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PREFACE.

I HAVE again the pleasure of acknowledging a grant of £100 from the British Association for the Advancement of Science, and a contribution of £100 from the Government Grant Fund of the Royal Society (the fifth contribution from that source): a sixth contribution, of £50, has also been voted by the Council of the Zoological Society of London, in aid of this undertaking.

I thank my fellow Recorders very sincerely for their continued co-operation.

The engagements of the Recorder of *Arachnida* and *Myriopoda* have prevented him from supplying his contributions at the usual period; and in the idea of not further delaying the publication of the present volume, the first of those groups has been omitted, and will be incorporated in the next issue. As to the *Myriopoda*, I have put together such notes as have occurred to me. Increasing engagements have also rendered it impossible for me to continue to record so many groups of the *Insecta* as heretofore; and Mr. W. F. Kirby of the British Museum has undertaken all of them but the *Coleoptera*, which, with the General Subject of *Insecta*, will in future also be recorded by him.

At the last Annual General Meeting of the ZOOLOGICAL RECORD ASSOCIATION, a Special Committee was appointed for the purpose of endeavouring to expedite the publication of the annual volume; and arrangements have been made, both as regards Contributors and Printers, which it is hoped will have the eventual effect of bringing out the Record of one year's work during the succeeding year. It is obvious that this cannot be effected at the first attempt, and the increasing bulk of the work must be considered with reference to the difficulty of earlier publication (the present volume, in spite of the omission of the *Arachnida*, being upwards of sixty pages longer than its predecessor). It is, however, confidently expected that the Record of 1879 will be published in the beginning of next year.

EDWARD CALDWELL RYE.

ROYAL GEOGRAPHICAL SOCIETY,
1, Savile Row, Burlington Gardens, London,
July, 1880.

Communications, Papers, and Memoirs intended for this work should be addressed *solely* to "THE EDITOR of the Zoological Record, care of Mr. Van Voorst, 1, Paternoster Row, London." It is earnestly requested that in the case of separately-printed copies of papers so forwarded the *original pagination* be indicated.

LIST OF THE

PRINCIPAL ABBREVIATED TITLES OF JOURNALS

QUOTED IN THIS VOLUME.

Abh. Ak. Berl.—Abhandlungen der k. Akademie der Wissenschaften zu Berlin.

Abh. bayer Ak.—Abhandlungen der mathematisch-physikalischen Classe der k. bayerischen Akademie der Wissenschaften (Munich).

Abh. schw. pal. Ges.—Abhandlungen der schweizerischen paläontographischen Gesellschaft (Bâle).

Abh. Ver. Brem.—Abhandlungen herausgegeben vom naturwissenschaftlischen Verein zu Bremen.

Abh. Ver. Hamb.—Abhandlungen aus dem Gebiete der Naturwissenschaften des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg.

Actes Soc. Helv.—Actes de la Société Helvétique des Sciences naturelles.

Am. J. Sci. (3)—American Journal of Science and Art. Third series (New Haven).

Am. Nat.—American Naturalist (Boston, U.S.A.).

Amtl. Ber. = *Ber. Vers. Naturf.*

Ann. Agric. Loire—Annales de la Société d'Agriculture, industrie, sciences, &c., du département de la Loire (St. Etienne).

Ann. Agric. Tor.—Annali della R. Accademia d'Agricoltura de Torino.

Ann. Ent. Belg.—Annales de la Société entomologique de Belgique (Brussels).

Ann. Lyc. N. York.—Annals of the Lyceum of Natural History of New York.

Ann. Mus. Genov.—Annali del Museo civico di Storia naturale di Genova.

Ann. Mus. Méx.—Anales del Museo Nacional de México.

Ann. N. H. (5).—Annals and Magazine of Natural History. Fifth series (London).

Ann. N. York Ac.—Annals of the New York Academy of Science.

Ann. Sci. Nat. (6)—Annales des Sciences Naturelles. 6me série (Paris).

Ann. Soc. Agric. Lyon—Annales de la Société d'Agriculture, Histoire naturelle, et Arts utiles de Lyon.

Ann. Soc. Ent. Fr. (5)—Annales de la Société entomologique de France. 5me série (Paris).

Ann. Soc. L. Lyon (*n. s.*)—Annales de la Société Linnéenne de Lyon. Nouvelle série.

Ann. Soc. Mod.—Annuario della Società dei Naturalisti di Modena.

An. Soc. Arg.—Anales cientificos Argentinos (Sociedad científica: Buenos Aires).

An. Soc. Esp.—Anales de la Sociedad Española de Historia Natural (Madrid).

Arb. Inst. Würzb. (2)—Arbeiten aus dem zoologisch-zootomischen Institut in Würzburg. Neue Folge.

Arb. z. Inst. Wien—Arbeiten des zoologischen Instituts in Wien.

Arch. Anat. Phys.—Archiv für pathologische Anatomie und Physiologie (Berlin).

Arch. f. Nat. (2)—Archiv für Naturgeschichte. Neue Folge (Berlin).

Arch. ges. Phys.—Archiv für die gesammte Physiologie des Menschen und der Thiere (Bonn).

Arch. Math. Naturvid.—Archiv för Mathematik og Naturvidenskab (Christiania).

Arch. mikr. Anat.—Archiv für mikroskopische Anatomie (Bonn).

Arch. Mus. Lyon—Archives du Muséum d'Histoire Naturelle de Lyon.

Arch. Mus. R. Jan.—Archivos do Museu Nacional do Rio de Janeiro.

Arch. Néerl.—Archives Néerlandaises des Sciences exactes et naturelles (The Hague).

Arch. Phys. (2)—Archives de Physiologie normale et pathologique. 2me série (Paris).

Arch. sci. nat.—Archives des sciences physiques et naturelles (Geneva).

Arch. Ver. Mecklenb.—Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg.

Arch. Z. expér.—Archives de Zoologie expérimentale et générale (Paris).

Assoc. Fr. = *Bull. Ass. Sci. Fr.*

Atti Acc. Linc. = *Atti Acc. Rom.*

Atti Acc. Nap.—Atti dell' Accademia di Scienze fisiche e mathematiche di Napoli.

Atti Acc. Palerm.—Atti della R. Accademia Palermitana delle scienze e lettere (Palermo).

Atti Acc. Rom.—Atti della R. Accademia dei Lincei (Rome).

Atti Acc. Tor.—Atti della R. Accademia delle Scienze di Torino (Turin).

Atti Ist. Venet.—Atti del R. Istituto Veneto di scienze, &c. (Venice).

Atti Soc. Ital.—Atti della Società Italiana di Scienze naturali (Modena).

Atti Soc. Pad.—Atti della Società Veneto-Trentina di Scienze naturali (Padua).

Atti Soc. Tosc.—Atti della Società Toscana di Scienze naturali residente in Pisa.

Ber. Berl. chem. Ges.—Bericht der deutschen chemischen Gesellschaft (Berlin).

Ber. offenb. Ver.—Bericht über die Thatigkeit des offenbacher Vereins für Naturkunde (Offenbach-o.-M.).

Ber. senck. Ges.—Bericht der senckenbergischen naturforschenden Gesellschaft (Frankfurt-o.-M).

Ber. Ver. Innsbr.—Berichte des naturwissenschaftlich-medicinischen Vereins, Innsbruck.

Ber. Ver. Pass.—Bericht des naturhistorischen Vereins in Passau.

Ber. Vers. Naturf.—Amtlich Bericht über die Versammlungen deutscher Naturforscher und Aertze.

Bibl. Univers. = *Arch. Sci. Nat.*

Bol. Ac. Cordoba.—Boletin de la Academia Nacional de Ciencias exactas existente en la Universidad de Cordoba.

Boll. Soc. Adr.—Bolletino dellà Societa Adriatica di Scienze naturali (Trieste).

Bull. Ac. Belg. (2)—Bulletin de l'Académie Royal des Sciences de Belgique. 2me série (Brussels).

Bull. Ac. Hipp.—Bulletin de l'Académie d'Hippone (Bône).

Bull. Ass. Sci. Fr.—Bulletin de l'Association française pour l'avancement des Sciences.

Bull. Ent. Ital.—Bullettino della Società Entomologica Italiana (Florence).

Bull. Ess. Inst.—Bulletin of the Essex Institute (Salem, U.S.A.).

Bull. Illin. Mus.—Bulletin of the Illinois Museum of Natural History (Bloomington).

Bull. mal. (2)—Bulletino malacologico Italiano. Serie seconda (Florence).

Bull. Mal. Belg.—Bulletin de la Société Malacologique de Belgique (Brussels).

Bull. Mosc.—Bulletin de la Société impériale des Naturalistes de Moscou.

Bull. Mus. C. Z.—Bulletin of the Museum of Comparative Zoology of Harvard College (Cambridge, U.S.A.).

Bull. Nutt. Orn. Club—Bulletin of the Nuttall Ornithological Club (Allen : Cambridge, U.S.A.).

Bull. Pétersb.—Bulletin de la classe physico-mathématique de l'Académie impériale des Sciences de St. Pétersbourg.

Bull. Sci. Nord—Bulletin scientifique, historique, et littéraire du Département du Nord et de pays voisins (Gosselet: Lille).

Bull. Soc. Acclim. (3)—Bulletin de la Société d'Acclimatation. 3me série (Paris).

Bull. Soc. Colm.—Bulletin de la Société d'Histoire Naturelle de Colmar.

Bull. Soc. Ent. Fr.—Bulletin des séances de la Société entomologique de France (Paris).

Bull. Soc. Géol. (3)—Bulletin de la Société géologique de France. 3me France (Paris).

Bull. Soc. Géogr. Fr. (6)—Bulletin de la Société de Géographie. 6me série (Paris).

Bull. Soc. L. N. Fr.—Bulletin mensuel de la Société Linnéenne du Nord de la France (Amiens).

Bull. Soc. mal. Ital.—Bullettino della Societa malacologica Italiana.

Bull. Soc. Mars.—Bulletin de la Société d'études des sciences naturelles de Marseille.

Bull. Soc. Nancy—Bulletin de la Société des Sciences de Nancy (Ancienne Société des Sciences Naturelles de Strasbourg). Paris and Nancy.

Bull. Soc. Neuch.—Bulletin de la Société des Sciences Naturelles de Neuchâtel.
Bull. Soc. Nimes—Bulletin de la Société d'étude des Sciences Naturelles de Nimes.
Bull. Soc. Philom.—Bulletin de la Société Philomathique de Paris.
Bull. Soc. Pyrén.—Bulletin de la Société agricole, scientifique, et littéraire des Pyrénés Orientales (Perpignan).
Bull. Soc. Reims—Bulletin de la Société d'histoire naturelle de Reims.
Bull. Soc. Toulouse—Bulletin de la Société d'histoire naturelle de Toulouse.
Bull. Soc. Vaud.—Bulletin de la Société Vaudoise des Sciences Naturelles (Lausanne).
Bull. Soc. Vétér.—Bulletin de la Société centrale de Médicine Vétérinaire (Paris).
Bull. Soc. Z. Fr.—Bulletin de la Société Zoologique de France (Paris).
Bull. U. S. Geol. Surv.—Bulletin of the United States Geological and Geographical Survey of the Territories (Washington).
Bull. U. S. Nat. Mus.—Bulletin of the United States National Museum (New York).

Canad. Ent.—Canadian Entomologist (Bethune : Montreal).
Canad. Nat.—Canadian Naturalist and Quarterly Journal of Science.
CB. Ver. Regensb.—Correspondenz-Blatt des zoologisch-mineralogischen Vereins in Regensburg (Ratisbon).
CB. Ver. Rheinl.—Correspondenz-Blatt des naturhistorischen Vereins der preussischen Rheinlande und Westphalens (Bonn).
Cincinn. J. Sci.—Cincinnati Quarterly Journal of Science (Miller).
Cist. Ent.—Cistula Entomologica (Janson : London).
C. R.—Comptes rendus des séances hebdomadaires de l'Académie des Sciences (Paris).
CR. Ent. Belg.—Comptes rendus des séances de la Société entomologique de Belgiques (Brussels).

Dan. Selsk. Skr.—K. Danske-Videnskabernes Selskabs Skrifter (Copenhagen).
Denk. Ak. Wien—Denkschriften der k. Akademie der Wissenschaften zu Wien (Vienna).
Deutsche E. Z.—Deutsche entomologische Zeitschrift (Kraatz : Berlin).

Ent.—The Entomologist (Newman : London).
Ent. M. M.—Entomologist's Monthly Magazine (Douglas, McLachlan, Rye, & Stainton : London).
Ent. Nachr.—Entomologische Nachrichten (Katter : Putbus).

Feuill. Nat.—Feuilles des jeunes Naturalistes (Mülhausen).
Forh. Selsk. Chr.—Forhandlinger i Videnskabs-Selskabet i Christiania.

Geogr. MT.—Mittheilungen aus Justus Perthes' geographischer Anstalt (Petermann : Gotha).
Geol. Mag.—Geological Magazine (Woodward : London).

Giorn. Sc. Palerm.—Giornale di scienze naturali ed economiche (Reale Istituto tecnico, Palermo).

Hor. Ent. Ross.—Horæ Societatis Entomologicæ Rossicæ (St. Petersburg).

Ibis—The Ibis (Salvin: London).

J. Anat. Phys.—Journal of Anatomy and Physiology (Humphry: London).
J. A. S. B.—Journal of the Asiatic Society of Bengal (Calcutta).
JB. ak. Gymn. Wien—Jahresbericht des k.-k. akademischen Gymnasium in Wien.
JB. Anat. Physiol.—Jahresberichte über die Fortschritte der Anatomie und Physiologie (Hofmann & Schwalbe: Leipzig).
JB. Comm. deutsch. Meere = JB. Komm. Kiel.—Jahresbericht der Kommission zur wissenschaftlichen Untersuchung der deutschen Meere in Kiel.
JB. f. Mineral.—Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie (Leonhard & Geinitz: Stuttgart).
JB. Frankf. Ver. Geogr.—Jahresbericht des Frankfurter Vereins für Geographie und Statistik.
JB. geol. Reichsanst.—Jahrbuch der k.-k. geologischen Reichsanstalt (Vienna).
JB. Ges. Graub.—Jahresbericht der naturforschenden Gesellschaft Graubündens (Coire).
JB. mal. Ges.—Jahrbuch der deutschen malakozoologischen Gesellschaft (Frankfort-o.-M.).
JB. nass. Ver.—Jahrbuch des nassauischen Vereins für Naturkunde (Wiesbaden).
JB. schles. Ges.—Jahresbericht der schlesischen Gesellschaft für vaterländische Cultur (Breslau).
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JB. Ver. Magd.—Jahresbericht des naturwissenschaftlichen Vereins zu Magdeburg.
JB. Ver. Zwickau — Jahresbericht des Vereins für Naturkunde zu Zwickau.
JB. zool. Sect. westf. Ver.—Jahresbericht der zoologischen Section für das Etatjahr 1877–78 des westfälischen provinzial-Vereins für Wissenschaft und Kunst (Münster).
J. Cincinn. Soc.—Journal of the Cincinnati Society of Natural History.
J. Cin. Soc. N. H.—(Ditto).
J. de Conch.—Journal de Conchyliologie (Paris).
J. de l'Anat. Phys.—Journal de l'Anatomie et de la Physiologie (Robin: Paris).
Jen. Z. Nat.—Jenaische Zeitschrift für Medecin und Naturwissenschaft (Leipzig).

J. f. O.—Journal für Ornithologie (Cabanis: Leipzig).
J. G. Soc.—Quarterly Journal of the Geological Society (London).
J. Imp. Educ. Inst. St. Petersb.—Journal of the Imperial Educational Institute of St. Petersburg.
J. Inst. Cornw.—Journal of the Royal Institution of Cornwall (Truro).
J. L. S.—Journal of the Linnean Society, Zoology (London).
J. Mus. Godeffr.—Journal des Museum Godeffroy; Geographische ethnographische und naturwissenschaftliche Mittheilungen (Hamburg).
J. Quek. Club.—Journal of the Quekett Microscopical Club (London).
J. R. Micr. Soc.—Journal of the Royal Microscopical Society (London).
J. Sc. Lisb.—Jornal de Sciencias da Academia de Lisboa (Lisbon).
J. Zool.—Journal de Zoologie (Gervais: Paris).

L'Ab.—L'Abeille (De Marsuel: Paris).
Leop.—Leopoldina (Dresden).
Lotos.—Lotos (Prague).

Mal. Bl.—Malakozoologische Blätter (Cassel).
MB. Ak. Berl.—Monatsberichte der k. Akademie der Wissenschaften zu Berlin.
Medd. Soc. Fenn.—Meddelanden af Societatis pro Fauna et Flora Fennica (Helsingfors).
Mél. biol.—Mélanges biologiques tirés du Bulletin de la Classe physico-mathématique de l'Académie impériale des sciences de St. Pétersbourg.
Mem. Ac. Bologn.—Memorie dell' Accademia di Scienze dell' Instituto di Bologna.
Mém. Ac. Montp.—Mémoires de l'Académie des sciences et lettres de Montpellier.
Mém. Ac. Sci.—Mémoires de l'Académie des Sciences (Paris).
Mem. Bost. Soc.—Memoirs of the Boston Society of Natural History.
Mém. Liége.—Mémoires de la Société Royale des Sciences de Liége.
Mém. Pal. Suisse.—Mémoires de la Société paléontologique Suisse (Zürich).
Mém. Pétersb. (7).—Mémoires de l'Académie impériale des Sciences de St. Pétersbourg. 7me série.
Mém. Soc. Biol.—Mémoires de la Société de Biologie (Paris).
Mém. Soc. Cherb. (3).—Mémoires de la Société des Sciences Naturelles de Cherbourg. 3me série.
Mém. Soc. Phys. Genèv.—Mémoires de la Société de Physique et d'Histoire naturelle de Genève.
M. Micr. J.—Monthly Microscopical Journal (London).
Moleschott's Untersuch.—Untersuchungen zur Naturlehre des Menschen und der Thiere (Moleschott: Frankfurt-o.-M.).
Morph. JB.—Morphologisches Jahrbuch: eine Zeitschrift für Anatomie und Entwickelungsgeschichte (Gegenbauer: Leipzig).
MT. aarg. Ges.—Mittheilungen der aargauischen naturforschenden Gesellschaft (Aarau).

MT. Ges. Bern.—Mittheilungen der naturforschenden Gesellschaft in Bern.

MT. Ges. Ostas.—Mittheilungen der deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens (Yokohama).

MT. Königsb. Lab.—Mittheilungen aus der Königsbergischen physiologischen Laboratoriums.

MT. Münch. ent. Ver.—Mittheilungen des Münchener entomologischen Vereins (Munich).

MT. Mus. Dresd.—Mittheilungen aus dem k. zoologischen Museum zu Dresden.

MT. orn. Ver. Wien—Mittheilungen des ornithologischen Vereins in Wien.

MT. schw. ent. Ges.—Mittheilungen der schweizerischen entomologischen Gesellschaft (Schaffhausen).

MT. Vorpomm.—Mittheilungen aus dem naturwissenschaftlichen Vereine von Neu-Pommern und Rügen (Greiswalde).

MT. z. Stat. Neap.—Mittheilungen der zoologischen Station in Neapel (Naples).

Nachr. Ges. Götting.—Nachrichten von der k. Gesellschaft der Wissenschaften zu Göttingen.

Nachr. mal. Ges.—Nachrichtsblatt der deutschen malakozoologischen Gesellschaft (Frankfort-o-M.).

N. Act. Ups.—Nova Acta R. Societatis scientiarum Upsaliensis.

N. Arch. Mus. (2).—Nouvelles Archives du Muséum d'Histoire Naturelle (2me série). Paris.

Nat. Canad.—Le Naturaliste Canadien (Provancher : Montreal).

Nat. Tids.—Naturhistorisk Tidsskrift (Schiödte : Copenhagen).

Nature.—Nature (London).

Neues lausitz. Mag.—Neues lausitzisches Magazin (Görlitz).

Niederl. Arch. Zool.—Niederländisches Archiv für Zoologie (Hoffmann ; Haarlem).

N. Mag. Naturv.—Nyt Magazin for Naturvidenskaberne (Sars & Kjerulf : Christiania).

N. Mém. Mosc.—Nouveaux Mémoires de la Société impériale des Naturalistes de Moscou.

Nouv. et faits—Nouvelles et faits divers (De Marseul : Paris).

Œfv. Ak. Forh.—Œfversigt af k. Vetenskaps Akademiens Förhandlingar (Stockholm).

Onderz. phys. Lab. Utrecht.—Onderzoekingen gedaan en het physiologisch Laboratorium der Utrechtsche Hoogeschool.

Orn. Centralbl.—Ornithologisches Centralblatt (Berlin).

Orn. Misc.—Ornithological Miscellany (Rowley : London and Brighton).

Overs. Dan. Selsk.—Oversigt over det k. Danske Videnskabernes Selskabs Skrifter (Copenhagen).

P. Ac. Philad.—Proceedings of the Academy of Natural Sciences of Philadelphia.

Palæontogr.—Palæontographica : Beiträge zur Petrefactenkunde (Cassel).
Pal. Ind.—Palæontologia Indica : Memoirs of the Geological Survey of India (Calcutta).
Pal. Soc.—[Publications of the] Palæontographical Society (London).
P. Am. Ac. (2).—Proceedings of the American Academy of Arts and Sciences. 2nd Series (Boston).
P. Am. Ass.—Proceedings of the American Association for the Advancement of Science.
P. Am. Phil. Soc.—Proceedings of the American Philosophical Society Philadelphia.
P. A. S. B.—Proceedings of the Asiatic Society of Bengal (Calcutta).
P. Belf. Soc.—Proceedings of the Belfast Society of Natural History.
P. Bost. Soc.—Proceedings of the Boston Society of Natural History.
P. Cal. Ac.—Proceedings of the California Academy of Sciences (San Francisco).
P. Chester Soc.—Proceedings of the Chester Society of Natural History.
P. E. Soc.—Proceedings of the Entomological Society of London.
P. Ess. Inst.—Proceedings and Communications of the Essex Institute (Salem).
Pet. Nouv.—Petites Nouvelles Entomologiques (Deyrolle : Paris).
P. Geol. Ass.—Proceedings of the Geologists' Association (London).
P. Glasg. Soc. = *P. N. H. Soc. Glasg.*
Phil. Tr.—Philosophical Transactions of the Royal Society (London).
P. Linn. Soc. N. S. W.—Proceedings of the Linnean Society of New South Wales (Sydney).
P. Liverp. Soc.—Proceedings of the Literary and Philosophical Society and Natural History Society of Liverpool.
P. N. H. Soc. Glasg.—Proceedings of the Natural History Society of Glasgow.
P. N.-Scot. Inst.—Proceedings and Transactions of the Nova-Scotian Institute of Natural Sciences (Halifax).
Pop. Sci. Rev.—Popular Science Review (Dallas : London).
P. R. Dubl. Soc.—Proceedings of the Royal Dublin Society.
P. R. Inst.—Proceedings of the Royal Institution (London).
P. R. Irish Ac. (2).—Proceedings of the Royal Irish Academy. Second Series. (Dublin.)
P. R. Phys. Soc. Edinb.—Proceedings of the Royal Physical Society of Edinburgh.
Prodr. Zool. Vict.—Prodromus of the Zoology of Victoria. (McCoy : Victoria).
P. R. Soc.—Proceedings of the Royal Society (London).
P. R. Soc. Edinb.—Proceedings of the Royal Society of Edinburgh.
P. R. Soc. N. S. W.—Proceedings of the Royal Society of New South Wales (Sydney).
P. R. Soc. Tasm.—Monthly Notices and Proceedings of the Royal Society of Tasmania (Hobarton).
Psyche.—Psyche : Organ of the Cambridge [U.S.A.] Entomological Club.
P. U. S. Nat. Mus.—Proceedings of the United States National Museum.

P. Z. S.—Proceedings of the Zoological Society (London).
Q. J. Conch.—Quarterly Journal of Conchology (London).
Q. J. Meteorol. Soc.—Quarterly Journal of Meteorological and Physical Science (London).
Q. J. Micr. Sci.—Quarterly Journal of Microscopical Science (London).

Rec. Geol. Surv. Ind.—Records of the Geological Survey of India (Calcutta).
Rend. Acc. Bologn.—Rendiconto dell' Accademia di scienze dell' Istituto di Bologna.
Rend. Acc. Nap.—Rendiconti dell' Accademia di scienze fisiche e matematiche (Naples).
Rend. Ist. Lomb.—Rendiconti del R. Istituto Lombardo di scienze, &c. (Milan).
Rep. & Tr. Plym. Inst.—Annual Report and Transactions of the [Plymouth Institution and] Devon and Cornwall Natural History Society.
Rep. Ass. Fr.—Compte rendu de l'Association Française pour l'avancement des Sciences.
Rep. Brit. Ass.—Report of the British Association for the Advancement of Science.
Rep. Devon. Ass.—Report and Transactions of the Devonshire Association for the Advancement of Science, &c. (Plymouth).
Rep. Dorset N. H. Club—Report of the Dorsetshire Natural History Club.
Rep. U. S. Geol. Surv.—Report of the United States Geological and Geographical Survey of the Territories (Hayden : Washington).
Rev. agric. Gers—Revue agricole et horticole du Gers (? Auch).
Rev. Int.—Revue Internationale des Sciences (Paris).
Rev. Montp.—Revue des Sciences Naturelles (Montpellier).
Rev. Sci.—Revue Scientifique (Paris).
R. Z. (3).—Revue et Magasin de Zoologie pure et appliquée. 3me série. (Guérin-Méneville : Paris).

SB. Ak. Wien—Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe der k. Akademie der Wissenschaften (Vienna).
SB. böhm. Ges.—Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften (Prague).
SB. Ges. Dorp.—Sitzungsberichte der Dorpater Naturforscher Gesellschaft (Dorpat).
SB. Ges. Isis.—Sitzungsberichte der naturwissenschaftlichen Gesellschaft 'Isis' (Dresden).
SB. Ges. Leipzig—Sitzungsberichte der naturforschenden Gesellschaft zu Leipzig.
SB. Nat. Fr.— Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin.
SB. Soc. Erlang.—Sitzungsberichte der physicalisch-medicinischen Societät (Erlangen).
SB. Ver. Rheinl.—Sitzungsberichte des naturhistorischen Vereins der preussischen Rheinlande und Westphalens (Budge : Bonn).

SB. z.-b. Wien—Sitzungsberichte der zoologisch-botanischen Gesellschaft in Wien (Vienna).
Schr. Ges. Danz.—Neueste Schriften der naturforschenden Gesellschaft zu Danzig.
Schr. Ges. Königsb.—Schriften der k. physikalisch-ökonomischen Gesellschaft in Preussen (Königsberg).
Schr. Ver. Schlesw. Holst.—Schriften des naturwissenschaftlichen Vereins für Schleswig-Holstein (Kiel).
Sci. Gos.—Science Gossip (Taylor: London).
Scot. Nat.—The Scottish Naturalist (White: Perth).
S. E. Z.—Stettiner entomologische Zeitung (Dohrn: Stettin).
Sm. Misc. Coll.—Smithsonian Miscellaneous Collections (Washington).
Sprawozd. Kom. fizyogr.—Sprawozdanie Komisyi fizyograficznéj (Cracow).
Str. Feath.—Stray Feathers (Calcutta).
Sv. Ak. Handl.—K. Svenska Vetenskaps Akademiens Handlingar (Stockholm).

TB. Vers. Naturf.—Tagblatt der Versammlung der deutschen Naturforscher und Aerzte (Cassel).
Term. füzetek.—Természetrajzi füzetek az állat-, növény-, ásvány-, és Földtan Köréből (= Naturhistorische Hefte: Vierteljahrsschrift für Zoologie, Botanik, Mineralogie, und Geologie). Pesth.
Term. közl.—Természettudományi Közlemének (Pesth).
Tijdschr. Ent.—Tijdschrift voor Entomologie (The Hague).
Tijdschr. Nederl. Dierk. Ver.—Tijdschrift der Nederlandsche Dierkundige Vereeniging (The Hague and Rotterdam).
Tijdschr. Nederl. Ind.—Natuurkundig Tijdschrift voor Nederlandsch Indië (Bleeker: Batavia).
Tr. Ac. St. Louis.—Transactions of the Academy of Sciences of St. Louis.
Tr. Am. Ent. Soc.—Transactions of the American Entomological Society (Philadelphia).
Tr. Devon. Ass.—Report and Transactions of the Devonshire Association for the Advancement of Science (Plymouth).
Tr. E. Soc.—Transactions of the Entomological Society of London.
Tr. L. S. (2)—Transactions of the Linnean Society: Zoology (2nd series). London.
Tr. North. Dur.—Natural-History Transactions of Northumberland and Durham (Newcastle-upon-Tyne).
Tr. Norw. Soc.—Transactions of the Norfolk and Norwich Naturalists' Society (Norwich).
Tr. N. Z. Inst.—Transactions and Proceedings of the New Zealand Institute (Wellington).
Troudy Ent. Ross. = Transactions of the Russian Entomological Society (St. Petersburg).
Tr. R. Irish Ac.—Transactions of the Royal Irish Academy (Dublin).
Tr. Wiscons. Ac.—Transactions of the Wisconsin Academy of Sciences, Arts, and Letters (Madison).
Tr. Z. S.—Transactions of the Zoological Society (London).

Untersuch. Inst. Heidelb.—Untersuchungen des physiologischen Instituts in Heidelberg.

Verh. Ak. Amst.—Verhandelingen der koninklijke Akademie van Wetenschappen (Amsterdam).
Verh. Ges. Bas.—Verhandlungen der naturforschenden Gesellschaft in Basel (Bâle).
Verh. Ges. Freib.—Verhandlungen der naturforschenden Gesellschaft in Freiburg.
Verh. Ges. Würzb. (2)—Verhandlungen der physikalisch-medicinischen Gesellschaft in Würzburg. Neue Folge.
Verh. phys. Ges. Berl.—Verhandlungen der physalischen Gesellschaft in Berlin.
Ver. siebenb. Ver.—Verhandlungen und Mittheilungen des siebenbürgischen Vereins für Naturwissenschaften (Hermannstadt).
Verh. Ver. Brünn—Verhandlungen des naturforschenden Vereins in Brünn.
Verh. Ver. Homb.—Verhandlungen des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg.
Verh. Ver. Rheinl.—Verhandlungen des naturhistorichen Vereins der preussichen Rheinlande und Westphalens (Budge: Bonn).
Verh. z.-b. Wien—Verhandlungen der zoologisch-botanischen Gesellschaft in Wien (Vienna).
Versl. Ak. Amst.—Verslagen en Mededeelingen der k. Akademie van Wetenschappen (Amsterdam).
Veter.—The Veterinarian (London).
Veter. Journ.—The Veterinary Journal (London).
Vid. Medd.—Videnskabelige Meddelelser fra den Naturhistoriske Forening (Copenhagen).
Viert. Ges. Zürich.—Vierteljahrsschrift der naturforschenden Gesellschaft, Zürich.

Z. E. Ver. schles.—Zeitschrift für Entomologie des Vereins für schlesische Insektenkunde (Breslau).
Z. Ferd.—Zeitschrift des Ferdinandeums (Innsbruck).
Z. geol. Ges.—Zeitschrift der deutschen geologischen Gesellschaft (Berlin).
Z. Ges. Erdk.—Zeitschrift der Gesellschaft für Erdkunde (Koner: Berlin).
Z. ges. Naturw. (2)—Zeitschrift für die gesammten Naturwissenschaften Neue Folge (Giebel: Berlin).
Zool. Anz.—Zoologischer Anzeiger (Carus: Leipzig).
Zool. Gart.—Der zoologische Garten (Weinland, Bruch, & Noll: Frankfort-o.-M.).
Zool. Rec.—Zoological Record (Rye: London).
Zool. (3)—The Zoologist. Third Series (Harting: London).
Z. wiss. Zool.—Zeitschrift für wissenschaftliche Zoologie (Siebold & Kölliker: Leipzig).

ERRATA.

AVES.

P. 35, line 8, for "*Ninox spinocephala*," read "*N. spiocephala*"; also for "p. 940," read "p. 939."
P. 35, line 18, for "*Pseudotynx*," read "*Pseudoptynx*."
P. 35, line 23, for "p. 493," read "p. 942."
P. 39, TROCHILIDÆ, for "*Arinia boucardi*, sp. n.," read "*Arinia boucardi*, g. & sp. nn."
P. 40, line 4, for "p. 984, read "p. 944."
P. 56, line 24, transfer *Gallinago gallinaria* from CHARADRIIDÆ to SCOLOPACIDÆ.

REPTILIA.

P. 13, line 2, for "J. Anat. Phys.," read "J. de l'Anat. Phys."

PISCES.

P. 3, line 8, to "J. de l'Anat." add "Phys."
P. 29, transfer PHYSOSTOMI to p. 26, above *Siluridæ*.
P. 37, line 2, for "*Ammocœtes*," read "*Ammocœtes*."

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ZOOLOGICAL RECORD

FOR 1878.



MAMMALIA.

BY

EDWARD RICHARD ALSTON, F.L.S., F.Z.S., &c.

DOBSON'S exhaustive "Catalogue of the Chiroptera" [p. 3], the first parts of Elliot's magnificently illustrated "Monograph of the *Felidæ*" [p. 4], and Feilden's appendices to Nares's "Voyage to the Polar Sea" [p. 6], may be specially noticed among the separate works published in 1878. Attention may also be directed to Allen's views on geographical distribution [p. 2], to the palæontological labours of Rütimeyer [p. 19] and Lydekker [p. 17], to Cope's descriptions of New Mexican fossil Mammals [p. 3], and to his further elaboration of his groups of "Bunotheria" and "Amblypoda" [pp. 12, 16]. Harting has described the hitherto unknown placentation of the *Sirenia* [p. 5]. Brooke has revised the arrangement of the *Cervidæ* [p. 18], and Trouessart has begun the publication of what promises to be a very useful general catalogue of Mammals [p. 8]. Of the various orders, the *Chiroptera* and *Artiodactyla* appear to have attracted more attention than any of the others.

THE GENERAL SUBJECT.

ADAMS, A. LEITH. (Abridgment.) Report on the History of Irish Fossil Mammals. P. R. Irish Ac. (2) iii. pp. 89–100.

Remains of 10 species have been found, of which 7 are now extinct; it is considered probable that the early Mammals entered Ireland from South-Western Scotland.

[Adams, A. Leith.] The Recent and Extinct Irish Mammals. P. R Soc. Dubl. 1878, pp. 1–42, pls. i.–v.

Includes 41 recent species, of which 10 are marked as either "doubtful" or "introduced."

Allen, J. A. The Geographical Distribution of the Mammalia, considered in relation to the principal Ontological Regions of the Earth and the Laws which govern the Distribution of Animal Life. Bull. U. S. Surv. Terr. iv. pp. 313–378.

Rejects Sclater's six regions and divides the world into eight "realms," viz. :—I., Arctic; II., North Temperate (with 2 regions and 8 provinces); III., American Tropical (3 regions); IV., Indo-African (2 regions, 5 provinces); V., South-American Temperate (2 provinces); VI., Australian (3 regions, 2 provinces); VII., Lemurian; VIII., Antarctic. The distribution of life on the globe is held to be "co-ordinated with climatic zones," and the argument is illustrated by tables of Mammalian genera.

——. [See *Sciuridæ*.]

Alston, E. R. [See *Sciuridæ*, *Phalangistidæ*].

Anderson, J. List of Animals in the Zoological Gardens, Calcutta. (1st ed.) Calcutta, 1877; (2nd ed.) Calcutta, 1878; 8vo, 73 pp.

In 1878 no less than 153 species of Mammalia were represented, although the Garden had been little more than two years in existence.

Ball, V. Notes on certain Mammals occurring in the basin of the Máhanadi. P. A. S. B. 1877, pp. 168–172.

Bigg-Wither, T. P. Pioneering in South Brazil. Three Years of Forest and Prairie Life in the Province of Paraná. London, 1878: 2 vols. 8vo, pp. 378, 328.

Contains many interesting scattered notes of the Mammals of the country.

Blanford, W. T. On some Mammals from Tenasserim. J. A. S. B. xlvii. pt. 2, pp. 150–167, pls. vi.–viii. (Abstract P. A. S. B. 1878, p. 93.)

Notes on 14 species, 2 of which are new [*Viverridæ*, *Sciuridæ*].

——. [See *Erinaceidæ*.]

Brandt, A. Brevis enumeratio Operum ad Faunam mammalium et avium Imperii Rossici pertinentium. J. Imp. Educ. Inst. St. Petersb., 1877. [Also separately issued, 8vo, pp. 22.]

Enumerates all known works and papers on Russian Mammals and Birds, giving Latin translations of the titles of those which are published in Russian.

——, J. F. [See *Rhinocerontidæ*.]

Bronn, H. G. [See Giebel, C. G.]

Brooke, V. [See *Cervidæ*, *Bovidæ*.]

Brühl, —. Zootomie aller Thierklassen. i. Vienna: 1877.

[Not seen by the Recorder; *cf.* Arch. f. Nat. 1878, ii. p. 81].

Cope, E. D. Report upon the Extinct Vertebrata obtained in New Mexico by parties of the Expedition of 1874. Wheeler's Rep Surv. W. of 100th Mer., iv. [1877], pt. 2, pp. 72-370, pls. xxxiii.–lxxxiii.

In this important memoir many of the remarkable Eocene and Miocene forms already briefly characterized by the author are fully described and figured. [See "*Bunotheria*" (p. 12), *Carnivora*, *Proboscidea*, *Perissodactyla*, *Artiodactyla*, and *Glires*.]

——. Descriptions of New Extinct Vertebrata from the Upper Tertiary and Dakota Formations. Bull. U. S. Surv. Terr. iv. pp. 379–396.

Includes some new genera and species of fossil Mammals [*Rhinocerontidæ*, *Oreodontidæ*, *Cervidæ*, *Camelidæ*, *Glires* (*gen. incert. sed.*), *Bradypodidæ*].

Coues, E., & Yarrow, H. C. Notes on the Natural History of Fort Macon, N.C., and Vicinity (No. 4). Mammals. P. Ac. Philad. 1878, pp. 21 & 22.

Supplementary notes to Coues's former paper [*cf.* Zool. Rec. ix. p. 5].

Creighton, C. On the formation of the Placenta in the Guinea-Pig. J. Anat. Phys. xii. pp. 534–590, pls. xix. & xx.

Cunningham, D. J. Nerves of the Fore-limb of the Thylacine and Cuscus. J. Anat. Phys. xii. pp. 427–433.

——. Intrinsic Muscles of the Hand of the Thylacine, Cuscus, and Phascogale. *Tom. cit.* pp. 434–444.

——. Intrinsic Muscles of the Mammalian Foot. *Op. cit.* xiii. pp. 1–16.

These papers contain details of the myology and neurology of the manus and pes in Mammals, and especially in the Marsupials.

Davies, W. On a Collection of Pleistocene Mammals dredged off the Eastern Coast [of England]. Geol. Mag. 1878, pp. 97–100, 443 & 444, pl. xii.

Dawkins, W. Boyd. British Pleistocene Mammalia. Part A. Preliminary Treatise on the Relation of the Pleistocene Mammalia to those now living in Europe. (Pp. i.–xxxviii.) Pal. Soc. xxxii.

An introduction to the chapters of this work which have already been published by the Palæontological Society.

——. [See *Cervidæ*.]

——. [See Duncan, P. M.]

Dobson, J. E. Catalogue of the Chiroptera in the Collection of the British Museum. London: 1878, 8vo, pp. 567, pls. xxx.

A complete monograph of the order, all the known forms being included, and the families, genera, species, and varieties fully described. 400 species are recognized, of which 17 are new (*Pteropodidæ*, *Nycteridæ*, *Vespertilionidæ*, *Phyllostomidæ*).

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This important memoir [*cf.* Zool. Rec. xiv. *Mamm.* p. 3] is now published in full, and illustrated by 289 figures of Mammalian auditory ossicles.

Duncan, P. M. Cassell's Natural History. Vol. II. London: 1878, 4to, pp. 360.

The second volume of this popular work [*cf.* Zool. Rec. xiv. *Mamm.* p. 3] contains the account of the *Carnivora Pinnipedia*, *Cetacea*, and *Sirenia*, by J. Murie; *Carnivora Fissipedia*, by W. K. & T. J. Parker; and *Proboscidea*, *Hyracoidea*, *Perissodactyla*, and *Suina*, by W. B. Dawkins and H. W. Oakley.

Eberhardt, A. Ueber die Kerne der rothen Blutkörperchen der Säugethiere und des Menschen. Königsberg: 1877, 8vo, pp. 30.

On the nuclæi of the blood-corpuscles in Mammals. [Not seen by the Recorder; *cf.* Zool. Anz. 1878, p. 358].

Elliot, D. G. A Monograph of the *Felidæ*, or Family of the Cats. Parts I.–III. London and New York, roy. fol.

A magnificently illustrated work, the coloured plates being lithographed by J. Smit from drawings by J. Wolf [cf. *Felidæ*].

Ercolani, G. B. Recherches anatomiques sur l'unité de type du placenta dans les Mammifères et dans l'espèce humaine. Mem. Ac. Bologn. 1876.

[Not seen by the Recorder; *cf.* Arch. f. Nat. 1878, ii. p. 85.]

Feilden, H. W. [See Nares, G. S.]

Filhol, H. Sur les Vertébrés fossiles des dépôts des phosphates de chaux du Quercy. Bull. Soc. Philom. (6) xi. 1874, pp. 16–20 [publ. 1877 ?].

——. Considérations sur la découverte de quelques Mammifères appartenant à l'époque Eocène supérieure. *Op. cit.* (7) i. 1877, pp. 51–54.

Further notes on the Mammalian remains of these deposits, which are regarded as Upper Eocene and Lower Miocene, several genera and many species being indicated as new [*Talpidæ*, *Felidæ*, *Viverridæ*; *Equidæ Anoplotheriidæ*, *Suidæ*, *Palæotheriidæ*].

Flower, W. H. [See *Physeteridæ*, *Rhinocerontidæ*.]

Garrod, A. H. [See *Cercopithecidæ*, *Carnivora*, *Canidæ*, *Viverridæ*, *Rhinocerontidæ*, *Cervidæ*, *Dasypodidæ*.]

Gaudry, A. Les Enchainements du Monde Animal dans les Temps Géologiques; Mammifères Tertiaires. Paris: 1878, 8vo, pp. 293.

A popular summary of the light which the remains of the Mammals of the Tertiary epoch throw upon the theory of evolution, largely illustrated with excellent woodcuts.

Giebel, C. G. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. vi. Abth. v. Mammalia. Nos. 17–20. Leipzig and Heidelberg: 1878, 8vo, pp. 305–416, pls. lxii.–lxxi.

Entirely occupied with the continuation of the description of the skeleton [*cf.* Zool. Rec. xiv. *Mamm.* p. 4].

——. Ueber die am Oberarm der Säugethiere forkommenden Perforationen. Z. ges. Naturw. li. pp. 853–855.

Brief observations on the perforations of the humerus in certain Mammals.

Greenwood, F. [See Miall, L. C.]

Gundlach, J. Apuntes para la Fauna Puerto-Riqueña. Mamíferos. An. Soc. Esp. vii. pp. 139–141.

Four Bats and three introduced species of *Mus* are the only Mammals of Porto Rico.

Harting, P. Het Ei en de Placenta van *Halicore dugong*. Utrecht: 1878, 8vo, pp. 59. [Not seen by the Recorder.] Abstracts: J. Anat. Phys. xiii. p. 116; Tijd. Nederl. Dierk. Ver. iv. pp. 1–29, pls. i. & ii.

A thesis in Dutch, with a French translation, describing for the first time the ovum and fœtal membranes of a Sirenian. The placenta of *Halicore* is diffuse and non-deciduate.

Heldreich, T. de. La Faune de Grèce. Athens: 1878, 4to, pp. 113.

Thirty-eight species of Mammals are briefly treated of at pp. 5–26.

Heuglin, M. T. v. Reise in Nordost-Afrika. Schilderungen aus dem Gebiete der Beni Amer und Habab, nebst zoologischen Skizzen. Braunschweig: 1877, 8vo, 2 vols. pp. 285, 394. [Mammalia, ii. pp. 1–140.]

[Omitted from Zool. Rec. xiv.] Contains observations on the Mammals of the country, many being described as new [*Rhinolophidæ*, *Vespertilionidæ*, *Emballonuridæ*, *Sciuridæ*, *Muridæ*, *Spalacidæ*, *Bovidæ*].

Hönigschmeid, J. Kleine Beiträge zur Vertheilung der Geschmacksknospen bei den Säugethieren. Z. wiss. Zool. xxix. [1877] pp. 255–262.

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These valleys are regarded as forming a boundary between the Tibetan and Himalayan sub-regions.

——. [See *Artiodactyla*.]

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Similar in plan to the author's previous work on the Invertebrates. The Mammals are treated of at pp. 199–344, the orders and families being characterized, with references to the principal genera.

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Notes on 33 species, with many measurements of fresh specimens, annotated by E. Coues.

Maisonneuve, P. [See *Chiroptera*.]

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Miall, L. C., & Greenwood, F. Studies in Comparative Anatomy; No. II. Anatomy of the Indian Elephant. London: 1878, 8vo, pp. 84, pls. iv. [Cf. *infrà*, p. 18.]

Mihalkovics, — v. Entwicklungsgeschichte des Gehirns, nach Untersuchungen an höheren Wirbelthieren und dem Menschen. Leipzig: 1877.

[Observations on the development of the brain. Not seen by the Recorder; *cf.* Arch. f. Nat. 1878, ii. p. 82.]

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Describes two new genera and four new species [*Cercopithecidæ*, *Sciuridæ*, *Muridæ*].

Murie, J. [See Duncan, P. M.]

Nares, G. S. Narrative of a Voyage to the Polar Sea, during 1875-6, in H.M. Ships 'Alert' and 'Discovery.' With Notes on the Natural History, edited by H. W. Feilden. London: 1878, 2 vols. 8vo, pp. 395, 378.

Besides scattered notices, the Mammals are treated of by H. W. Feilden, vol. ii. Appendix, pp. 192–205, the author's previous notes [*cf.* Zool. Rec. xiv. *Mamm.* p. 3] being revised and extended.

Norgate, F. Notes on Norfolk Mammals. Tr. Norw. Soc. ii. pp. 458–470. [See *Talpidæ*].

Oakley, H. W. [See Duncan, P. M.].

Owen, R. [See *Artiodactyla*, *Macropodidæ*.]

Parker, A. J. Vegetative Repetition of Cerebral Fissures. P. Ac. Philad. 1878, pp. 148–153.

——. The Bridging Convolutions in the Primates. *Tom. cit.* pp. 159–162.

In these papers the relationships and homologies of the principal cerebral convolutions and fissures are discussed.

——, T. J. [See Duncan, P. M.]

——, W. K. [See Duncan, P. M.]

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A list of 45 species of East African Mammals, with localities and some native names; 8 are described as new. [*Rhinolophidæ*, *Emballonuridæ*, *Macroscelididæ*, *Muridæ*.]

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Reinhardt, J. [See *Bradypodidæ*.]

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[The latter not seen by the Recorder; *cf.* Zool. Anz. 1879, p. 76.]

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Sanderson, G. P. Thirteen Years among the Wild Beasts of India. London: 1878, 8vo, pp. 387, pls. xxiv.

Contains valuable field-notes on the larger Indian Mammals, and especially on the Elephant.

Schmidt, M. Die Lebensdauer der Thiere in Gefangenschaft. Säugethiere. Zool. Gart. 1878, pp. 1–8.

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Contains a few remarks on the Mammals of these Islands.

Théel, H. Rapport sur l'Expédition de Sibérie. Upsala: 1877, 8vo, pp. 64.

Contains notices of the Mammals met with by the Swedish Expedition to Northern Siberia in 1876.

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Trouessart, E. L. Catalogue des Mammifères Vivants et Fossiles. *Simiæ*, *Prosimiæ*. R. Z. (3) vi. pp. 108–140, 162.

The beginning of a general catalogue of recent and extinct Mammals, on the model of Gray's "Hand-list of Birds," but with fuller synonymy and indications of geographical distribution. The arrangement adopted is modified from those of Milne-Edwards and Cope [cf. *infrà*, p. 12], and the parts already published include the orders *Bimana*, *Simiæ*, *Prosimiæ*.

Trutat, E. Catalogue des Mammifères des Pyrénées. Bull. Soc. Toul. 1878, pp. 95–122, 2 pls.

A list of 58 species (of which 7 are Cetaceans) with notes on their distribution and characters.

Turner, W. On the Placentation of the Apes, with a comparison of the Structure of their Placenta with that of the Human Female. Phil. Trans. 1878, pp. 523–562, pls. xlviii. & xlix.; [abstract], P. R. S. 1878, pp. 271 & 272; J. Anat. Phys. xii. p. 495.

Summarizes former observations, compares the uterus and fœtal membranes of *Macacus* with those of *Homo*, and shows that they closely resemble one another.

——. [See *Cercopithecidæ*, *Cervidæ*.]

Wallace, A. R. Tropical Nature, and other Essays. London: 1878, 8vo, pp. 356.

Essays on tropical biology, on evolution, and on geographical distribution, in which are many observations on Mammals.

Watson, M. [See *Hyænidæ*, *Cervidæ*, *Dasypodidæ*.]

Yarrow, H. C. [See Coues, E.]

FAUNÆ.

America, United States of. [See Coues, E.; McChesney, C. E.; and Yarrow, H. C.]

Africa, East and North-east. [See Peters, W.; and Heuglin, M. J. v.]

Arctic Regions. [See Feilden, H. W.; and Nares, G. S.]

Eastern Archipelago. [See TEIJSMANN, J. E.]
England. [See NORGATE, F.]
France. [See TRUTAT, E.]
Greece. [See HELDREICH, T. DE.]
India. [See BALL, V.; LYDEKKER, R.]
Ireland. [See ADAMS, A. LEITH.]
Porto Rico. [See GUNDLACH, J.]
Tenasserim. [See BLANFORD, W. T.]

MONODELPHIA.

PRIMATES.

A. E. BROWN records experiments showing the instinctive fear which Monkeys have for Snakes. Am. Nat. xii. pp. 125–128, 554–556.

J. CHATIN discusses the anatomy of the nostrils in this order. Rep. Ass. Fr. 1877, p. 793 *et seq.* [Not seen by the Recorder; *cf.* Arch. f. Nat. 1878, ii. p. 83.]

W. GRUBER finds the *musculus peroneo-tibialis* to be present in all the genera of *Quadrumana* which he has examined. Bull. Pétersb. xxv. p. 97.

SIMIIDÆ.

BOLAU, H., & PANSCH, A. Die menschenähnlich Affen des Hamburger Museums. Th. i. Abh. Verh. Hamb. 1876, pp. 63–80, pls. A & B.

General notes on the Gorilla, with descriptions of visceral and cerebral anatomy, and photographs of the head and brain.

Simia satyrus. On its habits in captivity: M. Schmidt, Zool. Gart. 1878, pp. 193–198, 225–233, 266–270, 329–331, 357–359.

Gorilla savagei. On its brain; W. v. Bischoff, Morph. JB. iv. Suppl. pp. 59–73. On its osteology; C. Aeby, *tom. cit.* pp. 288–313. On its anatomy, and especially its myology; H. C. Chapman, P. Ac. Philad. 1878, pp. 385–394, pls. iii. & iv. Further observations on the Berlin Gorilla [*cf.* Zool. Rec. xiv. *Mamm.* p. 9]; O. Hermes, Zool. Gart. 1878, pp. 90–92.

Gorilla mayema, sp. n., Allix & Bouvier, C. R. lxxxvi. p. 58, Congo; *cf.* Ann. N. H. (5) i. pp. 422 & 423.

CERCOPITHECIDÆ.

Semnopithecus germani, sp. n., A. Milne-Edwards, Bull. Soc. Philom. (6) xi. 1877, p. 8, Cochin China and Cambogia.

Macacus cynomolgus. Note on its breeding with *Cercocebus fuliginosus* and *Cynocephalus mormon* in confinement; A. H. Garrod, P. Z. S. 1878, p. 791. On a gravid uterus and placenta; W. Turner, Phil. Trans. 1878, pp. 523–562, pls. xlviii. & xlix.; [abstr.], P. R. S. pp. 271 & 272: J. Anat. Phys. xii. p. 495.

Cebidæ.

Ateles variegatus. Note on its variability in coloration; A. Milne-Edwards, N. Arch. Mus. (2) i. pp. 162–166.

Pithecia. On the skull and dentition of various species; C. G. Giebel, Z. ges. Naturw. li. pp. 401–405, pls. xiv. & xv.

Hapalidæ.

Midas tripartitus, sp. n., A. Milne-Edwards, N. Arch. Mus. (2) i. p. 160, pl. iii., Ecuador.

LEMURES.

Indrisidæ.

Propithecus. Notes on the characters of the species; C. G. Giebel, Z. ges. Naturw. l. [1877] pp. 314–316.

CHIROPTERA.

G. E. Dobson in his "Catalogue" (*cf. suprà*, p. 3) follows the arrangement adopted in his "Conspectus" [Zool. Rec. xii. p. 7], fully describes all the groups, species, and varieties, gives analytical synopses of genera and species, and figures the heads, skulls, and dentition of many forms. He has also published additional notes on Bats from New Britain and the vicinity; *Pteropus albo-scapulatus*, Ramsay, = *Melonycteris melanops*, Dobson [*cf.* Zool. Rec. xiv. *Mamm.* p. 10]; P. Z. S. 1878, pp. 314–318. Also observations on recent additions to the Paris Museum, with descriptions of new and rare species [infrà, *Pteropodidæ*, *Emballonuridæ*, *Phyllostomidæ*]; P. Z. S. 1878, pp. 873–880.

P. Maisonneuve exhaustively describes the osteology and myology of *Vespertilio murinus*, Schreb., in his "Thèses présentées à la Faculté des Sciences de Poitiers," Paris: 1878, 8vo, pp. 324, pls. ix.

Pteropodidæ.

Pteropus rodricensis (p. 36, Rodriguez), *P. brunneus* (p. 37, Percy Island [E. Australia]), *P. pteronotus* (p. 48, Java, = *Eunycteris phaiops* Gray, pt.), *P. fuscus* (p. 59, Celebes), spp. nn.; G. E. Dobson, Cat. Chiropt.

Pteropus germaini, sp. n., G. E. Dobson, P. Z. S. 1878, p. 874, New Caledonia.

Cynopteris torquata (p. 76, Angola, = *C. collaris*, Gr., *nec* Geoff.), *C. latidens* (p. 86, Malay Archipelago), spp. nn., G. E. Dobson, Cat. Chiropt.

Cephalotus minor, sp. n., G. E. Dobson, P. Z. S. 1878, p. 875, New Guinea.

Rhinolophidæ.

Rhinolophus macrocephalus, sp. n., M. T. v. Heuglin, Nord-ost-Af. ii. p. 22, N. E. Africa.

Rhinolophus hildebrandti, sp. n., W. Peters, MB. Ak. Berl. 1878, p. 195, pl. i. fig. 1, East Africa.

Nycteridæ.

Nycteris æthiopica, sp. n., G. E. Dobson, Cat. Chiropt. p. 165, N. E. Africa.

Vespertilionidæ.

Myxopoda, g. n., A. Milne-Edwards, Bull. Soc. Phil. (7) ii. p. 1. With adhesive pads on the thumbs and feet, and three phalanges in the third digit. Type, *M. aurita*, sp. n., *l. c.*, Madagascar. *Cf.* G. E. Dobson, P. Z. S. 1878, pp. 871–873.

Vesperugo indicus (p. 222, India), *V. maderensis* (p. 231, Madeira and Canaries), spp. nn., G. E. Dobson, Cat. Chiropt. *V. fuscus* (Beauv.) = *V. serotinus* (Schreb.) ; *id. tom. cit.* p. 193.

Vesperugo leisleri. Its occurrence in Piedmont ; Lessona, Atti Acc. Tor. xiv. pp. 215 & 216.

Nycticeius serratus, sp. n., M. T. Heuglin, Nord-ost. Afr. ii. p. 35, N. E. Africa.

Vespertilio insularum (p. 313, Navigator's Islands), *V. australis* (p. 317, N. S. Wales), spp. nn., G. E. Dobson, Cat. Chiropt.

Kerivoula brunnea (p. 334, habit. incert.), *K. africana* (p. 335, Zanzibar), *K. papuensis* (p. 339, New Guinea), spp. nn., G. E. Dobson, *tom. cit.*

Emballonuridæ.

Emballonura raffrayana, sp. n., G. E. Dobson, P. Z. S. 1878, p. 876, Gilolo Island [Moluccas].

Noctilio leporinus. On its pelvis; C. G. Giebel, Z. ges. Naturw. li. p. 339.

Rhinopoma cordofanicum, sp. n., M. T. v. Heuglin, Nord-ost-Afr. ii. p. 24, N.E. Africa.

Mormopterus setiger, sp. n., W. Peters, MB. Ak. Berl. 1878, p. 196, pl. i. fig. 2, East Africa.

Phyllostomatidæ.

Chilonycteris psilotis, sp. n., G. E. Dobson, Cat. Chiropt. p. 451, habitat uncertain.

Schizostoma brachyote, sp. n., G. E. Dobson, P. Z. S. 1878, p. 880, Cayenne.

Chiroderma salvini, sp. n., G. E. Dobson, Cat. Chiropt. p. 532, Costa Rica.

INSECTIVORA.

Erinaceidæ.

Erinaceus niger, sp. n., W. T. Blanford, J. A. S. B. xlvii. pt. 2, p. 212, pl. ix., Arabia.

Macroscelididæ.

Macroscelides rufescens, sp. n., W. Peters, MB. Ak. Berl. 1878, p. 198, i. fig. 3, East Africa.

Talpidæ.

Talpa europæa. On its breeding habits, and on varieties in colour; F. Norgate, Tr. Norw. Soc. ii. pp. 461–464.

Amphidozotherium, g. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) i. 1877, p. 51. Allied to *Urotrichus*, but differing in dentition. Type, *A. cayluxi*, sp. n., *id. l. c.*, Eocene of Quercy.

Neurogymnurus and *Protalpa*, gg. nn. (foss.), *id. tom. cit.* p. 52. Allied to *Gymnurus* and *Talpa*. Types, *N. cayluxi* and *P. cadurcensis*, spp. nn., *id. l. c.*, Eocene of Quercy.

Soricidæ.

Crocidura manni, sp. n., W. Peters, SB. nat. Fr. 1878, p. 19, West Africa.

"BUNOTHERIA."

E. D. Cope gives detailed descriptions and figures of the remains on which this proposed order [*cf.* Zool. Rec. xiii. *Mamm.* p. 12] is founded; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877) pt. 2, pp. 72–170, pls. xxxiii.–xlv. It is regarded as being now represented by the *Insectivora*; the *Creodonta* were probably the ancestors of the Carnivores, and *Mesodonta* of the Lemurs; while the *Tillodonta* present affinities with the Rodents, and the *Taniodonta* with the Edentates. *Stypolophus hians* (p. 118), *Tomitherium tatum* (p. 141), and *Opisthotomus astutus* and *O. flagrans* (p. 152), spp. nn., Eocene of New Mexico.

CARNIVORA.

A. H. Garrod remarks on the affinities of the families of Fissiped *Carnivora* as indicated by the convolutions of their brains; P. Z. S. 1878, pp. 376 & 377.

Felidæ.

D. G. Elliot, in his "Monograph of the *Felidæ*" [cf. *suprà*, p. 4], considerably reduces the number of described species, with full notes on synonymy, range, &c. He figures *F. onca*, *F. chrysothrix*, *F. pajeros*, *F. geoffroyi*, *F. uncia*, *F. pardus*, *F. bengalensis*, *F. pardalis*, *F. viverrina*, *F. ornata*, and *Cynælurus jubatus*, with their varieties. Mon. Felidæ, pts. i.–iii.

Felis tigris. J. Fayrer has notes on "The Size of the Indian Tiger," showing that sometimes, though very rarely, it exceeds eleven feet in total length; Nature, xviii. pp. 219 & 220. R. Lydekker describes an example with a third lower premolar, as in the fossil genus *Pseudælurus*; J. A. S. B. xlvii. pt. 2, pp. 2 & 3.

Felis serval and *F. viverrina.* On their cranial characters; C. G. Giebel, Z. ges. Naturw. l. [1877] p. 292.

Felis catus. Notices of the Wild Cat in old charters, &c., in England; J. E. Harting, Zool. 1878, pp. 251 & 252.

Felis lanea. Note on a second example [*cf.* Zool. Rec. xiv. *Mamm.* p. 12]; E. L. Layard, P. Z. S. 1878, pp. 655 & 656.

Lynx rufus. Note on its preying on the Skunk; B. W. Barton, Am. Nat. xii. p. 628.

Hyænodon heberti, H. compressus, and *H. cayluxi*, spp. nn. (foss.); H. Filhol, Bull. Soc. Philom. (6) xi. p. 19 [1877], Miocene of Quercy.

Hyænidæ.

Hyæna crocuta. On the male generative organ, which externally greatly resembles the female [*cf.* Zool. Rec. xiv. *Mamm.* p. 12]; M. Watson, P. Z. S. 1878, pp. 416–428, pls. xxiv. & xxv.

Viverridæ.

Arctictis binturong. Additional note on its anatomy [*cf.* Zool. Rec. x. p. 9]; A. H. Garrod, P. Z. S. 1878, p. 142.

Prionodon maculosus, sp. n., W. T. Blanford, P. A. S. B. 1878, p. 71; J. A. S. B. xlvii. pt. 2, p. 152, pls. vi. & vii., Tenasserim.

Herpestes mutgigella, Rüpp., renamed *H. mutscheltschela*, M. T. v. Heuglin, Nord-ost-Afr. ii. p. 41. *H. iodoprymnus* (p. 42), and *H. ruficauda* (p. 43), spp. nn., *id. ibid.*, N.E. Africa.

Cynodictis gracilis, C. leptorrhynchus, C. crassidens (p. 49), *C. brevirostris* and *C. ferox* (p. 20), spp. nn. (foss.), H. Filhol, Bull. Soc. Philom. (6) xi. 1874 [1877], Miocene of Quercy.

Canidæ.

Canis. W. T. Blanford remarks on Jeitteles's views as to the origin of domestic Dogs [*cf.* Zool. Rec. xiv. *Mamm.* p. 12]; P.A.S.B. 1877, pp. 114–117.

Canis wheelerianus, sp. n., (foss.), E. D. Cope, Wheeler's Rep. Surv. W. of 100th Mer. iv. [1877] pt. 2, p. 302, pl. lxix., Miocene of New Mexico.

Lycaon pictus. Note on its visceral anatomy; A. H. Garrod, P. Z. S. 1878, pp. 373 & 374.

Vulpes canus. Note on the character of this species [*cf.* Zool. Rec. xiv. *Mamm.* p. 12]; P. L. Sclater & E. R. Alston, *tom. cit.* p. 392.

Nyctereutes procyonides. Notes on its visceral anatomy; A. H. Garrod, *tom. cit.* pp. 374–376.

Procyonidæ.

Bassaris astuta. On its occurrence in Oregon; E. Coues, Am. Nat. xii. p. 253.

Mustelidæ.

Mustela putorius. An account of a case of hydrophobia resulting from its bite, quoted from the MS. journal of R. Marsham (1739); T. Southwell, Zool. 1878, pp. 55 & 56.

Martes. A Marten, referred to *M. foina*, killed in Cornwall; E. H. Rodd, Zool. 1878, p. 127, *id.* J. Inst. Cornw. No. xx. p. 128. Still found in Cumberland; W. A. Durnford, Zool. 1878, p. 128.

Rhabdogale libyca and *R. mustelina.* On their characters; C. G. Giebel, Z. ges. Naturw. li. pp. 582–587.

Pterura sambachi. On its skull and dentition; C. G. Giebel, *tom. cit.* pp. 373–377, pl. xv.

Ursidæ.

Ursus labiatus. On its pharyngeal pouches and epimeral muscle; — Alix, Bull. Soc. Philom. (7) i. 1877, pp. 47 & 48.

Ursus priscus. On a skull from the bone-cave of Lherm, and on its specific distinction from *U. spelæus*; H. Filhol, *op. cit.* ii. pp. 19–25.

Otariidæ.

Otaria ursina. J. W. Clark describes and figures three specimens from the Pribilov Islands; P. Z. S. 1878, pp. 371–373, pl. xx.

Phocidæ.

I. Sahlertz describes abnormalities in dentition, some probably caused by the retention of milk-molars [cf. *suprà*, p. 7]; Vid. Medd. 1877, pp. 275–304.

CETACEA.

J. E. Harting, in a paper on "The Distinguishing Character of the British Cetacea," gives an abridgment of the account in the second edition of "Bell's British Quadrupeds"; Zool. 1878, pp. 1–13.

A. Starbuck publishes a very exhaustive "History of the American Whale Fishery, from its earliest inception to the year 1876"; Rep. U. S. Comm. Fisheries, 1875–6 [1878], pp. 1–768, pls. vi.

Squalodontidæ.

Pachyacanthus, Brandt, = *Priscodelphinus*, De Bus [*cf.* Zool. Rec. xii. p. 14]; G. Capellini, Atti Acc. Rom. (3) ii. pp. 49–52.

Delphinidæ.

Delphinus albirostris, its occurrence on the Irish coast; A. G. Moore, Zool. 1878, p. 292.

Delphinus tursio at Plymouth; J. Gatcombe, *tom. cit.* p. 56.

Monodon monoceros. Note on a bidental skull [*cf.* Zool. Rec. x. p. 12]; J. Gibson, P. Phys. Soc. Edinb. iv. pp. 257 & 258.

Physeteridæ.

W. H. Flower's "Further Contribution to the Knowledge of the existing Ziphoid Whales: Genus *Mesoplodon*" [cf. Zool. Rec. xiv. *Mamm.* p. 15], is printed in full; Tr. Z. S. x. pp. 415–437, pls. lxi.–lxiii.

Hyperoodon rostratus in the Menai Strait; H. Lee, Zool. 1878, pp. 13–15.

Physetes macrocephalus. W. Turner has "Notes on some rare prints of stranded Sperm Whales"; J. Anat. Phys. xii. pp. 593–600.

Balænidæ.

Balæna mysticetus. On its rudimentary finger-muscles; J. Struthers, J. Anat. Phys. xii. pp. 217–227.

Balæna (*Macleayius*) *australiensis.* A skeleton in the Paris Museum compared with the Tarento Whale [*cf.* Zool. Rec. xiv. *Mamm.* p. 15], which is referred to *B. biscayensis*; F. Gasco, C. R. lxxxvii. pp. 410–412; *cf.* Ann. N. H. (5) ii. pp. 495–497.

* *Balænoptera sibbaldi.* Note on two skeletons received by the Stockholm Museum; F. A. Smith, Zool. Anz. 1878, pp. 365 & 366. Münter describes and figures two males; MT. Vorpomm. ix. [1877] pp. 1–107.

SIRENIA.

P. Harting shows that the placenta is diffuse and non-deciduate, at least in *Halicore* [suprà, p. 5].

Manatidæ.

Manatus australis. A second live specimen brought to England [*cf.* Zool. Rec. xii. p. 14]; J. E. Harting, Zool. 1878, pp. 285–287.

Halitheriidæ.

Felsinotherium gastaldi, sp. n. (foss.), — de Zigno, Atti Acc. Rom. (3) ii. p. 186, Pliocene of Piedmont.

PROBOSCIDEA.

Elephantidæ.

Elephas indicus. L. C. Miall and F. Greenwood describe its anatomy; Part I., Muscles of the Extremities, J. Anat. Phys. xii. pp. 261–287; Part II., Muscles of the Head and Trunk, *tom. cit.* pp. 286–400; Part III., General Observations, *op. cit.* xiii. pp. 17–50, pls. ii.–v. The above reprinted; "Studies in Comparative Anatomy" [cf. *suprà*, p. 6]. On its habits, both in a state of nature and captivity, see G. P. Sanderson's "Wild Beasts of India" [*suprà*, p. 7].

Mastodon productus, fully described and figured; E. D. Cope, Wheeler's Rep. Surv. W. of 100th Mer., iv. (1877), pt. 2, pp. 306–316, pls. lxx.–lxxii.

UNGULATA PERISSODACTYLA.

E. D. Cope gives further particulars as to his proposed order Amblypoda [*cf.* Zool. Rec. xii. p. 16], with figures and detailed descriptions of remains of *Coryphodon* and *Metalophodon*; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877), pt. 2, pp. 179–251, pls. xlvi.–lxiv. New species described are *Coryphodon obliquus* (p. 207) and *C. lobatus* (p. 152); Eocene of New Mexico.

R. Owen remarks on the development of the Perissodactyla, reproducing some of Marsh's figures; Ann. N. H. (5) ii. pp. 216–223, pl. xi.

Rhinocerontidæ.

J. F. Brandt publishes supplementary notes to his "Monographie der Tichorhinen Nashörner" [*cf.* Zool. Rec. xiv. *Mamm.* p. 16]; Bull. Pétersb. xxv. pp. 260–265.

Rhinoceros. W. H. Flower describes a skull from Tipperah, differing in some points from that of *R. sumatrensis*, and perhaps belonging to *R. lasiotis*; P. Z. S. 1878, pp. 634–636.

Rhinoceros sondaicus does not now exist on the Máhanadi River, as believed by Jerdon; V. Ball, P. A. S. B. 1877, p. 171. H. J. Rainey brings forward evidence to show that the nasal septum is always partially ossified, and that the female is hornless [*cf.* Zool. Rec. xii. p. 15]; *op. cit.* 1878, pp. 139–141.

Rhinoceros tichorrhinus: on the form of its brain; C. G. Giebel, Z. ges. Naturw. li. pp. 370–373, pl. xiv.

Rhinoceros merki: on remains found along with traces of man; A. Portis, Palæontogr. xxv. pp. 143–162.

Ceratorrhinus sumatrensis. A. H. Garrod describes and figures the brain; Tr. Z. S. x. pp. 411–413, pl. lxx.

Aphelops. Remains described and figured; E. D. Cope, Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877), pt. 2, pp. 316–320, pls. lxxiii. & lxxiv.

Aphelops fossiger (p. 382) and *A. malacorrhinus* (p. 383), spp. nn. (foss.), E. D. Cope, Bull. U. S. Surv. Terr. iv., "Loup-Fork beds" of Kansas.

Elasmotherium. A. Brandt describes a skull from the Volga, and refers the genus to this family: Die Natur, 1878, pp. 401–404; *cf.* Nature, xviii. pp. 387–389.

Tapiridæ.

Tapirus roulini. P. L. Sclater notices and figures a living specimen, probably the first received alive in Europe; P. Z. S. 1878, pp. 631 & 632, pl. xxxix. L. Döderlein fully describes the skeleton; Arch. f. Nat. 1878, i. pp. 37–90.

Palæotheriidæ.

Paloplotherium javali and *P. cayluxi*, spp. nn. (foss.); H. Filhol, Bull. Soc. Philom. (6) xi. 1874, p. 17 [1877], Miocene of Quercy and Caylux.

Equidæ.

E. D. Cope describes and figures remains of *Hippotherium* and *Protohippus*; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877), pt. 2, pp. 321–323, pl. lxxv.

Equus. A. Geoffroy St Hilaire describes two animals believed to be mules between *E. caballus* and *E. tæniopus*; Bull. Soc. Acclim. 1878, pp. 741–746.

"*Sivatherium*," Zool. Rec. xiv. *Mamm.* p. 17, line 29 from the top, recorded as a new genus, is in error for *Sivalhippus*.

Anchilophus cadurcensis, sp. n. (foss.); H. Filhol, Bull. Soc. Philom. (6) xi. 1874, p. 18 [1877], Miocene of Quercy.

UNGULATA ARTIODACTYLA.

Lydekker, R. Indian Tertiary and Post-Tertiary Vertebrata. 3. Crania of Ruminants. Pal. Ind. (10) i. pp. 88–171, pls. xi.–xxviii.

Describes and figures remains of many new or little known Indian fossil Artiodactyles [*Sivatheriidæ*, *Bovidæ*]. Cf. Rec. Geol. Surv. Ind. xi. pp. .

Hippopotamidæ.

Hippopotamus liberiensis. W. Peters describes and figures the sternum; MB. Ak. Berl. 1878, pp. 445–447, pl. i.

Suidæ.

Sus scrofa. "On a breed of solid-hoofed Pigs apparently established in Texas" [*cf.* Zool. Rec. xiv. *Mamm.* p. 18]; E. Coues, Bull. U. S. Surv. Terr. iv. pp. 295–297.

Plesiomeryx cayluxi, sp. n. (foss.); H. Filhol, Bull. Soc. Philom. (6) xi. 1874, p. 18 [1877], Miocene of Quercy.

Anoplotheriidæ.

Metadichobune, g. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) i. [1877], p. 53, connecting *Dichobune* with *Acotherulum*. Type, *D. campichii*, Pictet.

Leptacotherulum, subg. n. (foss.) [of *Acotherulum*], id. *tom. cit.* p. 54. Type, *L. cadurcensis*, sp. n., *ib. l. c*, Eocene of Quercy.

Adapis magnus, sp. n. (foss.), *id. op. cit* (6) xi. [1874], p. 17 [1877], Miocene of Quercy, is referred to this family.

Oreodontidæ.

Ticholeptus, g. n. (foss.), E. D. Cope, Bull. U. S. Surv. Terr. iv. p. 380, intermediate in dental and cranial characters between *Oreodon*, *Merycochærus*, and *Leptauchenia*. Type, *T. zygomaticus*, sp. n., *l. c.*, Upper Miocene of Montana.

Tragulidæ.

Hyomoschus aquaticus. A. H. Garrod and W. Turner describe and figure the gravid uterus and placenta; P. Z. S. 1878, pp. 682–686, pl. xliv.

Cervidæ.

Brooke, V. On the Classification of the *Cervidæ*, with a Synopsis of the existing Species. P. Z. S. 1878, pp. 883–928, pl. lv.

Two principal groups are recognized—I., *Plesiometacarpi*, in which the *proximal* ends of the rudimentary lateral metacarpals remain; and II., *Telemetacarpal*, in which the *distal* ends are retained; the former series is almost exclusively confined to the Western, and the latter mostly to the Eastern Hemisphere. The probable line of development of the family is considered, the genera and subgenera are characterized, and the known species enumerated.

Dawkins, W. B. Contributions to the History of the Deer of the European Miocene and Pliocene Strata. J. G. Soc. xxxiv. pp. 402–420.

Ten species are accepted, and are grouped into "*Caprioli*," "*Axeidæ*," and "Deer *incertæ sedis*." Many antlers are figured, and the gradual increase in their complication is traced.

Cervus porcinus. On its placentation; W. Turner, J. Anat. Phys. xiii. pp. 94–98.

Cervus suttonensis (p. 411, Norfolk Crag), *C. cylindroceros* (p. 414, Pliocene of Auvergne), and *C. tetraceros* (p. 416, Pliocene of Peyrolles), spp. nn. (foss.), W. B. Dawkins, J. G. Soc. xxxiv.

Alces machlis. On its anatomy; M. Watson & A. H. Young, J. L. S. xiv. pp. 371–393, pls. vi. & vii. On its habits and distribution in Livonia; O. v. Loewis, Zool. Gart. 1878, pp. 65–73.

Hydropotes inermis. On its fecundity and placentation [*cf.* Zool. Rec. xiv. *Mamm.* p. 19]; J. C. Ewart, J. Anat. Phys. xii. pp. 225–228.

Capreolus caprœa. Note on the metatarsal glands; B. Solgar, Zool. Anz. 1878, pp. 174–176.

Cariacus virginianus. Note on an abnormity in which the hoofs were consolidated; E. Coues, Bull. U. S. Surv. Terr. iv. pp. 293 & 294.

Cariacus dolichopsis, sp. n. (foss.), E. D. Cope, *l. c.* p. 379, Post-pliocene of Indiana.

Rangifer tarandus. On its placenta; W. Turner, J. Anat. Phys. xii. pp. 601–603. A. Nehring argues against its existence in the Hercynian Forest in Cæsar's time; Z. ges. Naturw. li. pp. 384–386.

Dicrocerus. E. D. Cope describes and figures remains from New Mexico, two species, *D. trilateralis* (p. 357) and *D. tehuanus* (p. 359) being new; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877), pt. 2, pp. 346–360, pls. lxxx.–lxxxii.

Blastomeryx borealis [cf. Zool. Rec. xiv. *Mamm.* p. 19], further note on its characters; E. D. Cope, Bull. U. S. Surv. Terr. iv. p. 382.

Sivatheriidæ.

R. Lydekker describes and figures a skull of *Hydaspitherium megacephalum*, and discusses its affinities; along with *Bramatherium*, he considers that it forms a link between *Sivatherium* and *Camelopardalis*. Pal. Ind. (10) i. pp. 159–168, pls. xxvi. & xxvii.

Antilocapridæ.

Antilocapra americana. On its skull and horns; C. G. Giebel, Z. ges. Naturw. li. pp. 856–861. E. D. Cope holds that the shedding of the horns "is not periodical, nor even frequent"; Am. Nat. xii. p. 557.

Bovidæ.

Rütimeyer, L. Die Rinder der Tertiär-Epoche, nebst Forstudien zu einer natürlichen Geschichte der Antilopen; 2r Th. Abh. schw. pal. Ges. v. pp. 73–208, pls. iv.–vii.

Concludes the account of the *Antilopinæ* [cf. Zool. Rec xiv. *Mamm.* pp. 6 & 19], and treats of the Tertiary *Caprinæ* and *Bovinæ*, describing 2 new genera and 6 new species [*infrâ*].

Antelopinæ. J. V. Barboza du Bocage gives a list of the Antilopes of Angola, including 12 species, and describes *Æpyceros petersi* (p. 471), *Cephalopus anchietæ* (p. 743), and *C. ruficrista* (p. 744), spp. nn.; P. Z. S. 1878, pp. 741–745.

Antelope tilonura, sp. n., M. T. v. Heuglin, Nordost-Afr. ii. p. 101, N.E. Africa; *A. leptoceros*, Cuv., figured, *id. op. cit.*

Antilope sivalensis (p. 154), *A. paluticornis* (p. 157), and *A. porrecticornis* (p. 158), spp. nn. (foss.); R. Lydekker, Pal. Ind. (10) i. pl. xxv., Tertiaries of the Siwaliks.

Gazella granti. Notes on its characters and affinities; V. Brooke, P. Z. S. 1878, pp. 723–726.

Gazella walleri, sp n., V. Brooke, *tom. cit.* p. 929, Eastern Africa.

Aeronotus lelwel, sp. n., M T. v. Heuglin, Nordost-Afr. ii. p. 124, N.E. Africa.

Capra ibex. A. Girtanner has published a monograph of this species; "Der Alpensteinbock," Trier: 1878, 8vo, pp. 69. [Not seen by the Recorder; *cf.* Zool. Anz. 1879, p. 77.]

Capra sivalensis (p. 169, Tertiaries of Siwaliks) and *C. perimensis* (p. 170, Perim), spp. nn. (foss.). R. Lydekker, Pal. Ind. (10) i. pl. xxviii.

Ovis musimon and *O. montana*. On their skulls; C. G. Giebel, Z. ges. Naturw. li. pp. 840–843, 849–851.

Ovis blanfordi, sp. n., A. O. Hume, J. A. S. B. xlvi. pt. 2, p. 327, pl. iv., abst., P. A. S. B. 1877, p. 203, Kelat [Baluchistan].

Bucapra, g. n. (foss.), L. Rütimeyer, Abh. schw. pal. Ges. v. p. 105, pl. ii., intermediate between the *Caprinæ* and *Bovinæ*. Type, *B. daviesi*, sp. n., *l. c.*, Tertiaries of the Siwaliks.

Anoa depressicornis. On its supposed existence in the Philippines:

A. H. Everett, P. Z. S. 1878, p. 792; A. B. Meyer, *tom. cit.* pp. 881 & 882; A. D. Bartlett, *tom. cit.* pp. 882 & 883.

Bos taurus. A. H. Cocks gives an account of the present state of the existing herds of white cattle at Chartley, Lyme Park, Chillingham, and Hamilton, with preliminary remarks by J. E. Harting; Zool. 1878, pp. 273–284.

Bos platyrrhinus, sp. n. (foss.), R. Lydekker, Pal. Ind. (10) i. p. 119, pl. xiv., Siwaliks. Skulls of *B. planifrons*, *B. acutifrons*, and *B. namadicus* figured and described; *id. tom. cit.* pp. 95–121, pls. xi.–xvi.

Bubalus platyceros and *B. palæindicus*. Their skulls described and figured; R. Lydekker, *tom. cit.* pp. 127–140, pls. xvii.–xix.

Bison sivalensis. Its skull described and figured; R. Lydekker, *tom. cit.* pp. 122–126, pls. xv.–xxii.

Peribos, g. n. (foss.). R. Lydekker, *tom. cit.* p. 141. Type, *Bos occipitalis*, Falc. Its skull figured, *tom. cit.* pls. xx. & xxi.

Hemibos triqueticeros and *Amphibos acuticornis*. Their skulls figured and described; R. Lydekker, *tom. cit.* pp. 145–153, pls. xxi.–xxiv.

Probubalus triquetricornis (p. 123, pls. i. & ii.) and *P. antilopinus*, spp. nn. (foss.), L. Rütimeyer, Abh. schw. pal. Ges. v., Tertiaries of the Siwaliks.

Bubalus sivalensis, sp. n. (foss.), L. Rütimeyer, *tom. cit.* p. 138, pl. ii. Tertiaries of the Siwaliks.

Leptobos, g. n. (foss.), L. Rütimeyer, *tom. cit.* p. 137, pls. i., iv., vi., & vii. Types, *L. falconeri* (p. 157, Siwaliks), *L. frazeri* (p. 165, Nerbudda), and *L. stozzii* (p. 167, Italy), spp. nn., *id. tom. cit.*

Camelidæ.

E. D. Cope remarks on the evolution of this family [*cf.* Zool. Rec. xii. p. 19] and describes and figures remains of *Procamelus* and *Pliauchenia*; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877) pt. 2, pp. 325–346, pls. lxxvi.–lxxix.

Auchenia vitakeriana, sp. n. (foss.), E. D. Cope, Bull. U. S. Surv. Terr. iv. p. 380, Pliocene of Oregon.

GLIRES.

E. D. Cope describes and figures various Eocene and Miocene forms from New Mexico; Wheeler's Rep. Surv. W. of 100th Mer. iv. (1877) pt. 2, pp. 170–173, 295–301, pl. lxix. One new species is described [*Sciuridæ*].

Sciuridæ.

E. R. Alston reviews "The Squirrels of the Neotropic Region," he differs from some of Allen's identifications [*cf.* Zool. Rec. xiv. *Mamm.* p. 20], recognizes and describes 12 species, with notes on synonymy and distribution, and figures *S. pusillus*, Geoff.; P. Z. S. 1878, pp. 656–670, pl. xli. He corrects some errors in a supplementary note, *tom. cit.* p. 954.

J. A. Allen, in a "Synonymatic List of the American *Sciuri*," accepts Alston's determinations, but differs on some questions of nomenclature; Bull. U. S. Geol. Surv. iv. pp. 877–887.

Sciurus harmandi, sp. n., A. Milne-Edwards, Bull. Soc. Philom. (6) xi. 1877, p. 8, Island of Phu-cok, Gulf of Siam.

Sciurus rufigenis, sp. n., W. T. Blanford, P. A. S. B. 1878, p. 72; J.A.S.B. xlvii. pt. 2, p. 156, pls. vii. & viii., Tenasserim.

Sciurus bougensis, sp. n., M. T. v. Heuglin, Nordost-Afr. ii. p. 59, N.E. Africa.

Sciurus pyrrhopus, *S. stangeri*, and *S. isabella*. On their characters; C. G. Giebel, Z. ges. Naturw. l. (1877), pp. 308–311.

Cynomys ludovicianus. On its habits; S. W. Williston, Am. Nat. xii. pp. 203–208.

Arctomys primigenius, sp. n. (foss.), K. T. Liebe, Zool. Gart. 1878, p. 39, bone caves of Thuringia. It is regarded as the probable ancestor of both *A. marmotta* and *A. bobac*.

Plesiarctomys buccatus, sp. n. (foss.), E. D. Cope, Wheeler's Rep. Surv. W. of 100th Mer. iv. [1877], pt. 2, p. 171, Eocene of New Mexico.

Haplodontidæ.

Haplodon rufus. On its habits [*cf.* Zool. Rec. xiv. *Mamm.* p. 20]; S. K. Lum, Am. Nat. xii. pp. 10–13.

Castoridæ.

Castor fiber. On its extinction (in 1841) in Livonia; O. V. Loewis, Zool. Gart. 1878, pp. 353–357.

Muridæ.

Gerbillus nigricaudus (p. 200), *G. vicinus* (p. 200), and *G. pusillus* (p. 201), spp. nn., W. Peters, MB. Ak. Berl. 1878, East Africa.

Meriones stygmonyx (p. 78), *M. dongolanus* (p. 79), and *M. macropus*, spp. nn., M. T. v. Heuglin, Nordost-Afr. ii., N. E. Africa.

Psammomys elegans, sp. n., M. T. v. Heuglin, *tom. cit.* p. 80, N. E. Africa.

Oreomys, g. n., M. T. v. Heuglin, *tom. cit.* p. 76; allied to *Euryotis*, [*Otomys*, F. Cuv.], but both upper and lower incisors with three sharp longitudinal furrows. Type, *O. typus*, sp. n., *id. l. c.* p. 77, N. E. Africa.

Dendromys pallidus, sp. n., M. T. v. Heuglin, *tom. cit.* p. 74, N. E. Africa.

Mus samharensis (p. 67), *M. keren[en]sis* (p. 67), *M. ochropus* (p. 68), *M. rufidorsalis* (p. 70), *M. lateralis* (p. 71), *M. tacazienn* (p. 72), *M. pallescens* (p. 72), and *M. (?) galanus*, spp. nn., M. T. v. Heuglin, *tom. cit.*, N. E. Africa.

Mus hildebrandti and *M. fumatus*, spp. nn., W. Peters, MB. Ak. Berl. 1878, p. 200, East Africa.

Mus rattus and *M. alexandrinus*. On their specific identity [*cf.* Zool.

Rec. ii. p. 39]; J. C. Forsyth-Major, Atti Soc. Tosc. iii. p. 29 *et seq.* [Not seen by the Recorder; *cf.* Arch. f. Nat. 1878, ii. p. 99].

Typhlomys, g. n., A. Milne Edwards, Bull. Soc. Philom. (6) xi. [1877], p. 9, allied to *Mus*, but with greatly reduced eyes, like a mole. Type, *T. cinereus*, sp. n., *ibid. l. c.*, Fokien [China].

Malacomys, g. n., A. Milne Edwards, *l. c.*, intermediate between *Mus* and *Gerbillus*. Type, *M. longipes*, sp. n., *ibid.* W. Africa.

Acomys albigena, sp. n., M. T. v. Heuglin, Nordost-Afr. ii. p. 69, N.E. Africa.

Synaptomys cooperi. Note on its generic distinction; E. R. Alston, P. Z. S. 1878, p. 633.

Spalacidæ.

Rhizomys erythrogenys, sp. n., J. Anderson, P. A. S. B. 1877, p. 150, Tenasserim and Salwin.

Bathyergus splendens. On its habits [under name of *Rhizomys*]; M. T. v. Heuglin, Nordost-Afr. ii. pp. 61–64.

Geomyidæ.

Geomys bursarius. The muscles of the cheek pouches described; C. E. McChesney, Bull. U. S. Surv. Terr. iv. pp. 214 & 215.

Dipodomys. On the form of the stapes; J. A. Ryder, Am. Nat. xii. p. 125.

Caviidæ.

Cavia caprera. On "Singing Guinea-Pigs," similar to the well-known "Singing Mice" [*cf.* Zool. Rec. xiv. *Mamm.* p. 21]; R. Hensel, Zool. Gart. 1878, pp. 184–186.

Dolichotis centralis, sp. n., H. Weyenbergh, Versl. Ak. Amst. xi. [1877], p. 247, S. America; = *D. salinicola*, Burm., *teste* F. H. Troschel, Arch. f. Nat. 1878, ii. p. 101.

Leporidæ.

A. von Mojsisovics describes accessory basi-cranial processes in Hares and Rabbits; SB. Ak. Wien, lxxvi. pt. i. pp. 503–506, pl. i.

Lepus europæus. C. E. Thüngen has published a monograph of this species; "Der Hase," Berlin: 1878, 8vo, pp. 431. [Not seen by the Recorder; *cf.* Zool. Anz. 1878, p. 373.]

Genus incertæ sedis.

Mylagaulus, g. n. (foss.). E. D. Cope, Bull. U. S. Surv. Terr. iv. p. 384, described from a single molar. Type, *M. sesquipedalis*, sp. n., *l. c.*, "Loup-Fork Beds" of Kansas.

EDENTATA.

Bradypodidæ.

Bradypus tridactylus. On its placentation and affinities; the latter are considered to be Lemurian rather than Edentate; N. Joly, C. R. lxxxviii. pp. 283–287.

Colodon. J. Reinhardt describes the remains of this genus from Brazilian bone-caves in the Copenhagen Museum, belonging to *C. maquinensis*, Lund., and *C. escrivanensis*, sp. n. (foss.) (p. 264); he considers the genus to be most nearly allied to *Megalonyx*, but to show certain affinities with *Cholopus*; Dan. Selsk. Skr. (5) xii. pp. 257–349, pls. i.–v.

Mylodon sodălis, sp. n. (foss.), E. D. Cope, Bull. U. S. Surv. Terr. iv. p. 385, Pliocene of Oregon.

Manidæ.

Manis temminckii. Note on its habits; F. Holmwood, P. Z. S. 1878, pp. 632–633.

Dasypodidæ.

A. H. Garrod has notes on the anatomy of the Armadillos, and especially on *Tolypeutes tricinctus*; P. Z. S. 1878, pp. 222–230.

Tolypeutes muriei, sp. n., A. H. Garrod, *tom. cit.* p. 223, = *T. conurus*, Murie. *nec* Geoffroy [*cf.* Zool. Rec. ix. p. 20].

Chlamydophorus truncatus and *Dasypus sexcinctus.* M. Watson describes and figures their male generative organs, and considers the two genera to be closely related; *tom. cit.* pp. 673–679, pl. xliii.

DIDELPHIA.

MARSUPIALIA.

Didelphidæ.

Dryolestes, g. n. (foss.), O. C. Marsh, Am. J. Sci. (3) xv. p. 459, probably allied to the Opossums, but known only from a mandible. Type, *D. priscus*, sp. n., *l. c.*, Upper Jurassic of the Rocky Mountains, being the first Jurassic Mammal discovered in N. America.

Dasyuridæ.

Sarcophilus ursinus. Note on its anal glands; J. Chatin, Bull. Soc. Philom. (6) xi. 1877, pp. 54 & 55.

Phascogale calura. On the muscles of its manus; D. J. Cunningham, J. Anat. Phys. xii. pp. 434 & 444 [*cf. suprà*, p. 3]; (abstr.) Rep. Br. Ass. 1877. pp. 106–111.

Thylacinus cynocephalus. On the anatomy of its fore-limbs; D. J. Cunningham, J. Anat. Phys. xii. pp. 427–444 [*cf. suprà*, p. 3]; (abstr.) Rep. Br. Ass. 1877, pp. 106–111.

Phalangistidæ.

Phalangista maculata. On the anatomy of its fore-limbs; D. J. Cunningham, J. Anat. Phys. xii. pp. 427–444 [*cf. suprà*, p. 3].

Cuscus. Note on the variability of the dentition; E. R. Alston, P. Z. S. 1878, pp. 274 & 275. On the anatomy of the fore-limb; D. J. Cunningham, Rep. Br. Ass. 1877, pp. 106–111.

Peramelidæ.

Perameles raffrayana, sp. n., A. Milne-Edwards, Ann. Sci. Nat. (6) vii. art. 11, p. 2, pl. viii., New Guinea.

Macropodidæ.

Macropus. On the arrangement of the ligaments of the knee-joint in the Kangaroo; A. J. Parker, P. Ac. Philad. 1878, pp. 222 & 223.

Pleopus nudicaudatus, Owen, = *Hypsiprymnodon moschatus*, E. P. Ramsay [*cf.* Zool. Rec. xiii. *Mamm.* p. 24, xiv. *Mamm.* p. 24]; R. Owen, Ann. N. H. (5) i. p. 103.

ORNITHODELPHIA.

MONOTREMATA.

C. G. Giebel has a brief note on the shoulder-girdle; Z. ges. Naturw. l. [1877] p. 96.

Ornithorrhynchidæ.

Ornithorrhynchus anatinus seen in Queensland as far north as 18° S. lat.; W. E. Armit, J. L. S. xiv. p. 413.

Tachyglossidæ.

Tachyglossus histrix. J. W. Fewkes minutely describes its myology; B. Ess. Inst. ix. pp. 111–137, pls. i. & ii. Found in Queensland as far north as 18° S. lat.; W. E. Armit, J. L. S. xiv. pp. 411–413. Note on a skull from Queensland; J. Murie, *tom. cit.* pp. 413–417.

AVES.

BY

HOWARD SAUNDERS, F.L.S., F.Z.S., &c.

THE year 1878 shows no diminution in the amount of ornithological literature, and there is a notable increase in the number of works through which it is diffused; it being, indeed, difficult to say in what class of periodicals some paper relating to Birds may not be found. The Recorder has endeavoured to avoid omissions, but the risk of these would be diminished, and the object of this work would be promoted, if, at the close of each year, authors would either remit separate copies, or at least a list of their papers, with the necessary indications of place and date of publication. In thanking those who have already done this, the Recorder would be glad to see their example more generally followed. He must also express his regret that owing to the rule against noticing works not actually published in, or prior to, 1878, he is prevented from recording several important papers in the Phil. Trans. Royal Society, on the Ornithology of Kerguelen's Land and Rodriguez; although the separate copies of some of them have been noticed long since in other publications which are unfettered by similar restrictions.

Amongst the publications illustrative of special geographical divisions the following may be cited. Palæarctic region: H. E. Dresser's Birds of Europe (continuation), and H. Seebohm's Ornithology of Siberia. Ethiopian region: B. du Bocage's and J. M. Cabanis's contributions. Indian region: A. O. Hume and W. Davison's Birds of Tenasserim, and V. Legge's Birds of Ceylon, and the late Marquis of Tweeddale on the Philippines. Australian region: T. Salvadori, on Papuan ornithology; Layard and Tristram on New Caledonia and the New Hebrides. Neotropical region: G. N. Lawrence on F. Ober's explorations in the smaller West Indian Islands; also P. L. Sclater and O. Salvin's contributions.

THE GENERAL SUBJECT, WITH TITLES OF SEPARATE WORKS AND OF THE MOST IMPORTANT PAPERS PUBLISHED IN PROCEEDINGS OF SOCIETIES, &c.

ADAMS, EDWARD. Notes on the Birds of Michalaski, Norton Sound. Ibis, 1878, pp. 420–442.

This paper is prefaced by a Memoir of the deceased author, from H.

Stevenson. The observations, which are most interesting, were made as long ago as 1850–51, and had they then been published would have anticipated several recent discoveries. [Norton Sound is in N.W. America, about 63° N., 162° W.] Perhaps the most remarkable birds obtained there were the Palæarctic species, *Cyanecula suecica* [*Sylviidæ*] and *Motacilla flava* [*Motacillidæ*].

Adamson, C. Murray. A Naturalist's View of the Extension of the Close-Time of the Sea Birds Preservation Act in Northumberland, and on the Protection of Wild Birds generally. Tr. North. Dur. vii. pt. 1, pp. 108–125.

Allen, J. A. Description of a Fossil Passerine Bird from the Insect-bearing Shales of Colorado. Am. J. Sci. (3) xv. pp. 381–384, and also Bull. U. S. Geol. Surv. iv. No. 2, pp. 423–445.

In the absence of the bill it is impossible to assign the species to any particular family, but the fossil (of which two cuts are given) conveys on the whole the impression of Fringilline affinities. It is named *Paleospiza bella*, g. & sp. nn. [*Fringillidæ*].

——. A List of the Birds of Massachusetts, with Annotations. Bull. Ess. Inst. x. pp. 3–37.

A very carefully compiled local catalogue, divided into five sections, showing 316 species of ascertained occurrence, 135 being breeders; a third section treats of probable occurrences, and the other two of introduced species (6), and rare visitants (90).

——. An inadequate "Theory of Birds' Nests." Bull. Nutt. Orn. Club, iii. pp. 23–32.

A criticism of Mr. A. R. Wallace's essay, which was originally published in that author's "Contribution to the Theory of Natural Selection," in 1870.

Anderson, A. See *Prinia* [*Sylviidæ*].

Armit, W. E. See *Poephila* [*Ploceidæ*].

Aughey, S. Notes on the Nature of the Food of the Birds of Nebraska. 1st Ann. Rep. U.S. Entom. Comm. for 1877. Appendix II. pp. 13–62, 1878.

The result of an important series of observations on upwards of 1000 specimens belonging to 250 species, during 13 years, principally with regard to locust-eating, a taste which appears to prevail not only amongst the Passerine species, but in some members of *Accipitres*, *Picariæ*, *Gallinæ*, *Grallæ*, and *Anatidæ*.

Ayres, Thomas. Additional Notes on the Ornithology of the Transvaal. Communicated by John Henry Gurney. Ibis, 1878, pp. 281–301, 406–411.

Further supplementary lists [*cf.* Zool. Rec. xiii. *Aves*, p. 2, and xiv. *Aves*, p. 1], making the total number of species observed 307; with useful notes on their habits, plumage, &c. [See *Enneoctonus* (*Laniidæ*), *Acrocephalus*, *Phylloscopus*, *Sylvia* (*Sylviidæ*), *Ardetta* (*Ardeidæ*).]

BALDAMUS, A. C. E. Illustrirtes Handbuch der Federviehzucht. Die Tauben und das übrige Ziergeflügel. Dresden: 1878, 8vo, pp. 451, 124 illustrations.

BALFOUR, F. M., & SEDGWICK, A. On the existence of a rudimentary Head-Kidney in the embryo Chick. Phil. Trans. xxvii. pp. 443–446

BALL, V. From the Ganges to the Godaveri. On the distribution of Birds, so far as it is at present known, throughout the hilly region which extends from the Rajmehal Hills to the Godaveri Valley. Str. Feath. vii. pp. 191–235.

BECCARI, ODOARDO. Letter dated from Kajú Tanam, Sumatra, 8th September, 1878, mentioning the principal species of birds observed. Ann. Mus. Genov. xiii. p. 405.

BELL, F. JEFFREY. [See MÜLLER, JOHANNES.]

BICKNELL, E. P. Evidences of the Carolinian Fauna in the Lower Hudson Valley, principally from observations taken at Riverdale, N.Y. Bull. Nutt. Orn. Club, iii. pp. 128–132.

BIGG-WITHER, T. P. Pioneering in South Brazil. 2 vols., 8vo. London: 1878.

An account of three years of forest and prairie life in the province of Paraná, with many interesting field-notes on the birds observed.

BINGHAM, C. T. See *Leptoptila* [*Ciconiidæ*].

BLAKISTON, T. Letter rectifying erroneous identifications in R. Swinhoe's paper on Birds of Hakodate [*Cf.* Zool. Rec. xiii. *Aves*, p. 31]. Ibis, 1878, p. 385.

—— & PRYER, H. A Catalogue of the Birds of Japan. Ibis, 1878, pp. 209–250.

This revised list contains 313 species, but of some the identification is uncertain, and about 50 skins have to be determined by H. Seebohm.

BLANFORD, W. T. See *Cygnus* [*Anatidæ*], *Ruticilla* [*Sylviidæ*].

BLASIUS, R., BÖHM, R., REICHENOW, A., ROHWEDER, J., SCHALOW, H. Jahresbericht (1877) des Ausschusses für Beobachtungsstationen der Vögel Deutschlands. J. f. O. 1878, pp. 370–436.

The second year of this useful compendium, the result of the observations of many German ornithologists.

BLASIUS, R. Skizzen aus dem Riesengebirge. Orn. Centralbl. 1878, pp. 121 & 122, 129 & 130.

——. Ornithologia aus Braunschweig. *Tom. cit.* pp. 145 & 146. [See also *Circus* (*Falconidæ*)].

BOCAGE, J. V. BARBOZA DU. Aves das possessões portuguezas d'Africa occidental. xvi. lista, J. Sc. Lisb. vi. pp. 193–206; xvii. lista, *tom. cit.* pp. 260–280.

The sixteenth list treats of two collections sent by Señhor Anchieta from Caconda, one containing 52 and the other 76 species: the novelties in these are merely enumerated, being really described in the next

paper, "Melanges ornithologiques" [which see]. In the seventeenth list of birds from the same source, comprising 105 species, 12 appear to be novelties, 2 of which [*Nectariniidæ*] are left for G. E. Shelley to describe, and 1 [*Caprimulgidæ*] is here first described. There is also a list of 11 species from Cazembe, north of the Quanza.

[Bocage, J. V. B. du.] Mélanges ornithologiques. J. Sc. Lisb. vi. pp. 208–213, 254–259. [*Cf.* Zool. Rec. xiv. *Aves*, p. 2.]

In the first, 4 new species are described from Angola, one of them being made the type of a new genus [*Nectariniidæ*, *Certhiidæ*, *Laniidæ*]. In the last, 7 new species and 1 new genus are described, from the same source [See *Nectarinia* (*Nectariniidæ*), *Hylypsornis*, g.n., (*Certhiidæ*: the first recorded occurrence of this family in the Æthiopian region), *Hirundo* (*Hirundinidæ*), *Platystira*, *Muscicapa* (*Muscicapidæ*), *Tricholais* (*Sylviidæ*), *Sharpia*, g.n., and *Penethria* (*Ploceidæ*)].

Böckmann, F. Ornithologische Beiträge zur Fauna der Nieder-Elbe. Verh. Ver. Hamb. 1878, pp. 252–270.

126 resident species, 66 migrants, and 66 irregular visitants are recorded from the Lower Elbe.

Boucard, Adolph. On Birds collected in Costa Rica. P. Z. S. 1878, pp. 37–71, pl. iv.

The result of five months' diligent collecting was 258 species, many of which proved to be new, and have already been described; 1 (*Zonotrichia vulcani*) is here described for the first time, and there are notes on many others of interest. [*Fringillidæ*.]

——. Liste des Oiseaux récoltés au Guatémala en 1877. Ann. Soc. Linn. Lyon, 1878, pp. 167–216 [only separate copy, pp. 47, seen by Recorder].

A catalogue of 273 species, with remarks upon their habitat and comparative abundance or rarity.

Bouvier, A. Sur une Collection Ornithologique de l'Uganda, Royaume de M'Tesa, Afrique Centrale (1er article). Bull. Soc. Zool. Fr. ii. pp. 437–459.

In this first paper of a series, 34 species are enumerated, 1 of which (*Turdus piaggiæ*) is described as new. [*Turdidæ*].

—— & Sharpe, R. B. [See Sharpe.]

Brewer, T. M. Changes in our North American Fauna. Bull. Nutt. Orn. Club, iii. pp. 49–52.

On the addition of *Totanus ochropus*, *Ægialitis hiaticula*, and *Larus canus* to the American list, and the rejection therefrom of *Podiceps cristatus*. See also *Junco* [*Fringillidæ*], *Stercorarius* [*Laridæ*], *Rhyacophilus* [*Scolopacidæ*].

——. Notes on Certain Species of New England Birds, with additions to his Catalogue of the Birds of New England. P. Bost. Soc. xix. pp. 301–309.

Late industrious research has added 21 species of rare or accidental occurrence to the New England List.

[Brewer, T. M.] Variations in the Nests of the same Species of Birds. Am. Nat. 1878, pp. 35–40.

——. Letters [on a *Parula*, on *Myiarchus erythrocercus*, and other birds; on J. C. Merrill's and G. B. Sennett's discoveries in Texas]. Ibis, 1878, pp. 116–118, 204–206, 487 & 488.

Brewster, William. Description of the First Plumage in various species of North American Birds. Bull. Nutt. Orn. Club, iii. pp. 15–23, 56–64, 115–123, 175–181.

In this important contribution, the young of 98 species are described.

——. See also *Siurus* and *Protonotaria* [*Mniotiltidæ*].

Brooks, W. E. On an overlooked species of *Reguloides*. Str. Feath. vii. pp. 128–139.

The species identified as *R. superciliosus*, the eggs of which were secured with avidity by collectors of so-called British species, is now considered to be distinct, and is named *R. humei* [*Sylviidæ*]. A. O. Hume adds an editorial note. See also W. E. Brooks, *tom. cit.* p. 236.

——. Observations on *Motacilla alba* and other Wagtails. *Tom. cit.* pp. 136–140. [*Motacillidæ*.]

Brown, N. C. A List of Birds observed at Coosada, Central Alabama. Bull. Nutt. Orn. Club, iii. pp. 168–174.

This first instalment of a proposed series, contains field-notes on 40 species of *Passeres*.

Brown, J. A. Harvie. [A communicated translation of Leonida Sabanäeff's "Avifauna of the Ural."] P. N. H. Soc. Glasg. 1878, pp. 282–316.

The value of this translation of what was practically a sealed work to the majority of English readers, is enhanced by Mr. Brown's foot-notes.

Brüggemann, F. Weitere Mittheilungen über die Ornithologie von Central Borneo. Abh. Ver. Brem. v. pp. 625–537.

Some valuable remarks on an additional collection of 152 species [*cf.* Zool. Rec. xiv. *Aves*, p. 4] sent to the Darmstadt Museum by Dr. G. Fischer, from Moora Teweh, Central Borneo. [See also Fischer, G.]

——. See also *Artamus* [*Artamidæ*], *Pityriasis* [*Corvidæ*].

Buller, W. L. Notes on the Ornithology of New Zealand. Tr. N. Z. Inst. x. pp. 191–200.

A continuation of the series [*cf.* Zool. Rec. xiv. *Aves*, p. 5], the most interesting feature being the disinterment of the description of *Fulica nova-zealandiæ* by W. Colenso in the Tasmanian Journal of Natural Science, &c., for April, 1845, a species which is evidently distinct from *Fulica australis*, and which is now in all probability extinct, as it has not been heard of since its discovery. [*Rallidæ*.]

——. Further Notes on the Ornithology of New Zealand. *Tom. cit.* pp. 201–209.

[Buller, W. L.] See also *Anthornis* [*Meliphagidæ*], *Heteralocha* [*Corvidæ*], *Ocydromus* [*Rallidæ*], *Diomedea* [*Procellariidæ*], *Phaeton* [*Phaetontidæ*].

Burmeister, H. See *Conurus* [*Psittacidæ*].

Butler, E. A. My last Notes on the Avifauna of Sind. Str. Feath. vii. pp. 173–191.

Thirteen species are added to the previous lists and notes are contributed on many species previously recorded, supplemented by an account of an important breeding-place of water-birds [*Ardeidæ*, *Anatidæ*, *Pelecanidæ*] in the Eastern Narra. See also a letter from S. Doig, *tom. cit.* pp. 466 & 468.

Cabanis, J. Ueber ein Sammlung von Vögeln der Argentinischen Republik. J. f. O. 1878, pp. 194–199.

Remarks on a collection consisting of 29 species obtained by Dr. A. Döring in the Sierra de Córdova of the Argentine Republic, with descriptions of 3 new species. [*Furnarius*, *Synallaxis* (*Dendrocolaptidæ*), *Nothoprocta* (*Tinamidæ*).]

——. Uebersicht der Vögel Ost-Afrikas, welche von den Herren J. M. Hildebrandt und v. Kalckreuth gesammelt sind. J. f. O. 1878, pp. 213–246.

The important collections made by the above in Zanzibar and adjacent coast, Mombas, and thence to the foot of the snowy mountains of Kilima-ndjaro and Kerwa, and to a small extent in Abyssinia, comprise 194 species, 15 of which are described as new. [*Turdus* (*Turdidæ*), *Bessornis* (*Sylviidæ*), *Macronyx* (*Motacillidæ*), *Lanius* (*Laniidæ*), *Crateropus* (*Pycnonotidæ*), *Cinnyris* (*Nectariniidæ*), *Habropyga*, *Hyphanturgus* (*Ploceidæ*), *Notauges* (*Sturnidæ*), *Pogonorrhynchus*, *Tricholæma*, *Trachyphonus* (*Capitonidæ*), *Francolinus* (*Perdicidæ*).]

Cadiat, —. Sur l'époque de formation du cloaque chez l'embryon du poulet. C. R. lxxxvi. pp. 836–838 ; also in abstract in Les Mondes, xlv. p. 653.

Camarano, L. See *Nasiterna* [*Psittacidæ*].

Carl, L. Untersuchungen über den Schädelbau domesticirter Tauben. Separatabdruck aus dem Osterprogramm 1878, der Realschule zu Pirna.

On modifications found in the skull of about 16 races of the domestic pigeon.

Carus, J. Victor. Zoologischer Anzeiger. i. Jahrgang 1878. Nos. 1–17.

Commencing on 1st July, 1878, this fortnightly publication contains, amongst other matter, the titles of many works and papers on ornithology. For *Aves*, see pp. 45, 209, 229, 349.

Clarke, W. B. On *Dromornis australis* (Owen), a new Fossil Bird of Australia. P. R. Soc. N. S. W. xi. pp. 41–49.

An account of the discovery of this species in 1869, and the result of subsequent investigations.

CLÉMENT, J. Curiosités ornithologiques rencontrées dans le Gard pendant l'année 1877. Bull. Soc. Nîmes, Nos. 6 & 7.

CONDER, C. E. Tent Work in Palestine. London: 1878, 2 vols, 8vo.

Many remarks on the birds observed, the native names being sometimes given, are scattered through the pages of this narrative of the Survey of Western Palestine, conducted in company with the late C. F. Tyrwhitt Drake.

COPE, E. D. Report upon United States Geographical Surveys West of the 100th Meridian in charge of Lieut. G. M. Wheeler. Vol. iv. Palæontology, pt. ii. pp. 69–71, 287–295, pls. lxvii. & lxviii. [*Struthionidæ*, *Vulturidæ*].

CORDEAUX, JOHN. Remarks on Migration of Birds in 1877–78. See Zoologist, 1878, pp. 47, 102, 132, 240; and Q. J. Meteorol. Soc. 1878, pp. 59 & 157.

These observations are based upon the author's own experience, on correspondence with Gaetke at Heligoland, and on reports received from 20 English stations.

CORY, C. B. A Naturalist in the Magdalen Islands [Gulf of St. Lawrence]. Boston: 1878, sm. 4to.

Part ii. contains a catalogue of the 109 species obtained or observed there, with notes on nidification, &c.

COUES, E. Field Notes on Birds observed in Dakota and Montana along the 49th Parallel, during the seasons of 1873 & 1874. Bull. U. S. Geol. Surv. iv. pp. 545–661.

Interesting field-notes on this little known district, with details of the nesting of several species hitherto considered rare.

——. Birds of the Colorado Valley. (Department of Interior U. S. Geological Survey of the Territories. Miscellaneous Pub. No. 11). Part i. *Passeres* to *Laniidæ*. Bibliographical Appendix, 70 illustrations. Washington: 1878, 8vo, pp. 807.

——. The Ineligibility of the European House-Sparrow in America. Am. Nat. 1878, pp. 499–505.

The author points out the increasing damage resulting from artificial interference with natural distribution by the introduction and fostering of the plague of *Passer domesticus*.

——. See also SENNETT, and for single species see *Passerculus* [*Fringillidæ*], *Petrochelidon* [*Hirundinidæ*].

—— & YARROW, H. C. Notes on the Natural History of Fort Macon, N.C., and vicinity. No. 4. P. Ac. Philad. 1878, (*Aves*) pp. 22–24.

Several species are added to E. Coues's former list. [See Zool. Rec. viii. p. 46].

CRIPPS, J. R. First List of the Birds of Furreedpore, Eastern Bengal. Str. Feath. vii. pp. 238–315.

A long list with useful field-notes, and, in the majority of cases, with

measurement of the specimens and details of the coloration of their soft parts.

DALGLEISH, J. J. List of the Birds which have been observed in the District of Arduamurchan, Argyllshire. P. N. H. Soc. Glasg. 1877–78, pp. 259–267.

115 species are recorded from this most western peninsula of the mainland of Great Britain.

DALL, W. H. Nomenclature in Zoology and Botany. A Report to the American Institution for the Advancement of Science at the Nashville Meeting, August 31, 1877. Salem : Dec. 1877.

DANFORD, C. G. A Contribution to the Ornithology of Asia Minor. Ibis, 1878, pp. 1–35. [*Cf.* Zool. Rec. *Aves*, p. 7.]

Valuable field-notes upon the nidification and habits of 188 species obtained or identified. [For most interesting see *Elanus* (*Falconidæ*), *Coracias* (*Coraciidæ*), *Serinus* (*Fringillidæ*), *Tetraogallus* (*Perdicidæ*).]

DARESTE, C. Récherches sur la suspension des phénomènes de la vie dans l'embryon de la poule. C. R. lxxxvi. pp. 723–725.

DAVISON, W. [See HUME, A. O.]

—— & WENDEN, —. A Contribution to the Avifauna of the Deccan. Str. Feath. vii. pp. 68–95.

This paper which supplements S. R. Fairbank's list of the Birds of Khandalla, &c. [*cf.* Zool. Rec. xiii. *Aves*, p. 8], enumerates 255 species, of which 44 were not included by the former author. A map is added to show the places where collections were made.

DISSE, J. Die Entwickelung des mittleren Keimblattes im Hühnerei. Arch. f. mikr. Anat. xv. pp. 67–94.

DIXON, W. A. Notes on the Meteorology and Natural History of a Guano Island. P. R. Soc. N. S. W. xi. pp. 165–175.

Contains some interesting, although unscientific, remarks on the sea-birds productive of the guano at Malden Island [Pacific Ocean, lat. 3° 58′ S., long. 155° W.].

DRESSER, H. E. A History of the Birds of Europe, including all the Species inhabiting the Western Palæarctic Region. Parts lxv.–lxxii.

Eight parts are issued under date of 1878. [*Anatidæ*, *Perdicidæ*, *Rallidæ*, *Columbidæ*, *Charadriidæ*, *Strigidæ*, *Meropidæ*, *Scolopacidæ*, *Procellariidæ*, *Sylviidæ*, *Falconidæ*, *Turdidæ*, *Laniidæ*, *Emberizidæ*, *Fringillidæ*, *Laridæ*, *Coraciidæ*, *Ibididæ*, *Podicipidæ*, *Gruidæ*, *Motacillidæ*.]

DRUMMOND-HAY, H. M. On Migration. Scot. Nat. pt. xxx. pp. 229–241, pp. 283–292. [*Cf.* Zool. Rec. xiv. *Aves*, p. 6].

DURNFORD, H. Notes on the Birds of the Province of Buenos Ayres. Ibis, 1878, pp. 58–68. Continued from *op. cit.* 1877, p. 203 [*cf.* Zool. Rec. xiv. *Aves*, p. 7].

Interesting field-notes on 47 species.

Durnford, H. Notes on the Birds of Central Patagonia. *Tom. cit.* pp. 389–406.

This paper gives the result of a second visit of about six months to the Chupat valley [*cf.* Zool. Rec. xiv. *Aves*, p. 7], when about 30 more species were observed than on the former occasion.

Elliot, D. G. A Monograph of the *Bucerotidæ* or Family of the Hornbills. Pt. v. 1878. [*Cf.* Zool. Rec. xiv. *Aves*, p. 7.] [*Bucerotidæ*.]

——. A Study of the *Pteroclidæ*, or Family of the Sand-Grouse. P. Z. S. 1878, pp. 233–263.

A monograph of the family, with its literature, classification, synonymy, geographical distribution and description of the two genera [*Pterocles*, with 13 species, and *Syrrhaptes*, with 2 species], recognized by the author. [*Pteroclidæ*].

——. On the Fruit-Pigeons of the Genus *Ptilopus*. P. Z. S. 1878, pp. 500–575, pls. xxxiii. & xxxiv.

The literature, geographical distribution, and characteristics of the 71 species contained in this genus are fully discussed, and the paper is illustrated by woodcuts of the first primaries, tarsi, &c., of many species. [*Columbidæ*.]

——. Notes on the *Trochilidæ*. The genus *Thaumatias*. Ibis, 1878, pp. 35–53.

Twenty-one species are recognized as belonging to this genus (originally instituted as *Thaumantias* by Bonaparte); their synonymy is discussed, and their geographical distribution indicated.

——. Remarks on certain Species of the *Corvidæ* and *Paradiseidæ*, with a description of an apparently new species of *Cyanocorax*. Tom. cit. pp. 54–57.

The author unites the 3 species of *Platylophus*, acknowledged by R. B. Sharpe, Cat. B. Brit. Mus. iii. pp. 317–319; describes a new species [*Corvidæ*]; and remarks on *Phonegama* and *Manucodia* [*Paradiseidæ*].

——. The Genus *Porphyrio* and its Species. Str. Feath. vii. (Aug. 1878), pp. 6–25.

The literature, synonymy, and geographical distribution of the 9 species comprised in this genus are fully discussed, and plates are given of the heads of the type of *P. calvus*, and of a larger example, both from Java; also a coloured plate of *P. edwardsi* [*Rallidæ*].

——. See also *Iolæma* [*Trochilidæ*], *Anthracoceros*, *Bucorvus* [*Bucerotidæ*], *Porphyrio* [*Rallidæ*], *Ptilopus*, *Drepanoptila* [*Columbidæ*], *Phasianus* [*Phasianidæ*].

Embleton, D. A Paper on Eggs. Tr. North. Dur. vii. pt. 1, pp. 43–87, pls. i.–iv.

The author discusses the etymology, early history, structure, colouring matter, and depositing of the egg, and gives plates from photographs of specimens in Mr. John Hancock's collection.

Feilden, H. W. Ornithological Notes from the Færoe Islands. Zool. 1878, pp. 153–155.

On species observed by H. C. Müller subsequently to the author's visit in 1872 [*cf.* Zool. Rec. ix. p. 21].

——. Notes from an Arctic Journal. *Tom. cit.* pp. 313–320, 372–384, 407–418, 445–451.

Interesting details of the Polar Expedition, 1875–76. [See also Nares, Sir G. S.]

——. See also *Alca* [*Alcidæ*], *Rhodostethia* [*Laridæ*].

Finsch, Otto. See *Amblynura* [*Fringillidæ*], *Sturnus* [*Sturnidæ*].

Fischer, G. Bemerkungen über zweifelhafte celebensische Vögel. Abh. Ver. Brem. v. p. 538.

Corrects some errors in locality in F. Brüggemann's paper on Birds of Celebes and Sangir [*cf.* Zool. Rec. xiv. *Aves*, p. 4].

Fischer, G. A. Briefliche Reiseberichte aus Ost-Afrika, iii. J. f. O. 1878, pp. 268–297.

Interesting remarks upon many East African species [*cf.* Zool. Rec. xiv. *Aves*, p. 9].

—— & Reichenow, A. Uebersicht der von Dr. G. A. Fischer auf Sansibar und während einer Reise durch das Küstenland von Mombassa bis Wito gesammelten oder sicher beobachteten Vögel. J. f. O. 1878, pp. 247–268.

This collection comprises 158 species, of many of which detailed measurements and field-notes are given, 1 species [*Alaudidæ*] being described as new.

See also *Euplectes* and *Pyrenestes* [*Ploceidæ*].

Forbes, W. A. Reports on the Collections of Birds made during the Voyage of H.M.S. 'Challenger.' No. VII.—On the Birds of Cape York and the neighbouring Islands (Raine, Wednesday, and Booby Islands). P. Z. S. 1878, pp. 120–128.

Thirty-seven species are noticed, but none are new, although 1 (*Pachycephala*) is doubtful.

——. On a Small Collection of Birds from the Samoan Islands and the Island of Rotumah, Central Pacific. *Tom. cit.* pp. 351–353.

Remarks on 3 species, the most interesting of which (*Myzomela chermesina*) is here described at length. [*Meliphagidæ*.]

——. See also *Garrulus* [*Corcidæ*].

Garrod, A. H. On the Systematic Position of the *Momotidæ*. P. Z. S. 1878, pp. 100–102.

Corrects an error in former paper (P. Z. S. 1874, p. 123), subsequent dissection having shown the absence of colic cæca in this group, and he therefore removes it from the *Passeriformes* to the *Piciformes*. Syrinx of *Momotus lessoni* is described and figured [*Momotidæ*].

GARROD, A. H. Note on the Gizzard and other organs of *Carpophaga latrans*. Tom. cit. pp. 102–105. [*Columbidæ*.]

——. On the Anatomy of Passerine Birds. Part IV. *Tom. cit.* p. 143.

The author gives the result of the dissection of *Psarisomus dalhousiæ* and *Serilophus rubripygius* [*Eurylæmidæ*].

——. On the Trachea of *Tantalus loculator* and of *Vanellus cayennensis*. Tom. cit. pp. 625–629.

Woodcuts illustrative of the trachea in both the above species accompany this paper. [*Tantalidæ*, *Charadriidæ*.]

——. On the Anatomy of the Maleo (*Megacephalon maleo*). Tom. cit. pp. 629–631. [*Megapodidæ*.]

——. Note on Points in the Anatomy of Levaillant's Darter (*Plotus levaillanti*). Tom. cit. pp. 679–681. [*Pelecanidæ*.]

——. Notes on the Anatomy of *Indicator major*. Tom. cit. pp. 930–935.

On dissection, both the soft parts and the osteology show that *Indicator* is not related to the Cuckoos, but rather to the Barbets and Toucans. [*Indicatoridæ*.]

——. [See MÜLLER, JOHANNES.]

GASSER, E. Beobachtungen über die Entstehung des Wollfschen Ganges bei Embryonen von Hühnern und Gansen. Arch. mikr. Anat. xiv. pp. 442–459.

——. Ueber die Entstehung des Herzens bei Vogelembryonen. *Tom. cit.* pp. 459–470, pls. 2.

On the development of the embryos of fowls and geese.

GATCOMBE, JOHN. Ornithological Notes from Devon and Cornwall. Zool. 1878, pp. 52–58, 131 & 132, 249–251, 430–433.

GERVAIS, PAUL. Structure calcaire des Œufs et caractères que l'on peut en tirer. J. Zool. vi. pp. 88–96.

—— & ALIX, E. Ostéologie et Myologie des Manchots ou Sphéniscidés. J. Zool. vi. pp. 424–472, pls. xvi. & xvii.

Principally based upon the examination of *Eudyptes chrysolopha* [*Spheniscidæ*].

GENTIL, A. Catalogue des Oiseaux observés dans la Sarthe. Bull. Soc. L. Norm. (3) i. pp. 24.

——. Contributions à l'histoire naturelle de la Sarthe. Bull. Soc. d'Agric. et Arts de la Sarthe. 4me. trim. 1877.

251 species are noticed in the former, and 11 in the latter.

GENTRY, T. G. Life History of the Birds of Pennsylvania. II. Salem: 1877, 12mo, pp. 336. [See Zool. Rec. xiii. *Aves*, p. 12].

GIBSON, JOHN. On certain Birds collected by the late Captain (Rear-Admiral) P. P. King in the Straits of Magellan, between 1826 and 1827. P. Phys. Soc. Edinb. 1876–78, pp. 183–186.

Remarks on, and identification of, supposed types of two species [*Rallidæ*, *Anatidæ*].

[Gibson, John.] See also *Dromæus* [*Casuariidæ*].

Gillies, R. Notes on some changes in the Fauna of Otago. Tr. N. Z. Inst. x. pp. 306–322.

Contains, amongst other things, some important observations on those species of birds which are gradually disappearing.

Godwin Austen, H. H. Sixth List of Birds from the Hill Ranges of the North-East Frontier of India. J. A. S. B. xlvii. pt. 2, pp. 12–25, with pls. xxxi. [of vol. xlvi.]. [An Abstract of above appeared in P. A. S. B. April, 1878, p. 108.]

This list is the result of the collections made by Mr. A. W. Chennell in the Eastern Nágá Hills, and also in the North Khasi Hills; and by Mr. M. T. Ogle in the low hills about Sadiya, and the neighbourhood of the Bráhmakhúnd. One species is described as new (*Abrornis flavigularis*), two are figured, and several are of interest for locality; there are also some rectifications of synonymy [*Sylviidæ*, *Timeliidæ*, *Podargidæ*, *Ardeidæ*, *Turdidæ*].

——. [For single species, see *Timeliidæ*, *Bucerotidæ*.]

Göring, A. Notizen über die Vogelwelt Venezuela's. Orn. Centralbl. 1878, pp. 98 & 99.

Gould, J. The Birds of New Guinea and the adjacent Papuan Islands, including any new species that may be discovered in Australia. Parts vi., vii., & viii., Feb. 1, June 1, and Oct. 1, 1878. [*Alcedinidæ*, *Artamidæ*, *Paradiseidæ*, *Psittacidæ*, *Pittidæ*, *Columbidæ*, *Picidæ*, *Diceidæ*, *Dicruridæ*, *Nectariniidæ*, *Muscicapidæ*.]

Grandidier, Alfred. See Milne-Edwards, A.; also *Heliodilus* [*Strigidæ*].

Gray, Robert. See *Sturnella* [*Icteridæ*], *Ardea* [*Ardeidæ*].

Grunack, A., & Thiele, H. Die Sommervögel der Insel Sylt. Orn. Centralbl. 1878, pp. 153–155.

Remarks on the birds found on the island of Sylt, Frisian Group, in summer time.

Gurlt, — von. Neues Verzeichniss der Thiere auf welchen Schmarotzer-Insecten leben. Arch. f. Nat. 1878, pp. 162–210.

A list of the animals and birds infested by parasites, and of the various forms found on each species.

Gundlach, J. Contribucion á la Ornithologia Cubana. Habana: 1876, large 8vo, pp. 364.

An important work, in which are collected the author's previous papers, with reviews of the works of his predecessors, and valuable notes on the 225 species in the Cuban list.

——. Apuntes para la Fauna Puerto-Riqueña. An. Soc. Esp. vii. *Aves* pp. 141–234, 343–422.

An important extension of the author's former paper on the birds of the island of Porto Rico [*cf.* Zool. Rec. xi. p. 33], with details on the

habits, modification, local names, &c., of the species observed, 153 in number.

GUNDLACH, J. Neue Beiträge zur Ornithologie der Insel Porto Rico. J. f. O. 1878, pp. 157–194.

An abstract of the above work for German readers.

——. See also *Dysporus* [*Pelecanidæ*.]

GURNEY, J. H. Notes on a 'Catalogue of the *Accipitres* in the British Museum,' by R. Bowdler Sharpe (1874). Ibis, 1878, pp. 84–102, pp. 145–164, 352–356, 451–465. [*Cf.* Zool. Rec. xii. p. 34, xiii. *Aves*, p. 13, and xiv. *Aves*, p. 11 ; see also *Strigidæ*.]

The genera *Circaetus*, *Helotarsus*, *Haliaetus*, *Thalassaetus*, *Pandion*, and *Gypohierax*, and the group *Milvinæ* are here discussed.

——. See also *Huhua* [*Strigidæ*], *Buteo* [*Falconidæ*].

HANF, P. BLASIUS. Ornithologische Miscellen. Verh. z.-b. Wien, xxviii. pp. 11–14.

HARTING, J. E. On the Moult of Bill and Palpebral Appendages in the common Puffin, discovered by Dr. Bureau. Zool. 1878, pp. 233–240, and plate.

An adaptation for English readers, with the original illustrations, of Dr. Bureau's article. [*Cf.* Zool. Rec. xiv. *Aves*, p. 5.]

——. See also *Anser* [*Anatidæ*].

HELDREICH, T. DE. La Faune de Grèce. Athènes: 1878, 8vo. (Oiseaux, pp. 26–61).

A catalogue of the 167 species which breed in Greece, and of 164 which occur there on migration, making a total of 331 species observed, with the local Greek names, and, where identification is possible, those of Aristotle.

HENSHAW, H. W. Report on the Ornithology of Portions of Nevada and California. In Wheeler's Ann. Rep. Geogr. Explor. W. of 100th Mer., &c. Appendix N. N. pp. 1303–1322.

——. See also *Passarella* [*Fringillidæ*], *Selasphorus* [*Trochilidæ*], *Gymnocitta* [*Corvidæ*].

HODEK, E. Europäische Raubvögel. MT. orn. Ver. Wien, 1878, pp. 36–38, 48–51, 53–57, 73–75, 80–82, 91 & 92.

A notice of the European diurnal *Accipitres*, with an elaborate description of the various plumages of *Aquila fulva* [*Falconidæ*].

HOMEYER, E. F. v. Die Heerstrassen und die Stationen der Vögel, mit Rücksicht auf die ererbten Gewohnheiten. J. f. O. 1878, pp. 113–126.

——. Beiträge zur Gattung *Budytes*. Tom. cit. pp. 126–131.

Four new species are incidentally described [*Motacillidæ*].

——. Die Wanderungen der Vögel in Bezug auf die selteneren Erscheinungen. Orn. Centralbl. 1878, pp. 41–44.

HUME, A. O. A Second List of the Birds of Southern Travancore. Str. Feath. vii. pp. 33–39.

This second collection made by Mr. Bourdillon [*cf.* Zool. Rec. xiii. *Aves*, p. 15] contains 28 additional species, some of which are of considerable interest [*Sylviidæ*, *Turdidæ*, *Timeliidæ*].

——. The Birds of drought. *Tom. cit.* pp. 52–68.

A list of the 28 species observed during a month at the dry station of Jodhpoor, where no rain had fallen for 15 months.

——. A Lake in Oodeypore. *Tom. cit.* pp. 95–99.

On the birds observed in that district of Rajpootana.

——. Further Notes on the Swans of India. *Tom. cit.* pp. 101–108 [*Anatidæ*].

——. Notes on Nomenclature, III. *Tom. cit.* pp. 124–128. [*Cf.* Zool. Rec. xiv. *Aves*, p. 12.]

——. Novelties. *Tom. cit.* pp. 140–142, 316–318.

The species considered new are *Garrulax subcærulatus*, *Iole terricolor*?, *Rallina telmatophila*, *Asio butleri* [*Timeliidæ*, *Pycnonotidæ*, *Rallidæ*, *Strigidæ*]; but at p. 451 [see below] the author expresses doubt as to whether the second and third are not identical with previously described species.

——. Notes. *Tom. cit.* pp. 149–170, 451–465.

The above contains many rectifications in synonymy, including retractations concerning some of the author's supposed new species.

——. Birds occurring in India not described in Jerdon or in "Stray Feathers." Str. Feath. vii. pp. 320–451.

A compilation suited to the requirements of those Indian Field-Naturalists who have not access to ornithological libraries.

——. For papers on single genera and species, see *Suya* [*Sylviidæ*], *Pellorneum*, *Trochalopterum* [*Timeliidæ*], *Batrachostomus* [*Podargidæ*].

[For extensive Editorial Notes see also MURRAY, and BROOKS.]

——, & DAVISON, W. A Revised List of the Birds of Tenasserim. Str. Feath. vi. pp. 1–524.

The whole of vol. vi. is devoted to this important monograph, the value of which can hardly be overrated. 721 species are enumerated, and Hume's synonymy and descriptions are supplemented by Davison's remarks on their distribution, with interesting field-notes. A new genus (*Turdinulus*) is proposed by Hume for *Pnoepyga roberti* [Cf. Zool. Rec. xii. p. 79, where this species was recorded amongst the *Troglodytidæ*, but, following Tweeddale & Blyth, the Recorder now places it amongst the *Turdidæ*, although it will probably be eventually referred to the *Timeliidæ*].

HUTTON, F. W. [See *Dinornis*.]

JEITTELES, L. J. Neue Beiträge zur Geschichte des Haushuhns. MT. orn. Ver. Wien, 1878, pp. 4–8, 15–18.

An elaborate history of the more important branches, and an attempt

to trace the origin of the domestic fowl. This paper has also been translated into French by Count Marschall; Bull. Soc. Philom. (7), ii. p. 108.

JORDAN, D. S. Manual of the Vertebrates of the Northern United States. 2nd edition. Chicago: 1878. [See Zool. Rec. xiii. *Aves*, p. 16.]

Seven species of birds are added to those in the first edition.

JOUAN, HENRI. Notes sur la Distribution Géographique des Oiseaux dans quelques Archipels de l'Océanie. Mem. Soc. Cherb. (3) i. 1877–78, pp. 293–327.

A review of the distribution of birds in the Sandwich Islands, the Marquesas, the Society, and Paumotou groups, New Caledonia, the New Hebrides, the Solomon Islands, New Britain, New Ireland, New Guinea, and New Zealand.

KUTTER, —. Betrachtungen über Systematik und Oologie vom Standpunkte der Selectionstheorie. J. f. O. 1878, pp. 300–348.

The concluding portion of a long article. [*Cf.* Zool. Rec. xiv. *Aves*, p. 12.]

LACORDAIRE, LÉON. Catalogue des Oiseaux observés de 1845 à 1874, dans les departements du Doubs et de la Haute-Saône. Revu et publié par le Dr. Louis Marchant. Besançon: 1878, 8vo, pp. 181.

LANGDON, F. W. Observations on Cincinnati Birds. J. Cin. Soc. N. H. i. p. 110.

——. A Revised List of Cincinnati Birds. *Tom. cit.* pp. 167–193.

A useful revision of the author's previous paper [*cf.* Zool. Rec. xiv. *Aves*, p. 13], comprising 256 identified species, and a valuable addition to the natural history of Ohio.

LANDOIS, H. Missbildung bei Hühnereiern. Mit 26 Abbildungen monströser Formen. Zool. Gart. 1878, pp. 17–24.

LASSÈRE, R. Sur deux cas de monstruosités doubles offerts par deux jeunes poulets. Bull. Soc. Toulouse, 1878, pp. 138–141.

LAWRENCE, G. N. Descriptions of Seven New Species of Birds from the Island of St. Vincent, West Indies. Ann. N. York Ac. i. pp. 147–153.

[See *Turdus* (*Turdidæ*), *Myiadestes* (*Sylviidæ*), *Thryothorus* (*Troglodytidæ*), *Certhiola* (*Certhidæ*), *Leucopeza* (*Mniotiltidæ*), *Calliste* (*Tanagridæ*)].

——. Descriptions of supposed New Species of Birds from the Islands of Granada and Dominica, West Indies. *Tom. cit.* pp. 160–163.

Three species are described from Granada and 1 from Dominica, which see under *Turdus* [*Turdidæ*], *Thryothorus* [*Troglodytidæ*], *Quiscalus* [*Icteridæ*], *Blacicus* [*Tyrannidæ*].

——. Catalogue of the Birds of Dominica from the Collections made for the Smithsonian Institution by F. A. Ober, together with his Notes and Observations. Pr. U. S. Nat. Mus. 1878, pp. 48–69.

Details and field-notes on 56 species which had hitherto been only enumerated. [See Zool. Rec. xiv. *Aves*, p. 13.] [*Strigidæ*, *Vireonidæ*.]

[Lawrence, G. N.] Catalogue of the Birds of St. Vincent, from Collections made by Mr. F. A. Ober under the direction of the Smithsonian Institution, with his Notes thereon. *Tom. cit.* pp. 185–198.

Fifty-nine species are enumerated, with the collector's important field-notes, but with few exceptions, notably that of *Chrysotis guildingi* [*Psittacidæ*], the land birds are similar to those of Dominica.

——. Catalogue of the Birds of Antigua and Barbuda, from Collections made for the Smithsonian Institution by Mr. F. A. Ober, with his Observations. *Tom. cit.* pp. 232–242.

Forty-two species are enumerated from the Island of Antigua, one of them *Speotyto amaura* [*Strigidæ*] being described as new. Barbuda possesses 39 species whose affinities appear to be with the forms of the islands to the southward.

——. See also *Chætura* [*Cypselidæ*], *Chrysotis* [*Psittacidæ*], *Gymnoglaux* [*Strigidæ*].

Layard, E. L. Descriptions of New Species of Birds from the Island of Lifu, New Caledonia. Ann. N. H. (5) i. pp. 374–375.

Five species are described as new: *Turdus* [*Turdidæ*], *Pachycephala* [*Laniidæ*], *Zosterops* [*Diceidæ*], *Erythrura* [*Fringillidæ*].

——. See also *Lamprolia* [*Sylviidæ*].

—— & Layard, E. L. C. Notes on the Avifauna of New Caledonia. With remarks by the Rev. Canon Tristram. Ibis, 1878, pp. 250–252.

A catalogue of the species obtained by the authors, and also of some observed in two local collections; five of them having recently been described in Ann. N. H. (5) i. pp. 374 & 375 (*suprà*). The analysis of the species tends to show that the character of the avifauna is essentially Australian, and probably its most eastern limit.

—— & ——. Notes on some Birds Collected and Observed by Mr. E. Leopold C. Layard in the New Hebrides. With remarks by the Rev. Canon Tristram. Ibis, 1878, pp 267–280.

The islands visited were Erromango, Vate (where the major part of the collecting was done), Ambrym, St. Bartholomew, Santo, Api, and Mallicolo, the number of species noted being 38, of which 25 were obtained. Some interesting remarks on geographical distribution by the two authors and annotator are added.

Legge, W. V. A History of the Birds of Ceylon. Part i., *Accipitres, Psittaci, Picariæ*. London: November, 1878, 4to.

The first instalment of an admirably designed and well-executed work, with coloured plates of some of those species which are peculiar to Ceylon, in J. G. Keulemans's best style. [*Falconidæ, Strigidæ, Psittacidæ, Picidæ, Capitonidæ, Cuculidæ, Bucerotidæ.*]

——. For separate papers see *Scops* [*Strigidæ*], *Baza*, *Spizaetus* [*Falconidæ*], *Locustella* [*Sylviidæ*].

Le Ménicier, J. Catalogue des Oiseaux observés dans le département de la Manche, plus particulièrement dans l'arrondissement de Saint-Lo, depuis près de 85 ans. St. Lo : 1878, 8vo, engravings.

Two hundred and forty-six species are enumerated.

Lemire, C. La Colonisation Française en Nouvelle-Calédonie et dépendances. Paris: 1878, 8vo, pp. 376.

At pp. 218–221 are some remarks on the avifauna, and pp. 313–315 contain a list of the birds, for which acknowledgment is given to Mr. E. L. Layard.

Liebe, K. T. Die Brutvögel Ost-Thuringiens und ihr Bestand. J. f. O. 1878, pp. 1–87.

Remarks on habits and distribution of the 146 species which breed in Eastern Thuringia, with observations on others of rare occurrence, and on some species which might be expected but have not yet been noticed.

Liebermann, C. Ueber die Färbungen der Vogeleierschalen. Ber. Berl. Chem. Ges. xi. pp. 606–610.

Investigations into the cause of the brilliant colours in many birds' eggs show that they are essentially due to only two colouring matters, respecting which chemical details are given.

Lockwood, E. Natural History, Sport, and Travel. London: 1878, 8vo, pp. 284.

Contains numerous field-notes on the birds of the district of Monghyr, Bengal.

Macalister, A. An Introduction to the Systematic Zoology and Morphology of Vertebrate Animals. Dublin & London : 1878, 8vo [Birds, pp. 145–198].

McVean, Colin A. Notes on the Ornithology of Yedo. P. Phys. Soc. Edinb. 1876–78, pp. 144–154.

Malm, A. W. Die Erscheinung des Wanderns oder Ziehens in der Thierwelt im allgemeinen und der Vögel in besonderen. Arch. f. Nat. 1878, pp. 131–161.

A translation from pp. 26–49 of the author's "Göteborgs och Bohusläns Fauna." [*Cf.* Zool. Rec. xiv. *Aves*, p. 14].

Masters, G. On a Collection of Birds from Port Darwin. P. Linn. Soc. N. S. W. ii. pp. 269–276.

One hundred and six species are enumerated, and one of them (*Craticus spaldingi*) is described as new. [*Laniidæ*.]

Marshall, A. M. The Development of the Cranial Nerves in the Chick. Q. J. Micr. Sc. xviii. pp. 10–40.

Maynard, C. J. The Birds of Florida, with the Water and Game Birds of eastern North America. Newtonville, Mass. : 1878, 4to, pt. iv. pp. 89–112. [*Cf.* Zool. Rec. ix. p. 34.]

MARSH, O. C. Caractères des *Odontornithes* et Notice relative à un genre qui s'y rattache. J. Zool. vi. pp. 385–389.

A French version of the author's original article in Am. J. Sci. [*cf.* Zool. Rec. xiv. *Aves*, p. 14].

MERRIAM, C. H. Remarks on some of the Birds of Lewis County, Northern New York. Bull. Nutt. Orn. Club, iii. pp. 52–56, 123–128.

——. See also *Picoides* [*Picidæ*].

MERRILL, J. C. Notes on the Ornithology of Southern Texas, being a List of the Birds observed in the vicinity of Fort Brown, Texas, from February, 1876, to June, 1878. Pr. U. S. Nat. Mus. 1878, pp. 118–173.

The author, often working in company with G. B. Sennett [*infrà*], has succeeded in identifying 251 species, many of which are Mexican forms, and 11 species or varieties are added to the United States avifauna, although none are new to science.

MEYER, A. B. See *Zeocephus* [*Muscicapidæ*], *Surniculus* [*Cuculidæ*], *Casuarius* [*Casuariidæ*], *Eclectus* [*Psittacidæ*].

MILNE-EDWARDS, A. Observations sur les affinités zoologiques du genre *Phodilus*. C. R. lxxxv. pp. 1173–1175. [*Strigidæ*.]

——. Sur un nouveau genre d'oiseau de proie nocturne provenant de Madagascar. *Tom. cit.* p. 1282. [*Heliodilus* (*Strigidæ*)].

——. Observations sur les affinités zoologiques du genre *Phodilus*, et description d'un nouvelle genre [*Heliodilus*] de Rapace nocturne. N. Arch. Mus. H. N. (2) i. pp. 185–200, pls. iv. & v. [*Strigidæ*].

——. Observations sur les affinités zoologiques du genre *Mesites*. C. R. lxxxvi. pp. 1029–1031.

——. Remarques sur le genre *Mesites*, et sur la place qu'il doit occuper dans la série ornithologique. Ann. Sc. Nat. (6) vii. pp. 2–4.

The examination of two specimens sent home from Madagascar in spirits leads the author to consider that this is the surviving representative of a family allied to the *Rallidæ* and *Ardeidæ*. [For the present, see it under *Ardeidæ*, and *cf.* Zool. Rec. xiv. *Aves*, p. 2.]

—— & GRANDIDIER, A. Histoire Physique, Naturelle et Politique de Madagascar. Vol. xiii. Histoire Naturelle des Oiseaux. Tome ii. Atlas i. 2e partie, 5e fascicule, Royal 4to. Paris: 1878. [*Cf.* Zool. Rec. xiii. *Aves*, p. 13.]

This 2nd portion of the atlas is all that is published in 1878, the first volume of text being dated 1879, under which year it will be duly recorded. Numerous plates of birds, their skeletons, osteology, and the more interesting portions of their pterylosis and anatomy are given: reference may especially be made to *Heliodilus*. [*Falconidæ*, *Strigidæ*, *Cypselidæ*, *Meropidæ*, *Upupidæ*, *Caprimulgidæ*, *Coraciidæ*, *Cuculidæ*, *Alcedinidæ*.]

MIVART, ST. G. On the Axial Skeleton of the *Pelecanidæ*. Tr. Z. S. x. pp. 315–378, pls. lv.–lxi.

Montrouzier, C. R. Note d'histoire naturelle sur les Iles Huon et Surprise. Bull. Soc. Géogr. Fr. (6) xii. [1876] pp. 645–648.

The birds of these islands [situate to the S. of New Caledonia in lat. 18° 18′ S., long. 163° E.] appear to consist of some 6 or 7 species, amongst which a *Tachypetes* is described as new. [*Pelecanidæ*.]

More, A. G. British Association Meeting, 1878. Guide to the County of Dublin. *Aves*, pp. 77–90.

An excellent list of the Birds of the county of Dublin; perhaps the most interesting fact being the recorded nesting of the Siskin [*Fringillidæ*.]

Müller, J. On Certain Variations in the Vocal Organs of the *Passeres* that have hitherto escaped notice. The Translation by F. Jeffrey Bell; edited with an appendix by A. H. Garrod. Oxford: 1878, pp. 74, pls. i.–viii.

An excellent translation of this work is followed by a valuable Appendix, containing descriptions of the vocal organs of some aberrant Passerine Birds not recorded by Müller, with 2 additional plates illustrative of those parts in *Menura*, *Atrichia*, *Lipaugus*, *Hadrostomus*, *Gralaria*, *Hylactes*, *Coracina*, and *Pitta*.

Mulsant, É., & Verreaux, É. Histoire Naturelle des Oiseaux-Mouches ou Colibris. iv. liv. 3 & 4. [See Zool. Rec. xiv. *Aves*, p. 15.]

These parts, containing additions to and corrections of synonymy, as well as the index and a catalogue of publications on the *Trochilidæ*, complete the work. [*Trochilidæ*.]

Murray, J. A. Further Additions to the Sindh Avifauna. Str. Feath. vii. pp. 108–123.

This paper adds 24 species to the Sindh list, of which 6 are new to India, the latter being noticed at length by A. O. Hume. The 6 species are *Reticilla mesoleuca*, *Saxicola leucomela*, *Lanius auriculatus*, *Corvus umbrinus*, *Emberiza miliaria*, and *Linaria cannabina*, but there seems a little doubt about some of them.

Nares, Sir G. S. Narrative of a Voyage to the Polar Sea during 1875–6 in H.M. Ships 'Alert' and 'Discovery,' with Notes on the Natural History, edited by H. W. Feilden. London: 1878, 2 vols., 8vo.

Numerous observations on birds are to be found in the narrative portion; and Appendix No. III. (ii. pp. 206–217), by H. W. Feilden, treats of the Ornithology, with coloured plate of the eggs of *Calidris arenaria* [*Charadriidæ*].

Nathusius, W. v. Abgrenzung der Ordnung der Oscinen von der Clamatoren, Scansoren, und Columbiden durch die Structur der Eischalen. Z. wiss. Zool. xxx. Supplement, pp. 69–77, 5 woodcuts.

The structure of the egg-shell of the *Clamatores* differs from that of the *Oscines*, and more nearly approaches that of the *Scansores* and *Columbæ*.

NEWALD, J. Seltene Vögel in der Umgebung Wiens. MT. orn. Ver. Wien, 1878, pp. 1–4, 18–22.

Notes on some Birds of rare occurrence in the neighbourhood of Vienna.

NEWTON, ALFRED. A History of British Birds, by the late William Yarrell. 4th edition. Part xii. London: 1878, 8vo.

This number concludes the *Sturnidæ*, and contains the majority of the *Corvidæ*.

——. Letters relating to the Natural History of Norfolk. Communicated by Mrs. Richard Lubbock and Alfred Newton [with introduction and foot-notes by Prof. Newton & H. Stevenson]. Tr. Norw. Soc. 1877–78, pp. 388–428.

Interesting letters from such veteran ornithologists as Lubbock, Yarrell, Girdlestone, Hoy, &c., throwing an important light on the state of the Eastern Counties about half-a-century ago.

——. See also article EMEU, Encyclopædia Britannica. 9th Ed. Vol. viii. (1878).

NICHOLSON, FRANCIS. On a Collection of Birds from Abeokuta. P. Z. S. 1878, pp. 128–131, pl. x.

Thirty-eight species are recorded, one (*Amadina sharpii*) being new, and figured, and another is interesting for the extension of its range. [*Fringillidæ*, *Hirundinidæ*].

——. A List of the Birds collected by Mr. E. C. Buxton at Darra-Salam, on the Coast of Africa opposite Zanzibar. *Tom. cit.* pp. 353–359.

Forty-four species are enumerated.

——. See also *Anthus* [*Motacillidæ*].

——, H. ALLEYNE. The Ancient Life-History of the Earth. New York and London: 407 pp. 8vo, 1878.

A useful text-book. For Birds see pp. 222, 251–253, 281, 297, 345–348.

OATES, E. W. Notes on the Nidification of some Burmese Birds. II. Str. Feath. vii. pp. 40–52.

This second instalment [*Cf.* Zool. Rec. xiv. *Aves*, p. 16] contains many interesting remarks on species whose eggs are little known. [For most important, see *Pelecanidæ*, *Glareolidæ*.]

OUSTALET, E. Étude sur la faune ornithologique des Seychelles. Bull. Soc. Philom. (7) ii. pp. 161–206.

Notes on 44 species, obtained by M. de l'Isle, naturalist to the French Transit of Venus Expedition, and by M. Lantz, of Réunion; and, as the 14 terrestrial species are all peculiar to the Archipelago, these observations are of much interest.

——. See also *Pitta* [*Pittidæ*], *Pelecanus* [*Pelecanidæ*].

——. Description de quelques espèces nouvelles de la Cochin-Chine et de la Nouvelle Guinée. *Tom. cit.* pp. 50–59.

The new species are *Chætura cochinchinensis*, *Ixus germani*, and *Pachy-*

cephala squalida, and the habitat of *Hypothymis menadensis* is shown to be New Guinea, not Celebes. [*Cypselidæ*, *Pycnonotidæ*, *Laniidæ*, *Muscicapidæ*.]

Oustalet, E. Observations sur le groupe des Ibis, et descriptions de deux espèces nouvelles. N. Arch. Mus. (2) i. pp. 167–183, pls. vi. & vii.

The *Ibidinæ* are classed as a sub-family of the *Tantalidæ*, and 8 genera, in 2 sections, are enumerated, with a list of their component species, and full descriptions and plates relating to *I. harmandi* and *I. gigantea* [*Ibididæ*].

——. Sur quelques Oiseaux de la Papouasie. Ass. Sc. Fr. Bull. No. 533, p. 247.

One genus and 4 species are described as new. [See *Chalcospitta* (*Psittacidæ*), *Merops* (*Meropidæ*), *Cheno(r)rhamphus*, g. n. (*Muscicapidæ*), *Megapodius* (*Megapodiidæ*)].

——. Observations nouvelles sur les Oiseaux coureurs de la Papouasie. *Op. cit.* No. 539, pp. 349 & 350.

Casuarius salvadorii is described as new.

——. See also *Casuariidæ*; *Coccycolius*, g. n. [*Sturnidæ*], *Eudyptula* [*Spheniscidæ*].

Owen, Richard. Memoirs of the Extinct Wingless Birds of New Zealand, with an Appendix on those in England, Australia, &c. London: 1878, 2 vols., 4to, pp. 512, & pls. 130.

This is mainly a collection of the author's detached memoirs in the Trans. Zool. Soc., with some additions both in the text and the plates [*Dinornithidæ*, *Alcidæ*].

[This work is dated on the back 1878, in which year it was actually published, but the title-page bears date 1879.]

——. On *Argillornis longipennis*, Owen, a large bird of flight from the Eocene clay of Sheppey. J. G. Soc. xxxiv. pp. 124–130, pl. vi.

The remains are considered to be those of a long-winged natatorial bird, most nearly related to *Diomedea*, but larger than *D. exulans*, and the above new generic and specific names are given to it. On the plate, its remains and corresponding bones of *D. exulans* are compared [*Procellariidæ*].

——. On the Solitaire (*Didus solitarius*, Gm.; *Pezophaps solitarius*, Strkl.). Ann. N. H. (5) i. pp. 87–97, pls. vii. & viii.

Remarks based on the bones, completing two nearly entire skeletons, brought by the Transit of Venus Expedition from the island of Rodriguez, several portions not hitherto described being here noticed. [*Dididæ*.]

Palacky, Johann. Über die Vogelsfluglinien in Asien. SB. böhm. Ges. 1878, pp. 161–162.

On the travelling routes of migratory birds in Asia.

PELZELN, A. VON. Weitere Sendung von Vögel aus Ecuador. Verh. z.-b. Wien, xxviii. pp. 15–20.

Lists of two collections from Ecuador, the second and more important one containing several rare species of *Trochilidæ*, &c., and one species *Chlorochrysa sodiroi*, is described as new, but Sclater & Salvin (Ibis, 1878, p. 479), who have examined the type, consider it = ♂ *C. phonicotis*, Bp. [*Tanagridæ*].

——. Bericht über die Leistungen in der Naturgeschichte der Vögel während des Jahres 1877. Arch. f. Nat. 1878, pt. iv. pp. 1–80.

PARKER, W. K. On the Skull of the Ægithognathous Birds. Part ii. Tr. Z. S. x. pp. 251–314, pls. xlvi.–liv. [*Cf.* Zool. Rec. xii. p. 46.]

PURDIE, H. A. See *Empidonax* [*Tyrannidæ*].

PLESKE, T. Ornithologische Notizen aus Ost-Russland. J. f. O. 1878, pp. 89–94.

Notes on 25 species observed in the Baschkir district [roughly speaking, between Orenburg and Ekaterinburg].

PRJEVALSKY, N. The Birds of Mongolia, the Tangut Country, and the Solitudes of Northern Tibet. Orn. Misc. iii. pp. 87–110, 145–162.

The conclusion of the translation of this important paper. [*Cf.* Zool. Rec. xiii. *Aves*, p. 21, xiv. *Aves*, p. 17].

——. Reise des Russischen Generalstabs-Obersten N. M. Przewalsky von Kuldscha über den Thian-Shan an den Lob-Nor und Altyn-Tag 1876 und 1877. Geogr. MT., Ergänzungsheft No. 53. [An abstract of the original work, which is in Russian.]

In this report, compiled from the official Russian sources, of the expedition from Kulja, across the desert of Gobi, along the river Tarim, and to the northern base of the Altyn-tagh range, a list is given of 48 species of birds observed in winter on the Tarim; amongst these are 2 on which new names are bestowed: *Podoces tarimensis* [= *P. biddulphi*] and *Rhopophilus deserti*, which is described as larger and paler than *R. pekinensis*. There are also other remarks on the birds of several localities.

——. [An English version of Prjevalsky's Journey, under the title of "From Kulja across the Tian Shan to Lob-Nor," has been produced by E. DELMAR MORGAN (London: 1879, 8vo), and for principal remarks on above and other birds, see pp. 39, 43, 62–64, 85, 103, 116–126, 131, 166–168.]

PRYER, T. [See BLAKISTON, H.]

QUATREFAGES, A. DE. Mémoire sur un pigeon monstrueux du genre *Deradelphe*, *D. synanencephale*. Ass. Franç. Congr. Havre, 1877. Paris: 1878, pp. 14.

[Not seen by Recorder.]

RAMSAY, E. P. Notes on "List of Australian Birds" [*Cf.* Zool. Rec. xiv. *Aves*, p. 18]. P. Linn. Soc. N. S. W. iii. pp. 38–40.

Remarks on several species [*Anatidæ*, *Sylviidæ*] with abstract of additions to the list, and corrections.

——. Descriptions of Five Species of new Birds, from Torres Straits and New Guinea, &c. *Tom. cit.* pp. 72–75. [*Psittacidæ*, *Pittidæ*, *Laniidæ*, *Meliphagidæ*.]

——. Zoology of the 'Chevert': Ornithology. Part ii. *Tom. cit.* pp. 100–116.

Observations on an interesting collection from New Guinea, consisting of 67 species.

——. On the Tracheæ of certain Australian Ducks. *Tom. cit.* p. 154.

On the absence of the *bulla ossea* in the trachea of the ♀ of *Anas castanea* and other species [*Anatidæ*].

——. See also *Edoliosoma* [*Campephagidæ*], *Pachycephala*, *Eopsaltria*, and *Myiolestes* [*Laniidæ*], *Ianthœnas*, *Macropygia*, and *Calcophaps* [*Columbidæ*], *Arses*, *Rhipidura* [*Muscicapidæ*], *Casuarius* [*Casuariidæ*], *Eclectus* [*Psittacidæ*], *Gerygone* [*Sylviidæ*], *Ptilotis* [*Meliphagidæ*].

RAMSAY, R. G. WARDLAW. A Synopsis of the Genus *Pomato*[r]*rhinus*. Ibis, 1878, pp. 129–145.

A valuable revision of the 21 species comprised in this genus, with figures of 5 of them.

RASPAIL, XAVIER. Histoire Naturelle des Merles; mœurs et chasse des espèces qui fréquentent les environs de Paris. Paris: 1878, 8vo, pp. 48.

The principal feature of this pamphlet consists in the revolutionary changes made in nomenclature. *Turdus iliacus* is named *Sylvia vitimala*, *T. pilaris* becomes *Sylvia linortata*, and *T. musicus* is renamed *Sylvia turdela*.

REICHENOW, A. Vogelbilder aus fernen Zonen. Atlas der bei uns eingeführten ausländischen Vögel, mit erläuterndem Text. Pts. i. & ii. Cassel: 1878, fo.

These parts contain five coloured plates on a reduced scale, two of them consisting of groups of American, and one of Australian, Parrots; one of Cockatoos and one of Parraquets.

——. [See FISCHER, G. A.; also *Corythaix* (*Musophagidæ*)].

RIDGWAY, R. Studies of the American *Herodiones*. Part i. Synopsis of the American Genera of *Ardeidæ* and *Ciconiidæ*; including descriptions of three new genera and a monograph of the American species of the genus *Ardea*, Linn. Bull. U. S. Surv. Terr. iv. pp. 219–251.

The author divides the *Ardeidæ* into *Ardeinæ*, with 14 genera, 3 of which *Dicromanassa*, *Hydranassa*, and *Syrigma*, are new, and *Botaurinæ*,

with 2 genera. He also assigns *Eurypyga* to the *Herodiones*, thus removing it from its usual place near the *Rallidæ*. In the *Ciconiidæ*, a new genus, *Euxenura*, is also proposed. [*Ardeidæ*, *Ciconiidæ*.]

[Ridgway, R.] A Review of the American Species of the Genus *Scops*, Savigny. Pr. U. S. Nat. Mus. 1878, pp. 85–117.

Seven American species of this genus are recognized, and the subdivisions of some of them into local races is fully gone into; the whole subject being treated in an elaborate manner. One species (*S. cooperi*) is described as new. [*Strigidæ*.]

——. Notes on some of the Birds of Calaveras County, California, and adjoining localities. Bull. Nutt. Orn. Club, iii. pp. 64–68.

——. Notes on Birds observed at Mount Carmel, Southern Illinois, in the spring of 1878. *Tom. cit.* pp. 162–166.

——. See also *Thryothorus* [*Troglodytidæ*], *Parus* [*Paridæ*], *Syrnium* [*Strigidæ*], *Atthis* [*Trochilidæ*].

Rodd, E. H. Cornish Ornithology. J. Inst. Corn. xx. pp. 131–135.

Rosenberg, C. B. H. von. Der Malayische Archipel. Leipzig: 1878, 8vo.

This work treats of the author's travels in Sumatra and the principal references to Birds will be found at pp. 99–109, 217–219.

——, H. von. Die Papageien von Insul-inde. Zool. Gart. 1878, pp. 344–348.

A recapitulation of the genera and 76 species of Parrots found in Malaysia, with localities for each.

Rowley, G. D. A few words on Fen-land. Orn. Misc. iii. pp. 203–221, pls. cv.–cix.

Contains many details on Fen birds.

——. Remarks on the Extinct Gigantic Birds of Madagascar and New Zealand. *Tom. cit.* pp. 237–247, pls. cxii.–cxv.

A summary of the discoveries made in the above countries, with illustrations of the eggs of *Æpyornis maximus*, *Dinornis ingens*, and *D. crassus*, and other remains.

——. See also *Chlorœnas*, *Geotrygon*, *Leptoptila*, *Ptilopus* [*Columbidæ*], *Ardea* [*Ardeidæ*], *Cotyle* [*Hirundinidæ*], *Machœrirrhynchus* [*Muscicapidæ*], *Domicella* [*Psittacidæ*], *Cittura* [*Alcedinidæ*], *Anas* [*Anatidæ*].

Russ, Carl. Die fremländischen Stubenvögel, ihre Naturgeschichte, Pflege und Zucht. Hanover: 1877–78, 8vo.

An illustrated work on cage-birds in course of publication.

——. See also *Palæornis* [*Psittacidæ*].

Sachs, Carl. Aus den Llanos; Schilderung einer naturwissenschaftlichen Reise nach Venezuela. Leipzig: 1878, 8vo.

Contains some interesting notices of Venezuelan birds.

SALVADORI, T. Descrizione di una nuova specie di Uccello del genere *Chalcopsittacus*, e note intorno ad altre specie di Uccelli della Nuova Guinea, inviate recentemente dal Sig. A. A. Bruijn, o raccolte dal Sig. Leon Laglaize. Atti Acc. Tor. xiii. pp. 309–316.

A Papuan species, *Chalcopsittacus bruijni*, is described as new, but in a foot-note is identified with E. Oustalet's new species *Chalcopsitta insignis*, and there are several other rectifications of the latter's supposed novelties in his paper on birds of Papuasia [*suprà*, p. 21]. The male of *Chalcophaps beccarii* and the female of *Macropygia nigrirostris* are here described for the first time. [*Psittacidæ*, *Meropidæ*, *Muscicapidæ*, *Megapodiidæ*, *Columbidæ*.]

——. Catalogo di una Collezione di Uccelli di Tarawai, fatta dai cacciatori del Sig. A. A. Bruijn. *Tom. cit.* pp. 317–324.

One hundred and sixty-one species are enumerated from the above Island [better known as D'Urville] of which a *Lamprococcyx* [*Cuculidæ*] is doubtful, and a *Hermotimia* [*Nectariniidæ*] is described as new.

——. Descrizione di tre nuove specie di Uccelli, e note intorno ad altre poco conosciute delle Isole Sanghir. *Tom. cit.* pp. 1184–1189.

Seven species are enumerated, one being an undetermined form of the genus *Eudynamis*. For the three new species see *Dicruropsis* [*Dicruridæ*], *Macropygia* [*Columbidæ*], *Ardetta* [*Ardeidæ*].

——. Reports on the Collection of Birds made during the voyage of H.M.S. 'Challenger.'—No. VI. On the Birds of Ternate, Amboyna, Banda, the Ké Islands, and the Aru Islands. P. Z. S. 1878, pp. 78–100.

Seventy-nine species are noticed, some of which are of special interest as having been recently described, or as new to the localities where they have been found, although none are new to science. [*Columbidæ*, *Psittacidæ*.]

——. Prodromus Ornithologiæ Papuasiæ et Moluccarum. Pt. V. ACCIPITRES ; Ann. Mus. Genov. xii. pp. 32–42. VI. PICARIÆ, Fam. *Cuculidæ*, op. cit. xiii. pp. 456–463. [*Cf.* Zool. Rec. xiv. *Aves*, p. 20.]

Of the order *Accipitres*, 54 species are enumerated. Of the family *Cuculidæ*, 36 species are recorded from Papua and the Moluccas, 3 of them, *Cacomantis æruginosus*, *Lamprococcyx pœciluroides*, and *L. crassirostris* being described as new, whilst 2 new generic names are proposed, *Rhamphomantis* and *Microdynamis* [*Cuculidæ*].

——. Descrizione di trentuna specie nuove di Uccelli della sottoregione papuana, e note intorno ad altre poco conosciute. Ann. Mus. Genov. xii. pp. 317–347.

The author gives the result of his visit to the Museums of Paris, London, Leyden, Bremen, Berlin, Dresden, and Vienna, erecting 2 genera, *Glycichæra* [*Meliphagidæ*] and *Macruropsar* [*Sturnidæ*], and describing 31 species as new, and making many identifications and corrections in nomenclature. [*Cuculidæ*, *Cypselidæ*, *Muscicapidæ*, *Campephagidæ*, *Laniidæ*, *Diceidæ*, *Meliphagidæ*, *Sylviidæ*, *Sturnidæ*, *Casuariidæ*.]

[Salvadori, T.] Intorno ad alcune specie di Casoari poco note. Ann. Mus. Genov. xii. pp. 419–425.

Remarks on *Casuarius tricaruneulatus* and *C. occidentalis* [*Casuariidæ*].

——. Nuove specie di Colombi dei generi *Megaloprepia*, Rchb., e *Macropygia*, Sw. *Tom. cit.* pp. 426–432.

Three species are described as new [*Columbidæ*].

——. Osservazioni intorno alla supposta identità specifica della *Rectes cirrhocephala* (Less.), e della *Rectes dichroa*, Bp., e descrizione di due nuove specie del genere *Rectes*, Rchb. *Tom. cit.* pp. 471–474. [*Laniidæ*.]

——. Monografia del sottogenere *Globicera*, Bp. Cronaca del R. Liceo-Ginnasio Cavour, 1877–78, pp. 17. [Only separate copy seen by the Recorder.]

The synonymy and geographical distribution of the 7 species comprised in this section of the genus *Carpophaga* are fully treated. [*Columbidæ*.]

——. See also *Carpophaga*, *Trerolæma* [*Columbidæ*], *Calornis* [*Sturnidæ*], *Hermotimia* [*Nectariniidæ*], *Lanius* [*Laniidæ*].

Salvin, Osbert. A Synopsis of the Genus *Setophaga*. Ibis, 1878, pp. 302–321, pls. vii. & viii.

This synoptical revision comprises 15 species, 2 of which [*S. chrysops* and *S. bairdi*] are described as new, and figured; illustrations being also given of *S. ruficoronata* and *S. albifrons*. [*Mniotiltidæ*.]

——. Note on the Type of *Malaconotus leucotis*, Swainson. *Tom. cit.* pp. 443–445, pl. xi.

The author shows that it really belongs to the American genus *Vireolanius*; *V. icterophrys*, Bp., being a synonym of it. [*Vireonidæ*.]

——. Descriptions of two New Species of Birds from Central America, and one from South America. *Tom. cit.* pp. 445–449.

The three new species are *Pyrgisoma occipitale* [*Fringillidæ*], *Odontophorus spodiostethus* [*Perdicidæ*], and *Osculata purpurata* [*Columbidæ*].

——. Report on the Collection of Birds made during the Voyage of H.M.S. 'Challenger.' No. XII.—The *Procellariidæ*. P. Z. S. 1878, pp. 735–740.

22 species, belonging to 13 genera, are here enumerated.

Sanchez, Jesus. Datos para el Catalogo de las Aves que viven en México, y su distribucion geografica. Ann. Mus. Mex. i. pp. 92–110 (Feb. 1878).

A list of 630 species with their localities, and, where obtainable, their native names, with an appendix of species whose exact localities are not known, making a total of 701.

Saunders, Howard. On the *Larinæ*, or Gulls. P. Z. S. 1878, pp. 155–212.

A monograph of the family similar in scope to previous papers on the *Stercorariinæ* and *Sterninæ* [cf. Zool. Rec. xiii. *Aves*, p. 26]. The

synonymy and geographical distribution of the 4 genera and 49 species recognized by the author is fully discussed, and woodcuts of the three outer primaries of many species are given to facilitate recognition. [*Laridæ*.]

SAUNDERS, HOWARD. On the Geographical Distribution of the Gulls and Terns (*Laridæ*). J. L. S. xiv. pp. 390–406.

——. A Catalogue of Works and Articles relating to the Ornithology of France. Zool. 1878, pp. 95–99.

SCHACHT, H. Die Vogelwelt des Teutoburger Waldes. Detmold: 1877, 8vo, pp. 268 (with 92 illustrations by F. Specht).

——. Die Schlafstätten unserer Vögel. Zool. Gart. 1878, pp. 129–135, 178–184, 204–210.

Remarks on the roosting-places adopted in Germany by various species of birds.

SCHIAVUZZI, B. Elenco degli Uccelli viventi nell' Istria ed in ispecialitá nell' agro Piranese. Boll. Soc. Adr. iv. pp. 53–76.

196 species are enumerated from this little-known corner of Southern Europe.

SCHAUER, ERNST. Ueber die Vogelwelt in den Umgebungen von Krakau. MT. orn. Ver. Wien, 1878, pp. 59–63, 70–73, 81–83.

An important contribution to the ornithology of the little-known district of Cracow.

SCHALOW, HERMAN. [See *Collurio* (*Laniidæ*).]

SCLATER, P. L. Preliminary Remarks on the Neotropical Pipits. Ibis, 1878, pp. 356–367, pl. x.

Descriptions and particulars of geographical distribution are given of the 6 species considered truly Neotropical, one of them (*Anthus nattereri*) being described as new and figured. The paper is also illustrated by woodcuts. [*Motacillidæ*.]

——. Reports on the Collections of Birds made during the Voyage of H.M.S. 'Challenger.'—No. VIII. On the Birds of the Sandwich Islands. P. Z. S. 1878, pp. 346–351.

A collection of 13 species made near Hilo, Owyhee, contained 13 species, one (*Munia nisoria*) introduced, and one (*Anas wyvilliana*) previously undescribed [*Anatidæ*].

——. Reports on the Collections of Birds made during the Voyage of H.M.S. 'Challenger.'—No. X. On the Birds of the Atlantic Islands and Kerguelen's Land, and on the Miscellaneous Collections. P. Z. S. 1878, pp. 576–579.

——. On a Third Collection of Birds made by the Rev. G. Brown, C.M.Z.S., in the Duke of York Group of Islands and its vicinity. P. Z. S. 1878, pp. 670–673, pl. xlii.

The collection consisted of 30 species, and 9 of these are specially noticed, one (*Carpophaga melanochroa*) being described as new and figured [*Columbidæ*].

[SCLATER, P. L.] Zoological Distribution, and some of its Difficulties. P. R. Inst. viii. p. 511.

Remarks are made upon the geographical distribution of several species and genera of Birds, the principal being *Cyanopica*, *Oxyrrhamphus*, *Neomorphus*, and *Pitta*.

——. [New Edition of H. E. Strickland's Rules for Zoological Nomenclature, 1878, 8vo, pp. 27.]

—. See also *Pipreola* [*Cotingidæ*], *Ibis* [*Ibidida*], *Athene*, *Ninox* [*Strigidæ*], *Fulica* [*Rallidæ*], *Muscipipra* [*Tyrannidæ*], *Casuarius* [*Casuariidæ*], *Fuligula* [*Anatidæ*], *Ciconia* [*Ciconiidæ*], *Saxicola* [*Sylviidæ*].

—— & SALVIN, O. On the Collection of Birds made by Professor Steere in South America. P. Z. S. 1878, pp. 135–142, pls. xi.–xiii.

On Professor Steere's journey across South America, from Pará to Callao, and the ascent of the coast to Guayaquil, and thence to Quito, about 362 species were collected, 22 of the most interesting being noticed here, 5 of which are described as new [*Oryzoborus* (*Fringillidæ*), *Myiarchus* (*Tyrannidæ*), *Furnarius* (*Dendrocolaptidæ*), *Capito* (*Capitonidæ*), *Crypturus* (*Tinamidæ*), ; also *Xema* (*Laridæ*)].

—— & ——. Reports on the Collections of Birds made during the Voyage of H.M.S. 'Challenger.'—No. IX. On the Birds of Antarctic America. *Tom. cit.* pp. 431–437.

A list of 41 species, obtained at the Island of Juan Fernandez, on the passage along the coast of Patagonia, and at the Falkland Islands.

—— & ——. Descriptions of three New Species of Birds from Ecuador. *Tom. cit.* pp. 438–440, pls. xxvii. & xxviii.

The 3 species are *Buarremon leucopis* [*Tanagridæ*], *Neomorphus radiolosus* [*Cuculidæ*], and *Aramides calopterus* [*Rallidæ*], the two latter being figured.

—— & ——. Reports on the Collections of Birds made during the Voyage of H.M.S. 'Challenger.'—No. XI. On the Steganopodes and Impennes. *Tom. cit.* pp. 650–655.

Nine species of the former and 6 of the latter family are recorded.

SCHLEGEL, H. De Vogel van Nederland. Amsterdam : 1878, 2 vols. 8vo.

SEEBOHM, H. Contributions to the Ornithology of Siberia. Ibis, 1878, pp. 173–184, 322–352.

The first paper contains the narrative portion of the author's second adventurous journey, extending to Krasnoyarsk and the Yen-e-say. In the second the list of the birds is carried to the end of the *Motacillidæ*, one species of which is described as new (*M. amurensis*), and many valuable remarks are made on distribution and habits, with rectifications of synonymy. [For most important, see *Corvidæ*, *Emberizidæ*, *Motacillidæ*.]

——. Letter [on *Sylviidæ* and *Muscicapidæ*]. Ibis, 1878, p. 491.

——. See also *Cettia* and *Sylvia* [*Sylviidæ*].

SENNETT, G. B. Notes on the Ornithology of the Lower Rio Grande of Texas, from observations made during the season of 1877. Edited with annotations by Dr. ELLIOTT COUES. Bull. U. S. Surv. Terr. iv. pp. 1–66.

About 500 specimens were secured, 3 species of which were new to the American Avifauna, and 1 (*Parula nigrilora*) new to science. The last is described by E. Coues, by whom a new genus of doves (*Æchmoptila*) is also characterized. The field-notes are full, and very interesting. [*Mniotiltidæ, Columbidæ, Icteridæ, Strigidæ, Ibididæ.*]

SHARPE, R. B. On a small Collection of Birds from the Ellice Islands. With a Note on other Birds found there, by the Rev. S. J. WHITMEE. P. Z. S. 1878, pp. 271–273.

Observations on a small collection of 6 species made by S. J. Whitmee, the only important species being *Anous cærulcus* (Bennett), which enables the author to show that it is really distinct from *A. cinereus* (Gould), with which, from want of material, the Recorder had united it [*Laridæ*].

——. On a new Species of *Indicator*, with Remarks on other Species of the Genus. *Tom. cit.* pp. 793–795.

A supplement to the author's revision of the *Indicatoridæ*, in Orn. Misc. i. pt. iii., with amended key to the species and description of *I malayanus*, sp. n. [*Indicatoridæ*].

——. A Note on *Pœoptera lugubris*. Tom. cit. pp. 802–804, pl. xlix.

A rectification of the author's synonymy as given in his Cat. B. Brit. M. iii. p. 281 [*Muscicapidæ*].

——. A Note on the Genus *Artamus*, and its Geographical Distribution. Orn. Misc. iii. pp. 179–202.

In this synoptical revision, 16 species are admitted, one of which (*A. venustus*) is described as new [*Artamidæ*].

——. Contributions to the Ornithology of Borneo. Part iii. On Two Collections of Birds from Sarawak. Ibis, 1878, pp. 414–419 [*cf.* Zool. Rec. xiv. *Aves*, p. 23].

The first consists of 24 species, only one of which (*Anous*) is new to Borneo; but the second contained 16 species, one of which, *Ixidia paroticalis*, is new, and several had not before been obtained in that island [*Pycnonotidæ, Muscicapidæ*].

——. On the Collections of Birds made by Dr. Meyer during his Expedition to New Guinea and some neighbouring Islands. MT. Mus. Dresd. 1878, pp. 349–372, pls. xxviii.–xxx.

Dr. Meyer's collection contained 18 species, which are here noticed, the synonymy of the Papuan and Molluccan birds being given in full, and some previous and erroneous determinations being corrected. Eight species, to which a very necessary index is given, are here described as new [*Campophagidæ*], and 3 other species are figured [*Falconidæ, Campophagidæ*].

Sharpe, R. B., & Bouvier, A. Étude d'Ornithologie Africaine. Nouvelle Liste d'Oiseaux recueillis dans la région du Congo, par MM. le Dr. A. Lucan et L. Petit, de Sept. 1876, à Sept. 1877. Bull. Soc. Zool. Fr. ii. pp. 470–481, iii. pp. 73–80.

The third list [*cf.* Zool. Rec. xiii. *Aves*, p. 30, xiv. *Aves*, p. 24] contains one new species, *Lophotriorchis lucani* [*Falconidæ*]. In the fourth list, *Nigrita lucieni* [*Ploceidæ*] is described as new.

Shelley, G. E. A Monograph of the *Cinnyridæ*, or Family of Sun-Birds. Pts. vi.–viii. London: 1878, 4to.

The above are the issue for the year of this handsome work [*cf.* Zool. Rec. xiv. *Aves*, p. 24]. For species figured, see *Nectariniidæ*.

Siepi, P. Nomenclature systématique des oiseaux d'Europe, classés d'après la théorie de leur mode d'apparition sur la terre. Bull. Soc. Nîmes, 1878, p. 39.

Sievert, Richard. Ornithologiska Antekningar under Resor i Guvernementet Olonetz, Sommarne 1875 och 1876. Medd. Soc. Fenn. ii.

Spence, J. M. The Land of Bolivar: or War, Peace, and Adventure in the Republic of Venezuela. London: 1878, 2 vols., 8vo.

Contains incidental remarks of natural history and cuts of two species of birds described by Sclater & Salvin, P. Z. S. 1873, p. 511, whose paper is also reproduced [*Dendrocolaptidæ*, *Tinamidæ*].

Stevenson, Henry. Ornithological Notes [from Norfolk] for 1877. Tr. Norw. Soc. 1877–78, pp. 478–487.

Studer, T. Beiträge zur Entwickelungsgeschichte der Feder. Z. wiss. Zool. xxx. pp. 421–436, pls. xxv. & xxvi.

Observations on the development of the feathers, chiefly based upon the families of the *Spheniscidæ*, *Casuariidæ*, and *Megapodiidæ*.

——. Ueber die Bildung der Federn bei dem Goldhaarpinguin und Megapodius. Actes Soc. Helv. 60 Sess. Bex, pp. 240–246.

Taczanowski, L. Liste des Oiseaux recueillis par M. Jankowski dans l'île Askold (Mantschourie). Bull. Soc. Z. Fr. iii. pp. 131–140.

Forty-nine species from this district of Manchuria are noticed.

——. [See *Gecinus* (*Picidæ*), *Otomela* (*Laniidæ*).]

Taylor, E. Cavendish. A few additional Notes on Birds of Egypt. Ibis, 1878, pp. 368–374. [*Ibididæ*.]

Théel, H. Nagra bidrag till Novaja Semljas Fogelfauna. Œfv. Ak. Förh. 1876, No. 5, pp. 43–53.

A list of the birds observed by the Swedish Expedition to Nova Zembla in 1875, amounting to 41 species.

Thompson, D'Arcy W. The Birds of the South-East of Scotland. Scot. Nat. v. pp. 277–283, 325–332.

TIFFANY, W. L. Notes on Three Rare Birds of Minnesota. Am. Nat. 1878, p. 470.

The species are *Ampelis garrulus*, *Hesperiphona vespertina*, and *Coturniculus lecontii*, which have lately visited Minneapolis in some numbers.

TREVELYAN, SIR WALTER C. Bewick Correspondence, with Notes. Tr. North. Dur. vii. pt. 1, pp. 97–107.

A very interesting series of letters, mostly between Thomas Bewick and Sir John Trevelyan; amongst them will be found the earliest details of the first British-killed *Neophron percnopterus*, with the correct date of its capture, viz., June, 1826, not Oct., 1825, as almost invariably quoted.

TRISTRAM, H. B. [See LAYARD.]

TSCHUSI ZU SCHMIDHOFFEN, V. VON. Ornithologische Mittheilungen aus Oesterreich und Ungarn. J. f. O. 1878, pp. 94–98.

——. Bibliographia ornithologica. Verzeichniss der gessamten ornithologischen Literatur der österreichisch-ungarischen Monarchie. Verh. z.-b. Wien, xxviii. [for 1878, published in 1879], pp. 491–544.

An extensive and useful catalogue of all the papers and works relating to the ornithology of Austria and Hungary.

——. [See also *Lanius* (*Laniidæ*).]

TWEEDDALE, MARQUIS OF. Contributions to the Ornithology of the Philippines. No. iv. On the Collection made by Mr. A. H. Everett in the islands of Dinagat, Bazol, Nipah, and Sakuyok. P. Z. S. 1878, pp. 106–114, pls. vi.–viii.

Note on 49 species, one of which, *Æthopyga dubia*, is here described as new, whilst other recently described species are noticed and figured. [*Nectariniidæ*, *Alcedinidæ*, *Muscicapidæ*, *Timeliidæ*, *Diceidæ*.]

——. On a new Philippine Genus and Species of Bird. *Tom. cit.* pp. 114 & 115, pl. ix. [*Dasycrotapha speciosa* (*Timeliidæ*)].

——. Contributions to the Ornithology of the Philippines. No. v. On the Collection made by Mr. A. H. Everett in the island of Negros. *Tom. cit.* pp. 280–288.

In one month, Mr. Everett secured 56 species, of which 24 were previously unrecorded from Negros, and of these again 6 were new to the Philippine area, and 3 of them new to science; one of these has been recently described, and 2, *Zosterops nigrorum* [*Diceidæ*] and *Macropygia eurycerca* [*Columbidæ*], are here described for the first time. [See also *Cypselidæ*.]

—— Contributions to the Ornithology of the Philippines. No. vi. On the Collection made by Mr. A. H. Everett in the island of Leyte. *Tom. cit.* pp. 339–346.

Owing to the contiguity of this island to others of the group, but little novelty was to be expected, but out of 67 species obtained, 2 (*Thriponax pectoralis* and *Arachnothera flammifera*) are described as new. [*Picidæ*, *Nectariniidæ*.]

[Tweeddale, Marquis of.] Contributions to the Ornithology of the Philippines. No. vii. On the Collection made by Mr. A. H. Everett in the island of Panaon. *Tom. cit.* pp. 379–381.

So far as the evidence of this small collection of 20 species goes, the ornithological affinities of Panaon are rather with Leyte than with Mindanao. One new species (*Dicæum modestum*) is described [*Dicæidæ*].

——. Contributions to the Ornithology of the Philippines. No. viii. On some Luzon Birds in the Museum at Darmstadt. *Tom. cit.* pp. 429 & 430, pl. xxvi.

Remarks on 8 species collected by Herr v. Othberg near Manilla, one being figured [*Pittidæ*].

——. Contributions to the Ornithology of the Philippines. No. ix. On the Collection made by Mr. A. H. Everett in the island of Palawan. *Tom. cit.* pp. 611–624, pls. xxxvii. & xxxviii.

Fifty-two species were obtained, which, with the other 12 species obtained by Dr. Steere, making a total of 64, rather tend to show that zoologically Palawan has stronger affinities with Borneo than with the Philippines. 9 species are here described for the first time. [*Picidæ*, *Dicruridæ*, *Oriolidæ*, *Timeliidæ*, *Pycnonotidæ*, *Nectariniidæ*, *Corvidæ*].

——. Contributions to the Ornithology of the Philippines. No. x. On the Collection made by Mr. A. H. Everett in the island of Bohol. *Tom. cit.* pp. 708–712.

Forty-seven species are enumerated, 7 not having previously been recorded from the Philippines.

——. Contributions to the Ornithology of the Philippines. No. xi. On the Collection made by Mr. A. H. Everett at Zamboanga, in the island of Mindanao. *Tom. cit.* pp. 936–954, pls. lvii.–lix.

Within a radius of ten miles of Zamboanga, 98 species were obtained, of which 11 were new to the Philippines, and of these again 6 were new to science. [*Strigidæ*, *Cypselidæ*, *Caprimulgidæ*, *Campephagidæ*.]

——. Note on the *Dicruridæ*, and on their arrangement in the Catalogue of the British Museum. Ibis, 1878, pp. 69–84.

An important revision of the family, and criticism on R. B. Sharpe's family *Coliomorphæ* in Cat. Birds Brit. Mus. iii.

——. [See also *Artamidæ*, *Falcònidæ*, *Bucerotidæ*.]

Vélain, C. La Faune des Iles Saint-Paul et Amsterdam. Arch. Z. expér. vi. pp. 1–143.

For descriptions of the sea-birds of Saint Paul, see pp. 48–64 ; and for brief remarks on those of Amsterdam Island, p. 96.

Viallanes, H. [See *Phonygama* (*Paradiseidæ*).]

Wallace, A. R. Tropical Nature, and other Essays. London : 1878. 8vo, pp. 356.

This work abounds with important observations on Birds ; amongst the principal are chap. iii., "On Animal Life in the Tropical Forests;"

chap. iv., "On Humming-birds;" and chap. v., "On the Colours of Animals and Sexual Selection."

WARREN, R. On the Occurrence of some Rare Birds in the Counties of Mayo and Sligo. P. Belf. Soc. 1877–78, pp. 61–73.

WIEPKEN, C. F. Die Wirbelthiere des Hertzogthums Oldenburg analytisch bearbeitet. Säugethiere und Vögel. Oldenburg: 1878. [Not seen by the Recorder]

——. [See also *Turdus* (*Turdidæ*).]

WOOD-MASON, J. On the Structure and Development of the Trachea in the Indian Painted Snipe (*Rhynchæa capensis*). P. Z. S. 1878, pp. 745–751, pl. xlvii.

The author shows by diagrams based on the dissection of a series of specimens of both sexes obtained in the Calcutta market, that the trachea in the ♂ is straight and simple, whilst in the adult ♀ it is much looped; with important observations on the intermediate ages in both sexes.

ACCIPITRES.

VULTURIDÆ.

Vultur cinereus. Notes on; G. M. Sintenis, Orn. Centralbl. 1878, p. 146.

Vultur umbrosus. Details and figures of the bones of this extinct species from the Wasatch Eocene, New Mexico; E. D. Cope, Wheeler's Rep. Surv. W. of 100th Mer. iv. pp. 287–295, pls. lxvii. figs. 10–18, lxviii. [See Zool. Rec. xii. p. 29].

Neophron percnopterus: the first British specimen [Somersetshire] was obtained June, 1826, and not October, 1825, as usually stated; Sir W. C. Trevelyan, Tr. North. Dur. vii. pt. i.

FALCONIDÆ.

Accipiter stevensoni figured; Marquis of Tweeddale, P. Z. S. 1878, pl. lvii. Remarks on; *id. tom. cit.* p. 938.

Aquila clanga and *A. pomarina* figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii.

Aquila fulva: on its various stages; E. Hodek, MT. orn. Ver. Wien, 1878. pp. 53–57, 73–75, 80–82, 91 & 92.

Astur henstii juv. figured; A. Milne-Edwards & A. Grandidier, Ois. Madagascar, Atlas, i. 2e pl. xxx.

Astur etorques figured; R. B. Sharpe, MT. Mus. Dresd. iii. pl. xxix.

Asturinula monogrammica. On its singing habits, similar to those in *Melierax*; J. H. Gurney, P. Z. S. 1878, p. 791.

Baza ceylonensis figured; W. V. Legge, B. Ceylon, pt. i.

Buteo desertorum. Two examples recorded from Northumberland; J. H. Gurney, Ibis, 1878, p. 118.

Circaetus: remarks on the species comprised in this genus; *id. l. c.* pp. 146–164.

Circus cinereaceus and *C. swainsoni* (pts. lxvii. & lxviii.), *C. æruginosus* (pts. lxxi. & lxxii.) figured; H. E. Dresser, B. Eur.

Circus pallidus [*C. swainsoni*] breeding in Brunswick; R. Blasius, Orn. Centralbl. 1878, p. 146.

Dryotriorchis spectabilis figured; J. H. Gurney, Ibis, 1878, p. 88, pl. ii.

Eutriorchis, *Dryotriorchis*, *Spilornis*, *Herpetotheres*, *Circaetus*, and *Helotarsus*: remarks on these genera; J. H. Gurney, Ibis, 1878, pp. 87–102, 145–164.

Elanus cæruleus observed in winter at Zebil, Asia Minor; C. G. Danford, Ibis, 1878, p. 3.

Falco feldeggi figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Gypaetus barbatus: remarks on; A. Girtanner, MT. orn. Ver. Wien, 1878, p. 85.

Haliaetinæ: remarks on this group; J. H. Gurney, Ibis, 1878, p. 451.

Haliœtus vociferoides: skeleton figured; A. Milne-Edwards & A. Grandidier, Ois. Madagascar, Atlas, i. pt. 2, pl. ix.*a* bis.

Harpyia destructor: field-notes on its habits as observed in Mexico; F. L. Oswald, Am. Nat. 1878, pp. 146–157.

Harpyopsis novæ-guineæ figured; R. B. Sharpe, MT. Mus. Dresd. iii. pl. xxviii.

Helotarsus: remarks on members of this genus; J. H. Gurney, Ibis, 1878, pp. 352–356.

Lophotriorchis lucani, sp. n., R. B. Sharpe & A. Bouvier, Bull. Soc. Zool. Fr. ii. p. 471, Landana, Loango.

Milvinæ: remarks on this group; J. H. Gurney, Ibis, 1878, p. 459.

Poliohierax insignis, ♂ & ♀ figured; Marquis of Tweeddale, Orn. Misc. iii. p. 169, pl. ciii.

Polyborus tharus: on a pallid specimen, probably of this species, in the Gardens of the Zoological Society; J. H. Gurney, P. Z. S. 1878, p. 230.

Spizaetus kelaarti, sp. n., distinguished from *S. nipalensis*, W. V. Legge, Ibis, 1878, p. 201, Ceylon: ♀, juv. ♂ figured; *id.* B. Ceylon, i.

Strigidæ.

Asio butleri, sp. n., A. O. Hume, Str. Feath. vii. p. 316, Omara, Mekran Coast.

Asio capensis figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Athene variegata, Sclater, has priority over *Ninox solomonis*, R. B. Sharpe, with which it is identical; P. L. Sclater, P. Z. S. 1878, p. 290.

Glaucidium castanonotum figured; W. V. Legge, B. Ceylon, pt. i.

Glaucidium ferrugineum: its second occurrence in Texas, and fully described; E. Coues in G. B. Sennett's Birds of the Rio Grande of Texas, Bull. U. S. Surv. Terr. iv. p. 40.

Gymnoglaux: on the members of this genus; G. N. Lawrence, Ibis, 1878, p. 184.

Heliodilus, g. n., A. Milne-Edwards, C. R. lxxxv. pp. 1282–1284. Type, *Heliodilus soumagnii*, sp. n., A. Grandidier, Bull. Soc. Philom. (7) ii. p. 65, Tamatave, Madagascar; also N. Arch. Mus. (2) i. pp. 186–199. *H. soumagnii*: bird, and skeleton, and several bones figured; A. Milne-Edwards & Grandidier, Ois. Madagascar, Atlas, i. pt. 2, pls. xxxvi. A, xxxvi. B, & xxxvi. C.

Huhua nipalensis, remarks on; J. H. Gurney, Ibis, 1878, p. 119.

Ninox spinocephala, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 940, Zamboanga, Philippines. *N. solomonis*, Sharpe, = *Noctua variegata*, Quoy & G.; P. L. Sclater, P. Z. S. 1878, p. 290.

Nyctea nivea, notes on its breeding in Norway; J. A. Harvie-Brown, P. Phys. Soc. Edinb. 1876–78, p. 250. Its bones found in the caves of the Haute-Garonne; P. Gervais, J. Zool. vi. p. 66.

Phodilus, its structural affinities shown to be with *Syrnium*; A. Milne-Edwards, C. R. lxxxv. p. 1173; and N. Arch. Mus. (2) i. pp. 185–200, pls. iv. & v., figures of skeleton and other bones of *P. badius*. *P. assimilis* figured; W. V. Legge, B. Ceylon, pt. i.

Pseudotynx gurneyi, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 940, figured, pl. lviii., Zamboanga, Philippines.

Scops: a review of the American species of the genus; R. Ridgway, Pr. U. S. Nat. Mus. 1878, pp. 85–117. *S. cooperi*, sp. n., *id. tom. cit.* p. 116, Costa Rica.

Scops everetti, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 492, Zamboanga, Philippines.

Scops minutus, sp. n., W. V. Legge, Ann. N. H. (5) i. pp. 174–176, Ceylon; figured, W. V. Legge, B. Ceylon, pt. i. p. 143.

Speotyto amaura, sp. n., G. N. Lawrence, Pr. U. S. Nat. Mus. 1878, p. 234, Island of Antigua.

Strix flammea figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii. *S. flammea* var. *nigrescens*: name proposed for the very dark insular form found in the Island of Dominica; G. N. Lawrence, Pr. U. S. Nat. Mus. 1878, p. 64.

Surnia ulula obtained at St. Michael's, Alaska; R. Ridgway, Bull. Nutt. Orn. Club, iii. p. 38.

Syrnium indrani figured; W. V. Legge, B. of Ceylon, pt. i.

Syrnium lapponicum obtained at the Yukon Delta; R. Ridgway, Bull. Nutt. Orn. Club, iii. p. 37.

PSITTACI.

PSITTACIDÆ.

Ara spixi, figured; P. L. Sclater, P. Z. S. 1878, p. 976, pl. lxi.

Chalcopsitta insignis, sp. n., E. Oustalet, Ass. Sci. Fr. Bull. No. 533, p. 247, Island of Amberpon, Papua.

Chalcopsittacus bruijni, sp. n., T. Salvadori, Atti Acc. Tor. xiii. p. 311, Island of Amberpon, Papua, = *P. insignis*, Oust. [*suprà*], id. *tom. cit.* p. 312.

Chrysotis lactifrons, sp. n., G. N. Lawrence, Ann. N. York Ac. i. p. 125, Bahia ?. *C. guildingi* described; *id.* Pr. U. S. Nat. Mus. 1878, p. 193.

Conurus hilaris, notes on, and on other parrots of the Argentine Republic; H. Burmeister, P. Z. S. 1878, pp. 75–77.

Cyclopsittaca suavissima and *C. melanogenys* figured; J. Gould, B. New Guinea, pt. vii.

Domicella coccinea figured; G. D. Rowley, Orn. Misc. iii. pl. xcviii., with remarks, *tom. cit.* p. 124.

Eclectus, on the coloration in this genus; A. B. Meyer, Orn. Centralbl. 1878, p. 119; *id.* Zool. Gart. xix. *Eclectus polychlorus* and *E. linnæi*, remarks on plumage; E. P. Ramsay, Ibis, 1878, p. 379. *Eclectus polychlorus*, figured; J. Gould, B. New Guinea, pt. viii.

Geoffroyius heteroclitus figured; J. Gould, B. New Guinea, pt. viii.

Loriculus indicus figured; W. V. Legge, B. Ceylon, pt. i.

Lorius gulielmi, sp. n., differentiated from *L. hypænochrous*; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 73, South Coast, New Guinea.

Nasiterna pusio, notes on the anatomy of a specimen; L. Camerano, Atti Acc. Tor. xiii. pp. 301–308, pl. xvi. *N. pygmæa*, *N. maforensis*, *N. misoriensis*, *N. bruijni*, *N. beccarii*, *N. pusio*, *N. keiensis*, figured; J. Gould, B. New Guinea, pt. vi.

Palæornis bodini, sp. n., C. Russ, Die gefiederte Welt, vii. p. 359, Antwerp Sale! [Suspected to be *P. rosa*, Bodd.]

Palæornis calthorpæ figured; W. V. Legge, B. Ceylon, pl. i.

Trichoglossus nigrigularis is confined to Aru and Ké Islands, and is quite distinct from *T. cyanogrammus*; T. Salvadori P. Z. S. 1878, p. 93.

PICARIÆ.

Picidæ.

Chrysocolaptes stricklandi figured; W. V. Legge, B. Ceylon, pt. i.

Gecinus saundersi, sp. n., L. Taczanowski, J. f. O. 1878, p. 349, Caucasus.

Orthonyx novæ-guineæ figured; J. Gould, B. New Guinea, pt. vii.

Picoides americanus, first description of authenticated eggs, obtained in Northern New York; C. H. Merriam, Bull. Nutt. Orn. Club, iii. p. 200.

Thriponax pectoralis, sp. n., distinguished from *P. javensis*, Cab.; Marquis of Tweeddale, P. Z. S. 1878, p. 341, Leyte Island, Philippines.

Tiga everetti, sp. n., P. Z. S. 1878, *id. l. c.* p. 612, pl. xxxvii., Palawan, Philippines.

Yunx torquilla in Perthshire; H. M. Drummond Hay, Scot. Nat. v. p. 333.

Meropidæ.

Merops apiaster and *M. persicus* figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Merops superciliosus figured (pl. xc.), *M. madagascarensis*, osteology

(pl. xcii.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2.

Merops modestus, sp. n., E. Oustalet, As. Sc. Fr. Bull. No. 533, p. 248, D'Urville, Island, New Guinea, = *M. ornatus*, Lath.; T. Salvadori, Atti Acc. Tor. xiii. p. 312.

Alcedinidæ.

Cittura: remarks on the genus; G. D. Rowley, Orn. Misc. iii. pp. 131–143. *Cittura cyanotis*, ♀ (pl. xcix.), and *C. sanghirensis*, ♀ (pl. c.), figured, *id. tom. cit.*

Corythornis cristatus figured (pl. xc.), osteology (pl. xci. No. 1); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2.

Ceyx argentata, ♀ fully described and figured; Marquis of Tweeddale, P. Z. S. 1878, p. 108, pl. vi.

Ispidina madagascarensis figured (pl. lxxxix.), osteology (pl. xci., No. 2), A. Milne-Edwards & A. Grandidier, Ois. Madagasc. *l. c.*

Tanysiptera nympha (pt. vi.) and *T. nigriceps* (pt. vii.), figured, J. Gould, B. New Guinea.

Momotidæ.

Discussion as to scientific position of the family, with figure of syrinx of *Momotus lessoni*; A. H. Garrod, P. Z. S. 1878, pp. 100–102.

Upupidæ.

Upupa marginata figured (pl. xciii.), skeleton and osteology (pls. xciv. & xcv.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2.

Coraciidæ.

Brachypteracias leptostomus figured (pl. xcvi.), skeleton, osteology, and anatomy (pls. xcvii.–xcix.); *B. squamigera* figured (pl. c.), anatomy (pl. xcix.), skeleton (pl. ci.), osteology (pl. cii.); *B. crossleyi* figured (pl. ciii.), *B. pittoides* (pl. civ.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2.

Coracias indica observed near Ala-dagh, Asia Minor; C. D. Danford, Ibis, 1878, p. 7. Figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Eurystomus glaucurus figured (pl. lxxx.), skeleton (pl. lxxxi.), osteology (pl. lxxxii.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, *l. c.*

Cuculidæ.

Cacomantis æruginosus, sp. n., T. Salvadori, Ann. Mus. Genov. xiii. p. 458, Buru, Amboina, Ceram.

Cuculus canorus. [A. Newton's article "Cuckow" in Encycl. Brit. has given rise to a number of contributions respecting this species and its nidification; for principal see Von Pralle, Orn. Centralbl. 1878, pp. 44–46,

124 & 125, 130–132, 137 & 138, 158–160, 169–172; A. Nehrkorn, *tom. cit.* p. 149; A. Walker, *tom. cit.* pp. 65–67, 73–75; A. Müller, Zool. Gart. 1878, pp. 170–178.] Notes on the species in whose nests it deposits its eggs; A. Müller, Zool. Gart. 1878, pp. 170–178.

Lamprococcyx pœciluroides (New Guinea) and *L. crassirostris* (New Guinea and Moluccas), spp. nn., T. Salvadori, Ann. Mus. Genov. xiii. p. 460.

Leptostomus discolor figured (pls. lxxxiii. & lxxxiv.), skeleton (pl. lxxxv.), osteological details (pl. lxxxvi.), other anatomy (pls. lxxxvii. & lxxxviii.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2.

Microdynamis, g. n., type *Eudynamis parva*; T. Salvadori, Ann. Mus. Genov. xiii. p. 461.

Neomorphus radiolosus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 439, figured pl. xxvii., Intaj, Ecuador.

Nesocentor aruensis, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 317, Aru Islands.

Phœnicophaes pyrrhocephalus figured; W. V. Legge, B. Ceylon, pt. i.

Rhamphomantis, g. n., type *Cuculus megarrhynchus*, G. R. Gray; T. Salvadori, Ann. Mus. Genov. xiii. p. 459.

Surniculus musschenbræki, sp. n., A. B. Meyer, Orn. Misc. iii. p. 164, Batjan, Moluccas.

Musophagidæ.

Corythaix fischeri, sp. n., A. Reichenow, J. f. O. 1878, p. 354, Wito, East Africa.

Capitonidæ.

Capito steeri, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 140, figured, pl. xii., Moyobamba, Peru.

Pogonorrhynchus irroratus, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 239, Mombassa, East Africa.

Megalæma zeylanica and *M. flavifrons* figured; W. V. Legge, B. Ceylon, pt. i.

Trachyphonus erythrocephalus, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 240, figured, pl. ii. figs. 1 & 2, Ukamba, East Africa.

Tricholæma stigmatothorax (Taita), and *T. lacrymosa* (Adi river, East Africa), spp. nn., J. Cabanis, J. f. O. 1878, pp. 205 & 240.

Zantholæma rubricapilla figured; W. V. Legge, B. Ceylon, pt. i.

Indicatoridæ.

Indicator malayanus, sp. n., R. B. Sharpe, P. Z. S. 1878, p. 794, Malacca; with remarks on the genus.

Indicator major. Notes on its anatomy; A. H. Garrod, *tom. cit.* p. 930.

CYPSELIDÆ.

Chætura cochinchinensis, sp. n., E. Oustalet, Bull. Soc. Philom. (7) ii. p. 52, Saigon. *Chætura dominicana*, sp. n., differentiated from *C. poliura*, Temm.; G. N. Lawrence, Ann. N. Y. Ac. Sci. i. p. 255. *Chætura grandidieri* figured; A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2, pl. lxxi. fig. 2, osteology, pl. lxxvii. *Chætura picina*, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 944, figured pl. lix., Zamboanga, Philippines.

Collocalia francica figured (pl. lxxii.), skeleton (pl. lxxiii., fig. 1), other anatomical details (pls. lxxiv. & lxxv.); A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2. *Collocalia francica* obtained in Negros, Philippines; Marquis of Tweeddale, P. Z. S. 1878, p. 282.

Cypselus parvus figured, A. Milne-Edwards & A. Grandidier, Ois. Madagasc. Atlas, i. pt. 2, pl. lxxi. fig. 1; skeleton, pl. lxxiii. fig. 2; osteological details, pl. lxxiv. fig. 1. *C. pallidus*: egg described; S. G. Reid, Zool. 1878, p. 25.

Hirundinapus celebensis, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 320, Celebes. [Described by P. L. Sclater, P. Z. S. 1865, p. 608, as *Chætura gigantea* var. *celebensis*.]

TROCHILIDÆ.

See ELLIOT, *suprà*, p. 9, and MULSANT, p. 19.

Atthis ellioti, sp. n., differentiated from *A. heloisæ*, with cut of each; R. Ridgway, Pr. U. S. Nat. Mus. 1878, pp. 8–10, Volcan de Agua, Guatemala.

Arinia boucardi, sp. n., É. Mulsant, Ann. Soc. Linn. Lyon (Oct. 12, 1877, published in 1878), also as *Arena boucardi*, id. Hist. Ois.-Mouches, iv. livr. 3, p. 194, Punta Arenas, Costa Rica.

Calligenia dichrura figured; *id. tom. cit.*

Docimastes ensiferus figured; *id. tom. cit.*

Eugenes fulgens figured; *id. op. cit.* livr. 4.

Iolæma luminosa (Gould MS.), sp. n.; D. G. Elliot, Ibis, 1878, p. 188, loc. incert., Bogotá ?.

Lepidolarynx mesoleucus figured; É. Mulsant, Hist. Nat. Ois.-Mouches, iv. livr. 3.

Orotrochilus chimborazo figured; *id. tom. cit.*

Patagona gigas figured; *id. op. cit.* livr. 4.

Primnacantha langsdorffi figured; *id. l. c.*

Selasphorus alleni: additional remarks on; H. W. Henshaw, Bull. Nutt. Orn. Club, iii. p. 11. [*Cf.* Zool. Rec. xiv. *Aves*, p. 34.]

Tilmatura duponti figured; É. Mulsant, Hist. Nat. Ois.-Mouches, iv. livr. 4.

CAPRIMULGIDÆ.

Caprimulgus madagascarensis (pl. lxxvii.), osteology (pl. lxxviii.), *C. enarratus* (pl. lxxix.), figured; A. Milne-Edwards & A. Grandidier, Ois.

Madagasc. Atlas, i. pt. 2. *C. shelleyi*, sp. n., differentiated from *C. pectoralis*; J. V. B. du Bocage, J. Sc. Lisb. vi. p. 266.

Lyncornis mindanensis, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 984, Zamboanga, Philippines.

Podargidæ.

Batrachostomus javensis, Horsf., described from Nagá Hills; H. H. Godwin Austen, J. A. S. B. xlvii. pt. 2, p. 13.

Batrachostomus: remarks on, in reply to Marquis of Tweeddale; A. O. Hume, Ibis, 1878, p. 120.

Bucerotidæ.

Aceros nepalensis figured; D. G. Elliot, Mon. Bucerot. pt. v.

Anorrhinus tickelli: letter on; H. H. Godwin Austen, Ibis, 1878, pp. 206–208.

Anthracoceros fraterculus, sp. n., D. G. Elliot, Ann. N. H. (5) i. p. 85, Cochin China.

Buceros semigaleatus, sp. n., distinguished from *B. mindanensis*, with woodcuts of heads of each; Marquis of Tweeddale, P. Z. S. 1878, pp. 277–280, Negros Island, Philippines, also on Leyte Island, Philippines, *id. tom. cit.* p. 340.

Buceros albitibialis figured, J. Cabanis & A. Reichenow, J. f. O. 1878, pl. i. [*Cf. op cit.* 1877, p. 103.]

Bucorvus: remarks on the genus, with figures of heads of *B. abyssinicus*, *B. guinecensis*, *B. cafer*, ad. & juv., and *B. pyrrhopsis*; D. G. Elliot, Bull. Soc. Z Fr. iii. pp. 34–36, pl. i.

Lophoceros birostris figured; *id.* Mon. Bucerot. pt. v.

Penelopides manillæ figured; *id. l. c.*

Pholidophalus fistulator figured; *id. l. c.*

Rhytidoceros plicatus figured; *id. l. c.*

Tockus fasciatus and *T. semifasciatus* figured; *id. l. c.* *T. gingalensis* figured; W. V. Legge, B. Ceylon, pt. i.

PASSERES.

Pittidæ.

On the vocal organs, see Müller & Garrod.

Erythropitta kochi figured; Marquis of Tweeddale, P. Z. S. 1878, p. 429, pl. xxvi.

Pitta novæ-hibernicæ, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 73, New Ireland. *P. ellioti*, description of ♀; E. Oustalet, Bull. Soc. Philom. (7) ii. p. 206. *P. cæruleitorques*, *P. maforensis* [*mefoorana*, Schl.], *P. celebensis*, *P. rubrinucha* figured; J. Gould, B. New Guinea, pt. vii.

Dendrocolaptidæ.

Furnarius pileatus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 139, Santarem, Amazons. *F. tricolor*, sp. n., J. Cabanis, J. f. O. 1878 p. 196, Cordova, Argentine Republic.

Lochmias sororia, Scl. & Salv., figured ; J. M. Spence, Land of Bolivar, i. p. 266. Believed to be identical with *L. obscurata*, Cab., which has priority ; P. L. Sclater & O. Salvin, Ibis, 1878, p. 192, note.

Synallaxis sclateri, sp. n., J. Cabanis, J. f. O. 1878, p. 196, Sierra de Cordova [? *S. hudsoni*, Scl. ; see P. Z. S. 1879, p. 461].

Meliphagidæ.

Anthornis melanura : on its gradual disappearance on the mainland of New Zealand, and its discovery on the island of Kapiti ; W. L. Buller, Tr. N. Z. Inst. x. p. 209.

Glycichæra fallax and *G. poliocephala*, g. & sp. nn. ; T. Salvadori, Ann. Mus. Genov. xii. pp. 335 & 336, New Guinea.

Glyciphila fasciata, Gould. E. L. Layard suggests that as this species is different from *G. fasciata* (Forst.) the name of the former should be changed to *G. gouldi* ; P. Z. S. 1878, p. 655. [As Gould's description was published, P. Z. S. 1842, p. 137, and Forster's Descr. An. (p. 263), in 1844, Gould's name will, of course, stand.]

Myzomela rubro-tincta, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 334, Obi (type in Leyden Mus.). *M. chermesina*, G. R. Gray, fully described ; W. A. Forbes, P. Z. S. 1878, p. 352, Island of Rotumah, Central Pacific.

Philemon meyeri, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 339, Rubi, New Guinea.

Ptilotis germana, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iii. pt. i. p. 2, Torres Straits. *Ptilotis ? ixoides*, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 338, Sorong, New Guinea.

Stigmatops squamata, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 337, Choor. *S. albo-auricularis*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 75, South-east Coast New Guinea.

Dicæidæ.

Dicæum modestum, sp. n., closely resembling ♀ *Myzanthe pygmæa* ; Marquis of Tweeddale, P. Z. S. 1878, p. 380, Panaon Island, Philippines. *D. schistaceum*, ♂, and *D. everetti*, ♂, figured, *id. l. c.* pl. viii. figs. 1 & 2. *D. sumatranum*, sp. n., J. Cabanis, J. f. O. 1878, p. 101, Sumatra. *D. vulneratum*, Wald., ♀ described ; T. Salvadori, P. Z. S. 1878, p. 83, Amboyna. *D. eximium* figured ; J. Gould, B. New Guinea, pt. vii.

Melanocharis unicolor, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 333, Jobi ; type in Leyden Mus.

Prionochilus olivaceus, ♀ figured ; Marquis of Tweeddale, P. Z. S. 1878, pl. viii. fig. 3.

Zosterops minuta and *Z. inornata*, spp. nn., E. L. Layard, Ann. N. H. (5) i. p. 375, & Ibis, 1878, p. 259, Island of Lifu, New Caledonia. *Z. nigrorum*, sp. n., differentiated from *Z. austeni* ; Marquis of Tweeddale, P. Z. S. 1878, p. 286, Negros Island, Philippines. *Z. auriventer*, sp. n., A. O. Hume, Str. Feath. vi. p. 519, Tavoy ; appears = *Z. lateralis*, Temm., *id. op. cit.* vii. p. 453. *Z. fuscifrons* (Halmahera), *Z. hypoleuca* (New

Guinea), *Z. aureigula* (Jobi), *Z. novæ-guineæ* (Arfak Mts., New Guinea), *Z. buruensis* (Buru), *Z. frontalis* (Aru Islands), spp. nn., T. Salvadori, Ann. Mus. Genov. xii. pp. 339–342.

Nectariniidæ.

See Shelley, *suprà*, p. 30.

Æthopyga dubia, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 112, Dinagak, Philippines. *Æ. nicobarica*, *Æ. saturata*, *Æ. sanguinipectus*, *Æ. cara*, figured; G. E. Shelley, Mon. Cinnyr. pt. vi.

Anthreptes simplex, *A. malaccensis* (pt. vi), *A. rhodolæma*, *A. malaccensis*, *A. chlorigastra*, *A. celebensis*, *A. singalensis* (pts. vii. & viii.), figured; G. E. Shelley, Mon. Cinnyr.

Anthrobaphes violacea figured; G. E. Shelley, Mon. Cinnyr. pts. vii. & viii.

Arachnothera flammifera, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 343, Leyte Island, Philippines.

Arachnothera longirostra (pt. vi.), *A. magna*, *A. aurata*, *A. modesta*, *A. affinis* (pts. vii. & viii.), figured; G. E. Shelley, Mon. Cinnyr.

Arachnoraphis crassirostris and *A. robusta* figured; G. E. Shelley, Mon. Cinnyr. pts. vii. & viii.

Cinnyris (*Chalcomitra*) *kalckreuthi*, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 227, Mombassa, East Africa. *C. osiris*, *C. erythrocercus*, *C. jugularis*, *C. pectoralis* (pt. vi.), *C. grayi*, *C. juliæ* [*Nectarophila juliæ*, Twd.], *C. habessinicus*, *C. cruentatus*, *C. acik*, *C. senegalensis*, *C. fuliginosus*, *C. adelberti*, *C. splendidus* (pts. vii. & viii.), figured; G. E. Shelley, Mon. Cinnyr. *C. maforensis*, *C. mysorensis*, *C. sangirensis*, figured; J. Gould, B. New Guinea, pt. viii.

Cyrtostomus [*Cinnyris*] *aurora*, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 620, Palawan, Philippines.

Hedydipna metallica figured; G. E. Shelley, Mon. Cinnyr. pts. vii. & viii.

Hermotimia cornelia, sp. n., T. Salvadori, Atti Acc. Tor. xiii. p. 319, Island of Tarawai [or D'Urville], New Guinea. Remarks on the species of this genus from Duke of York Island; *id. tom. cit.* pp. 530–534. *H. corinna*, sp. n., *id. l. c.*

Nectarinia anchietæ, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. pp. 195 & 208, Caconda, Angola. *N. oustaleti*, sp. n., *id. tom. cit.* p. 254, Caconda. *N. pulchella* figured; G. E. Shelley, Mon. Cinnyr. pts. vii. & viii.

Urodrepanis christinæ figured; G. E. Shelley, Mon. Cinnyr. pts. vii. & viii.

Eurylæmidæ.

For Anatomy, see Garrod, *suprà*, p. 11.

Hirundinidæ.

Cotyle riparia. Its breeding habits; G. D. Rowley, Orn. Misc. iii. p. 81.

Hirundo æthiopica. Its first appearance in Abeokuta, W. Africa; F. Nicholson, P. Z. S. 1878, p. 129.

Hirundo rufigula, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 256, Caconda, Angola.

Petrochelidon lunifrons. Note on its haunts and breeding habits; E. Coues, Bull. Nutt. Orn. Club, iii. pp. 105–112.

Tyrannidæ.

Blacicus brunneicapillus, sp. n., differentiated from *B. blancoi*; G. N. Lawrence, Ann. N. York Ac. i. p. 161, Dominica, W. Indies.

Empidonax flaviventris. On its nest and eggs; H. A. Purdie, Bull. Nutt. Orn. Club, iii. p. 167; also S. D. Osborne, *tom. cit.* p. 187.

Muscipipra vetula (Licht.). The type specimen of Blyth's *Dicrurus marginatus* is really this species; P. L. Sclater, P. Z. S. 1878, p. 339.

Myiarchus semirufus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 138, figured, pl. xi., Pacasmayo, Peru.

Timeliidæ.

Actinura oglei figured; H. H. Godwin Austen, J. A. S. B. xlvi. pt. 2, pl. xi. [issued with vol. xlvii. pt. 1].

Dasycrotapha speciosa, g. & sp. nn., Marquis of Tweeddale, P. Z. S. 1878, p. 114, figured pl. ix., Island of Negros, Philippines.

Garrulax subcærulatus, sp. n., A. O. Hume, Str. Feath. vii. p. 140, Khasia Hills.

Garrulax nuchalis figured; H. H. Godwin Austen, J. A. S. B. xlvi. pt. 2, pl. x. [issued with xlvii. pt. 1]

Minla rufigularis, Mand., = *Alcippe collaris*, Wald.; H. H. Godwin Austen, Ibis, 1878, p. 116.

Mixornis capitalis, ♀ described (p. 110) and figured (pl. vii. fig. 2); Marquis of Tweeddale, P. Z. S. 1878.

Pellorneum tickelli, Blyth. On its identification; A. O. Hume, Ibis, 1878, pp. 114 & 115. ♂ = *Turdinus garoensis*; H. H. Godwin Austen, note, *l. c.*

Trichostoma rufifrons, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 616, figured pl. xxxviii., Palawan, Philippines. *T. minor*, Hume, = *Drymocataphus fulvus*, Walden; H. H. Godwin Austen, Ibis, 1878, p. 115.

Trochalopterum fairbanki obtained in S. Travancore; A. O. Hume, Str. Feath. vii. p. 36.

Turdinus williamsoni, Godwin Austen [named, but not fully described, J. A. S. B. xlvi. pt. 2, p. 44], = *T. striatus*, Wald.; H. H. Godwin Austen, J. A. S. B. xlvii. pt. 2, p. 16.

Turdirostris rufescens, sp. n., A. Reichenow, J. f. O. 1878, p. 209, & Orn. Centralbl. 1878, p. 71, Liberia.

Cotingidæ.

Pipreola. Revision of the 9 established species of this genus; P. L Sclater, Ibis, 1878, pp. 164–173. *P. frontalis* figured; *l. c.* pl. vi.

Laniidæ.

Collurio, Bp. Remarks on this subgenus; Herman Schalow, J. f. O. 1878, pp. 133–156.

Craticus spaldingi, sp. n., G. Masters, P. Linn. Soc. N. S. W. ii. p. 271, Port Darwin. *C. quoyi*: on the supposed young; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 375.

Enneoctonus collurio obtained in Transvaal; T. Ayres, Ibis, 1878, p. 295.

Eopsaltria nana, sp. n., distinguished from *E. capito*, Gould; E. P. Ramsay, P. Linn. Soc. N.S.W. ii. p. 372, Rockingham Bay, Queensland.

Lanius antinorii, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 316, Afmu, Equatorial Africa. *L. souzæ*, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 213, Caconda, Angola. *L. (Fiscus) dorsalis*, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 225, Taita, E. Africa. *L. collurio* obtained near Belfast; T. Darragh, Zool. 1878, p. 437. *L. isabellinus* figured; H. E. Dresser, B. Eur. pts. lxix. & lxx. *L. major*, Pall.; its occurrence in Austria and Hungary; V. v. Tschusi zu Schmidhoffen, MT. orn. Ver. Wien, 1878, p. 30; and J. v. Csató, Term. füzetek, 1878, pp. 91 & 174.

Laniarius melamprosopus, sp. n., A. Reichenow, Orn. Centralbl. 1878, p. 71, and J. f. O. 1878, p. 209, Liberia.

Myiolestes nigrigularis = *Lalage nigrigularis*, Layard, fully described; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 14, Fiji.

Nilaus affinis, sp. n., differentiated from *N. brubru*, J. V. B. du Bocage, J. Sc. Lisb. vi. pp. 204 & 213, Caconda.

Otomela, remarks on the species of; L. Taczanowski, Bull. Soc. Z. Fr. iii. pp. 36–45.

Pachycephala littayei, sp. n., E. L. Layard, Ann. N. H. (5) i. p. 375, and Ibis, 1878, p. 255, Island of Lifu, New Caledonia. *P. pallida*, sp. n., allied to *P. falcata*, Gould; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 224, Gulf of Carpentaria. *P. obiensis* (Obi), *P. cinerascens* (Ternate, Tidore, Morotai), spp. nn., T. Salvadori, Ann. Mus. Genov. xii. pp. 331 & 332. *P. squalida*, sp. n., E. Oustalet, Bull. Soc. Philom. (7) ii. p. 56, Amberbaki, New Guinea. *P. fuliginata* and *P. collaris*, spp. nn., E. P. Ramsay, P. Linn. Soc. N. S. W. iii. pp. 74 & 75, South-east Coast New Guinea.

Platylophus coronatus (Raffles) = ♀, *P. ardesiacus*, and *P. malaccensis*, Cab., = ♂ imm. of *P. galericulatus*, Cuv.; D. G. Elliot, Ibis, 1878, p. 54.

Rectes cirrhocephala, Less, and *R. dichroa*, Bp., are quite distinct species (p. 471); *R. decipiens*, sp. n., is an intermediate form (p. 473); *R. holerythra*, sp. n. (p. 474, Jobi); T. Salvadori, Ann. Mus. Genov. xii.

Campophagidæ.

Artamides schistaceus, sp. n. (Sula Islands), differentiated from *A. pollenti*, and *A. floris*, sp. n. (Flores), differentiated from *A. personatus*; R. B. Sharpe, MT. Mus. Dresd. 1878, p. 363.

Campophaga polioptera, sp. n., R. B. Sharpe, MT. Mus. Dresd. 1878, p. 370, Cochin China.

Edoliosoma schisticeps, ♂, ♀, and juv. described; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 222. *E. meyeri* (Misori), *E. dispar* (Moluccas, &c.), *E. obiense* (Obi), spp. nn., T. Salvadori, Ann. Mus. Genov. xii. pp. 327–329.

Edoliosoma salvadorii, sp. n. (p. 367, Gt. Sangi Island), *E. aruense*, sp. n. (p. 369, Aru Islands), *E. timoriense*, sp. n. (p. 369, Timor), *E. remotum*, sp. n. (p. 369, New Hanover); R. B. Sharpe, MT. Mus. Dresd. 1878.

Gravcalus parvulus (Halmahera), *G. sclateri*, Finsch [*sic*] (New Ireland), and *G. fortis* (Buru), spp. nn., T. Salvadori, Ann. Mus. Genov. xii. pp. 324–326; types in Leyden Mus. *G. subalaris*, sp. n., differentiated from *G. boyeri*; R. B. Sharpe, MT. Mus. Dresd. 1878, p. 364, South-eastern New Guinea. *G. maforensis* figured; *id. tom. cit.* pl. xxx.

Lalage whitneei, sp. n., R. B. Sharpe, MT. Mus. Dresd. 1878, p. 371, Savage Island.

Volvocivora mindanensis, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 947, Zamboanga, Philippines.

Dicruridæ.

Notes on the family, and its arrangement in the Catalogue of the Collection in the British Museum; Marquis of Tweeddale, Ibis, 1878, pp. 69–84.

Dicranostreptus megarrhynchus figured; J. Gould, B. New Guinea, pt. viii.

Dicruropsis axillaris, sp. n., T. Salvadori, Atti Acc. Tor. xiii. p. 1184, Island of Sanghir.

Dicrurus palawanensis, Marquis of Tweeddale, P. Z. S. 1878, p. 614, Palawan, Philippines.

Muscicapidæ.

Arses telescophthalmus, note on; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 375.

Cheno[r]rhampus cyanopectus, g. & sp. nn., E. Oustalet, Bull. Ass. Sc. Fr. No. 533, p. 248, I. of Amberpon, Papua; = *Todopsis grayi*, Wall.; T. Salvadori, Atti Acc. Tor. xiii. p. 312.

Cyornis rufifrons, ♂ & ♀ fully described from a series; R. B. Sharpe, Ibis, 1878, p. 416.

Hypothymis cœlestis, ♀ figured; Marquis of Tweeddale, P. Z. S. 1878, p. 109, pl. vii. fig. 1. *Hypothemis menadensis*, Quoy & G., has its true home in New Guinea, not Celebes; E. Oustalet, Bull. Soc. Philom. (7) ii. p. 58.

Machærirrhynchus nigripectus, ♂ figured; G. D. Rowley, Orn. Misc. iii. pl. xcvii.

Microeca lata, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 323, Vandamen, New Guinea.

Monarcha diadematus (Obi, Moluccas?), *M. bernsteini* (Salvatti), *M.*

pileatus (Halmahera), spp. nn., T. Salvadori, Ann. Mus. Genov. xii. pp. 321 & 322.

Muscicapa (*Butalis*) *finschi*, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 257, Caconda, Angola.

Petroeca kleinschmidti, Finsch, = *P. pusilla*, Peale; E. L. Layard, P. Z. S. 1878, p. 655.

Platystira mentalis, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 256, Caconda, Angola.

Pœoptera lugubris figured; R. B. Sharpe, P. Z. S. 1878, p. 803, pl. xlix., with rectification of synonymy of genus.

Rhipidura bulgeri, sp. n., E. L. Layard, Ibis, 1877, p. 361, Ansevata, New Caledonia. Proves to be distinct from *R. albiscapa*; Layard & H. B. Tristram, *op. cit.* 1878, p. 254.

Rhipidura episcopalis, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 371, Torres Straits?. *R. saturata*, sp. n., T. Salvadori, Ann. Mus. Genov. xii. p. 323, Salvatti. *R. fuscescens*, Cab. & Rchnw., = *R. nebulosa*, Peale, and *R. griseicauda*, Salvad., = *R. squamata*, S. Müll.; *id. l. c.*

Todopsis cyanocephala, *T. bonapartii*, *T. wallacii*, *T. grayi*, figured; J. Gould, B. New Guinea, pt. viii.

Zeocephus rowleyi, sp. n., A. B. Meyer, Orn. Misc. iii. p. 163, Tabukan, Island of Great Sangi, Malay Archipelago.

Oriolidæ.

Broderipus palawanensis, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 616, Palawan, Philippines.

Oriolus galbula, notes on its habits and nidification; J. S. Petenyi, Term. füzetek, 1878, pp. 212 & 248.

Pycnonotidæ.

Brachypus cinereifrons, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 617, Palawan, Philippines.

Crateropus hypoleucus, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 226, Kitui, E. Africa.

Criniger palawanensis, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 618, Palawan, Philippines.

Iole terricolor, sp. n., A. O. Hume, Str. Feath. vii. p. 141, Malacca. May be *I. cinerea*, Hay; *id. tom. cit.* p. 451.

Ixidia parotidalis, sp. n., differentiated from *I. cyaniventris*, R. B. Sharpe, Ibis, 1878, p. 418, Sarawak, Borneo.

Ixus germani, sp. n., E. Oustalet, Bull. Soc. Philom. (7) ii. p. 54, Saïgon.

Pomatorrhinus. Synopsis of the genus: R. G. Wardlaw Ramsay, Ibis, 1878, pp. 129–145. *P. schisticeps* (pl. iii.), *P. fuliginosus* and *P. phayrei* (pl. iv.), *P. albigularis* and *P. stenorhynchus* (pl. v.), figured, *l. c.*

Turdidæ.

Malacocercus (*Layardia*) *rubiginosa*, Godwin Austen, = *Pyctorrhis* [*Malacocercus*] *longirostris*, Hodgs.; H. H. Godwin Austen, J. A. S. B. xlvii. pt. 2, p. 21.

Merula kinnisi, hitherto supposed to be restricted to Ceylon, obtained in South Travancore; A. O. Hume, Str. Feath. vii. p. 35.

Turdinulus, g. n., type *Pnoepyga roberti*; A. O. Hume, Str. Feath. i. 1878, p. 235.

Turdus brunneus, sp. n., G. N. Lawrence, Ibis, 1878, p. 57, figured pl. i., Upper Amazons. *Turdus nigrirostris*, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 147, St. Vincent, West Indies. *T. caribbæus*, sp. n., *id. tom. cit.* p. 160, Grenada, West Indies. *Turdus piaggiæ*, sp. n., A. Bouvier, Bull. Soc. Zool. Fr. ii. p. 456, Uganda, Central Africa. *Turdus migratorius*: capture of an adult ♂ at Upjever, Oldenburg; C. F. Wiepken, J. f. O. 1878, p. 133. *Turdus pritzbueri*, sp. n., E. L. Layard, Ann. N. H. (5) i. p. 374, and Ibis, 1878, p. 254, Island of Lifu, New Caledonia. *Turdus tephronotus*, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 218, figured, pl. iii. fig. 2, Tiva and Adi rivers, East Africa. *Turdus obscurus* figured; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Sylviidæ.

Abrornis [*Habr-*] *flavigularis*, sp. n., H. H. Godwin Austen, J. A. S. B. xlvii. pt. 2, p. 19, Sadiya.

Acrocephalus schenobænus obtained in Transvaal; T. Ayres, Ibis, 1878, p. 287. *A. lanceolatus*; remarks on, *l. c.* *A. arundinaceus* figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii.

Bessornis intercedens, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 219, Ukamba, East Africa.

Callene albiventris obtained in South Travancore; A. O. Hume, Str. Feath. vii. p. 35.

Cettia fortipes (Hodgs.) is the proper name for *Horornis fortipes*, Hodgs., *Neornis assimilis*, Gray, *Horsites robustipes*, Swinhoe, *H. pallidus*, Brooks, and *H. rufescens*, Hume; H. Seebohm, P. Z. S. 1878, pp. 980–982.

Cettia sericea is the proper name for Cetti's warbler, *Bradypterus*, Sw., having twelve tail feathers; H. Seebohm, Ibis, 1878, p. 380.

Cyanecula suecica obtained for the first time on the continent of America, at Michaelaski, Norton Sound; E. Adams, Ibis, 1878, p. 422.

Gerygone inconspicua, sp. n. (Lalokie River, p. 116), and *G. insularis*, sp. n. (p. 117, Lord Howe's Island), E. P. Ramsay, P. Linn. Soc. N. S. W.

Gerygone notata (New Guinea and Mysol), *G. hypoxantha* (Mysori Soek), spp. nn.; T. Salvadori, Ann. Mus. Genov. xii. pp. 345 & 345.

Gerygone flavida, Ramsay [Zool. Rec. xiv. *Aves*, p. 45], supposed to be ♀ of *G. personata*, Gould; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 39.

Lamprolia minor and *L. victoriæ*: letter upon; E. L. Layard, Ibis, 1878, p. 198.

Locustella certhiola obtained in Ceylon; W. V. Legge, Ibis, 1878,

p. 204. *Locustella luscinoides*: remarks on; Count C. Wodzicki (translated from J. f. O.), Orn. Misc. iii. p. 223. *Locustella certhiola* figured; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Nemura cyanura figured; H. E. Dresser, *l. c.* pts. lxvii. & lxviii.

Myiadestes sibilans, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 148, St. Vincent, West Indies.

Orthotomus maculicollis obtained in Singapore Island; A. O. Hume, Str. Feath. vii. p. 452.

Prinia poliocephala, sp. n., A. Anderson, P. Z. S. 1878, p. 370, figured pl. xix. Kumaon, India.

Phylloscopus borealis, *P. trochilus*, and *P. collybita* figured; H. E. Dresser, B. Eur. pts. lxix. & lxx. *Phylloscopus trochilus* obtained in Transvaal; T. Ayres, Ibis, 1878, p. 287.

Reguloides humei, sp. n., distinguished from *R. superciliosus*; W. E. Brooks, Str. Feath. vii. p. 131, N.W. Provinces, India. Further notes on above; *id. tom. cit.* p. 236.

Rhopophilus deserti, sp. n., distinguished from *R. pekinensis* (Swh.); N. Prjewalsky [in E. D. Morgan's English translation of Tian Shan and Lob Nor, p. 63], Tarim.

Ruticilla rufiventris and *R. erythrogastra* figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii. *Ruticilla schisticeps*, Hodgs., obtained in Tibet; W. T. Blanford, J. A. S. B. xlvii., pt. 2, pl. i. ♂ & ♀ figured, pl. i.

Saxicola stapazina [*S. rufa*, sec. H. E. Dresser] obtained in Lancashire; R. Davenport, Sc. Goss. 1878, p. 232: specimen exhibited; P. L. Sclater, P. Z. S. 1878, p. 881, and *tom. cit.* p. 977.

Schœnicola platyura, Jerd., rediscovered in Southern Travancore; A. O. Hume, Str. Feath. vii. p. 37.

Suya: remarks on the genus; A. O. Hume, Str. Feath. vii. pp. 1–6.

Sylvia blanfordi, sp. n., H. Seebohm, P. Z. S. 1878, p. 978, Rairo, Abyssinia, with remarks on other Abyssinian warblers. *Sylvia minula*, Hume, fully described and compared with allies; A. O. Hume, Str. Feath. vii. p. 58. *Sylvia salicaria* obtained in Transvaal; T. Ayres, Ibis, 1878, p. 287.

Thamnobia simplex, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 221, Taita, E. Africa.

Tricholais pulchra, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 257, Caconda, Angola.

Mniotiltidæ.

Helminthophaga leuco-bronchialis: capture of more specimens of this species; Spencer Trotter (p. 44), W. Brewster (pp. 99 & 199), Bull. Nutt. Orn. Club, ii. [No further occurrences will be recorded.]

Leucopeza bishopi, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 151, Island of St. Vincent, West Indies.

Parula nigrilora, sp. n., E. Coues in G. B. Sennett's Notes on Ornithology of Lower Rio Grande of Texas, Bull. U.S. Surv. Terr. iv. p. 11.

Protonotaria citrea, original observations on; W. Brewster, Bull. Nutt. Orn. Club, iii. pp. 153–162.

Setophaga: synopsis of the genus; O. Salvin, Ibis, 1878, pp. 302–321. *S. chrysops* (Colombia) and *S. bairdi* (Ecuador), spp. nn., *id. tom. cit.* pp. 314 & 317, figured pls. vii. fig. 2, & viii. fig. 1; *S. ruficoronata* figured, *l. c.* pl. vii. fig. 1, and *S. albifrons*, pl. viii. fig. 2.

Siurus motacilla: on its nest and eggs; W. Brewster, Bull. Nutt. Orn. Club, iii. p. 133.

Vireonidæ.

Vireolanius leucotis (Sw.), shown to be original of *Malaconotus leucotis*, Sw., and figured; O. Salvin, Ibis, 1878, p. 443, pl. xi.

Vireosylvia calidris, var. *dominicana*; G. N. Lawrence, Pr. U. S. N. Mus. 1878, p. 55, Dominica, and p. 189, St. Vincent.

Motacillidæ.

Anthinæ. Preliminary remarks on the Neotropical species; P. L. Sclater, Ibis, 1878, pp. 356–367.

Anthus bogotensis, woodcut of wing and foot (p. 358), *A. furcatus*, cut of foot, &c. (p. 365), *A. nattereri* (p. 366, S. Brazil), sp. n., figured pl. x. and woodcut; *id. l. c.* *A. peruvianus*, sp. n., F. Nicholson, P. Z. S. 1878, p. 390, Islay, Peru. *A. ludovicianus* figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Budytes. On the genus; E. F. v. Homeyer, J. f. O. 1878, pp. 126–131. *B. melano-griseus* [vox hybr.], India, *B. aralensis*, Sea of Aral, *B. leucostriatus* [vox hybr.], Lake Baikal, *B. brevicaudatus*, India, spp. nn., *id. l. c.*

Macronyx tenellus, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 220, figured pl. ii. fig. 3, Taita, E. Africa.

Motacilla amurensis, sp. n., H. Seebohm, Ibis, 1878, p. 345, Gulf of Abrek, Sea of Japan, figured, pl. ix. *M. alba* and *M. dukhunensis*: remarks on; E. W. Brooks, Str. Feath. vii. p. 136.

Troglodytidæ.

Thryothorus musicus, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 149, St. Vincent, W. Indies; *T. grenadensis*, sp. n., *id. tom. cit.* p. 161, Grenada, W. Indies. *T. felix*, *β lawrencii*, sp. n., R. Ridgway, Bull. Nutt. Orn. Club, iii. p. 10, Tres Marias Islands, W. Mexico.

Certhiidæ.

Hylypsornis salvadori, g. & sp. nn., J. V. B. du Bocage, J. Sc. Lisb. vi. pp. 198 & 211, Caconda, Angola. [The first record of the occurrence of this family in the Ethiopian region.]

Paridæ.

Parus cinctus, Bodd., obtained for the first time in N. America at St. Michael's, Alaska; R. Ridgway, Bull. Nutt. Orn. Club, iii. p. 37.

Parus (*Cyanistes*) *pleskii*: remarks on plumage of the young; J. Cabanis, J. f. O. 1878, p. 109.

Lioptila saturata, sp. n., distinguished from *L. annectans*; Lord Walden [Marquis of Tweeddale], in foot-note to R. Wardlaw Ramsay's paper, Ibis, 1875, p. 352, Karen-nee. [Omitted from Zool. Rec. xii.]

Fringillidæ.

Amadina sharpii, sp. n., F. Nicholson, P. Z. S. 1878, p. 130, figured, pl. x., Abeokuta.

Amblynura kleinschmidti, sp. n., O. Finsch, P. Z. S. 1878, p. 440, figured pl. xxix., Fiji Islands.

Carduelis spinus, nesting in co. Dublin and co. Wicklow; A. G. More, Brit. Ass. Guide to co. Dublin, 1878, pt. ii. p. 82. [See also Zool. 1874, p. 3914, and 1876, p. 4957].

Carpodacus purpureus, var. *californicus*. Note on its breeding habits, and description of nest and eggs; W. A. Cooper, Bull. Nutt. Orn. Club, iii. p. 8. *C. rubicillus* figured; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Erythrura cyanifrons, sp. n., E. L. Layard, Ann. N. H. (5) i. p. 375, & Ibis, 1878, p. 260, Island of Lifu, New Caledonia.

Junco caniceps and closely allied forms, notes on; T. M. Brewer, Bull. Nutt. Orn. Club, iii. p. 72.

Linota brevirostris figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Oryzoborus atrirostris, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 136 (with cut of head and that of *O. crassirostris*), Moyobamba, Peru.

Palæospiza bella, g. & sp. nn. (foss.), probably of this family, from the Florissant Shales of Colorado; J. A. Allen, Am. J. Sc. (3) xv. pp. 381–384, with two woodcuts.

Passerculus bairdi and *P. princeps*. Note on, with figure of former; E. Coues, Bull. Nutt. Orn. Club, iii. pp. 1–3.

Passerella. Note on the genus; H. W. Henshaw, Bull. Nutt. Orn. Club, iii. pp. 3–7.

Pyrgisoma occipitale, sp. n., O. Salvin, Ibis, 1878, p. 446, Guatemala.

Serinus pusillus. Its nidification; C. G. Danford, Ibis, 1878, p. 23.

Zonotrichia vulcani, sp. n., A. Boucard, P. Z. S. 1878, p. 57, figured, pl. iv., Volcano of Irazu, Costa Rica. *Z. coronata*: its nidification in California; T. M. Brewer, Ibis, 1878, p. 117.

Cæreb idæ.

Certhiola atrata and *C. saccharina*, spp. nn., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 150, St. Vincent, W. Indies.

Tanagridæ.

Buarremon leucopsis, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 439, Yonayaca, Ecuador.

Calliste versicolor, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 153, St. Vincent, W. Indies.

Chlorochrysa sodiroi, sp. n., A. v. Pelzeln, Verh. z.-b. Wien, xxviii. p. 19, Ecuador: = ♂ *C. phœnicotis*, Bp.; P. L. Sclater & O. Salvin, Ibis, 1878, p. 479 (Editorial note).

Euphonia mesochrysa, Salvad., has priority over *E. chalcopasta*, Scl. & Salv.; O. Salvin & P. L. Sclater, Ibis, 1878, p. 201, Editorial note in reply to T. Salvadori, *l. c.*

Ploceidæ.

Euplectes diadematus, sp. n., G. A. Fischer & A. Reichenow, J. f. O. 1878, p. 354, Malindi, E. Africa.

Habropyga minor, sp. n., J. Cabanis, J. f. O. 1878, p. 229, Voi River, E. Africa: sive *Habropyga astrild minor*.

Hyphanturgus melanoxanthus, sp. n., *id. l. c.* pp. 205 & 232, Mombassa, E. Africa.

Penthetria hartlaubi, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vi. p. 259, Caconda, Angola.

Poephila. Notes on this genus; W. E. Armit, J. L. S. xiv. p. 95 [*cf.* Zool. Rec. xiv. *Aves*, p. 49].

Pitylia (*Pytelia*, Sw.) *cinereigula*, sp. n., J. Cabanis, Orn. Centralbl. 1877, p. 182, and J. f. O. 1878, p. 101, Mombassa and Zanzibar.

Pyrenestes unicolor, sp. n., G. A. Fischer & A. Reichenow, J. f. O. 1878, p. 354, Mombassa and Zanzibar.

Sharpia angolensis, g. & sp. nn., J. V. B. du Bocage, J. S. Lisb. vi. p. 258, Caconda, Angola.

Emberizidæ.

Emberiza polaris, Midd., ♂ described; H. Seebohm, Ibis, 1878, p. 339.

Emberiza pusilla: first authentic eggs obtained; *id. l. c.* p. 337.

Emberiza schœniclus and *E. pyrrhuloides* figured; H. E. Dresser, B. Eur. pls. lxix. & lxx.

Alaudidæ.

Megalophonus fischeri, sp. n., A. Reichenow, J. f. O. 1878, p. 266, Mombassa [S.E. Africa].

Sturnidæ.

Calornis purpureiceps, sp. n., T. Salvadori, Atti Acc. Tor. xiii. p. 535, Admiralty Islands [*cf.* Zool. Rec. xiv. *Aves*, p. 49].

Coccycolius, subg. n., type *Lamprocolius iris*, sp. n., E. Oustalet, Ass. Sc. Fr. Bull. No. 580, Dec., 1878, p. 158, Loss Island, South of Senegambia.

Macruropsar, g. n., type *Lamprotornis major*, Rosenb.; T. Salvadori, Ann. Mus. Genov. xii. p. 345.

Notauges hildebrandti, sp. n., J. Cabanis, J. f. O. 1878, pp. 205 & 233, figured, pl. iii. fig. 1, Kikamba, East Africa.

Pastor roseus: its breeding in the Veronese; E. de Betta (translated), Zool. 1878, p. 16.

Sturnus poltaratskyi, new name proposed for *S. humeii*, Gould (1877), nec *S. humei*, Brooks (1878); O. Finsch, P. Z. S. 1878, p. 712. *S. vulgaris*: deformities in bill; S. Barth, Term. fuzetek, 1878, pp. 76 & 118, pl. vi. fig. 4.

Artamidæ.

Artamus: on the genus and its geographical distribution; R. B. Sharpe, Orn. Misc. iii. pp. 179–202. *A. venustus*, sp. n., *id. tom. cit.* p. 198, North-western Australia. Criticism on above; Marquis of Tweeddale, Ibis, 1878, p. 383. *A. spectabilis*, new name proposed for *A. monachus*, Bp.; F. Brüggemann, Ann. N. H. (5) i. p. 348. *A. maximus*, *A. insignis*, and *A. monachus* figured; J. Gould, B. New Guinea, pt. vi.

Icteridæ.

Molothrus æneus obtained on Rio Grande, Texas; G. B. Sennett & E. Coues, Bull. U. S. Surv. Terr. iv. p. 23.

Quiscalus luminosus, sp. n., G. N. Lawrence, Ann. N. Y. Ac. Sc. i. p. 162, Grenada, West Indies.

Sturnella militaris, remarks on, and exhibition of a specimen obtained at Panama; R. Gray, P. Phys. Soc. Edinb. 1876–78, p. 214.

Paradiseidæ.

Astrapia nigra figured; J. Gould, B. New Guinea, pt. viii.

Epimachus speciosus figured; *id. op. cit.* pt. vii.

Lophorrhina superba figured; *id. op. cit.* pt. vi.

Paradigalla carunculata figured; *id. op. cit.* pt. vii.

Phonygama atra and *P. keraudreni*: notes on the arrangement of the tracheal artery [in the ♂]; H. Viallanes, Bull. Soc. Philom. (7) ii. p. 106. *P. jamesi*, Sharpe, considered to be undistinguishable from *P. keraudreni*, Less.; D. G. Elliot, Ibis, 1878, p. 56.

Xanthomelus aureus figured; J. Gould, B. New Guinea, pt. vi.

Corvidæ.

Corvus pusillus, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 622, Palawan, Philippines. *C. cornix* and *C. corone*, remarks on, in Siberia; H. Seebohm, Ibis, 1878, pp. 328–331; united, A. Newton, Yarrell's Brit. Birds (3rd ed.). *C. frugilegus*, on its rookeries in London; E. Hamilton, Zool. 1878, pp. 193, & A. Newton, *tom. cit.* p. 441. Deformities in bill; S. von Szilassy, Term. füzetek, 1878, pp. 74 & 117, pl. vi. fig. 1.

Cyanocorax inexpectatus, sp. n., D. G. Elliot, Ibis, 1878, p. 55, allied to *C. cæruleus*, San Paulo, Brazil.

Garrulus lidthi, Bp.: its true habitat is Japan; W. A. Forbes, Ibis, 1878, p. 491.

Gymnocitta cyanocephala, on its nest eggs; H. W. Henshaw, Bull. Nutt. Orn. Club, iii. p. 112.

Heteralocha acutirostris, descriptive notes on the bird (p. 211), figures

of the bill (pl. v.), and description of the egg (p. 212); W. L. Buller, Tr. N. Z. Inst. x.

Pityriasis gymnocephala: on the young of this Bornean species; F. Brüggeman, Ann. N. H. (5) i. p. 37.

Podoces tarimensis, new name given by N. Prjevalsky to a species which he subsequently identified with *P. biddulphi*; [see E. D. Morgan's English translation, pp. 63 & 64, note.]

COLUMBÆ.

Columbidæ.

Æchmoptila, g. n. (*Leptoptila*, Sw. & Bp., nec *Leptoptilos*, Less.); E. Coues, in G. B. Sennett's Report, Bull. U. S. Surv. Terr. iv. p. 48. *Æ. albifrons* obtained at Hidalgo, Texas, *ibid.*

Carpophaga melanochroa, sp. n., P. L. Sclater, P. Z. S. 1878, p. 672, figured pl. xlii., Duke of York Island. *C. latrans*, note on its gizzard (with figure) and other organs; A. H. Garrod, P. Z. S. 1878, p. 102.

Carpophaga rufigula, sp. n., T. Salvadori, Atti Acc. Tor. xiii. p. 536, San Cristoval, Solomon Islands.

Chalcophaps beccarii, ♂ first described; T. Salvadori, Atti Acc. Tor. xiii. p. 314. *C. sandwichensis*, sp. n., *chrysochlora*, var., E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 288, Sandwich Islands, New Hebrides.

Chloræmas subvinacea, ♂ figured; G. D. Rowley, Orn. Misc. iii. pl. xci.

Columba œnas in Stirlingshire and South Perthshire; J. J. Dalgleish, Ibis, 1878, p. 382, and P. Phys. Soc. Edinb. 1876–78, p. 288.

Columba palumbus (pts. lxv. & lxvi.), *C. livia* (pts. lxvii. & lxviii.), figured; H. E. Dresser, B. Eur.

Deradelphe synancephale [? sp. n.], A. de Quatrefages, Bull. Ass. Sc. Fr. (1877), 1878. pp. 14. [Not seen by the Recorder.]

Drepanoptila holosericea, figure of wing pattern, which removes it from genus *Ptilopus*; D. G. Elliot, P. Z. S. 1878, p. 513.

Geotrogon ruficentris, ♂ ♀ figured; G. D. Rowley, Orn. Misc. iii. pl. xcii.

Globicera, Bp., a monograph of this sub-genus; T. Salvadori, Cr. R. Lic. Ginn. Cavour, 1877–78, pp. 17, in sep. copy.

Ianthœnas pallidiceps, sp. n., allied to *I. metallicus*, Temm.; E. P Ramsay, P. Linn. Soc. N. S. W. ii. p. 248, Duke of York Island.

Leptoptila cassini, ♂ figured; G. D. Rowley, Orn. Misc. iii. pl. xciii., may = *L. cerviniventris*, Scl. & Salv., *id. tom. cit.* p. 80.

Macropygia buruensis (Buru) and *M. maforensis* (Mafor), spp. nn., T. Salvadori, Ann. Mus. Genov. x. pp. 428 & 429. *M. eurycerca*, sp. n., Marquis of Tweeddale, P. Z. S. 1878, p. 288, Negros Island, Philippines. *M. mackinlayi* (Island of Tanna, New Hebrides) and *M. rufa*, Sandwich Island, New Hebrides), spp. nn.; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. pp. 286 & 287. *M. nigrirostris*, ♀ first described; T. Salvadori, Atti Acc. Tor. xiii. p. 315. *M. sanghirensis*, sp. n., *id. tom. cit.* p. 1185, Island of Sanghir. *M. keyensis*, Salv., adult fully described, and distinguished

from *M. amboinensis* and *M. doreya*; T. Salvadori, P. Z. S. 1878 p. 89.

Megaloprepia poliura, sp. n., distinguished from *M. puellæ* (Less.), T. Salvadori, Ann. Mus. Genov. xii. p. 426, New Guinea.

Œdirrhinus insolitus figured; J. Gould, B. New Guinea, pt. viii.

Oseulatia purpurata, sp. n., O. Salvin, Ibis, 1878. p. 448, Ecuador.

Philogœnas jobiensis and *P. johannæ* figured; J. Gould, B. New Guinea, pt. vii.

Ptilopus: on the genus; D. G. Elliot, P. Z. S. 1878, pp. 500–579; also G. D. Rowley, Orn. Misc. iii. pp. 59–64, 113–117, 171. *P. miqueli* (pl. lxxxviii.), *P. musschenbræki* (pl. xcv.), *P. speciosus* and *P. bellus* (pl. civ.), figured; *id.* tom. cit. *P. pictiventris*, sp. n., D. G. Elliot, Ann. N. H. (5) i. p. 349, Marquesas Islands, Samoa, Savage Island, Navigators' and Friendly Islands. *P. pictiventris* and *P. gestroi* figured; *id.* P. Z. S. 1878, pls. xxxiii. & xxxiv.

Trerolæma leclancheri, Bp., = *Leucotreron gironieri*, Verr. & Des Murs; T. Salvadori, Atti Ac. Tor. xiii. pp. 425–428.

Turtur risorius and *T. isabellinus* figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Dididæ.

Pezophaps solitarius. Remarks on; R. Owen, Ann. N. H. (5) i. pp. 87–98, pls. vii. & viii. Exhibition of its gizzard-stone; A. Newton, P. Z. S. 1878, p. 291.

GALLINÆ.

Pteroclidæ.

See Elliot, *suprà*, p. 9.

Phasianidæ.

Phasianus ignitus, Lath. Remarks upon this and allied species; D. G. Elliot, Ibis, 1878, pp. 411–414.

Phasianus reevesi naturalized in Scotland; Lord Ravensworth, Tr. North Durh. vii. pt. i. p. 168.

Polyplectron emphanes, Temm., proved to come from Palawan, Philippines; Marquis of Tweeddale, P. Z. S. 1878, p. 623. Its earliest name is *P. napoleonis*, Less.; *id. tom. cit.* p. 792.

Tetraonidæ.

Lagopus scoticus and *L. mutus*. Exhibition of a supposed hybrid between these species; A. Newton, P. Z. S. 1878, p. 793.

Lagopus rupestris appears to be the common species of the Aleutian Islands; E. W. Nelson, Bull. Nutt. Orn. Club, iii. p. 38.

Tetrao: remains of a species of this genus, found in Bone-caves of Liguria; A. Issel, Atti Acc. Rom. 1878, p. 82.

PERDICIDÆ.

Francolinus (*Sceloptera*) *hildebrandti*, sp. n., J. Cabanis, J. f. O. 1878, pp. 206 & 243, figured, pl. iv. fig. 2, Taita, E. Africa.

Odontophorus spodiostethus, sp. n., O. Salvin, Ibis, 1878, p. 447, Veragua.

Perdix ? petrosa: remains found in Bone-caves of Liguria; A. Issel, Atti Acc. Rom. 1878, p. 82.

Tetraogallus caspius. Its nidification; C. G. Danford, Ibis, 1878, p. 29.

Tetraogallus caucasicus and *T. caspius* figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

MEGAPODIIDÆ.

On the embryological covering in this family; T. Studer, Kosmos, ii. pp. 180–183.

Megacephalon maleo. On its anatomy, with cut of lower larynx; A. H. Garrod, P. Z. S. 1878, p. 629.

Megapodius decollatus, sp. n., E. Oustalet, Ass. Sc. Fr. Bull. No. 533, p. 248, D'Urville Island, New Guinea: = *M. affinis*, Meyer; T. Salvadori, Atti Ac. Tor. xiii. p. 312.

GRALLÆ.

Fossil remains (tarsi) belonging to this family, but of undeterminable species, found in the sub-Apennine neighbourhood of Rome; G. Pouzi, Atti Acc. Rom. 1878, p. 731.

RALLIDÆ.

Aramides calopterus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 439, figured, pl. xxviii., Sarayacu, Ecuador.

Crex pratensis figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii.

Fulica gallinuloides, King, = *F. leucoptera*, Vieill.; P. L. Sclater, P. Z. S. 1878, p. 291; also John Gibson, P. Phys. Soc. Edinb. 1876–78, p. 184.

Fulica novæ-zealandiæ, Colenso (in Tasman. J. Sc. 1845), is supposed to be extinct; W. L. Buller, Tr. N. Z. Inst. x. p. 191.

Ocydromus. A review of the species comprised in this genus; *id. l. c.* pp. 213–216.

Porphyrio. On the genus and its species; D. G. Elliot, Str. Feath. vii. pp. 6–25.

Porphyrio edwardsi, sp. n., D. G. Elliot, Ann. N. H. (5) i. p. 98, Cochin China; figured, *id.* Str. Feath. vii. p. 23, pl. ii. *P. calvus*: heads figured; *id. tom. cit.* p. 19, pl. i.

Porzana parva (pts. lxv. & lxvi.), *P. bailloni* (pts. lxvii. & lxviii.) figured; H. E. Dresser, B. Eur.

Rallina telmatophila, sp. n., A. O. Hume, Str. Feath. vii. p. 142, Malacca: probably = *R. superciliaris*, Eyton; *id. tom. cit* p. 451.

Rallus aquaticus figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Scolopacidæ.

Himantopus candidus, ♀ and pull. figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Macrorrhamphus griseus figured ; *id. op. cit.* pts. lxvii. & lxviii.

Pseudototanus, g. n. ; type, *P. haughtoni* : A. O. Hume, Str. Feath. vii. p. 489 [cf. *op. cit.* iv. p. 347, where generic distinctions are more fully given, although no name has been proposed till now].

Rhyacophilus solitarius. Description of the first authenticated eggs taken at Lake Bomaseen ; T. M. Brewer, Bull. Nutt. Orn. Club, iii. p. 197.

Rhynchæa capensis. Remarks on, and figures of the structural differences in trachea in ♂ and ♀ ; J. Wood-Mason, P. Z. S. 1878, pp. 745–751.

Tringa subarquata (pts. lxvii. & lxviii.), *T. maculata* (pts. lxxi. & lxxii.) figured ; H. E. Dresser, B. Eur.

Phalaropodidæ.

Phalaropus. On an etymological blunder in the derivation of this word ; John Murdoch, Bull. Nutt. Orn. Club, iii. p. 151.

Glareolidæ.

Glareola orientalis. On the difference of its eggs from those typical of the genus ; E. W. Oates, Str. Feath. vii. p. 49.

Charadriidæ.

Ægialitis geoffroyi and *Æ. asiatica* figured ; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Calidris arenaria : eggs figured ; H. W. Feilden in Sir G. S. Nares' Voy. 'Alert' and 'Discovery,' ii. App. iii. p. 210.

Gallinago gallinaria figured ; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Machetes pugnax, ♂ and pull. figured ; *id. ibid.*

Pluvianus ægyptius figured ; *id. op. cit.* pts. lxv. & lxvi.

Vanellus cayennensis: remarks on, and figure of its trachea ; A. H. Garrod, P. Z. S. 1878, p. 627.

Gruidæ.

Grus leucogeranus figured ; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Ciconiidæ.

See Ridgway, *suprà*, p. 23.

Ciconia maguari and *C. episcopus*, remarks on ; P. L. Sclater, P. Z. S. 1878, p. 633.

Euxenura, g. n., type, *Ciconia maguari* (Gm.); R. Ridgway, Bull. U.S. Surv. Terr. iv. p. 249, woodcut of the tail and rectrices.

Leptoptilus argala and *L. javanica*: on their nidification; C. T. Bingham, Str. Feath. vii. pp. 25–33.

Ibididæ.

Ibidinæ: remarks on this sub-family; E. Oustalet, N. Arch. Mus. (2) i. pp. 167–183.

Ibis harmandi and *I. papillosa*: heads figured; *id. l. c.* pl. vi. *I. gigantea* figured; *id. l. c.* pl. vii.

Falcinellus thalassinus, Ridgw., = *F. guarauna*, Gm., juv.; E. Coues, in G. B. Sennett's Notes, Bull. U. S. Surv. Terr. iv. p. 57.

Ibis æthiopica. Note on its breeding in the Zoological Gardens, and young and egg figured; P. L. Sclater, Ibis, 1878, pp. 449–451, pl. xii. Obtained on Lake Menzaleh; E. C. Taylor, Ibis, 1878, p. 372.

Plegadis falcinellus figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Tantalidæ.

Tantalus loculator: remarks on its trachea, with woodcut; A. H. Garrod, P. Z. S. 1878, p. 625.

Ardeidæ.

See Ridgway, *suprà*, p. 23.

Ardea cinerea: heronries in Sussex; G. D. Rowley, Orn. Misc. iii. p. 65, pls. lxxxix. & xc. *A. comata*: its first occurrence in Scotland; R. Gray, P. Phys. Soc. Edinb. 1876–78, p. 216.

Ardea occidentalis, Aud.: its supposed identity with *A. wurdemanni*, Baird, and its dichromatic plumage; R. Ridgway, Bull. U.S. Surv. Terr. iv. p. 227.

Ardetta melana, sp. n., T. Salvadori, Atti Ac. Tor. xiii. p. 1186, Island of Sanghir.

Ardetta minuta (Linn.), obtained in Transvaal; T. Ayres, Ibis, 1878, p. 300.

Dichromanassa, g. n., type *Ardea rufa*, Bodd.; R. Ridgway, Bull. U.S. Surv. Terr. iv. pp. 224 & 246.

Gorsachius melanolophus, Raffles, obtained in Eastern Assam; H. H. Godwin Austen, J. A. S. B. xlvii. pt. 2, p. 21.

Hydranassa, g. n. [no type indicated], R. Ridgway, Bull. U.S. Surv. Terr. iv. p. 224.

Mesites: on its affinities and systematic position; A. Milne-Edwards, C. R. lxxxvi. [1878], p. 1029, and Ann. Sc. Nat. (6) vii. pp. 2–4.

Syrigma, g. n., type *Ardea sibilatrix*, Temm.; R. Ridgway, Bull. U.S. Surv. Terr. iv. pp. 224 & 247.

ANSERES.

Anatidæ.

Anas wyvilliana, sp. n., distinguished from *A. boschas*; P. L. Sclater, P. Z. S. 1878, p. 350, Sandwich Islands. *A. castanea*: the bulla ossea is

only found in the ♂; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 154. *A. gibberifrons* of New Zealand, and *A. castanea* of Australia: their distinctness discussed; *id. tom. cit.* p. 38. *A. fuligula*: its breeding-place in Nottinghamshire; G. D. Rowley, Orn. Misc. iii. p. 229, pl. ex. *A. ferina*: on its breeding in Britain; *id. tom. cit.* p. 230.

Anser albatus in Co. Mayo, Ireland; J. E. Harting, Zool. 1878, pp. 419–422 & 453. *A. cinereus* and *A. brachyrrhynchus* figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Clangula islandica figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Cygnus olor obtained in Sind; W. T. Blanford, P. A. S. B. 1878, p. 138, also Str. Feath. vii. p. 99; also A. O. Hume, *tom. cit.* p. 101.

Fuligula nationi: further remarks on; P. L. Sclater, P. Z. S. 1879, pp. 477–479, figured, pl. xxxii., also woodcut of trachea of ♂.

Fuligula ferina figured; H. E. Dresser, B. Eur. pts. lxv. & lxvi.

Fuligula marila and *F. affinis*, remarks on; J. Vian, Bull. Soc. Z. Fr. iii. pp. 59–61.

Mareca penelope obtained on the Atlantic coast of the United States; N. T. Lawrence, Bull. Nutt. Orn. Club, iii. p. 98.

Nyroca australis: the bulla ossea is found in the ♂ only; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 154.

Œdemia patachonica, King, appears to be *Anas cristata*, Gm.; John Gibson, P. Phys. Soc. Edinb. 1876–78, p. 186.

Stictonetta nævosa: the bulla ossea is found neither in ♂ nor ♀; E. P. Ramsay, P. Linn. Soc. N. S. W. iii. p. 154.

Tadorna cornuta figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii.

Laridæ.

See Saunders, *suprà*, p. 26.

Larus, *Pagophila*, *Rhodostethia*, *Rissa*, and *Xema* recognized as valid genera; H. Saunders, P. Z. S. 1878, pp. 155–160.

Larus californicus obtained in Japan, and is probably *L. nivcus*, Pall., *nec* Bodd. (p. 175); *L. canus* obtained in Labrador (p. 177); *L. novæ-hollandiæ* (pp. 185–187), *L. scopulinus* (p. 188), *L. hartlaubi* (p. 189), *L. bulleri* (pp. 190 & 191), *L. gelastes* (p. 192), *L. serranus* (p. 196), *L. brunneicephalus* (p. 197), *L. melanocephalus* (p. 199), *L. ridibundus* (p. 201), *L. maculipennis* (p. 202), *L. glaucodes* (p. 203), *L. saundersi* (p. 205), *L. philadelphiæ* (p. 207), the three outer primaries of each figured; *id. tom. cit.*

Larus audouini and *L. gelastes* figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii. *L. affinis*, Reinhdt., obtained at Heligoland; H. Gaetke, Ibis, 1878, p. 489.

Rissa tridactyla figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Rhodostethia rosea: its supposed occurrence off Franz-Josefland; H. W Feilden, Ibis 1878, p. 200.

Xema sabinii obtained at Tumbez, Western Peru; P. L. Sclater & O. Salvin, P. Z. S. 1878, p. 141.

Stercorarius antarcticus, its habits on the Island of St. Paul; C. Vélain, Arch. Z. expér. vi. p. 52.

Stercorarius catarrhactes obtained on the coast of Massachusetts; T. M. Brewer, Bull. Nutt. Orn. Club, iii. p. 188.

Sterna anglica figured; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Sterna melanoptera, its habits on the Island of St. Paul; C. Vélain, Arch. Z. expér. vi. p. 53.

Anous caruleus occurs at Ellice Islands, and is distinct from *A. cinereus*; R. B. Sharpe, P. Z. S. 1878, p. 271.

Procellariidæ.

Argillornis longipennis, g. & sp. nn. (foss.), a large bird of flight from the Eocene of Sheppy; R. Owen, J. G. Soc. xxxiv. pp. 124-130, pl. vi.

Bulweria columbina figured; H. E. Dresser, B. Eur. pts. lxvii. & lxviii.

Diomedia cauta obtained in the North Island, New Zealand; W. L. Buller, Tr. N. Z. Inst. x. p. 217.

Fulmarus glacialis figured; H. E. Dresser, B. Eur. pts. lxix. & lxx.

Oceanites oceanicus figured; *id. op. cit.* pts. lxvii. & lxviii.

Puffinus anglorum, *P. yelkouan*, *P. obscurus*, *P. baroli*, remarks on; J. Vian, Bull. Soc. Z. Fr. iii. pp. 54–59.

Phaetontidæ.

Phaeton rubricauda obtained in New Zealand; W. L. Buller, Tr. N. Z. Inst. x. p. 219.

Pelecanidæ.

See Mivart, *suprà*, p. 18.

Dysporus hernandezi, sp. n., J. Gundlach, J. f. O. 1878, p. 298, Cuba.

Pelecanus barbieri, sp. n., E. Oustalet, Bull. Soc. Philom. (7) ii. pp. 208–211, Ancon, Peru [? = *P. molinæ*, ad.].

Pelecanus philippensis, on its nidification in Burma; E. W. Oates, Str. Feath. vii. p. 41.

Phalacrocorax carbo, remarkable account of its breeding in Eastern Narra, Sind; S. Doig, Str. Feath. vii. p. 468.

Plotus levaillanti, on its anatomy; A. H. Garrod, P. Z. S. 1878, p. 679.

Tachypetes chambeyroni, sp. n., C. R. Montrouzier, Bull. Soc. Géogr. Fr. (6) xii. [1876], Islands of Huon and Surprise.

Podicipidæ.

Podiceps griseigena figured; H. E. Dresser, B. Eur. pts. lxxi. & lxxii.

Alcidæ.

Alca impennis, on its reported occurrence in the Færoes in 1870; H. W. Feilden, Zool. 1878, p. 199.

Spheniscidæ.

Osteology and myology; P. Gervais & E. Alix, J. Zool. vi. pp. 424–472, pls. xvi. & xvii.

Eudyptula serresiana, sp. n., E. Oustalet, Ann. Sci. Nat. 1878, No. 4, Tierra del Fuego.

CRYPTURI.

Tinamidæ.

Nothoprocta dæringi, sp. n., J. Cabanis, J. f. O. 1878, p. 189, Cordova, Argentine Republic.

Crypturus transfasciatus, sp. n., O. Salvin, P. Z. S. 1878, p. 141, pl. xiii., Santa Rosa, Ecuador.

Crypturus cerviniventris figured; J. M. Spence, Land of Bolivar, i. p. 267.

STRUTHIONES.

Casuariidæ.

Casuarius australis, note on, and figure of the helmet; E. P. Ramsay, P. Linn. Soc. N. S. W. ii. p. 376, pl. xi.

Casuarius salvadorii, sp. n., E. Oustalet, Bull. Ass. Sc. Fr. No. 539, p. 349. Exhibition of skin, and woodcut of head; P. L. Sclater, P. Z. S. 1878, pp. 212–214.

Casuarius edwardsi, sp. n., E. Oustalet, P. Z. S. 1878, p. 389, head figured, pl. xxi., Dorey, New Guinea.

On a Papuan species; A. B. Meyer, J. f. O. 1878, p. 199. Appears to = *C. edwardsi*, Oustalet; *id. tom. cit.* p. 299.

Casuarius uni-appendiculatus, Blyth, is the species found at Sorong by D'Albertis; T. Salvadori, Ann. Mus. Genov. xii. p. 346. *C. tricaruncu-latus*, Becc., and *C. occipitalis*, Salvad., further remarks on; *id. tom. cit.* pp. 419–425 [*cf.* Zool. Rec. xii. p. 91].

Dromæus novæ-hollandiæ reared in Scotland; John Gibson, P. Phys. Soc. Edinb. 1876–78, p. 209.

Struthionidæ.

Diatryma giganteum. Further remarks upon this species, from the Eocene, of doubtful affinities, and figures of its bones [*cf.* Zool. Rec. xiii. *Aves*, pp. 6 & 59]; E. D. Cope, in Wheeler's Rep. Surv. W. of 100th Mer. iv. p. 69.

Dinornithidæ.

See Clarke, *suprà*, p. 6.

Dinornis and *Æpyornis*: see Rowley, *suprà*, p. 24.

Dinornis: on the number of cervical vertebræ; F. W. Hutton, Ann. N. H. (5) i. pp. 407–409.

REPTILIA.

BY

A. W. E. O'Shaughnessy.

GENERAL ANATOMY.

In general reviews of the anatomical literature of 1877, K. Bardeleben gives an account of the various contributions to the Comparative Osteology of the *Reptilia* which appeared in that year, the notice of each work being a summary of the contents, and results arrived at. JB. Anat. Phys. vi. Abth. i. pp. 174–179.

A similar condensed summary of memoirs, &c., bearing upon the Development of *Reptilia* and *Batrachia* is furnished by O. Hertwig, *tom. cit.* Abth. ii. pp. 204–210.

R. Blanchard, in a general review of recent literature respecting Impregnation in the Animal series, treats of this subject with reference to the *Batrachia*, in J. Anat. Phys. xiv. pp. 739–743.

Kuppffer, C., & Benecke, B. Die ersten Entwickelungsvorgänge am Ei der Reptilien. Königsberg: 1878.

See, with reference to the above work,

Balfour, F. The early Developmental Change in the Reptilian Ovum. Q. J. Micr. Sc. xviii. pp. 454 & 455.

A short summary of the observations made by Kuppffer & Benecke on *Lacerta agilis* and *Emys europæa*, in which the embryonic changes were found to be closely alike.

Braun, M. Das Urogenitalsystem der einheimischen Reptilien entwicklungsgeschichtlich und anatomisch bearbeitet. Arb. Inst. Würzb. iv. pp. 113–230.

The urogenital system studied in common indigenous reptiles, preceded by a historical account, and followed by a discussion of its relations with the other Vertebrates. The special descriptions of the segmental and sexual organs will be referred to below under the heads of the different groups.

FÜRBRINGER, M. Zur vergleichenden Anatomie und Entwickelungsgeschichte der Excretionsorgane der Vertebraten. Morph. JB. iv. pp. 1–111, pls. i.–iii.

On the development of the excretory system in the *Reptilia*, pp. 2–236.

GEGENBAUR, C. Bemerkungen über den Vorderarm niederer Wirbelthiere. Morph. JB. iv. pp. 314–319.

HOFFMANN, C. Beiträge zur vergleichenden Anatomie der Wirbelthiere. Niederl. Arch. Zool. iv. pp. 112–248, pls. ix.–xiii.

On the carpal bones of the *Chelonia*, pp. 112–119. On the same bones in the *Sauria*, pp. 120–125. In the *Crocodilia*, pp. 125–128; the carpal bones of the *Reptilia* and the *Amphibia* compared, pp. 128 & 129. On the tarsus of the *Chelonia*, pp. 130–136. On the tarsus of the *Sauria*, pp. 136–148; of the *Crocodilia*, p. 149; comparison of the tarsus of *Amphibia* and *Reptilia*, pp. 151 & 152. On the integument and dermoskeleton of the *Chelonia*, pp. 153–185. On the chorda dorsalis of the *Chelonia*, pp. 185–199. On the morphology of the ribs, pp. 199–240.

KORYBUTT-DASZKIEWICZ, —. Ueber die Entwickelung der Nerven aus Plasmazellen beim Frosche. Arch. mikr. Anat. xv. pp. 1–7, pl. i.

PARKER, W. K. On the Structure and Development of the Skull in the Common Snake (*Tropidonotus natrix*). Phil. Tr. clxix. pp. 385–418, pls. xxvii.–xxxiii.

——. On the Structure and Development of the Skull in the *Lacertilia*. Part I. On the Skull of the Common Lizards (*Lacerta agilis*, *L. viridis*, and *Zootoca vivipara*). P. R. Soc. xxviii. pp. 214–217 (abstract).

PARTSCH, C. Beiträge zur Kenntniss des Vorderarms einiger Amphibien und Reptilien. Arch. mikr. Anat. xiv. pp. 179–202, pl. xii.

SCHÖBL, J. Ueber eine eigenthümliche Schleifenbildung der Blutgefässe im Gehirn und Rückenmark der Saurier. Arch. mikr. Anat. xv. pp. 60–63, pl. iv. figs. 1 & 2.

F. MÜLLER has compiled a catalogue of *Reptilia* and *Amphibia* in the Museum of Basel. Copious notes on different species and details respecting the specimens are appended; several species and one or two genera are indicated as new, but without receiving any designation. Verh. Ges. Bas. vi. pp. 559–709.

O. v. LINSTOW enumerates the reptiles which are infested with parasitic worms, naming the parasites which affect each species. Compend. der Helminthologie; Hannover: 1878, 8vo, pp. 175–206.

BEDRIAGA gives accounts of various reptiles in captivity. Zool. Gart. 1878, pp. 82–90.

CLASSIFICATION.

COPE, E. Professor Owen on the *Pythonomorpha*. Bull. U. S. Geol. Surv. iv. pp. 299–311.

A review of Professor Owen's criticisms on the views as to the position

of the order *Pythonomorpha*, recently expressed by Professor Cope in Rep. U. S. Geol. Surv. ii. Prof. Cope adduces considerations in support of his proposition that, constituting a distinct order of the Streptostylicate group, these reptiles present more points of affinity to the Serpents than does any other order. He considers that five out of seven characters enumerated are sufficient to justify his conclusion that they are nearer to the *Ophidia* than are the *Lacertilia*, premising, however, that the approximation is not with extreme modifications of the order, but with the *Tortricidæ*, *Erycidæ*, *Scolecophidia*, &c., which also approach the Lizards.

FAUNÆ.

Europe.

Bedriaga, J. v. On species and varieties of *Lacerta*, and general remarks on European lizards. Arch. f. Nat. xliv. pp. 128, 259–320.

Braun, M. *Lacerta lilfordi* und *Lacerta muralis*. Arb. Inst. Würzb. iv. pp. 1–64, pls. i. & ii.

An elaborate paper on these two lizards with notices of other species of *Lacerta*, and description of one as new.

T. Heldreich, in "La Faune de Grèce," Athènes, 1878, 8vo, gives a list of the reptiles found in Greece, pp. 61–77.

Kessler, in "Reisebriefe aus der Krym," makes observations on the lizards of the Crimea; Bull. Mosc. liii. pt. 2, pp. 209–211.

Asia.

O. Böttger has given, in Z. ges. Naturw. (2) xlix. p. 285, a list of 16 reptiles, 13 snakes and 3 lizards, from localities north of Beirut; and a further account of Syrian reptiles consisting of redescriptions and geographical particulars of 18 species, in Ber. Senck. Ges. 1878–79, pp. 57–84.

Scientific results of the Second Yarkand Mission, based upon the collections and notes of the late F. Stoliczka. *Reptilia* and *Amphibia* by W. T. Blanford, Calcutta, 4to, 26 pp. 2 pls. The reptiles procured by Dr. Stoliczka in Eastern Turkistan which have been already recorded [see Zool. Rec. xii. p. 95], are now described at length with details and figures.

New species of reptiles from the Himalayas and Burma are described by W. T. Blanford, J. A. S. B. xlvii. pt. 2, pp. 125–131.

New Guinea.

W. Peters & G. Doria give a classified catalogue of all the Reptiles and Batrachians collected by Beccari, D'Albertis, and Bruijn in the Austro-Malayan sub-region. In the introductory remarks some very severe criticisms are passed upon W. Macleay's recent papers on the results of the 'Chevert' expedition [Zool. Rec. xiv. *Rept.* p. 4]. A number of new species are described and notices are given of many previously known ones. Tables showing the geographical distribution in the different islands of all the species are appended. Ann. Mus. Genov. xiii. pp. 323–450, pls. i.–vii.

SAUVAGE, E. Essai sur la faune herpétologique de la Nouvelle-Guinée, suivi de la description de quelques espèces nouvelles ou peu connues. Bull. Soc. Philom. (7) ii. pp. 25–44.

The greatest affinities of this fauna are with Australia, although it has certain relations with that of the Sunda Archipelago. The list now given consists of 1 Tortoise, 12 Geckos, 5 Varans, 6 Iguanas, 23 Scincs, 27 Snakes. Several species are redescribed.

Australia.

MACLEAY, W. Notes on a Collection of Snakes from Port Darwin. P. Linn. Soc. N. S. W. ii. pp. 219–222.

Five are described as new.

Africa.

L. CAMERANO has published observations on the *Anura* of Morocco, describing one new species. Atti Acc. Tor. xiii. (also separately, 19 pp.).

The reptiles collected by J. Hildebrandt in Eastern Africa are described by PETERS in MB. Ak. Berl. 1878, pp. 202–209, pl. ii. figs. 1–9.

C. B. KLUNZINGER describes 3 species of *Chelonia* and 12 of *Sauria* from the Red Sea. Z. Ges. Erdk. Berl. xiii. pp. 91–96.

REICHENOW mentions a few *Reptilia* from the Loango Coast Expedition which had been omitted by Peters. SB. nat. Fr. 1878, p. 92.

Madagascar.

O. BÖTTGER describes two new reptiles, a Gecko and a Frog, from Madagascar. Ber. Senck. Ges. 1878–79, p. 1.

A. GÜNTHER notices extinct reptiles of Rodriguez, describing *Testudo vosmæri* and *Gecko newtoni*, in Phil. Tr. clxviii. p. 452 [see Zool. Rec. xiv. *Rept.* p. 5]. A short note on the recent *Reptilia*, l. c. p. 470.

America.

JORDAN, D. Manual of the Vertebrates of the Northern United States, 2nd ed., revised and enlarged. Chicago : 8vo.

The *Reptilia* occupy pp. 157–198. The characters of a new species of *Rana* are given, abridged from Mr. Rice's notes.

COUES, E., & YARROW, H. Notes on the Natural History of Fort Macon, N. C, and vicinity. No. 4. P. Ac. Philad. 1878, pp. 24–28.

The Reptiles are here noticed ; they are all of known species.

——. Notes on the Herpetology of Dakota and Montana. Bull. U. S. Geol. Surv. iv. pp. 259–291.

A list, with descriptions and synonymy, and particulars of a semi-popular kind.

BOCOURT, F. Mission Scientifique au Méxique et dans l'Amérique Centrale ; iiie. partie, Études sur les Reptiles et les Batraciens. Paris : 1878, 5e. livr. fol. pp. 281–360, pls. xx.–xxi.c.

The conclusion of the *Tejidæ*, the *Helodermidæ*, the genera *Lepidophyma*, *Xenosaurus*, *Xantusia*, and *Cricosaura*, and the *Gerrhonotidæ*.

1re. livr. 1870. The Recorder finds that a portion of the figures of lizards

published in this part have not yet been referred to, in consequence of their being unaccompanied at the time by the text [see Zool. Rec. ix. p. 62]. They occupy pls. xi. & xii. (*Phrynosoma*, subgenera *Tapaya*, *Batrachosoma*, *Phrynosoma*, and *Anota*), and include *Tapaya orbiculare*, varr. nn., *cortezi*, pl. xi. fig. 2 A–G, *dugesi*, pl. xi. fig. 3 A–F, *T. boucardi*, sp. n., pl. xi. fig. 4 A–F, *Phrynosoma braconnieri*, sp. n., pl. xii. fig. 7 A–G. The letterpress describing the subjects of these plates and other species of the group found in this region was issued in livr. 4e. pp. 217–242 [1874].

T. H. Streets, in "Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California," notices Reptiles collected during the U. S. North Pacific Expedition; Bull. U. S. Nat. Mus. vii. pp. 35–42.

F. Mueller, in 'Ueber einige seltene und neue Reptilien aus Guatemala,' describes a species of *Lepidophyma* and some Snakes as new. Verh. Ges. Bas. vi. pp. 390–411.

CHELONIA.

Monks, Sarah. On the Columella and the Stapes in some North American Turtles. P. Am. Phil. Soc. xvii. pp. 335–337, pls. xvi. & xvii.

Stewart, C. On the Lachrymal Gland of the Common Turtle. M. Micr. J. 1877, p. 241, pl.

Observations on certain cutaneous excretory glands in Chinese fluviatile tortoises. Rathouis, C. R. lxxxvi. p. 1466, and Ann. Sc. Nat. (6) vii. Art. 14, pp. 1–4, pl. xi. B.

Vaillant, S. Description of peculiar anatomico-pathological appearances observed in a *Platemys macquaria*. Bull. Soc. Philom. (7) ii. p. 14.

On worm-like appendages on the tongue of *Chelydra temminckii*, Troost. *Id. tom. cit.* p. 15.

Stockwell, G. On some peculiarities in the Anatomy of Soft-shelled Turtles. Zool. 1878, pp. 401–407.

Motta-Maïa, —, & Renaut, J. Note sur la structure et la signification morphologique des glandes stomacales de la Cistude d'Europe. Arch. Phys. (2) v. pp. 67–75, pl. vii.

Testudo horsfieldi, Gray. Note by P. L. Sclater, P. Z. S. 1878, p. 975.

Testudo ibera, Pall. On its secondary sexual characters; Atti Acc. Tor. xiii. pp. 97–101, pl. iv.

CROCODILIA.

Rabl-Rückhard, —. Das Centralnervensystem des Alligators. Z. wiss. Zool. xxx. pp. 336–373, pls. xix. & xx.

Alligator sclerops, L. Note on anatomy; H. Weyenbergh, Bol. Ac. Cordoba, ii. pp. 244–253, pl.

RHYNCHOCEPHALIA.

W. L. Buller describes a new variety of *Sphenodon* from New Zealand, without naming it specifically, p. 220, and A. Newman gives an account of the physiology and anatomy of *Sphenodon guentheri*, pp. 229–239; Tr. N. Z. Inst. x. [for 1877, published in 1878].

SAURIA.

Amphisbænidæ.

Amphisbæna leucocephala, p. 778, pl. fig. 1, Bahia; *subocularis*, p. 779, pl. fig. 2, Pernambuco; *mildei*, p. 779, pl. fig. 3, Porto Alegre; *cubana*, p. 780, pl. fig. 4; Peters, MB. Ak. Berl. 1878: spp. nn.

Amphisbæna innocens, Weinl., = *cæca*, Cuv., *id. l. c.* p. 781. *A. krausi*, sp. n., *id.* SB. nat. Fr. 1878, p. 192, W. Africa.

Helodermidæ.

F. Bocourt gives a sketch of the views of authors with respect to *Heloderma*. He associates with it, under the family *Trachydermi*, Wiegm., several lizards to which it offers considerable zoological affinities; they differ from it in having smooth ungrooved teeth. Such a difference might at first seem to militate against their union with *Heloderma*, but this dental character, of great importance in the higher *Vertebrata*, has only a secondary importance among the reptiles, as is exemplified by the serrated teeth of *Macroscincus coctei*, D. & B. The *Trachydermi* are arranged as follows:—

I. *Trachydermi Glyphodonta*. Teeth grooved.
Heloderma horridum, Wiegm., described and figured, p. 297, pls. xx.E & xx.G.

II. *Trachydermi Aglyphodonta*. True pleurodonts, with grooveless teeth.

1. *Xenosaurus grandis*, Gray, p. 303, pl. 20 F, figs. 1 *a–g*.
2. *Lepidophyma flavo-maculatum*, Dum., p. 306, pl xx. F, figs. 2 *a–g*; *smithi*, Boc., p. 209, pl. xx. F, figs. 3 *a* & *b*, pl. xx. G, figs. 2 *a* & *b*.
3. *Cricosaura typica*, Gundl., Pet., p. 313, pl. xx. E. figs. 14–19.

The above fully described and figured. *Xantusia*, Baird, does not seem to differ from *Lepidophyma* except in the form of the pupil. Mis. sc. Méx. iii.

Lepidophyma, sp. n., from Guatemala, described and figured, but without designation; allied to *L. grayi*. F. Mueller, Verh. Ges. Bas. vi. pp. 389–398, pls. i. & ii.

Varanidæ.

Monitor doreanus, Meyer, = *M. indicus*, Daud., head figured, p. 330, pl. i. fig. 1; *M. kalabeck*, Less., fully described, head figured, p. 332, fig. 3; *M. gouldi*, Gray, pl. i. fig. 4, *prasinus*, Schleg., pl. ii. fig. 3, *kordensis*, Mey., pl. ii. fig. 4, head figured; *M. salvadorii*, sp. n., p. 337, pl. ii. figs. 1 & 2, New Guinea. Peters & Doria, Ann. Mus. Genov. xiii.

Monitor niloticus. On an example of *M. saurus*, Laurenti, from the Gaboon; Giebel, Z. ges. Naturw. li. pp. 137–140.

Teiidæ.

Descriptions and figures of species of *Amiva* and *Cnemidophorus* from Mexico and Central America, with lists and synoptical tables. Bocourt, *op. cit.* livr. 4e, 1874, pp. 232–280, pls. xx. A, B, C, and continued in livr. 5e, 1878, pp. 281–286. Entire figures of *Amiva undulata*, Wiegm., *festiva*, Licht. (= *eutropia*), Cope, and *Cnemidophorus deppii*, Wiegm., from the type specimens, pl. xx. figs. 1, 2, 3.

Teiovaranus and *Lanthanotus*; Steindachner, Denk. Ak. Wien, xxxviii. pp. 93–95, pls. 1 & 2. [Zool. Rec. xiv. *Rept.* p. 6. *Teiovaranus* = *Callopistes*, with note on the teeth of *Lanthanotus*; id. SB. Ak. Wien, lxxviii. Abth. i.]

Lacertidæ.

Anatomy: the primitive kidneys and the sexual organs of *Lacerta agilis*. Braun, Arb. Inst. Würzb. iv. pp. 132, 145.

Lacerta. On the numerous variations and distinct varieties of *L. muralis*. *L. muralis fusca* from different localities, *L. muralis neapolitana*, Bedr., and *rasquineti*, the latter figured. Key of short diagnoses of the species and varieties, *L. viridi-ocellata* and *filfolensis*, Bedr., and *melisellensis*, Braun, *archipelagica*, Bedr., and *L. schreiberi*, sp. n., from Asturia; followed by general remarks on European lizards. J. v. Bedriaga, Arch. f. Nat. xliv. pp. 128, 259–320, pl. x.

Lacerta melisellensis, sp. n., p. 49, pl. ii. fig. 4, Melisello in the Adriatic. M. Braun gives detailed descriptions of *L. lilfordi*, Gthr., as to its external characters and the structural peculiarities of its epidermis, habits, &c. He also describes with equal minuteness *Lacerta muralis*, as exemplified severally by specimens from the Islands of Minorca, Colon, Sargantanas, and Del Rey. To this extensive monograph are added descriptions of *L. faraglionensis*, Bedr., *filfolensis*, Bedr., the above new species, *L. archipelagica*, Bedr. The points of difference presented by all the recently established black species of *Lacerta* are copiously discussed and formulated in a table, being further illustrated by 14 figures. Arb. Inst. Würzb. iv. pp. 1–64, pls. i. & ii.

Podarcis defilippii, p. 90, Persia, *judaica*, p. 92, Palestine, *depressa*, p. 538, Trebizond, spp. nn., L. Camerano, Atti Acc. Tor. xiii.

Eremias yarkandensis, Blanf., pl. ii. fig. 3, and var. A *saturata*, pl. ii.

fig. 4, figured. = *E. multi-ocellata* according to Günther, note p. 17; Blanford, Second Yarkand Mission.

Eremias vermiculata, Blanf., figured; *id. tom. cit.* pl. ii. fig. 5.

Eremias rugiceps, sp. n., Peters, MB. Ak. Berl. 1878, p. 202, pl. ii. fig. 1, Taita.

Acanthodactylus boskianus, Daud., var. n. *syriacus*, Böttger, Ber. Senck. Ges. 1878–79, p. 69.

Zonuridæ.

Gerrhonotus. On the genus, with synoptical table of species. *G.* (*Abronia*) *deppii*, Wiegm., *taeniatus*, Wiegm., *gramineus*, Cope, *rhombifer*, Peters, *vasconcellosii*, Boc., *auritus*, Cope, (*Elgaria*) *kingi*, Bell, *G. liocephalus*, Wiegm., *antauges*, Cope, *morcleti*, Boc., *fulvus*, Boc., *caeruleus*, Wiegm., *burnetti*, Gray, *multicarinatus*, Blainv., are all fully described and figures of the head given, pp. 323–360, pls. xx. A, B, C. *G. lemniscatus*, Boc., is now regarded as a variety of *G. liocephalus*, p. 345. *G. viridiflavus*, Boc., = *Barissia antauges*, Cope, p. 346; *Elgaria scincicauda*, Bd. & Gir., *grandis*, iid., *marginata*, Hallow., *G. olivaceus*, Bd., and *webbii*, Bd., are all referred to *G. multicarinatus*, Blainv., p. 357. Bocourt, Miss. Sc. Méx. iii.

Pseudopus pallasi. "Étude sur le membre antérieur du Pseudope de Pallas"; E. Sauvage, Ann. Sc. Nat. (6) vii. Art. No. 15, pp. 1–13, pl. xix.

On the occurrence of this lizard in Lower Austria, and probably in other parts of Eastern Central Europe; Knauer, Zool. Anz. i. p. 296.

Scincidæ.

Anatomy:—the primitive kidney and the sexual organs in *Anguis fragilis*; Braun, Arb. Inst. Würzb. iv. pp. 138, 145.

(*Hinulia*) *Lygosoma consobrinum*, p. 342, *undulatum*, p. 343, *elegantulum*, p. 344, spp. nn., Islands of the Austro-Malayan sub-region: Peters & Doria, Ann. Mus. Genov. xiii.

Mocoa noctua, Less. Peters (*l. c.* p. 347) confirms the Recorder's statement of the identity of *Euprepus novarae*, Steind., with this species. He further suggests that *Mocoa cuprea*, Gray, may be the same thing. [The Recorder is able to state that this is not the case; but he agrees that from the meagre description it would be impossible to form any idea of the species intended. The specimen shows a very different kind of lizard, and probably not a *Mocoa* at all. The Recorder has since found that *Lygosoma vertebrale*, Hallowell, is also identical with *Mocoa noctua*.]

(*Mocoa*) *Lygosoma lacrymans*, sp. n., Peters & Doria, *l. c.* p. 348, note, N. S. Wales. [This is identical with the Recorder's *M. mustelina*.]

Eumeces aruensis, Doria, = *Hinulia jobiensis*, Meyer; *iid. l. c.* p. 349.

[*Mocoa*] *Lygosoma nigro-punctata* [*-tum*], sp. n., Bocourt, Ann. Sc. Nat. (6) vii. Art. No. 16. p. 2, China.

Mocoa ladacensis, Anders., = *kargilensis*, Steind., = *stoliczkai*, Steind.; Blanford, Second Yarkand Miss. p. 20.

Lygosoma (*Mocoa*) *sonderi*, sp. n., Peters. SB. nat. Fr. 1878, p. 191, S. Australia.

Lygosoma muelleri, sp. n., *id. ibid.*, S. Australia.

Heteropus beccarii, p. 361, Kei Islands, *albertisi*, p. 362, and *luctuosus*, p. 364, New Guinea, spp. nn., Peters & Doria, *l. c.*

[*Riopa*] *Eumeces fischeri*, sp. n., Bocourt, Ann. Sc. Nat. (6) vii. No. 16, p. 1, Puerto-Cabello.

Euprepes (*Tiliqua*) *cingulatus*, p. 352, and *callistictus*, p. 355, spp. nn., Peters & Doria, *l. c.*, New Guinea.

Mabuya beccarii, Doria, =*M. kordoanus*, Meyer; *iid. l. c.* p. 357.

Euprepes planifrons and *taitanus*, spp. nn., Peters, MB. Ak. Berl. 1878, p. 203, pl. ii. figs. 2 & 3, Taita.

Euprepes (*Mabuya*) *melanurus*, sp. n., *id. l. c.* p. 204, pl. ii. fig. 4, Taita.

Euprepes ocellatus, sp. n., Bocourt, Ann. Sci. Nat. (6) vii. No. 16, p. 3, N. America.

Typhlinidæ.

Typhloscincus martensi, Peters, =*Dibamus novæ-guineæ*; Peters & Doria, *l. c.* p. 366.

Geckotidæ.

Braun, M. Zur Bedeutung der Cuticularborsten auf den Haftlappen der Geckotiden. Arb. Inst. Würzb. iv. pp. 231–237, pl. ii.

Dactychilikion, g. n. Toes enlarged at extremity only, spatulate below with transverse lamellæ, not divided by a median suture, and furnished on their hinder edge with fine fringes. *D. braconnieri*, sp. n., A. Thominot, Bull. Soc. Philom. (7) ii. p. 254, Lake Ngami.

Phyllodactylus stumffi, sp. n., Böttger, Ber. Senck. Ges. 1878–79, p. 1, Madagascar.

Phyllodactylus doriæ, Lataste. L. Camerano compares this species with *P. europæus*, and comes to the conclusion that they are identical; Atti Acc. Tor. xiv. pp. 219–223.

Gecko trachyleæmus, Ptrs., = *vittatus*, D. B.; Peters & Doria, *l. c.* p. 368.

Gehyra papuana, Mey., = *oceanica*, Less.; *iid. l. c.* p. 369.

Peripia mysorensis, Mey., = *meyeri*, Blkr. & Gthr., = *cantoris*, Gthr., = *lugubris*, D. B.; *iid. l. c.* p. 371.

Gymnodactylus arfakianus, Mey., = *arnouxi*, Dum.; *iid. l. c.* p. 372.

Cyrtodactylus yarkandensis, Anders., = *Gymnodactylus stoliczkæ*, Steind., redescribed; Blanford, *tom. cit.* p. 12.

Gymnodactylus elongatus and *microtis*, Blanf., figured; *id. l. c.* pl. ii. figs. 1 & 2.

Teratoscincus keyserlingi, Str., redescribed, from a new locality, Eastern Turkistan; *id. ibid.*

Iguanidæ.

On living examples of *Phrynosoma orbiculare*; Wiedersheim, Zool. Anz. i. p. 105.

Anolis, sp. n., described without name; allied to *A. biporcatus*. F. Mueller, Verh. Ges. Bas. vi. p. 707, Vera Paz.

AGAMIDÆ.

Draco major, Blanford, J. A. S. B. xlvii. pt. 2, p. 125, Tenasserim; *D. beccarii*, Peters & Doria, *l. c.* p. 373, Celebes: spp. nn.

Bronchocela burmana, Blanford, *l. c.* p. 126, Tenasserim; *B. intermedia*, Peters & Doria, *l. c.* p. 375, Celebes: spp. nn.

Gonyocephalus (*Lophosteus*) *albertisi*, p. 377, *G.* (*Hypsilurus*) *bruiini*, p. 379, *G.* (*Arua*) *geelvinkianus*, p. 381, spp. nn., *iid. ibid.*, New Guinea.

Lophosalea, g. n. No femoral pores, no lateral wings, tympanum naked; crest of back and anterior portion of tail very high, the lobes separate; scales of back and sides large, irregular, imbricate, subequal in size, but mixed with a few small scales strongly keeled, the tips directed backwards; a few trihedral or spinous scales above the tympanum, a large regular sac; tail of moderate length, very much compressed; all the scales keeled, the lower ones very prominently. *L. anamallayana*, sp. n., Beddome, P. Z. S. 1878, p. 153, pl. xiv., Anamallay Mountains.

Stellio stoliczkanus, p. 3, pl. i. figs. 1 & 2, figured; Blanford, Second Yarkand Miss.

On the habits of *Stellio vulgaris*; J. Fischer, Zool. Gart. 1878, pp. 135–139.

Phrynocephalus axillaris, Blanf., figured; Blanford, *tom. cit.* pl. i. fig. 4.

Remarks on the formation of *Uromastix*, *Liolepis*, and *Phrynocephalus* into a distinct family; *id.* J. A. S. B. xlvii. pt. 2, p. 128.

OPHIDIA.

TIEGEL, E. Vom Rückenmark der Schlangen und der Aale. Arch. ges. Phys. xvii. pp. 594–600.

An account of experiments on the spinal marrow of Snakes and the Eel, conducted in the physiological laboratory at Tokio in Japan.

PARKER, W. K. On the Structure and Development of the Skull in the Common Snake (*Tropidonotus natrix*). Phil. Tr. clxix. pp. 385–418, pls. xxvii.–xxxiii.

On the structure and development of the Snake; *id.*, Nature, xviii. pp. 202 & 203.

The primitive kidney and the sexual organs in *Tropidonotus natrix*, and other snakes; Braun, Arb. Inst. Würzb. iv. pp. 139 & 153.

Typhlops (*Letheobia*) *unitæniatus*, sp. n., Peters, MB. Ak. Berl. 1878, p. 205, pl. ii. fig. 5, Taita.

Typhlops porrectus, Stol., var. described by Blanford, Second Yarkand Miss. p. 21, Yarkand.

Onychocephalus simoni, sp. n., Böttger, Ber. Senck. Ges. 1878–79, p. 58, Syria.

Silybura nigra, *nitida*, *petersi*, *maculata*, p. 154, *brougham*, *levingii*, *ochracea*, *dupeni*, *guentheri*, *madurensis*, pp. 800–802, spp. nn., R. H. Beddome, P. Z. S., 1878, India.

Xylophis, g. n. Calamarid: "body cylindrical, slender; head short, not distinct from neck, gradually narrowed forward, and pointed; eyes very small, with round pupil; tail about one-third of total length; maxillary teeth very numerous, equal, the two palatine rows very conspicuous, and the teeth slightly longer behind; upper labials four, the first very minute, the second and third enter the orbit, fourth in contact with a large temporal; rostral very small; an elongated loreal, gradually narrowed behind, replaces anteocular, and occupies all the space from rostral to eye; nasals simple, very small; frontals, only one pair, large; a very small superciliary shield, and a similar post-ocular; scales smooth, without apical groove, in 15 rows; anal single; sub-caudals broad, bifid, or a few occasionally entire." *X. indicus*, sp. n., *id. l. c.* p. 576, S. India.

A new genus and species of *Calamaridæ* indicated by F. Mueller, Verh. Ges. Bas. vi. p. 645, pls. iii. C–D.

? *Geophis* (*Rhabdosoma*) *annulatus*, Peters, redescribed; *id. l. c.* p. 409.

Ablabes hildebrandti, sp. n., Peters, *l. c.* p. 205, pl. ii. fig. 6, Ukamba.

Heterodon: on the habits and harmlessness of *H. niger* and *platyrrhinus*; H. Strecker, Science News, i. pp. 104 & 111. On the genus, with description of *H. kennerlyi*, Kennic.; Coues and Yarrow, Bull. U. S. Geol. Surv. iv. p. 270.

Eutænia; on the characters for determining the species, with descriptions; *iid. l. c.* p. 273.

Fordonia variabilis, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 219, Port Darwin.

Zamenis elegantissimus, sp. n., Günther, P. Z. S. 1878, p. 977, pl. lxii., Midian.

Lielaphis (*Lycodon*) *aruensis*, Doria, = *parvus*, Mey., = *lividus*, D. B.; *magnus*, Mey., = *cucullatus*, D. B.; *holochrous*, Gthr., = *modestus*, Schleg.: Peters & Doria, *l. c.* p. 396.

Dasypeltis lineolata, sp. n., Peters, *l. c.* p. 206, Ukamba.

Dromicus chitalonensis, sp. n. ?, F. Mueller, *l. c.* p. 407, Guatemala.

Psammophis punctulatus, D. B., var. n. *trivirgatus*, id. *ibid.* Taita.

Dendrophis olivacea, sp. n., Macleay, *l. c.* p. 220, New Guinea.

Dendrophis aruensis, Doria, = *calligastra*, Gthr., = *striolatus*, Ptrs., = *lineolatus*, D. B., = *Leptophis punctulatus*, Gray; Peters & Doria, *l. c.* p. 390.

Dendrophis lineolatus, D. B. Duméril & Bibron confounded two species under this name; one of them, the species figured by Jan, is *D. aruensis*, Doria. Sauvage, Bull. Soc. Philom. (7) ii. p. 41.

Styporrhynchus celebicus, sp. n., Peters & Doria, *l. c.* p. 386, Celebes.

Ulupe, g. n. Lycodontid: "corpus gracile, compressum. Caput breve, depressum, collo paullo latius. Oculi pupilla elliptica, verticalis. Scutum loreale cum præoculari junctum; nasale haud bipartitum. Squamæ corporis in 13 seriebus longitudinalibus, læves, ventrales ad latera angulatæ, subcaudales biseriatim ordinatæ." *U. davisoni*, sp. n., Blanford, J. A. S. B. xlvii. pt. 2, p. 129, Tenasserim.

Ophites gammiei, sp. n., *id. l. c.* p. 130, Sikkim.

Erebophis asper, from Duke of York Island and other islands W. of mainland of New Guinea, as well as in the Bay of Geelvink, remarks on;

Sauvage, Bull. Soc. Philom. (7) ii. p. 39. See also A. Hubrecht, Notes Leyd. Mus. i. p. 19. Redescribed and figured by Peters & Doria, *l. c.* p. 406, pl. iv.

A new genus and species of *Boidæ* characterized and figured, without name; F. Mueller, *l. c.* p. 652, pl. i.

Chondropython pulcher, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 37, New Guinea.

Leiopython [*Lio-*], g. n. *Pythonidæ*, between *Liasis* and *Nardoa*. Nostrils lateral in middle of nasal, followed by a groove which extends backwards and downwards. Shields on head extending beyond eyes; no prefrontals; number of frenals and preoculars considerably reduced; pits on the rostral, the upper and lower labials; scales short, smooth, rhombic. *L. gracilis*, sp. n., Hubrecht, *l. c.* p. 14, Salawatti.

Liasis petersi, sp. n., *id. l. c.* p. 17, Flores and Timor.

Liasis papuanus, p. 400, pl. iii. fig. 1, *albertisi*, p. 401, pl. iii. fig. 2, New Guinea, Peters & Doria, *l. c.*: spp. nn.

Brachysoma simile, sp. n., Macleay, *l. c.* p. 221, Port Darwin.

Elapocephalus, g. n. Body elongate, slender, cylindric; tail rather long, slight, and tapering to a fine point; head high, and broader than neck, with short round muzzle; eyes large, pupil round; head shields as in *Elaps*; scales smooth, in 15 rows; anal shield entire; subcaudals in two rows; fangs and poison glands large for the size. *E. ornaticeps*, sp. n., *id. ibid.*, Port Darwin.

Pseudechis porphyriacus, Shaw, *Hoplocephalus superbus*, Gthr., and *H. curtus*, Schleg., are figured, with descriptions, as being three of the most deadly of Australian poisonous snakes; F. McCoy, Prodr. Zool. Vict., Dec. 1, pls. i.–iii.

Pseudechis papuanus, Peters & Doria, *l. c.* p. 409, New Guinea; *P. darwiniensis*, Macleay, *l. c.* p. 220, Port Darwin: spp. nn.

Hoplocephalus bransbyi, sp. n., Macleay, *op. cit.* iii. p. 52, Sutton Forest.

Pelagophis, g. n. Hydrophid: "nasalia duo contigua, caput reliquum squamatum; squamæ corporis magnæ, lævissimæ, imbricatæ; scuta ventralia distincta; anale divisum; scutella subcaudalia; gastræum subcarinatum." *P. lubricus*, sp. n., Peters & Doria, *l. c.* p. 413, pl. v., New Guinea.

Crotalus: on action and bite of Rattle-snakes, &c.; Coues & Yarrow, Bull. U. S. Geol. Surv. iv. p. 262.

Bothrops (*Bothriechis*) *bernoulli*, sp. n., F. Mueller, Verh. Ges. Bas. vi. p. 399, pl. iii. A, Guatemala. Notices of the other known species of *Bothriechis*, Cope; also *Bothrops* (*Bothriopsis*) *godmanni*, Cope, redescribed, p. 402.

Vipera xanthina, *mauritanica*, and *confluenta*. A tabular comparison of the characters of these species; *id. l. c.* p. 700.

Echis colorata, sp. n., Günther, P. Z. S. 1878, p. 978, Midian.

PSEUDOPHIDIA.

On the primitive kidneys of the *Cæciliæ*; Fürbringer, Morph. JB. iv. p. 26.

BATRACHIA.

Blanchard, R. La fécondation dans la série animale, d'après les publications les plus récentes, revue bibliographique. J. Anat. Phys. xiv. pp. 551–562, 701–762.

As concerns the *Batrachia*, pp. 139–743.

Henneguy, F. Note sur la chute des œufs de l'ovaire chez les Batraciens. Bull. Soc. Philom. (7) ii. p. 141.

The egg of *Batrachia* quits the ovary by a mechanism which has no analogy in other Vertebrates. At the moment of expulsion, a destruction of the peritoneal envelope of the ovary takes place, at the level of each capsule; little by little, the egg projects from the external surface of the ovary, passing through the peduncule of the capsule which contains it.

Knauer, F. K. Hemmungsbildungen bei Caudaten und Batrachiern. Zool. Anz. i. p. 173.

On arrested or retarded metamorphoses in the *Batrachia*. [See infrà, *Alytes*.]

Kolessnikow, N. Ueber die Eientwickelung bei Batrachiern und Knochenfischen. Arch. mikr. Anat. xv. pp. 382–414, pl. xxv.

Fubini, S. Ueber den Einfluss des Lichtes auf die Kohlensäure-Ausscheidung bei den Batrachiern nach Wegnahme der Lungen. Moleschott's Untersuch. xii. 1, pp. 100–111.

Goette, A. Ueber Entwickelung und Regeneration der Extremitäten bei Amphibien. Amtl. Ber. xl. p. 172.

——. Zur Entwickelungsgeschichte des Gliedmassenskelets der Wirbelthiere. Zool. Anz. i. p. 246.

Note of further observations on the development of the limb-skeleton in *Proteus* and the *Anura*.

Wittich, W. v. Ueber die Resorption durch die Froschhaut. MT. Königsb. Lab. 1878, pp. 24–32.

[See Zool. Rec. xiv. *Rept.* p. 11.]

Strasser, H. Zur Entwickelung des Knorpelskeletes bei Tritonen. Zool. Anz. i. pp. 192–195, & 215–218.

On the primitive kidneys of the *Anura*; Fürbringer, Morph. JB. iv. p. 28.

Batrachia Salientia.

Rana circulosa, sp. n., Rice & Davis, Jordan's Manual Vert. 2nd ed. p. 355, Indiana.

Rana arvalis, Nilsson (*oxyrrhinus*, Steenstr.), new for the Netherlands Fauna; M. Weber, Tijdschr. Nederl. Dierk. Ver. iii. pp. 149–152.

Pyxicephalus ornatus, sp. n., Peters, MB. Ak. Berl. 1878, p. 207, pl. ii. fig. 7, Taita.

Discoglossus scovazzii, sp. n., Camerano, Atti Acc. Tor. xiii. p. 548, Morocco.

On larva of *Alytes* which remained in the water from May, 1869, to March, 1871, Wiedersheim, Zool. Anz. i. p. 104.

Atelopus, *Phryniscus*, *Allotis*. P. Brocchi finds that a comparison of the diagnoses of the genera *Atelopus* and *Phryniscus* affords no valid ground for separation, and that *Atelopus* represents true species of the older *Phryniscus*. *Atelopus* would not come into the section characterized by Günther as having the auditory apparatus completely developed, since it is without tympanum; *A. varius*, Stan., would be an *Atelopus* and not a *Phryniscus*, and *P. lævis*, Gthr., an *Atelopus*. *Ollotis*, Cope, cannot be distinguished from *Bufo*. Bull. Soc. Philom. (7) ii. p. 96.

Melanobatrachus, g. n. Phryniscid; toes cylindrical, not dilated at the ends; no maxillary or vomerine teeth; ear imperfectly developed; no parotids; sacral vertebra dilated; toes webbed; body slender, elongate, uniform in width; muzzle short, obtuse; fingers and toes short, metatarsus with a slightly swollen inconspicuous tubercle. *M. indicus*, sp. n., Beddome, P. Z. S. 1878, p. 722, S. India.

Bufo vulgaris. On the characters of the spermatozoon of the Toad. F. Henneguy, Bull. Soc. Philom. (7) ii. p. 156.

On change of habit in Toads; C. White, Nature, xvii. p. 242.

Bufo taitanus, sp. n., Peters, *l. c.* p. 208, pl. ii. fig. 9, Taita.

Lymnodytes arfaki, Mey., figured; Peters & Doria, Ann. Mus Genov. xiii. pl. vi. fig. 1.

Polypedates dispar, sp. n., Böttger, Ber. Senck. Ges. 1878–79, p. 2, Madagascar.

Hyperolius glandicolor, sp. n., Peters, *l. c.* p. 208, pl. ii. fig. 9, Taita.

Platymantis punctata, sp. n., Peters & Doria, *l. c.* p. 420, pl. vii. fig. 3, Hatam.

Hyla (*Litoria*) *arfakiana*, p. 421, pl. vi. fig. 2, *montana*, p. 423, pl. vii. fig. 1, *vagabunda*, p. 424, pl. vi. fig. 3, *impura*, p. 426, pl. vii. fig. 2, *congenita*, p. 427, pl. vi. figs. 4 & 5; *iid. l. c.*, Austro-Malayan region: spp. nn.

Microhyla achatina, Bois., var. n. *moluccensis*; iid. *l. c.* p. 428.

Sphenophryne, g. n. "Habitus raniformis, caput angulosum, rictus modicus; artus mediocres, digiti apice dilatati haud palmati; dentes nulli, lingua cordiformis, postice vix excisa, lateribus parteque posteriore libera; tympanum sub cute distinctum; tubæ eustachii coarctatæ; cutis lævis, paratoides nullæ; processus sacrales dilatati. Clavicula tenuis, coracoideum dilatatum, sternum latum cartilagineum, manubrium nullum." *S. cornuta*, sp. n., *iid. l. c.* p. 430, pl. vii. fig. 4, New Guinea.

Xenobatrachus, g. n. "Habitus raninus, capite brevi rotundato, rictus parvus, artus mediocres, digiti liberi, discis terminalibus mediocribus, dentes maxillares et vomerini nulli, palatini utrinque bini uncinati, recurvati, post choanes positi; choanæ parvæ; membrana tympani sub cute visibilis; lingua cordiformis, postice incisa; processus sacrales dilatati; apparatus sternalis *Calohylæ*; manubrium sterni nullum." *X. ophiodon*, sp. n.; *iid. l. c.* p. 432, pl. vii. fig. 5, Mount Arfak, Hatam.

In "Studî sugli anfibî anuri del Piemonte," Lessona has given de-

scriptions of seven species and of their larval stages; Atti Acc. Linc. (3) Mem. Sci. fis. i. [1877] pp. 1019–1098.

Batrachia Gradientia.

Knauer, F. Naturgeschichte der Lurche. (Amphibiologie.) Eine umfassendere Darlegung unserer Kenntnisse von dem anatomischen Bau, der Entwicklung und systematischen Eintheilung der Amphibien, sowie eine eingehende Schilderung des Lebens dieser Thiere. Wien: 1878, 8vo, pp. 340, 120 illustrations, 4 maps, and 2 tables.

A general work on the structure, development, habits, &c., of the tailed *Batrachia*.

Wiedersheim, R. [A short appendix to his late memoir on the cephalic skeleton of the *Urodela*.] Morph. JB. iv. p. 320.

Bedriaga, J. [Vorläufige Bemerkung über das Begattungsorgan der Tritonen. Arch. f. Nat. xliv. pp. 122–127.]

On the sexual organs of the Tritons.

Triton vittatus is no member of the European Batrachian fauna; F. Knauer, Die Natur, 1878, pp. 489–492. [See Lataste, in Zool. Rec. xiv. *Rept.* p. 14.]

On accessory organs of copulation in *Triton viridescens*, Raf.; Braun, Zool. Anz. i. p. 124.

Euproctus. E. H. Giglioli, in some notes on the Italian species of this genus, recognizes two, *E. montana*, Savi, from Corsica, and *E. rusconii*, Gené, from Sardinia. Ann. Mus. Genov. xiii. pp. 599–603.

Spelerpes, sp. n., F. Mueller, Verh. Ges. Bas. vi. p. 645, pl. iii. c–d.

On two young *Siren lacertina* and four *Spelerpes* living at Freiburg; A. Weisman & R. Wiedersheim, Zool. Anz. i. p. 6.

Axolotl. On its transformation; Fischer, JB. Ver. Magd. vii. p. 75. Note on living specimen; Lessona, Atti Acc. Tor. xiii. p. 137.

Pestalozzi, E. Beitrag zur Kenntniss des Verdauungscanales von *Siredon pisciformis*. Verh. Ges. Würzb. 1878, p. 83, pl. iii.

On digestional characteristics of *Siredon pisciformis*.

PISCES.

BY

A. W. E. O'Shaughnessy.

Anatomy and Physiology.

In general reviews of the anatomical literature of 1877, K. Bardeleben gives an account of the various contributions to the Comparative Osteology of Fishes which appeared in that year, the notice of each work being a summary of its contents and results. JB. Anat. Phys. vi. Abth. i. pp. 172–174.

The literature of 1877 on the development of Fishes is similarly treated of by O. Hertwig, *tom. cit.* Abth. ii. pp. 195–204.

Blanchard, R. Recherches sur la structure et le développement de la glande superanale (digitiforme) des poissons cartilagineux. J. de l'Anat. Phys. xiv. pp. 442–450.

The same author gives a review of our present knowledge of the phenomena of impregnation in fishes. *Tom. cit.* pp. 737–739.

Brock, J. Ueber den Eierstock der Knochenfische. SB. Soc. Erlang. ix. pp. 118 & 119.

Fürbringer, M. Zur vergleichenden Anatomie und Entwickelungsgeschichte der Secretionsorgane der Vertebraten. Morph. JB. iv. pp. 1–111, pls. i.–iii.

The section devoted to *Pisces*, pp. 36–60. See also under the different classes.

Fritsch, G. Untersuchungen über den feineren Bau des Fischgehirns mit besonderer Berücksichtigung der Homologien bei anderen Wirbelthier-classen. Berlin: 1878, fo. pp. 94, pls. xiii.

Goette, A. Beiträge zur Entwickelungsgeschichte der Wirbelthiere. iii. Ueber die Entwickelung des Central-Nervensystems der Teleostier. Arch. mikr. Anat. xv. pp. 139–199, pls. vii.–x. [See Sanders.]

[Goette, A.] Beiträge zur vergleichenden Morphologie des Skelet-systems der Wirbelthiere. ii. Die Wirbelsäule und ihre Anhang. i. Die Cyklostomen. Arch. mikr. Anat. xv. pp. 315–339 & 428, pl. xx. figs. 1–13. 2 Die Ganoide, *tom. cit.* pp. 442–641, pls. xxviii.-xxxiii.

Heinemann, C. Beiträge zur Anatomie der Retina. Arch. mikr. Anat. xiv. pp. 409–441, pl.

The anatomy of the retina in fishes is treated of in a portion of this paper.

His, W. Untersuchungen über die Bildung des Knochenfischembryo (Salmen) ii. Arch. Anat. Phys. 1878, anat. Abth. pp. 180–221, pl. ix.

On the formation of the embryo in Teleosteous fishes; studied specially in the Salmon.

Jobert, —. Recherches anatomiques et physiologiques pour servir à l'histoire de la Respiration chez les Poissons. Ann. Sc. Nat. (6) vii. Art. No. 5. Also: Mémoire sur la Respiration aérienne de quelques poissons de Brésil. C. R. lxxxvi. pp. 935–938. [See Zool. Rec. xiv. *Pisces*, p. 2.]

M. Jobert has continued his experiments and observations on different methods of respiration in fishes of several groups, viz., in other species of *Callichthys*, where it is performed by air passing through the intestine; in *Doras*, *Erythrinus*, and in *Sudis gigas*, where it takes place by means of the swimming-bladder.

Ihering, H. Ueber Wirbelverdoppelung bei Fischen. Zool. Anz. i. pp. 72–74.

On variations in the number of vertebræ in different parts by intercalation or excalation, tending to show that the vertebra cannot be considered to represent a segment.

——. Das peripherische Nervensystem der Wirbelthiere als Grundlage für die Kenntniss der Regionenbildung der Wirbelsäule. Leipsic: 1878.

——. [See Welcker.]

Kolessnikow, N. Ueber die Eientwickelung bei Batrachiern und Knochenfischen. Arch. mikr. Anat. xv. pp. 382–414, pl. xxv.

Kuhn, —. Untersuchungen über das häutige Labyrinth der Knochenfische. Arch. mikr. Anat. xiv. pp. 264–308, pls. xvii.-xx.

——. [See Retzius.]

Lorent, H. Ueber dem Mitteldarm von *Cobitis fossilis*, L. Arch. mikr. Anat. xv. pp. 429–441, pls. xxvii.

Mivart, St. George. Notes on the Fins of Elasmobranchs, with considerations on the nature and homologies of Vertebrate limbs. P. Z. S. 1878, pp. 116–120 (abstract).

The author has arrived at the conclusion that the nature of paired and azygos limbs is fundamentally the same. Continuity with the axial skeleton is described as existing in the dorsal fin-cartilages in several

forms, but especially in *Pristis* and *Pristiophorus*. He believes that the skeleton of the azygos fins is a structure also formed primitively in a continuous median fold, and that the dorsal rays are not out-growths from the vertebral column.

[Mivart, St. George.] [See also Nature, xviii. pp. 282–284, 309–311, 331–334.]

Pouchet, G. Du Développement du Squelette des Poissons osseux. J. de l'Anat. xiv. pp. 34–100, 139–153, pls. iv.–xiii.

Continued from *op. cit.* 1875 [*vide* Zool. Rec. xii. p. 106.] The author makes some remarks on W. K. Parker's "Memoir on the Skull of the Salmon," reproducing the text of a communication made by him to the Société de Biologie, in 1873, for which he claims priority of date. Some of Parker's conclusions are compared with those of the author, whose own results are summed up under 22 heads, pp. 145–147.

Retzius, G. Zur Kenntniss von dem membranösen Gehörlabyrinth bei den Knorpelfischen. Arch. Anat. Phys. 1878, anat. Abth. pp. 83–105, pl. iv.

A treatise on the membranous auditory labyrinth of the *Plagiostomi*, and comparison of its structure with that of the *Teleostei*, previously investigated by the author [see Zool. Rec. xii. p. 106].

Sanders, A. Contributions to the Anatomy of the Central Nervous System in Vertebrate Animals. Part I.—*Ichthyopsida*. Section i. —*Pisces*. Subsect. i.—*Teleostei*. Phil. Trans. 1878, pp. 735–776, pls. lviii.–lxv.

Commencing with the *Teleostei*, the author has selected the Grey Mullet (*Mugil cephalus*) as the species on which to base his investigations into the structure and homologies of the brain of fishes. With respect to the latter, he has come to nearly the same conclusions as Stieda, differing from some of Fritsch's determinations; it is presumed, however, that these opinions may perhaps undergo modification when the *Elasmobranchi* and *Ganoids* come under consideration.

[On the Central Nervous System in *Selachia*, see Rohon, infrà, *Palæichthyes*.]

Solger, B. Zur Kenntniss der Seitenorgane der Knochenfische. Leop. xiv. pp. 74–80.

Vetter, B. Untersuchungen zur vergleichenden Anatomie der Kiemen und Kiefer-musculatur der Fische. ii. Theil. Jen. Z. Nat. xii. pp. 431–450, 3 pls.

Following upon the first part of this memoir, which dealt with the *Selachia*, the present treats of the muscular apparatus for the gills and jaws in *Chimæra*, *Acipenser*, and the *Teleostei*.

Welcker, H. Zur Lehre von Bau und Entwickelung der Wirbelsäule. Zool. Anz. i. pp. 291–295, 311–315.

Discusses the subject of the numbers of the vertebræ, and increase or diminution as affecting homological considerations, with reference to the views of Ihering, *antè*.

General.

Emery, C. Note Ittiologiche. Atti Soc. Ital. xxi. pp. 18, 1 pl.

On the young stages of several fishes: *Fierasfer*, *Krohnius*, *Brosmius*, *Exocœtus*, *Centriscus*.

Day, F. Remarks on Mr. Whitmee's Paper on the Manifestation of Fear and Anger in Fishes. P. Z. S. 1878, pp. 214–221.

Whitmee, S. On the Manifestation of Anger, Fear, and other Passions in Fishes, and on the use of their spines. *Tom. cit.* pp. 132–134. (Reply to Day's remarks on the above paper. *L. c.* pp. 221.)

O. v. Linstow enumerates the Fishes in which parasitic worms are found, giving lists of those which affect each species. Compendium der Helminthologie; Hannover: 1878, 8vo, pp. 206–290.

On the destruction of fish in the vicinity of the Tortugas, during the months of September and October, 1878. By J. Jefferson, J. Porter, and T. Moore, 'Field and Forest,' 1878, pp. 244, 246.

Report of the U. S. Commission of Fish and Fisheries. IV.—(A.) Inquiry into the Decrease of the Food Fishes. (B.) The Propagation of Food Fishes in the waters of the U. S. Washington: 1878, 8vo, pp. 1029.

Numerous notices of fishes, and details respecting habits and economy, are given under different heads in this Report, which comprises special sections, on the Salmon Fisheries of the Columbia River, by L. Stone; on Fishes of the Delaware River, by C. Abbott; on the Carp and its culture, by R. Hessel; on the propagation and distribution of Shad, by J. Milner, &c.

Classification.

Cope, E. On the Classification of the Extinct Fishes of the Lower Types. P. Am. Ass. xxvi. pp. 292–300. [*Vide* Zool. Rec. xiv. *Pisces*, p. 2.]

See also Hasse & Bridge [*Palæichthyes*].

Faunæ.

Arctic.

A memoir on *Himantolophus* and *Ceratias* (*Pediculati*), two genera of fishes inhabiting great depths in the Arctic Seas, with remarks on deep-sea fishes. C. Lütken, Dan. Selsk. Skr. (5) v. pp. 309–348, pls. i. & ii.

Europe.

T. Heldreich enumerates the fishes found in Greece. La Faune de Grèce. Athènes: 1878, 8vo, pp. 77–103.

Kessler, in 'Reisebriefe aus der Krym' makes observations on the Ichthyology of the Crimea: Bull. Mosc. liii. pt. 2. pp. 212–216.

Von Linstow contributes some notices of fishes in the Weser river; Arch. f. Nat. xliv. p. 246.

Africa.

DAMBECK, C. Die Verbreitung der Süsswasser- und Wanderfische in Africa. Ber. Vers. Naturw. I. pp. 179 & 180.

REICHENOW mentions a few fishes from the Loango Coast Expedition which had been omitted by Peters, describing a Pipe-fish as new; SB. nat. Fr. 1878, p. 92.

MÖBIUS obtained 176 species of fishes in Mauritius, and 22 from the Seychelles. He has described 6 species as new. Schr. Ver. Schlesw. Holst. ii. p. 113.

Yarkand.

DAY, F. Scientific Results of the Second Yarkand Mission. Ichthyology. Calcutta: 4to, pp. 1–25, pls. i.–v.

The new species were recorded last year [*cf.* Zool. Rec. xiv. *Pisces*, p. 4]. In general remarks on the freshwater-fishes of India, the author arrives at the conclusion that a peculiar group of Carps (*Schizothoracinæ*) has spread almost due east and west from the cold and elevated regions of Eastern Turkistan, its southern progress having been barred by the Himalayas. Looking to the south, he finds that a wave of tropical forms of fishes has, at a pre-historic period, expanded over that portion of the globe where the Nicobars, Andamans, and the most southern portions of the continent of Asia and the islands of the Malay Archipelago now are, and that this fish-fauna has its progress northward arrested by some cause at or near where the Himalayas now exist and mark the division between the fish-fauna of India and that of Turkistan.

India.

BLEEKER, P. Atlas Ichthyologique des Indes orientales Néerlandaises. Livr. 36 [ix. pp. 41–80, pls. cccxi.–cccxx.].

The letterpress of this part is occupied with the descriptions of the *Chætodontidæ* continued [*cf.* Zool. Rec. xiv. *Pisces*, p. 4], and the commencement of the *Nandidæ*. The plates issued with it are *Scorpænidæ*, pls. i.–vii., and *Platycephali*, pls. i.–iii.

The Recorder understands that no arrangements have been made for continuing the publication of this work. It may be remarked that the late author's practice of affixing his own name to species which he had merely ranged under a new genus, greatly diminishes the usefulness for immediate reference of plates which were always issued apart from the text to which they belonged, as it is manifestly impossible to refer to them with certainty, or to state whether such species were figured for the first time, or otherwise.

DAY, F. Fishes of India. Part iv. London: 4to, pp. 553–778, pls. cxxxiv.–cxcv.

This work is now brought to a conclusion. The present part contains the continuation of the *Cyprinidæ* from the genus *Catla*, *Clupeidæ*, *Chirocentridæ*, *Notopteridæ*, *Symbranchidæ*, *Muræenidæ*, the orders *Lophobranchii* and *Plectognathi*, and the Chondropterygian fishes. The work is preceded by an introduction occupying nine pages.

Indo-China.

SAUVAGE, E. Considérations sur la Faune Ichthyologique des eaux douces de l'Asie et en particulier de l'Indo-Chine. Assoc. Fr. (1877) 1878, pp. 1–5, with map.

The ichthyological fauna of Indo-China, imperfectly known a few years since, has been much added to by the recent collections of Jullien & Harmand in Cochin-China, Siam, Laos, and Cambodia. Only 7 out of 61 species are common to India and Indo-China, the affinities being with Borneo, Java, and Sumatra, the species of *Cyprinidæ* being identical, so as to lead to the conclusion that at a recent geological period a complete communication existed.

New species of *Siluridæ* and *Cyprinidæ* described; Sauvage, Bull. Soc. Philom. (7) ii. pp. 233–241.

The same author describes some new *Pleuronectidæ*, of the genera *Synaptura* and *Cynoglossus*, from Cochin-China and Laos; *l. c.* pp. 92–95.

China.

E. SAUVAGE describes some new species of *Cyprinidæ* and *Cobitidinæ*, from China, sent by A. David & Dabry de Thiersant since 1874; Bull. Soc. Philom. (7) ii. pp. 86–90.

Japan.

H. Batson Joyner's collection has furnished some new species, and also further confirmation of the fact that there exists great similarity between the marine fauna of temperate Japan and that of the Mediterranean and adjacent parts of the Atlantic, there being 8 species in this collection which occur in both seas; A. GÜNTHER, Ann. N. H. (5) i. pp. 485–487.

Australia.

JOUAN, H. Quelques mots sur la Faune Ichthyologique de la côte Nord-est d'Australie et du Détroit de Torres comparée à celle de la Nouvelle-Calédonie. Mém. Soc. Cherb. (3) xxi. pp. 328–335.

In this paper an attempt is made to identify some of the fishes described as new species by Alleyne & Macleay [see Zool. Rec. xiii. *Pisces*, p. 4], with species described by the author in 1861, and with some other known species. The insufficiency of the descriptions furnished by the two writers referred to has been remarked upon elsewhere [suprà, *Reptilia*, p. 3], and though some of these determinations are doubtless correct, they amount in other cases to plausible guesses rather than certainty.

New or little known Australian fishes are described by CASTELNAU, P. Linn. Soc. N. S. W. ii. pp. 225–248, pls. ii. & iii., iii. pp. 140–143, also in 'Fishes of the Norman River,' *l. c.* pp. 41–51; and by MACLEAY, New Fishes from Port Jackson and King George's Sound, *l. c.* pp. 33–37, pls. ii.–v., and The Fishes of Port Darwin, *l. c.* pp. 344–369, pls. vii.–x. In the last paper, 21 species are given as new.

New Zealand.

Observations on New Zealand Fishes by F. E. CLARKE, J. VON HAAST,

J. RUTLAND, and others, will be referred to below. P. THOMSON contributes a paper on the Dunedin fish supply; Tr. N. Z. Inst. x. pp. 324–330.

New Guinea.

BLEEKER, P. Quatrième Mémoire sur la Faune Ichthyologique de la Nouvelle Guinée. Arch. Néerl. xiii. pp. 35–66.

In this paper all the fishes of New Guinea are enumerated, 78 being added to the fauna, which now numbers 342. Three new species are described, one being the type of a new genus.

America.

GILL, T. Catalogue of the Fishes of the East Coast of North America. Sm. Misc. Coll. xiv. art. 2, 25 pp.

This catalogue was issued as an Appendix to the Report of the U.S. Commission on Fish and Fisheries, 1873 [*cf.* Zool. Rec. xiii. *Pisces*, p. 5]. It is republished, for greater convenience, in the above series, and consists of a complete enumeration of the fishes of the fauna indicated, with a bibliography.

JORDAN, D. Contributions to North American Ichthyology, No. 3. Bull. U. S. Nat. Mus. xii.

(A. On the Distribution of the Fishes of the Alleghany Region of South Carolina, Georgia, and Tennessee, with descriptions of new or little known species. By D. Jordan & A. Brayton, pp. 1–95.)

Based primarily on collections made by Prof. Jordan and a party of students from Butler University in 1877. This paper gives a summary of all that is certainly known in regard to the ichthyology of the seven hydrographic basins embraced in its scope, viz., Santee, Savannah, Altamaha, Chattahoochee, Alabama, Tennessee, and Cumberland.

(B. A Synopsis of the Family *Catostomidæ*, pp. 97–230.)

——. Manual of the Vertebrates of the Northern U.S. 2nd ed., revised and enlarged. Chicago: 8vo, pp. 407. Fishes, pp. 199–350, with addenda.

The principal alterations have been made in the ichthyological portion, which has been entirely re-cast, to include recent results and additions; generic diagnoses are now substituted for the artificial keys. The publication here of some of the new species, and of the genera *Quassilabia* (*Catostomidæ*) and *Ulocentra* (*Etheostomidæ*), antedates by a few weeks their appearance in Bull. U. S. Nat. Mus.

——. On the Distribution of the Freshwater Fishes of the United States. Ann. N. York Ac. i. pp. 92–120.

A classified list, with localities and references.

——. Catalogue of the Fishes of the Fresh-waters of North America. Bull. U. S. Geol. Surv. iv. pp. 407–442.

May be considered a new edition of Jordan & Copeland's Check List [*cf.* Zool. Rec. xiv. *Pisces*, p. 6], revised and brought up to date. The species enumerated are now 665, instead of 670, although upwards of 40 have been added.

[Jordan, D.] Notes on a Collection of Fishes from Clackamas River, Oregon. P. U. S. Nat. Mus. i. pp. 69–85.

The Recorder has been unable to see this paper, but finds it referred to by Prof. Goode. [Vide *Salmonidæ*.]

——. Catalogue of the Fishes of Illinois. Bull. Illin. Mus. No. 2, 1878, pp. 37–70.

Contains descriptions of a few new species.

——. Notes on a Collection of Fishes from the Rio Grande, at Brownsville, Texas. Bull. U. S. Geol. Surv. iv. pp. 397–406, & 663–667.

23 species are enumerated or noticed, with one apparently new genus [vide *Gobiidæ*].

Forbes, S. The Food of Illinois Fishes. Bull. Illin. Mus. No. 2, 1878, pp. 71–89.

Details respecting varieties of food eaten by fishes.

Yarrow, H., & Henshaw, H. List of the Marine Fishes collected on the coast of California, near Santa Barbara, in 1875, with notes. Washington: 1878, 8vo, pp. 7.

T. H. Streets, in "Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California," gives the Ichthyological results of the U. S. North Pacific Expedition; Bull. U. S. Nat. Mus. vii. pp. 43–102.

Vaillant, L., & Bocourt, F. Mission Scientifique au Méxique. 4e. partie. Études sur les Poissons. Paris: 1878, 4to, pp. 41–120, pls. v.–x.

The ichthyological portion continued from 1874 [*cf.* Zool. Rec. xi. p. 88]. Descriptions and plates of the *Percidæ* [vide *infrà*].

Cope, E. Synopsis of the Fishes of the Peruvian Amazon, obtained by Prof. Orton during his expeditions of 1873 & 1877. P. Am. Phil. Soc. xvii. pp. 673–701. [*Vide* Zool. Rec. xiv. *Pisces*, p. 6.]

Galapagos Islands.

Two new fishes from the Galapagos Islands, one a new Percoid genus, are described. Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 395.

Transit of Venus Expeditions, in the years 1874–75:—

The Account of the Collections made in Kerguelen's Land and Rodriguez is issued as an extra volume of Phil. Tr. clxviii.*

Kerguelen Island: Fishes, by A. Günther, p. 166.

Rodriguez: List of the Fishes, with descriptions reproduced of *Mugil rodericensis* and *Myxus cæcutiens*, pp. 470–472. They had already appeared in 1876 [*cf.* Zool. Rec. xiii. *Pisces*, p. 26].

Günther contributes further accounts of the 'Challenger' fishes, describing many new and curious forms. Ann. N. H. (5) ii. pp. 17–28, 179–187, 248–251.

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* 1879 on title, and not actually published until the middle of that year.—Ed.

PALÆICHTHYES.

Hasse, C. Die fossilen Wirbel. Morphologische Studien aus dem anatomischen Institut zu Breslau. Die Cestracionten. Morph. JB. iv. pp. 214–268, pls. 3.

——. Ueber die Verwandtschaftsverhältnisse der Gattung *Selache*. Op. cit. Supplt. pp. 43–58, 2 pls.

On the developmental relations of *Selache* with *Carcharodon*.

——. [Note on the developmental relationship of Sharks and Rays] Ber. Vers. Naturw. 1878, pp. 173 & 174.

On the excretory system of Ganoids. Fürbringer, Morph. JB. iv. pp. 56–60.

On that of the *Dipnoi*; id. *l. c.* p. 60. On that of the *Plagiostomi*; id. *l. c.* pp. 49–56.

GANOIDEI.

Bridge, T. On the Osteology of *Polyodon folium*. Phil. Trans. clxix. pp. 683–734, pls. lv.–lvii.

With respect to classification, the author says that the facts elucidated in the earlier part of this paper abundantly justify adherence to H. Müller's two primary divisions of *Ganoidei* (*Chondrostei* and *Holostei*), or to Lütken's two groups of "*Ganoidei* proper," and "*Sturiones*." The remarkable combination of Teleostean, Elasmobranch, and Amphibian characters in *Polyodon* and *Acipenser*, if not justifying their elevation to a primary subdivision of the class, should be adequately expressed in any natural system. He considers that the true position of *Polyodon* is that of an annectant group between the *Elasmobranchii* on the one hand and the divergent stems of the *Teleostei* and *Ganoidei* on the other. The Ganoids may be classified as follows:—

Ganoidei.

A. *Selachoidei*. Pterygoid processes united in a median symphysis. Persistent and unsegmented notochord. Persistent spiracles and mandibular branchiæ.

Genera.—*Polyodon*, *Acipenser*, *Scaphirrhynchus*, and *Chondrosteus*.

B. *Teleosteoidei*. Pterygoid processes not united with each other, but connected directly or indirectly through the intervention of a palatine bone with the prefrontal region of the cranium. Vertebral column generally ossified into distinct vertebræ; notochord aborted; no mandibular branchiæ.

Genera.—*Amia*, *Polypterus*, *Calamoichthys*, and *Lepidosteus*.

Comparison of the skull of *Polyodon* with the *Amphibia*, pp. 724–731.

Barkas, W. On a dental peculiarity of the *Lepidosteidæ*. Tr. R. Soc. N. S. W. xi. pp. 203–207.

SALENSKY, W. Embryologie der Ganoiden. Zool. Anz. i. pp. 243–245, 266–269, 288–291.

1. Impregnation and cleavage of the egg of the Sterlet.
2. Development of the skeleton in the Sterlet.

WILDER, B. On the Respiration of *Amia*. P. Am. Ass. 1878, pp. 306–313.

LANKESTER, E. R. Notice of a Memoir on the Hearts of *Ceratodus*, *Protopterus*, and *Chimæra*. P. Z. S. 1878, p. 634.

MIALL, L. Monograph of the Sirenoid and Crossopterygian *Ganoids*; 1 *Ceratodus*. Pal. Soc. xxxii. pp. 1–32, pls. i. i.A, 2–5.

The object of this memoir is to present collectively the materials of knowledge respecting the *Ganoids* both recent and fossil; the present part gives the different species of *Ceratodus* in order.

C. HASSE has sketched the following as a natural system of classification of the *Elasmobranchii*:—

Subclass. *Elasmobranchii Aspondyli.*
Order 1. *Holocephali.*
Order 2. *Plagiostomi Cyclospondyli.*
Suborder i. *Plagiostomi Asterospondyli.*
Group 1. *Scyllia.*
Families. *Chiloscyllium.*
Mustelus.
Hemigaleus.
(Subfamily, *Galeus*; Genus, *Carcharias.*)
Group 2. *Scyllio-Lamnidæ.*
Families. *Lamna.*
(Genus, *Selache.*)
Ginglymostoma.
Group 3. *Acrodonti.*
Family. *Cestracion.*
Suborder ii. *Spinaces.*
Group 1. *Lamargi.*
Family. *Scymnus.*
Group 2. *Spinacidæ.*
Group 3. *Echinorrhini.*
Suborder iii. *Plagiostomi Tectospondyli.*
Group 1. *Pristiophoridæ.*
Families. *Squatina.*
Squatinoraia.
Group 2. *Trygones.*
Families. *Trygon.*
Myliobates.
Group 3. *Raiæ.*
Family. *Torpedo.*

Zool. Anz. i. pp. 144–148, 167–171.

CHONDROPTERYGII.

BALFOUR, F. A Monograph on the Development of Elasmobranch Fishes. London : 1877, 8vo, 300 pp., 20 pls. [See Zool. Rec. xiv. *Pisces*, p. 8].

A very extensive work, the result of studies followed out principally in the laboratory at Naples. The development of this class of fishes is traced from the earliest stages of cell-division and formation of the primitive cell-layers ; many results of the highest physiological interest have been obtained. The author has arrived at the conclusion that the paired fins of fishes have been formed by the specialization at the shoulder and hip of a pair of continuous lateral fins similar to the continuous dorsal fin of many kinds of fishes. He traces the development of the kidneys of all the Vertebrates back to a series of isolated coiled tubules, a pair of which corresponded to each joint of the backbone, each tubule having a funnel-like mouth opening into the body-cavity.

——. On the development of the Proto-vertebræ in Elasmobranchs. A Note in Rep. Br. Ass. xlvi. p. 147.

——. On the Structure and Development of the Vertebrate Ovum. Q. J. Micr. Sc. (n.s.) xviii. pp. 383–438, pls. xvii.–xix.

The present paper records observations on the ovary of but two types, viz., *Mammalia* and *Elasmobranchii*. The main points dealt with are these :—1. The relation of the germinal epithelium to the stroma. 2. The connection between primitive ova in Waldeyer's sense and the permanent ova. 3. The homologies of the egg membranes. Development of the Elasmobranch ovary, pp. 384–418. Post-embryonic development of the ova, pp. 401–415. Summary of observations on the development of the ovary in *Scyllium* and in *Raia*, p. 415.

A single number of BRONN'S "Klassen und Ordnungen des Thier-Reichs" has been issued, pp. 49–80, pls. ix. & x., continuing the description of the anatomy of the Elasmobranch fishes.

PARKER, W. K. On the Structure and Development of the Skull in Sharks and Skates. Tr. Z. S. x. pp. 189–234, pls. xxxiv.–xlii.

Of this elaborate memoir, a summary, which it would be impossible further to compress, was given in P. Z. S. 1876, p. 699.

REICHERT, —. Ueber das vordere Ende der Chorda dorsualis bei frühzeitigen Haifisch-Embryonen (*Acanthias vulgaris*). 1. Geschichtliche Einleitung, pp. 1–64. 2. Anatomische Beschreibung des Embryo's, pp. 65–90. 3. Anatomische Feststellung des vorderen gebeugten Abschnittes der Chorda dorsualis, pp. 91–105. Ergebnisse, pp. 105–113. Abh. Ak. Berl. 1877 [1878], pp. 49–113, pls. i. & ii.

On the anterior extremity of the chorda dorsalis in early Dog-fish embryos. Historical introduction ; anatomical description of the embryo ; determination of the anterior segment of the dorsal chord. Results are summed up at pp. 105–113. The author gives an abstract of precisely similar investigations on early embryos of [*Spinax*] *Acanthias niger*, in SB. nat. Fr. 1878, pp. 161–169.

Ehlers, E. Die Epiphyse am Gehirn der Plagiostomen. Z. wiss. Zool. xxx. Supplement, pp. 607–634, pls. xxv. & xxvi.

La Valette, St. George A. De spermatosomatum evolutione in Plagiostomis [in *Galeus canis* & *Raia clavata*]. Bonn : 1878, 4to, 9 pp.

Petri, K. Die Copulationsorgane der Plagiostomen. Z. wiss. Zool. xxx. pp. 288–385, pls. xvi.–xviii.

Blanchard, R. Recherches sur la structure et le développement de la glande superanale (digitiforme) des poissons cartilagineux. J. de l'Anat. xlv. pp. 442–450.

Rohon, J. Das Centralorgan des Nervensystems der Selachier. Denk. Ak. Wien, xxxviii. ii. pp. 43–108, 9 pls.

——. Ueber den Ursprung des Nervus vagus bei Selachiern, mit Berücksichtigung der *Lobi electrici* von Torpedo. Arb. Z. Inst. Wien, i. pp. 151–172.

Turner, —. The Oviducts of the Greenland Shark (*Læmargus borealis*). J. Anat. Phys. xii. pp. 604–607.

The writer has by present examinations detected the oviducts in this species, having previously supposed them to be absent.

Diagnoses and figures of the Sharks and Rays of the Indian Seas are given by Day in 'Fishes of India,' iv. pp. 709–745, pls. clxxxviii.–cxciii.

Note on jaws of *Galeocerdo* and *Carcharias*; id. P. Z. S. 1878, p. 976.

[*Odontaspis americanus*] *Carcharias tricuspidatus*, sp. n. [?], *id.* Fishes of India, p. 713, pl. clxxxvi. fig. 1, Sind.

Carcharias ellioti, sp. n., *id. l. c.* p. 716, pl. clxxxix. fig. 2.

Hemigaleus balfouri, sp. n., *id. l. c.* p. 717, pl. clxxxv. fig. 4, Coromandel.

Triænodon obtusus, sp. n., *id. l. c.* p. 720, pl. clxxxix. fig. 3, Kurrachee.

Carcharodon rondeletii, M. & H. R. Lawley, in "Confronto di una mascella di *C. lamia*, R. coi denti di Carcharodon fossili trovati nelle colline Toscane," unites the several species, with the exception of *C. megalodon*, Ag., into one designated *C. etruscus*. Atti Soc. Tosc. iii. pp. 230–336.

Lamna spallanzanii, Bon. The same writer making a similar comparison of fossil teeth with this species, unites them all under the name *Oxyrrhina desorius*, Ag. *Tom. cit.* pp. 343–349.

Selache maxima. P. Pavesi (Seconda Contribuzione alla Morfologica e Sistematica dei Selachi), Ann. Mus. Genov. xii. pp. 348–418, pl. iii. and figs.

Scyllium canescens, sp. n., Günther, Ann. N. H. (5) ii. p. 18, S. America.

Stegostoma tigrinum, Brouss. Note on the egg of this shark; Vaillant, C. R. lxxxvi. p. 1279.

On the uterine villi in *Myliobatis noctula* and *Centrina salviani*; Trois, Atti Ist. Venet. ii. p. 429, pl.

Uraptera binoculata, Gir., is not a climatic var. of *Raia batis*, as Günther believes; W. N. Lockington, P. Cal. Acc. vii. p. 108.

Raia eatoni. Description reproduced, with mention of a new species, *R. murrayi*, to be described subsequently. Günther, Phil. Tr. clxviii. p. 166.

Trygon (Himantura) oxy[r]rhynchus, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 94, Cochin China.

TELEOSTEI.

Beneden, E. van. A Contribution to the Embryonic Development of the Teleosteans. Q. J. Micr. Sci. xviii. pp. 41-57, 1 pl.

Describes the early phases of development of the eggs of Teleosteans, and compares the facts elicited by present observations with what is actually known relative to the formation of the germ-layers in Teleostean fishes.

Carlet, M. Mémoire sur les écailles des Poissons Téléostéens. Ann. Sc. Nat. (6) viii. Art. 8, 19 pp. 9 figs.

Note on the development of the gills in the *Teleostei*, observed in the young of *Cobitis*. Goette, Zool. Anz. i. p. 52.

On the excretory system of the *Teleostei*. Fürbringer, Morph. JB. iv. pp. 43–49.

ACANTHOPTERYGII.

Percidæ.

Ioa, g. n. Distinguished from *Pleurolepis* by two anal spines instead of one, and by greater scaliness of ventral region. Type, *Pœcilichthys vitreus*, Cope. Jordan & Brayton, Bull. U. S. Nat. Mus. xii. p. 88.

Pleurolepis asprellus, sp. n., Jordan, Bull. Illin. Mus. No. 2, p. 38, Illinois.

Alvordius crassus, sp. n. (*Ethcostoma maculatum*, var., Cope, 1870), Jordan & Brayton, Bull. U. S. Nat. Mus. xii. p. 12, Santee basin.

Ulocentra, g. n., for *Arlina atripinnis*, Jord.; *iid. l. c.* pp. 45, 73.

Boleosoma camarum, sp. n., Forbes, Bull. Illin. Mus. No. 2, p. 40, Illinois.

Vaillantia, g. n., for the above species, Jordan & Brayton, *l. c.* p. 89, in a foot note.

Boleosoma olmstedi, Jord., = *maculaticeps*, Cope; *iid. l. c.* p. 13.

Nothonotus camurus, Cope, distinguished from *N. maculatus*. Ag.; *iid. l. c.* p. 74.

Nothonotus inscriptus, sp. n., *iid. l. c.* p. 34, Georgia.

Nothonotus thalassinus, sp. n., *iid. l. c.* p. 13, Santee basin.

Pœcilichthys jessiæ, sp. n., Jordan, Man. Vert. 2nd ed. p. 227, and Bull. U. S. Nat. Mus. xii. p. 59, Tennessee.

Pœcilichthys asprigenis, sp. n., Forbes, Bull. Illin. Mus. No. 2, p. 41, Illinois.

Cratinus, g. n. Much elongate; dorsal deeply notched, anteriorly with many very strong elongate curved spines; teeth in both jaws on vomer

and palate very numerous, bristle-like; larger and stronger teeth in the outer border of the intermaxillary band, more forward on the outer edge of the mandibular band, as also on the inner edge of the same band on the sides of the lower jaw; hinder edge of præopercle toothed; operculum with a spine; scales on trunk moderate; branchiostegals seven. *C. agassizi*, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 395, Galapagos.

Perca fluviatilis. On the specific identity of *P. gracilis*, C. V., and *P. flavescens*, Mitch., with this species, and on the distribution of *Perca* in America; *id. l. c.* p. 399.

Percichthys godeffroyi, Gthr., is a sea fish belonging to *Serranus*, and identical with *S. humeralis*, C. V., = *S. semifasciatus*, placed in *Centropristis* by Günther. On the other hand, *S. humeralis*, Gthr., 1877, is not the above species of C. V., but *S. albo-maculatus*, Jen., erroneously referred by Günther to *S. humeralis*, C. V. *Id. l. c.*

Lates darwiniensis, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 315 (d. 7 $\frac{1}{17}$, a. $\frac{3}{8}$, ll. 60), Fort Darwin.

Gulliveria, g. n. Teeth on both jaws very numerous, short, conical, pointed, swollen, and rounded at the base, placed irregularly and crowded; no canines; tongue smooth; an angular line of teeth on palate; præopercle without denticulations, or with very feeble ones; opercle with a flat soft spine; two dorsals, the first with six spines, the second with a long spine; anal with two spines; general form oval, compressed; scales moderate or rather large; lateral line continuous, not extending on the caudal; maxillaries extending to posterior edge of the eye; opening of the mouth rather oblique. *G. fusca* and *fasciata*, spp. nn., Castelnau, P. Linn. Soc. N. S. W. iii. p. 45, Norman River.

Centropomus viridis, sp. n., W. N. Lockington, P. Cal. Ac. vii. p. 109, Asuncion Island, Lower California (? = *C. undecimalis*, C. V.).

Pseudanthias hypselosoma, sp. n., Bleeker, Arch. Néerl. xiii. p. 58, fig. 2, New Guinea.

Serranus. Remarks on this genus, particularly with respect to the specific characters based upon the proportions of the body, and the ratio of variability of such characters according to age and individualization; also on the relative value of characters for its subdivision into groups, and especially on the scales of the lateral line as being of primary importance. The subgenera are given as follows, p. 67 :—

1. *Serranus*: scales of lateral line quadrilateral, ctenoid; caudal rounded, truncated, or feebly concave. 2. *Paralabrax*: scales of lateral line subtriangular, ctenoid; dorsal with 10 spines; anal with 7 or 8 rays; caudal feebly concave; canines moderate, numerous, and ranged along the entire length of the jaws. 3. *Paranthias*: scales of lateral line triangular, with or without spinules along the canal; caudal deeply forked, with the angles prolonged; dorsal with 9 spines; anal with 8 or 9 rays. 4. *Epinephelus*: scales of lateral line triangular, without spinules; caudal rounded, truncated, or feebly concave; section 1, dorsal 9, section 2, dorsal 11. 5. *Itaiara*: scales of lateral line without spinules, canal ramified behind; caudal rounded; dorsal with 11 spines; anal with 8 rays. Vaillant & Bocourt, Miss. Scient. Méx.

Serranus acanthophorus, Boc., = *maculato-fasciatus*, Steind., is redescribed and figured. It belongs to the same subdivision as *S. clathratus* and *nebulifer*, Gir., viz., *Paralabrax*. Iid. *l. c.* p. 72, pl. iv. fig. 1, pl. i. (ter) figs. 3 & 3 A.

Serranus maculatus, Bl., with remarks on its synonymy, p. 83; *courtadii*, Boc., p. 80, pl. ii. figs. 3 & 3 A; *capreolus*, Poey, with doubtful synonymy, p. 87, pl. iii. fig. 1, pl. i. (ter) fig. 5; *itaiara*, Licht., = *S. galeus*, M. & Tr. ?, p. 90, pl. ii. figs. 4 & 4 A, pl. i. (ter) fig. 4: redescribed. Vaillant & Bocourt, *l. c.*

Serranus guttulatus, sp. n., Macleay, P. Linn. Soc. N. S. W. iii. p. 33, pl. xi., Port Jackson.

[*Serranus*] *Epinephelus rosaceus*, sp. n., Streets, Bull. U. S. Nat. Mus. vii. p. 51, Gulf of California.

Plectropoma: remarks on the characters of the genus, with table of subdivisions; Vaillant & Bocourt, *l. c.* *P. fasciatus*, Costa (*nec* Bl., *nec* Risso), renamed *Serranus costæ*; Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 389.

Lutjanus. Remarks and synoptical table, with divisions based on the form of the dental vomerine plate; Vaillant & Bocourt, *l. c.* p. 110.

Diacopus superbus, sp. n., Castelnau, P. Linn. Soc. N. S. W. ii. p. 228, Australia.

Pseudambassis, g. n.: small fishes closely allied to *Ambassis*, but having no recumbent spine in front of the dorsal. *P. macleayi*, p. 43, *P. elongatus*, p. 44, Norman river, Castlenau, *op. cit.* iii., spp. nn., also *Ambassis papuensis*, Macleay.

Acanthoperca, g. n., has much the form of *Ambassis*, but only one dorsal. *A. gulliveri*, sp. n., *id. l. c.* p. 45, Norman river.

Micropterus salmo[*no*]*ides*, Lac. Northern and southern forms constitute two distinct varieties, the old name retained for the southern, that of *achigan* (Raf.) being suggested for the northern. Jordan & Brayton, *l. c.* p. 30.

Apogon opercularis, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 347, pl. vii. fig. 1, Port Darwin.

Apogonichthys adspersus, sp. n., Castlenau, P. Linn. Soc. N. S. W. ii. p. 226, Rockhampton.

Therapon unicolor, Gthr.: note on specimens found in a dam near Warialda, ova supposed to have been conveyed by birds; Macleay, P. Linn. Soc. N. S. W. iii. p. 16.

Therapon hilli and *terræ-reginæ*, spp. nn., *id. tom. cit.* pp. 226 & 227, Australia.

Therapon fasciatus, Cast., description corrected; Castlenau, *l. c.* iii. p. 46.

Diagramma multivittatum, sp. n., Macleay, *l. c.* p. 349, pl. vii. fig. 2, Port Darwin.

Symphysanodon, g. n. *Pristipomatidæ*. *S. typus*, sp. n., Bleeker, Arch. Néerl. xiii. p. 61, fig. 1, (d. $\frac{?}{10\text{-}11}$, a. $\frac{3}{7}$), New Guinea.

Squamipinnes.

Chætodon aureo-fasciatus, Macleay, P. Linn. Soc. N. S. W. ii. p. 351, pl. viii. fig. 3, Port Darwin; *C. ocellipennis*, id. *op. cit.* iii. p. 33, pl. iii. fig. 1, King George's Sound: spp. nn.

Toxotes carpentariensis, sp. n., Castlenau, *l. c.* iii. p. 47, Norman river.

Mullidæ.

Parupeneus spilurus, Blkr., redescribed and figured; Bleeker, Arch. Néerl. xiii. p. 63, fig. 3.

Capture of Red Mullet in December in Cornwall; Zool. 1878, p. 61.

Sparidæ.

Lethrinus punctulatus, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 351, pl. viii. fig. 2, Port Darwin.

Chrysophrys australis, Gthr., figured; McCoy, Prodr. Zool. Vict. Dec. i. pl. iv.

Hoplopagrus guentheri, Gill, completely described and figured by Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 379, pls. i. & ii.

Chrysophrys hasta, C. V. Bleeker determines by comparison of specimens the specific distinctness of *Chrysophrys cuvieri*, Day, and *C. schlegeli*, Blkr. The first is described and figured. Verh. Ak. Amst. (2) xiii. pp. 43–46, pl.

Cirrhitidæ.

Chilodactylus rubro-fasciatus, sp. n., Castlenau, *l. c.* iii. p. 140, Melbourne.

Beridia, ? g. n. Head and body very compressed; general form oval; head very large, with its anterior profile strongly concave in front of the eyes, and convex below; teeth very numerous, very small, granular, none at the lower jaw nor on the palate; two dorsals well developed, the first not quite as long as the second, of 8 spines, the second with 3; caudal very long; anal large, with one spine; ventrals behind the pectorals; pectorals large, with the upper ray branched and all the others simple. *B. flava*, sp. n., *id. tom. cit.* p. 229, pl. ii. Victoria.

Scorpænidæ.

Sebastes. H. Sauvage, in "Description de Poissons Nouveaux on imparfaitement connus de la collection du Muséum d'Histoire Naturelle," is unable to recognize the value of the subgeneric divisions of this genus, designated by Gill as *Sebastichthys* and *Sebastosomus*, but admits as natural a typical group composed of *S. norvegicus*, *septentrionalis*, and *viviparus*; another for the southern species, *S. dactylopterus*, *kahli*, and *madurensis*; and a third, which he names *Pseudosebastes*, consisting of a single species, *S. bougainvillii*, pp. 111–115. He then characterizes *S.*

(*Eusebastes*) *septentrionalis*, Gaim., p. 115, *S.* (*Sebastichthys*) *filifer*, Val., p. 118, *oculatus*, p. 119, (*Pseudosebastes*) *bougainvillii*, C. V., p. 120, *Neosebastes scorpænoides*, Guich., p. 121, pl. i. fig. 4, *Sebastopsis minutus*, C. V., p. 121, pl. i. fig. 6, and describes *S.* (*Sebastichthys*) *bibroni*, p. 116, pl. i. fig. 3, Sicily, *S.* (*Sebastichthys*) *canariensis*, p. 117, pl. i. figs. 1 & 2, Canaries, spp. nn. Nouv. Arch. Mus. (2) i. pp. 111–122.

Sebastapistes (Gill, MS.), g. n., for *Sebastes strongia*, C. V., and allies; Streets, Bull. U. S. Nat Mus. vii. p. 62.

Remarks on the various fishes known as Rock Cod. *Sebastes ruber*, *helvo-maculatus* (= *rosaceus*, Grd.), *rosaceus* (= *pinniger*, Gill), *nebulosus*, Ayres, *paucispinus*, *melanops*, Grd., *flavidus*, Ayres, *auriculatus*, Gir.; W. N Lockington, P. Cal. Ac. vii. [for 1876, dated 1877], pp. 79–82.

Sebastes joyneri, sp. n., Günther, Ann. N. H. (5) i. p. 485, Japan.

Setarches fidjiensis, sp. n., *id. op. cit.* ii. p. 179, Fiji Islands.

Scorpæna. In the above cited memoir by Sauvage the following are characterized: *Scorpæna ballieui*, Sauv., p. 123, pl. ii. fig. 4, *fucata*, Val., p. 126, *scrofina*, C. V., p. 126, *Scorpænopsis venosa*, C. V., p. 128, *papuensis*, C. V., p. 129, *novæ-guineæ*, C. V., p. 129. Also *Scorpæna dabryi*, p. 124, pl. i. fig. 8, China, and *megastoma*, p. 127, pl. i. fig. 7, Réunion, spp. nn.; Sauvage, N. Arch. Mus. (2) i.

Scorpæna polylepis, Blkr., = *Sebastes minutus*, C. V., *id. l. c.* p. 122.

Prosopodasys dracæna, C. V., p. 130, *nigra*, C. V., p. 131, *trachinoides*, C. V., p. 131, characterized; *P. bottæ*, sp. n., p. 132, pl. i. fig. 11, Red Sea: *id. l. c.*

Tetraroge belangeri, C. V., and *bougainvillii*, C. V., described; *id. l. c.* pp. 132 & 133.

Agriopus kieneri, sp. n., *id. l. c.* p. 133, pl. i. fig. 12, Peru.

Pterois (*Pseudomonopterus*) *vittata*, sp. n., *id. l. c.* p. 135, pl. i. fig. 10, Nouka-Hiva.

Pelor caledonicum, sp. n., *id. l. c.* p. 147, pl. ii. fig. 6, New Caledonia.

Cyrtidæ.

Cyrtus gulliveri, sp. n., Castelnau, *l. c.* p. 233, Australia.

Polynemidæ.

Polynemus microstoma, Blkr. (*P. plebeius*, Gthr., *nec* Brouss.), redescribed and figured under the name of *Trichidion microstoma*; Bleeker, Arch. Néerl. xiii. p. 64, fig. 5.

Polynemus cæcus, sp. n., Macleay, *l. c.* ii. p. 354, pl. ix. fig. 1, Port Darwin.

Sciænidæ.

Umbrina galapagorum, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 396.

Sillago terræ-reginæ, Castelnau, *l. c.* p. 232, Australia.

The large Australian *Sciæna* identified with *S. aquila*, id. *ibid.* [This is no new discovery; *vide* Zool. Rec. xii. p. 116.]

Trichiuridæ.

Regalecus pacificus, sp. n., Haast, Tr. N. Z. Inst. x. p. 246, pl. vii., New Zealand. Note on *R. gladius*; Hector, *l. c.* p. 533.

Carangidæ.

Argyriosus pacificus, sp. n., Lockington, P. Cal. Ac. vii. p. 84, Lower California

Coryphænidæ.

Leptobrama, g. n. Elongate, strongly compressed, like *Chorinemus*; numerous pointed teeth in both jaws, longer in the inner row, still smaller on vomer, palatine and pterygoid bones; dorsal much shorter than anal, both (as also the other fins) entirely scaly, and with slender, gradually-increasing, and close-set spines anteriorly; scales adherent, rough. *L. muelleri*, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 388, Queensland.

Brama japonica, sp. n., Hilgendorf, SB. nat. Fr. 1878, p. 1, Japanese Seas.

Centropholis, g. n., near *Pteraclis*. *L.* [sic : ? *C.*] *petersi*, sp. n. (d. 50, a. 40, ll. 49), *id. ibid.*, Japanese Seas.

Scombridæ.

Echeneis naucrates. A specimen from Sierra Leone with twenty-two plates, and one from Samarang with twenty-eight. *E. lineata* attaches itself especially to *Sphyræna barracuda* as *E. remora* does to *Carcharias lamia*. Remarks on the distinctness of *E. osteochir*, Cuv. Lütken, Vid. Medd. 1877, p. 242.

Trachinidæ.

Bleeker has published a Revision of Indo-pelagic species of *Uranoscopus*, giving descriptions of *U. cognatus*, Cantor, p. 49, *bicinctus*, Schleg., p. 51, *asper*, Schleg., p. 53, and *oligolepis*, Blkr., p. 55. The latter species has been confounded with *U. scaber*, L., and *U. asper*, Schleg., which it greatly resembles. In order to facilitate the distinction of these three species, a detailed diagnosis of *U. scaber*, L., is appended in a note, in which is also described *U. capensis*, sp. n., p. 58, Cape of Good Hope. Verh. Ak. Amst. (2) xiii. pp. 47–59.

Cathetostoma malacopterus, Benn., is mentioned as distinct from *C. læve*, Gthr., on account of the improbability of their being identical; *id. l. c.* p. 59.

Iosillago, g. n. Body elongate, rather compressed, cleft of mouth small; eye lateral; scales very small; spinous dorsal with 13 spines, continuous with soft dorsal; ventrals thoracic; lower pectoral rays branched; teeth on vomer and palatine bones; præoperculum denticulated; bones of head with muciferous system well developed; seven branchiostegals;

pseudobranchiæ. *I. maculata*, sp. n., Macleay, P. Linn. Soc. N. S. W. iii. p. 34, pl. iv. fig. 3, King George's Sound.

Bathydraco, g. n. Body elongate, subcylindrical; tail tapering; head depressed, with the snout much elongate, spatulate; mouth wide, horizontal, with the lower jaw prominent; eyes very large, lateral, close together; scales very small, embedded in the skin; lateral line wide, continuous; one dorsal fin; ventrals jugular; lower pectoral rays branched; teeth in the jaws in villiform bands, none on the vomer or the palatine bones; opercles unarmed; ten branchiostegals; the gill membranes free from the isthmus, and but slightly united in front; air-bladder, none. *B. antarcticus*, sp. n., Günther, Ann. N. H. (5) ii. p. 18, Heard Island.

Percis filamentosa, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 386, Singapore.

Opisthognathus darwiniensis, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 355, pl. ix. fig. 3, Port Darwin.

Pediculati.

Himantolophus. An account of this remarkable genus, hitherto imperfectly known, being based on the single specimen of *H. grænlandicus* noticed by Reinhardt in 1837. A second example of the genus, *H. reinhardti*, sp. n., p. 320, pls. i. & ii. figs. 1–3, Arctic. Lütken, Dan. Selsk. Skr. (5) v.

Ceratias holbœlli, Kr.: description of its skeleton; *id. l. c.* p. 326.

Lütken's memoir contains also some general remarks upon the *Pediculati.*

Ægwonichthys, g. n. Head and body excessively large, broad, and depressed; tail very short; mouth exceedingly wide and vertical; supra-orbital bones produced into heavy ridges, divergent posteriorly, covered with the common skin, and terminating in a strong small spine directed upwards; between ridges a deep groove, in which is situated overhead a compound appendage, capable of movement in an almost universal manner, and with a thick, pear-shaped, muscular base, bony shaft, surmounted with a semispherical capsular gland, from the back and upper margin of which arise one simple, one double-branched, and two compound-branched fleshy tentacles, terminating at free ends of branches in white shining vermiform tips; the front of the capsular gland is covered with a silvery or nacreous integument, with aperture in centre connected with interior, and surrounded with a black ring; body and tail armed with broad-based conical spines, ending in fine points; one short dorsal and short anal, each terminating close to caudal, and placed far back; pectorals small, and but imperfectly pediculated; teeth in both jaws very numerous, in various rows, and of unequal lengths, they are slightly recurved, flat, sharp-pointed, with cutting edges, moving freely in socket when pressed in direction of interior of mouth, but perfectly rigid in opposite direction; the teeth in pharynx short and recurved, and in clusters on branchiostegals; gill-openings in axillæ, and partly on under surface of body. *A. appeli*, sp. n., F. E. Clarke, Tr. N. Z. Inst. x. p. 245, pl. vi., New Zealand.

Cataphracti.

(*Aspidophorus*) *Agonomalus proboscidalis*, Barthe, described; Sauvage, N. Arch. Mus. (2) i. p. 157.

Cottidæ.

Cottus. H. Sauvage recognizes the following subdivisions of this genus: *Cottus*, *Acanthocottus*, *Liocottus*, *Borcocottus*, *Porocottus*; and proposes the name of *Elaphocottus* to designate the species from Kamtschatka and the Aleutian Islands, which, like *C. pristilliger* and *claviger*, have the præopercular spines thick and antlered, and the head swollen posteriorly. He sketches the geographical distribution of the species corresponding to the different subgenera, and gives diagnoses of *C. cognatus*, Rich., p. 142, *viscosus*, Haldem., p. 142, *meridionalis*, Gir., p. 143, and describes *Cottus vietleri* (Dybow.), p. 143, *baikalensis* (Dybow.), p. 144, both from Lake Baikal, and (*Acanthocottus*) *anceps*, p. 145, pl. i. fig. 13, United States, spp. nn.: N. Arch. Mus. (2) i.

Cottus bathybius, sp. n., Günther, Ann. N. H. (5) ii. p. 180, Japanese Sea.

Potamocottus zopherus, Jord., and *carolinæ*, Gill, united under the older name *meridionalis*, Gir.; Jordan & Brayton, Bull. U. S. Nat. Mus. xii. p. 47.

Centridermichthys. On this genus, and its subdivision into *Centridermichthys*, *Leptocottus*, and *Oligocottus*, pp. 138, 140. *C. dabryi*, p. 146, pl. i. fig. 14, China, and *gruvintii* (Dybow.), p. 146, Lake Baikal, spp. nn.; Sauvage, *l. c.*

Triglopsis stimpsoni (Gill, MS.), Jordan, Man. Vert. 2nd ed., p. 256, Lake Michigan. [Prof. Jordan has informed the Recorder that this species = *T. thompsoni*; also that he does not consider the division of *Cottus* into *Uranidea*, *Tauridea*, *Potamocottus*, and *Triglopsis*, as valid.]

Platycephalus. This genus has hitherto been confined exclusively to the Red Sea, the Indian and Chinese Seas, and the Pacific; H. Sauvage describes *P. americanus*, sp. n., p. 148, pl. ii. fig. 3, from the Potomac. He gives diagnoses also of *P. vittatus*, C. V., p. 149, *bassensis*, C. V., p. 150, *grandispinis*, C. V., p. 151, *longiceps*, C. V., p. 151, and *fuscus*, C. V., p. 152: N. Arch. Mus. (2) i.

Platycephalus longiceps, C. V., is quite distinct from *P. tentaculatus*, Rüpp., differing in the absence of tentacles, and the longer præopercular spine. *Id. l. c.* p. 151.

Lepidotrigla vanessa, Rich., and *Trigla kumu*, Less., figured in colours by McCoy, Prodr. Zool. Vict. Dec. i. pl. v.

Lepidotrigla. Diagnoses of *L. phalæna*, C. V., p. 154, *sphynx*, C. V., p. 155, *papilio*, C. V., p. 155; scales figured of *L. aspera*, C. V., and *buergeri*, Schleg., pl. ii. figs. 11 & 14; *L. eydouxi*, sp. n., p. 156, Manilla: Sauvage, N. Arch. Mus. (2) i.

Discoboli.

Cyclopterus lumpus, L.: on a preparation of the bones of the head; Hilgendorf, SB. nat. Fr. 1878, p. 156.

Gobiidæ.

Gobius taalmankipi, sp. n., A. A. W. Hubrecht, Tijdschr. Nederl. Dierk. Ver. iii. pp. 15–20, North Sea.

Gobius maxillaris, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 357, pl. ix. fig. 2, Port Darwin.

Gobius pleurostigma, Blkr., = *sadanundio*, H. B.; Bleeker, Versl. Ak. Amst. xii. p. 202.

Apocryptes bivittatus, sp. n., Macleay, *l. c.* pl. ix. fig. 5, Port Darwin.

Gobiosoma guttulatum, sp. n., *id. ibid.* pl. ix. fig. 6, Port Darwin.

Gobius ? saurioides, sp. n., Castelnau, *l. c.* iii. p. 48, Norman River.

Stigmatogobius, Blkr., revised. *S. isognathus* and *singapurensis*, from Singapore, *ambly[r]rhynchus*, Java, spp. nn.; Bleeker, Versl. Ak. Amst. xii. pp. 201–208.

Latrunculus and *Crystallogobius*. R. Collett's observations [*cf.* Zool Rec. xiii. *Pisces*, p. 23] are translated into English; P. Z. S. 1878, pp. 318–339.

Aristeus, g. n. Body compressed, oval, rather high, with mouth advanced and nearly pointed; two dorsals, the first short, the second long, caudal truncate; anal very long; ventrals inserted very near one another, behind the pectorals, with 1 spine and 5 rays; scales large, not ciliated; teeth crowded on both jaws; small pavement-like teeth very numerous on all the bones of the palate; a transverse line of larger and pointed ones on the vomer; opercles entire; cleft of mouth small, not extending to line from orbit; head scaly; no distinct lateral line; lower jaw rather larger than the upper. *A. fitzroyensis* and *fluviatilis*, spp. nn., Castelnau, P. Linn. Soc. N. S. W. iii. p. 141, Australia.

Eleotris sulcaticollis and *adspersa*, spp. nn., *id. l. c.* p. 142, Australia.

Eleotris lantzi, sp. n., A. Thominot, Bull. Soc. Philom. (7) ii. p. 256, Réunion.

Eleotris compressus, sp. n., Macleay, *l. c.* p. 358, pl. ix. fig. 7, Port Darwin.

Eleotris simplex and *planiceps*, spp. nn., Castelnau, *l. c.* iii. p. 49, Norman River.

Sema, g. n., ? *Gobiidæ*. *S. signifer*, sp. n., Jordan, Bull. U. S. Geol. Surv. iv. p. 399, Texas.

Blenniidæ.

Anarrhichas leopardus, Ag., = *A. minor*, Ol. Steenstrup has published a further paper on this fish; Vid. Medd. 1878, pp. 109–113 [*cf.* Zool. Rec. xiv. *Pisces*, p. 16].

Salarias dussumieri, Playf., = *striato-maculatus*, Kner, figured; Bleeker, Versl. Ak. Amst. (2) xii. p. 197, fig. 1.

Salarias spaldingi, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 358, pl. ix. fig. 4, Port Darwin.

Tripterygium marmoratum, sp. n., *id. op. cit.* iii. p. 34, pl. iii. fig. 2, King George's Sound.

Sphyrænidæ.

Sphyræna. Steindachner, writing on the species of *Sphyræna* from the western coast of America, describes *S. argentea*, Grd., and the true *S. fosteri*, C. V. (Blkr., *nec* Gthr., in F. der Südsee); SB. Ak. Wien, lxxviii. Abth. i. pp. 377–380.

Atherinidæ.

Atherinichthys duboulayi, sp. n., Castelnau, P. Linn. Soc. N. S. W. iii. p. 143, Australia.

Mugilidæ.

Gastropterus, g. n. A broad band of teeth on premaxillary and dentary bones, and a patch on the vomer; dorsal spinous fin with four rays; ventral fins abdominal; second dorsal opposite to the anal; dermal fold not crossing superior portion of premaxillary region, hence the jaws are only partly protractile. *G. archæus*, sp. n., Cope, P. Am. Phil. Soc. xvii. p. 700, Peru.

Mugil joyneri, sp. n., Günther, Ann. N. H. (5) i. p. 486, Japan.

Agonostoma darwiniense, Macleay, P. Linn. Soc. N. S. W. ii. p. 360, pl. ix. fig. 8, Port Darwin; *A. dorsalis*, Streets, Bull. U. S. Nat. Mus. vii. p. 102, Samoa: spp. nn.

Agonostoma forsteri, Bl. Schn., redescribed by Steindachner, *l. c.* p. 383.

Myxus (*Neomyxus*) *sclateri*, sp. n., *id. l. c.* p. 384, Kingsmill and Sandwich Isles.

Fistulariidæ.

Fistularia villosa, Klunz., is the young of *F. serrata*; Hilgendorf, SB. nat. Fr. 1877, p. 236.

Aphredoderidæ.

Aphododerus isolepis, Nels. On the alteration of the position of the vent as the fish grows older; Jordan, Bull. Illin. Mus. No. 2, p. 48.

Asternotremia mesotrema, Jord., = *Aphododerus sayanus*, De K.; Jordan & Brayton, Bull. U. S. Nat. Mus. xii. pp. 41–47.

Elasso[*so*]*ma*. Confirmation of its relation as a separate family next to the "*Aphododeridæ*." Jordan, Bull. Illin. Mus. No. 2, p. 47.

ACANTHOPTERYGII PHARYNGOGNATHI.

Pomacentridæ.

Dascyllus fasciatus, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 361, pl. x. fig. 2, Port Darwin.

LABRIDÆ.

Platyglossus immaculatus, sp. n., Macleay, *l. c.* p. 362, pl. x. fig. 1, Port Darwin.

Anampses neo-guinaicus, sp. n., Bleeker, Arch. Néerl. xiii. p. 57, fig. 4, New Guinea.

Labrichthys nigro-marginatus, sp. n., Macleay, *op. cit.* iii. p. 35, pl. iii. fig. 3, Port Jackson.

Chilinus unifasciatus, sp. n., Streets, *l. c.* p. 82, Fanning Islands.

Gomphosus undulatus, sp. n., *id. l. c.* p. 85, Fanning Islands.

Trochocopus rufus, sp. n., Macleay, *l. c.* p. 35, pl. v. fig. 3, King George's Sound.

Olistherops brunneus, sp. n., *id. l. c.* p. 36, pl. v. fig. 1, Port Jackson.

Heteroscarus castelnaui, sp. n., *id. ibid.* pl. v. fig. 2, Port Jackson.

Scarus axillaris, sp. n., Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 384, pl. iii. fig. 1, N. Australia.

Pseudoscarus jonesi, sp. n., Streets, *l. c.* p. 80, Fanning Islands.

GERRIDÆ.

Gerres profundus, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 350, Port Darwin.

EMBIOTOCIDÆ.

Dacentrus lucens, g. & sp. nn., afterwards found to be a *Hysterocarpus*, perhaps identical with *H. traski*, Gibb.; Jordan, Bull. U. S. Geol. Surv. iv. p. 667, Texas.

CHROMIDÆ.

Acara sub-ocularis, p. 696, *hyposticta*, p. 697, Cope, P. Am. Phil. Soc. xvii., Peru, spp. nn.

Paracara, g. n. Dentes : maxillis pluriseriati conici acuti serie externa fortiores, pharyngeales compressi acuti infrà apicem emarginati. Corpus oblongum. Caput vertice, fronte, genis, operculisque squamatum. Præoperculum edentulum. Squamæ capite et trunco antice cycloideæ, trunco medio et postice ctenoideæ, lateribus 30 circ. in serie longitudinali. Processus arcus branchialis subelongati simplices antice denticulati. Pinnæ dorsalis et analis alepidotæ, dorsalis spinis [12] et radii 10, analis spinis 3 et radii 9 ; B. 5. *P. typus*, sp. n., Bleeker, Versl. Ak. Amst. (2) xii. p. 193, fig. 3, Madagascar.

Paretroplus polyactis, sp. n., Bleeker, *l. c.* p. 195, fig. 2, Madagascar.

ANACANTHINI.

GADIDÆ.

Melanonus, g. n. Head and body rather compressed, covered with cycloid scales of moderate size, and terminating in a long tapering tail without caudal ; eye of moderate size ; mouth anterior and lateral ; both jaws with narrow bands of villiform teeth, vomer and palatines with very

narrow stripes of minute teeth; barbel none; one short anterior dorsal, the second immediately behind the first, and with anterior rays well developed; it is continued to end of tail; anal like second dorsal; outer gill-rakers of first branchial arch strong and long, longer than the gill-laminæ; ventrals composed of several rays, slightly in advance of the pectorals; bones flexible; mucous cavities of the head small. Allied to *Stromateus*, but with different dentition. *M. gracilis*, sp. n., Günther, Ann. N. H. (5) ii. p. 19, Antarctic.

Lotella marginata, sp. n., *id. ibid.* S. America, Pacific.

Haloporphyrus rostratus, p. 18, S. Pacific, *australis*, p. 19, Magellan Straits, *id. l. c.*, spp. nn.

Ophidiidæ.

Acanthonus, g. n. Head large and thick, armed in front and on the opercles with strong spines; trunk very short, the vent being below the pectoral; tail thin, strongly compressed, tapering, without caudal; eye small; mouth very wide, with the teeth in villiform bands in jaws, on vomer and palatine bones, and along the hyoid; barbels none; ventrals reduced to simple filaments, placed close together on the humeral symphysis; gill-membranes not united; gill-laminæ remarkably short, gill-rakers long, lanceolate, stiff; scales extremely small; bones of the head soft. *A. armatus*, sp. n., Günther, *l. c.* p. 23, north of New Guinea.

Bathygadus, g. n. Snout not projecting beyond mouth; mouth wide, anterior and lateral. Eye small or of moderate size; teeth in both jaws villiform, in narrow bands which occupy the whole length of the jaws: barbels present or absent; the two dorsal fins almost contiguous, anterior rays of second not shortened, but gradually diminish in length in the narrow posterior portion of the tail; anal rays feeble; bones of the head cavernous, soft, without prominent ridges; scales small, cycloid, deciduous. *B. cottoides*, sp. n., *id. l. c.* p. 23, between New Zealand and Kermadec Island.

Bathynectes, g. n. Anterior part of body rather compressed, posterior produced into long tapering tail without caudal; snout not swollen, jaws equal or nearly equal in front; mouth very wide, teeth in villiform bands in jaws, on vomer and palatine bones; barbel none; ventrals reduced to simple or bifid filaments, close together and near to the humeral symphysis; gill-membranes not united; gill-laminæ remarkably short; the middle pieces of the first branchial arch have the gill-rakers of the outer series much elongate, stiff; bones of head soft and cavernous; operculum with a very feeble spine above. A true deep-sea form allied to *Sirembo*. *B. laticeps*, p. 20, Mid Atlantic, *compressus*, p. 21, New Guinea and Mid Atlantic, *gracilis*, p. 21, New Guinea, *id. l. c.* spp. nn.

Typhlonus, g. n. Head large compressed, with most of the bones in a cartilaginous condition; the superficial bones with large muciferous cavities not armed; snout a thick protuberance, projecting beyond the mouth, which is rather small, inferior; trunk very short, the vent being below the pectoral; tail thin, strongly compressed, tapering without

separate caudal; eye externally not visible, reduced to a minute rudiment hidden below the skin; bands of villiform teeth in the jaws on the vomer and palatine bones; barbel none; ventrals reduced to simple filaments placed close together on the humeral symphysis; gill-openings very wide, the gill-membranes being but slightly united in front; gills four, gill-laminæ rather short, gill-rakers of moderate length; scales thin, deciduous, small. *T. nasus*, sp. n., Günther, *l. c.* p. 21, N. E. Australia.

Aphyonus, g. n. Head, body, and tapering tail strongly compressed, enveloped in a thin, scaleless, loose skin; vent far behind the pectoral; snout swollen, projecting beyond the mouth, which is wide; no teeth in the upper jaw, small conical teeth in the lower, pluriserial in front and uniserial on the side; vomer with a few rudimentary teeth; palatine teeth; nostrils close together, small; no externally visible eye; barbel none; ventrals reduced to simple filaments, close together and near humeral symphysis; gill-membranes not united; four branchial arches, the posterior without gill-laminæ, the anterior with very short gill-rakers and with rather short gill-laminæ; head covered with a system of wide muciferous channels and sinuses, the dermal bones being almost membranaceous, whilst the others are in a semicartilaginous condition; notochord persistent, but with a superficial indication of the vertebral segments (as in some Leptocephaline forms). *A. gelatinosus*, sp. n., *id. l. c.* p. 22, N.E. Australia and New Guinea.

Sirembo messieri, sp. n., *id. l. c.* p. 19, Messier Strait.

Macruridæ.

Macrurus longirostris, p. 23, N.E. of New Zealand, *holotrachys*, p. 24, East of Rio Plata, *fasciatus*, p. 24, West of extremity of S. America; Günther, *l. c.*: spp. nn.

Coryphænoides rudis, p. 24, Pacific, *æqualis*, p. 25, Portugal, *crassiceps*, p. 25, Pacific, *microlepis*, p. 26, Feejee, *murrayi* and *serrulatus*, p. 26, New Zealand, *filicauda*, p. 27, Antarctic, *variabilis*, p. 27, Pacific, &c., *affinis*, p. 27, East of Rio Plata, *carinatus*, p. 28, Prince Edward's Island; *id. l. c.*: spp. nn.

Pleuronectidæ.

Agassiz, A. On the Young Stages of Osseous Fishes. II. Development of the Flounders. Pr. Am. Ac. xiv. pp. 25, 8 pls.

Describes the changes through which young flounders pass after their escape from the egg, and before they finally assume the adult appearances and rest on the colourless side. The development is traced in five of the common species.

Steenstrup, J. Fortsatte Bidrag til en rigtig opfattelse af Oiestillingen hos Flyndrene. Overs. Dan. Selsk. 1876 (1877), pp. 174–247, pls. i.–iv.

On the position of the eyes in the *Pleuronectidæ*; continued from the author's investigations of the same subject in November, 1863. See also Naturf. 1878, No. 38, p. 353.

Pleuronectes bogdanovi, sp. n., H. Sandeberg, Bull. Soc. Mosc. liii. pt. 2, p. 236, fig., White Sea.

Euchalarodus putnami, Gill, = *Pleuronectes glaber*, a species the male of which has ciliated rough scales, those of the female being perfectly smooth. Both sexes have the teeth moveable in the spawning season only. T. Bean, Science Notes, i. p. 104, and Pr. U. S. Nat. Mus.

Platessa flesus, L., caught in the Weser; Linstow, Arch. f. Nat. xliv. p. 246.

Plagusia guttata, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 362, pl. x. fig. 3, Port Darwin.

Synaptura filamentosa, p. 93, *siamensis*, p. 94, Laos, (*Anisochirus*) *harmandi*, p. 94, Me-Kong, Sauvage, Bull. Soc. Philom. (7) ii.; *S. sclerolepis*, Macleay, *l. c.* p. 363, pl. x. fig. 4, Port Darwin: spp. nn.

Apionichthys bleekeri, sp. n., R. Horst, Tijdschr. Nederl. Dierk. Ver. iv. pp. 30–33 [in Utrecht Univ. Mus.].

Cynoglossus (*Arelia*) *solum*, sp. n., Sauvage, *l. c.* p. 95, Me-Kong.

Cynoglossus joyneri, sp. n., Günther, Ann. N. H. (5) i. p. 486, Japan.

Siluridæ.

Plotosus elongatus, sp. n., Castelnau, P. Linn. Soc. N. S. W. ii. p. 237, Brisbane River.

Eumeda, g. n. *Siluridæ heteropteræ*, near *Silurichthys*. Body elongate, compressed; eye on upper part of head; one dorsal with pungent spine; adipose none; anal very long, and joining caudal, which is obliquely truncated; ventrals inserted behind the perpendicular from the dorsal; three pairs of short barbels on anterior part of snout, at angle of mouth, and on lower jaw; lateral line continued all the length of the body; teeth on both jaws numerous, crowded and tubercular, with a line of sharp conical ones in front; nostrils remote from each other; head and body covered with soft skin. *E. elongata*, sp. n., *id.*, *op. cit.* iii. p. 143, Rockhampton.

Neosilurus, g. n. Has the form of *Plotosus*, but without dorsal fin; comes near to *Silurichthys*. *N. australis*, sp. n., *id. l. c.* p. 239, Rockhampton.

Pangasius siamensis, sp. n., Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 393.

Pangasius pleurotænia, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 235, Laos.

Helicophagus hypophthalmus, sp. n., *id. l. c.* p. 235, Laos.

Hypophthalmus perporosus, sp. n., Cope, P. Am. Phil. Soc. xvii. p. 673, Peru.

Arius curtisi, sp. n., Castelnau, *l. c.* ii. p. 236, Moreton Bay. In case it should be separated from *Arius*, *Neoarius* proposed as a generic name; *id. ibid.*

Pimelodus humilis, Gthr., noticed; *P. bathyurus* and *ophthalmicus*, spp. nn., Peru, Cope, *l. c.* pp. 674 & 675.

Hemipimelodus siamensis, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 234, Siam.

Evanemus brachyurus, sp. n., Cope, *l. c.* p. 676, Peru.

Auchenipterus brevibarbus, p. 676, *isacanthus*, p. 677, spp. nn., Cope, *l. c.*, Peru.

Epapterus, g. n. *Doradinæ*: distinguished from *Evanemus* by absence of adipose fin, absence of teeth, and rudimental soft part of first dorsal fin. *E. dispilurus*, sp. n., Cope, *l. c.* p. 677, Peru.

Hypoptoma gulare, sp. n., *id. l. c.* p. 679, Peru.

Charnothorax, g. n. Callichthyiform, with osseous dorsal and pectoral spines, a produced occipital shield, and 9–11 soft rays in the dorsal fin; coracoid shields lateral, not covering abdomino-thoracic region. *C. bicarinatus*, sp. n., *id. ibid.* Peru.

Plecostomus robini, Gthr. & Steind. (*nec* C. V.), renamed *P. unæ*, sp. n.; Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 383.

Exostoma stoliczkæ, Day, figured; Day, Yarkand, pl. i. fig. 1.

Eremophilus mutisii noticed and figured in "Le Tour du Monde" xxxiv. [Paris: 1877], p. 52.

Characinidæ.

Pyrrhulina argyrops, sp. n., Cope, *l. c.* p. 694, Peru.

Elopomorphus, g. n. Curimatine Characinoids with an elongated fusiform body; rounded belly; conic head with the operculum very oblique; mouth terminal, and apparently transverse, but capable of considerable distension, the supra-maxillaries being quite movable and the mandible inserted under the eye; the margins of the jaws trenchant; teeth none; the dorsal median and above the ventrals; the anal short; the gill arches acutely bent and with prolonged limbs, and the gill-rakers very numerous and setiform. *E. jordani*, sp. n., Gill, 'Field and Forest,' Bolivia. Cope states that this genus is identical with *Anodus*, which he distinguishes 'for the first time' from *Curimatus*, describing *A. melanopogon* and *steatops*, l. c. p. 683, Peru: spp. nn.

Curimatus altamazonicus and *trachystethus*, spp. nn., *id. l. c.* p. 684, Peru.

Potamo[r]rhina, g. n., for *Curimatus pristigaster*, Steind.; *id. l. c.* p. 685.

Prochilodus ortonianus, p. 685, *cephalotes*, p. 686, *id. l. c.*, Peru: spp. nn.

Characidium steindachneri, sp. n., *id. l. c.* p. 688, Peru.

Schizodon sagittarius, sp. n., *id. l. c.* p. 689, Peru.

Leporinus holostictus and *multifasciatus*, spp. nn., *id. l. c.* p. 690, Peru.

Tetragonopterus longior and *diaphanus*, spp. nn., *id. l. c.* p. 691, Peru.

Tetragonopterus alosa, Gthr., = *maximus*, Steind.; Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 384.

Creagrutus nasutus, Gthr., = *Piabina peruana*, Steind.; *id. op. cit.* lxxviii. Abth. i. p. 384.

Anacyrtus limæsquamis, sp. n., Cope, *l. c.* p. 686, Peru.

Xiphorrhamphus abbreviatus and *heterolepis*, spp. nn., *id. l. c.* p. 687, Peru.

Serrasalmo immaculatus, sp. n., *id. l. c.* p. 692, Peru.

Metynnis, g. n. *Myletes*, with an external cultriform spine at base of dorsal fin as in *Serrasalmo* and *Stethaprion*. The premaxillary teeth are

in two series, and have an oblique more or less inconspicuous cutting edge, as in *Myletes*. Two conical teeth behind the mandibular series. Belly armed with spiniferous (? interhæmal) bones. *M. luna*, sp. n. *Id. ibid.* Peru.

Myletes nigripinnis, sp. n., *id. l. c.* p. 693, Peru.

Haplochitonidæ.

Prototroctes oxyrrhynchus. On the habits of the New Zealand Grayling; the writer is inclined to think that it resorts to the sea, although direct evidence has not yet been adduced. J. Rutland, Tr. N. Z. Inst. x. pp. 250–252.

Sternoptychidæ.

Argyropelecus intermedius, sp. n., Clarke, Tr. N. Z. Inst. x. p. 244, pl. vi., New Zealand

Gonostoma elongatum, New Guinea, *gracile*, Japan, p. 186, *microdon*, p. 187, Atlantic and Pacific, spp. nn., Günther, Ann. N. H. (5) ii.

Scopelidæ.

Bathysaurus, g. n. Shape of body similar to that of *Saurus*, subcylindrical, elongate, covered with small scales; head depressed, with snout produced, flat above; cleft of mouth very wide, lower jaw projecting; intermaxillary very long, styliform, tapering, not movable; teeth in jaws in broad bands, not covered by lips, curved, unequal in size, and barbed at the end; a series of similar teeth runs along each side of the palate, a few on the tongue, and groups of small ones on hyoid; eye of moderate size, lateral; pectoral of moderate length; ventral 8-rayed, immediately behind pectoral; dorsal in middle of length of body, with about 18 rays; adipose fin absent or present; anal moderate; caudal emarginate; gill-openings very wide, the gill-membranes being separate from each other and from the isthmus; eleven or twelve branchiostegals; gill-laminæ well developed, separate; gill-rakers tubercular; pseudobranchiæ well developed. *B. ferox*, east coast of New Zealand, *mollis*, S. Pacific, spp. nn., Günther, Ann. N. H. (5) ii. p. 182.

Ipnops, g. n. Body elongate, subcylindrical, covered with large, thin, deciduous scales, and without phosphorescent organs; head depressed, with broad, long, spatulate snout, the whole upper surface of which is occupied by a most peculiar organ of vision or luminosity, longitudinally divided into two symmetrical halves; bones of head well ossified; mouth wide, with lower jaw projecting; maxillary dilated behind; both jaws with narrow bands of villiform teeth; palate toothless; pectoral and ventral fins well developed, and, owing to the shortness of the trunk, close together; dorsal at a short distance behind vent; adipose none; anal moderately long; caudal subtruncated; pseudobranchiæ none. *I. murrayi*, sp. n., Günther, *l. c.* p. 186, S. Atlantic.

Harpodon microchir, sp. n., *id. op. cit.* i. p. 487, Japan.

Chlorophthalmus nigripennis and *gracilis*, spp. nn., *id. op. cit.* ii. p. 182, New Zealand, Juan Fernandez and S. Atlantic.

Saurus lucioceps, Ayres. Note on this species, which is probably identical with *S. foetens*, L.; Lockington, *l. c.* ii. p. 348.

Bathypterois, g. n. Shape like *Aulopus*; head moderate, depressed in front, snout projecting, and large mandible very prominent beyond upper jaw; cleft of mouth wide; maxillary much developed, very movable, much dilated behind; teeth in narrow villiform bands in jaws, on each side of the broad vomer a small patch of similar teeth, none on palatines or tongue; eye very small; scales cycloid, adherent, of moderate size; rays of pectoral much elongate, some of the upper being separate from the rest and forming a distinct division; ventrals abdominal, with outer rays prolonged, eight-rayed; dorsal inserted in middle of body above or immediately behind root of ventral, of moderate length; adipose fin present or absent; anal short; caudal forked; gill-opening very wide, gill-laminæ well developed, separate from each other, gill-rakers long; pseudobranchiæ none. *B. longifilis*, p. 183, Kermadec Island, *longipes*, p. 184, East of S. America, *quadrifilis*, Brazil, *longicauda*, S. Pacific, p. 184; Günther, Ann. N. H. (5) ii.: spp. nn.

Scopelus antarcticus, p. 184, *mizolepis*, *crassiceps*, p. 185, *macrostoma*, *microps*, p. 186, spp. nn., *id. l. c.*, Oceania.

Stomiatidæ.

Echiostoma microdon and *micripnus*, spp. nn., Günther, *l.* c. p. 180, Coasts of Australia.

Malacosteus indicus, sp. n., *id. l. c.* p. 181, Pacific.

Bathyophis, g. n. Body extremely narrow and elongate, snake-like, naked; vent far behind middle of length of body; head large, compressed, snout of moderate length, cleft of mouth nearly as long as head; teeth in jaws extremely large, numerous, unequal, depressible; similar teeth on tongue and on each side of vomer; eye rather small; opercular portion of head narrow; a long barbel anteriorly on hyoid; dorsal commences above ventrals and extends nearly to anal; anal also long, commencing behind vent; pectorals none; ventrals inserted before middle of body; a small phosphorescent organ above middle of upper jaw, and a series of small luminous dots along each side of abdomen and along outer ventral ray; similar organs on tail; gill-openings extremely wide. *B. ferox*, sp. n., *id. ibid.* Atlantic.

PHYSOSTOMI.

Salmonidæ.

Morton, Allport. On the present stage of the Salmon Experiment. P. R. S. Tasm. (1877) 1878, pp. 109–114.

On the Salmon of California (*Salmo quinnat*); Raveret-Wattel, Bull. Soc. Acclim. (3) v. pp. 19–28.

On the American Trout (*S. fontinalis*); id. l. c. pp. 445–453.

On *Trutta salar* in the Weser; Linstow, Arch. f. Nat. xliv. p. 248.

Salmo. In "Notes on a Collection of Fishes from Clackamas River, Oregon," Pr. U. S. Nat. Mus. i. pp. 69–85, Jordan discusses the subdivision of the old genus *Salmo* into the smaller genera *Oncorrhynchus*, *Cristivomer*, *Salvelinus*, and *Salmo*. A synoptical table of all the species of the United States classified in this manner, the result of the most recent investigations by Gill & Jordan, is given in Jordan's Manual of Vertebrates, 2nd ed., Addenda, pp. 355–362.

Salmo henshawi, G. & J., streams of Cal[ifornia?], is indicated as a new species, *id. l. c.* p. 358.

Bathylagus, g. n. Body oblong, compressed, covered with thin deciduous scales of moderate size; no phosphorescent organs; head short, rather compressed, with thin membranaceous bones; mouth very narrow, transverse, anterior, margin of upper jaw formed by intermaxillary and maxillary, which is very short, dilated; teeth in intermaxillary rudimentary, those of lower jaw extremely small, implanted on edge of bone, forming a minute serrature; a series of minute teeth across vomer and along palatine; eye very large; pectoral and ventral fins developed, the latter seven-rayed and inserted opposite to the dorsal, at considerable distance from pectoral; dorsal in middle of length of body; adipose fin small, not very far from caudal; anal fin of moderate length or many-rayed; gill-opening narrowed, commencing opposite root of pectoral, and extending across isthmus, the gill-membranes being united and not attached to the isthmus; gill-rakers lanceolate, rather long, gills small, pseudobranchiæ well developed. *B. antarcticus* and *atlanticus*, spp. nn., Günther, Ann. N. H. (5) ii. p. 248.

Salmo pluvius, *Oncophorus haberi* and *yessoensis*, Hilgendorf, MT. Ges. Ostas. xi. [1876] p. 25, spp. nn.

Esocidæ.

Tomes, C. On the Hinged Teeth of the common Pike. Q. J. Micr. Sci. xviii. pp. 1–6, 1 pl.

Lophius, the Hake, and other Gadoids, possess hinged teeth, and the writer now describes a similar condition in certain regions of the mouth of the common Pike.

Scombresocidæ.

Belonidæ. Cope insists that *Belone* must constitute a separate family on account of possessing a distinct coracoid bone and vertebræ with zygapophyses, a character unusual among fishes. Pr. Am. Phil. Soc. xvii. p. 695.

Belone stolzmanni, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 397, Pacific.

Hemirrhamphus breviceps, sp. n., Castelnau, P. Linn. Soc. N. S. W. ii. p. 240, Brisbane.

Exocætus. K. Möbius: Die Bewegungen der fliegenden Fische durch die Luft. I. Beobachtungen und Ansichten über den Flug der Exocœten. II. Ueber den Bau der fliegenden Fische für ihre Bewegung durch

die Luft. III. Erklärung der Bewegungen der fliegenden Fische durch die Luft. Anhang über die Bedeutung des Wortes erhaltungsmässig. Z. wiss. Zool. xxx. Supplement, pp. 343–382, pl. xvii. A very elaborate study of the powers of flight possessed by the *Exocœti*, and of the mechanical structures by which it is effected.

Cyprinodontidæ.

Gambusia episcopi, sp. n., Steindachner, SB. Ak. Wien, lxxvii. Abth. i. p. 387, pl. ii. figs. 3 & 4, Obispo.

Pœcilia boucardi, sp. n., *id. l. c.* p. 386, pl. iii. figs. 2–3*a*, Colon.

Zygonectes guttatus, Ag., = *notti*, Ag.; Jordan & Brayton, Bull. U. S. Nat. Mus. xii. p. 31. *Z. atrilatus*, sp. n., *iid. l. c.* p. 84, Neuse River.

Cyprinidæ.

D. Jordan has given an elaborate synopsis of the *Catostomidæ*, with concise descriptions, and synonymy and a bibliography. Fourteen genera and 56 species are enumerated, 3 new species being described. Bull. U. S. Nat. Mus. xii. A. pp. 97–230.

Catostomus arœopus, sp. n., *id. l. c.* p. 173, California.

Erimyzon goodei, sp. n., *id. l. c.* p. 148, St. John's River, Florida.

Chasmistes, g. n. for *Catostomus fecundus*, Cope & Yarrow; Jordan, Bull. U. S. Geol. Surv. iv. p. 417, and Bull. U. S. Nat. Mus. xii. p. 159. Subsequently the type was found to have been wrongly identified with Cope & Yarrow's species, and is renamed *Ch. liorus*, sp. n., Jordan, *l. c.* p. 219, Utah Lake.

Minytrema, g. n., Jordan, Man. Vert. 2nd ed. p. 318, and Bull. U. S. Nat. Mus. xii. p. 136. Type, *Catostomus melanops*, Raf.

Catostomus retropinnis, sp. n., *id.* Bull. U. S. Geol. Surv. (ined.), & Bull. U. S. Nat. Mus. xii. p. 178, Montana.

Quassilabia, g. n. for *Lagochila lacera*, Jord. & Brayt.; *id.* Man. Vert. 2nd ed. p. 406. Fully described; *id.* Bull. U. S. Nat. Mus. xii. pp. 104–106.

Ichthyobus cyanellus, *rauchi*, and *ischyrus* are the young of *I. bubalus*; *id.* Man. Vert. p. 406.

Bubalichthys altus, Nels., is based on old individuals of *B. bubalinus*, Jord.; *id. l. c.* p. 407.

The Indian *Cyprinidæ* continued from the genus *Catla*, figures being given as heretofore of nearly all the species; Day, Fishes of India, pp. 553–622, pls. cxxxiv.–clvi.

Cirrhina microlepis, *aurata*, p. 236, *jullieni*, p. 237, spp. nn., Sauvage, Bull. Soc. Philom. (7) ii., Indo-China.

Dangila lineata, sp. n., *id. l. c.* p. 237, Laos.

Rohita sima, *pectoralis*, *barbatula*, spp. nn., *id. l. c.*, p. 238, Indo-China.

Labeo auro-vittatus, sp. n., *id. l. c.* p. 239, Siam.

Labeo sindensis, Day, figured; Day, *op. cit.* pl. ii. fig. 4.

Cosmochilus, g. n. Dorsal opposite ventrals, with an osseous ray, and less than nine articulated rays; anal rays less than nine; muzzle obtuse, mouth transverse, inferior, with thick pendant fringed lips; lip con-

tinued from one jaw to the other; lower mandible with a horny edge without median tubercle; four barbels, postlabial groove simple; mouth with general formation of *Dangila*, Blkr., no pores on muzzle; pharyngeal teeth 5, 3, 1, teeth of the first series compressed. *C. harmandi*, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 240, Laos.

Tylognathus davidi, sp. n., *id. l. c.* p. 86, China.

Rhinogobio vaillanti, sp. n., *id. l. c.* p. 87, China.

Barbus. Diagnoses and synonymy of 70 species, nearly all of them being figured. Day, *op. cit.* pp. 557–582, pls. cxxxvi.–cxlv.

Barbus dukai, p. 564, pl. cxliii. fig. 3, Darjeeling, *bovanicus*, Madras, p. 566, pl. cxxxviii. fig. 1, *burmanicus*, p. 572, pl. cxli. fig. 4, *arenatus*, Madras, p. 574, pl. cxlii. fig. 7; *id. op. cit.*: spp. nn.

Thynnichthys cochinensis, Gthr., = *Leuciscus sandkhol*, Sykes. Day states that the specimen from which Günther described his species is the skin of a specimen of *T. sandkhol*, Sykes, which Day himself had obtained fresh, but which he accidentally left at the British Museum. He is therefore able to say that it did not come from Cochin but from the Godaveri. *Op. cit.* p. 554.

Barbichthys nitidus, sp. n., Sauvage, *l. c.* p. 241, Indo-China.

Schizothoraæ biddulphi, Gthr., = *chrysochlorus*, M'Clell., figured, p. 3, pl. i. fig. 2; *punctatus*, Day, pl. i. fig. 3, *esocinus*, Heck., pl. i. fig. 4, *intermedius*, M'Clell., pl. ii. fig. 1, *microcephalus*, Day, pl. iii. fig. 2, *irregularis*, Day, pl. iv. fig. 1, *nasus*, Heck., pl. iv. fig. 3, figured: Day, *op. cit.*

Ptychobarbus conirostris, Steind., p. 7, pl. iii. fig. 3, *laticeps*, Day, p. 8, pl. iii. fig. 1, *longiceps*, Day, pl. iv. fig. 2, figured; *id. op. cit.*

Schizopygopsis stoliczkæ, Steind., figured; *id. op. cit.* pl. ii. fig. 2.

Diptychus severtzowi, Kessl., = *D. maculatus*, Steind., p. 10, figured; *id. op. cit.* pl. ii. fig. 3.

Agenigobio, g. n. General appearance of *Saurogobio*; body elongate; pharyngeal teeth 4–2, long and pointed; barbels none; gill-opening large, reaching to level of anterior margin of orbit; thoracic region scaly throughout its extent; dorsal without spinous ray, opposite ventral, with nine soft rays; anal with more than seven split rays; anterior suborbital in contact with eye; a symphysial tubercle at the mandible; anus situated at the base of the anal. *A. halsoneti*, sp. n., Sauvage, Bull. Soc. Philom. (7) ii. p. 87, China.

Ceratichthys zanemus, sp. n., Jordan and Brayton, Bull. U. S. Nat. Mus. xii. p. 24, Saluda River.

Luciosoma bleekeri, sp. n., Steindachner, SB. Ak. Wien, lxxviii. Abth. i. p. 391, Bankok.

Leuciscus alburnolucidus, sp. n., Linstow, Arch. f. Nat. xliv. p. 247, Weser.

Alburnops nubilus, sp. n., Forbes, Bull. Illin. Mus. No. 2, p. 56, Illinois,

Cyprinella forbesi, sp. n., Jordan, *l. c.* p. 57, Illinois.

Lythrurus atripes, sp. n., *id. l. c.* p. 59, Illinois.

Episema jejuna, sp. n., *id. l. c.* p. 60, Illinois.

Gila estor, sp. n., *id.* Man. Vert. 2nd ed. p. 300, and Bull. U. S. Nat. Mus. xii. p. 66, Tennessee.

Alburnops saludanus, sp. n. (*Hybopsis amarus*, var., Cope), Jordan

& Brayton, Bull. U. S. Nat. Mus. xii. p. 16, Saluda and Catawba Rivers.

Erogala, subg. n. of *Codoma*, for the species lately included by Jordan under *Photogenis*; type, *P. stigmaturus*, Jord. *Iid. l. c.* p. 20. Analysis of species, p. 51.

Codoma chloristia, sp. n., *iid. l. c.* p. 21, Saluda River.

Codoma trichroistia, sp. n., Jordan & Gilbert, *l. c.* p. 50, Alabama.

Phoxinus flammeus, sp. n., Jordan, Man. Vert. 2nd ed. p. 303, and Bull. U. S. Nat. Mus. xii. p. 65, Tennessee.

Hydrophlox latipinnis, sp. n., Jordan & Brayton, Bull. U. S. Nat. Mus. xii. p. 36. *Hydrophlox* is not generically distinct from *Luxilus*.

Photogenis leucopus, sp. n., *iid. l. c.* p. 41, Chattahoochee River.

Leuciscus ? australis, sp. n., Castelnau, P. Linn. Soc. N. S. W. iii. p. 51, Norman River.

Hypophthalmichthys, Blkr., 4 species noticed; *H. molitrix*, Blkr., and *nobilis*, Blkr., figured. Bleeker, Versl. Ak. Amst. (2) xii. pp. 209–218, pls. i. & ii.

Notropis dilectus, *rubellus*, *dinemus*, cannot be distinguished as species; the name *N. atherinoides*, Raf., adopted for them; Jordan, Man. Vert. p. 406.

Psilorrhynchus fasciatus, sp. n, Sauvage, Bull. Soc. Philom. (7) ii. p. 88, China.

Crossostoma, g. n. Like *Homaloptera*, but with a circlet of barbels round the mouth. *C. davidi*, sp. n., Sauvage, *l. c.* p. 89, China.

Misgurnus crossochilus, sp. n., Sauvage, *l. c.* p. 89, China.

Misgurnus laoensis, sp. n., *id. l. c.* p. 241, Laos.

Paramisgurnus, g. n. Body elongate; anterior margin of eye without spines; upper jaw with 2, lower jaw with 6 barbels, of which 2 are at the angles of the jaws; ventrals very far back, opposite dorsal, retractile within a groove; dorsal and anal bipartite, an anterior portion high, and a posterior extending to the caudal, and united with that fin; scales large. *P. dabryanus*, sp. n., *id. l. c.* p. 90, China.

Nemachilus. 31 species described, with synonymy, and mostly figured, pp. 613–622, pls. cliii.–clvi. *N. evezardi*, sp. n., p. 613, pl. cliii. fig. 11, Poona, *N. botia*. var. n. *aureus*, p. 614, pl. clvi. fig. 4; Day, Fishes of India.

Reasons for considering *Diplophysa*, Kessl., a synonym of *Nemachilus*; and remarks on the fishes that have the air-vessels enclosed in bone. *Id. l. c.* pp. 12 & 13.

Nemachilus tenuicauda, Steind., = *stoliczkæ*, Steind., p. 14, figured, pl. v. fig. 2; *N. yarkandensis*, pl. v. fig. 3, *tenuis*, pl. v. fig. 4, *ladacensis*, pl. iv. fig. 4, *gracilis*, Day, pl. iv. fig. 5, *marmoratus*, Heck., pl. v. fig. 1, figured: *id. l. c.*

Parabotia taniops, sp. n., Sauvage, *l. c.* p. 90, China.

Clupeidæ.

Heincke, F. Die Varietäten des Herings. JB. Comm. deutsch. Meere, iv.–vi. pp. 37–132, 3 pls.

Kupffer, C. Die Entwickelung des Herings im Ei. *L. c.* pp. 175–226. 3 pls.

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Synonymy and diagnoses of the Indian *Clupeidæ*, with figures of nearly all the species, are given by Day, *op. cit.* pp. 623–651, pls. clvii.–clxvi. They belong to 14 genera.

Clupea sindensis, sp. n., ? different from *venenosa*, C. V.; *id. l. c.* p. 638, pl. clxiii. fig. 2, Seychelles, Sind, and Bombay.

Engraulis. Synonymy and diagnoses of 14 known Indian species, with figures of 12; *id. l. c.* pp. 625–630, pls. clvii. & clviii.

Engraulis nasutus, sp. n., Castelnau, P. Linn. Soc. N. S. W. iii. p. 51, Norman River.

Brisbania, g. n. A Clupeoid very near to *Chatoessus*, allied by its long tapering maxillary to *Gnathobolus*, Cuv. (*Pristigaster*); the hinder ray of the dorsal elongate. *B. staigeri*, sp. n., *id. op. cit.* ii. p. 241, pl. iii, Brisbane.

Alosa vulgaris, C. V. Remarks on the branchial apparatus of this fish; Gegenbaur, Morph. JB. iv., supplement, pp. 1–42, pl. ii. figs. 12 & 13. Record of its capture in the Weser; Linstow, Arch. f. Nat. xliv. p. 246.

Etrumeus jacksoniensis, sp. n., Macleay, P. Linn. Soc. N. S. W. iii. p. 26, pl. iv. fig. 1, Port Jackson.

Albula conorrhynchus, Gthr., described from Lower California; Lockington, P. Cal. Ac. vii. [1876] p. 83.

Alepocephalidæ.

Platytroctes, g. n. Body rather abbreviated, much compressed, and covered with small keeled scales; mouth of moderate width; maxillary, intermaxillary, and mandible armed with a single series of small teeth; palate smooth; eye rather large; dorsal and anal fins opposite to each other, on the tail, moderately long; adipose fin none; caudal forked; pectoral small; ventrals none; the humeral arch terminates in the middle of the chest in a long projecting acute spine; gill opening wide; six branchiostegals; gills very narrow; pseudobranchiæ present; gill-rakers long, lanceolate; pyloric appendages rudimentary. *P. apus*, sp. n., Günther, Ann. N. H. (5) ii. p. 249, Mid-Atlantic.

Bathytroctes, g. n. Body rather elongate, compressed, covered with scales of moderate size; cleft of mouth rather wide, maxillary extending to below middle of the large eye; intermaxillary and maxillary armed with a series of minute teeth, as is also the mandible; vomer and palatine bones with similar teeth; no teeth on tongue; eyes very large; dorsal and anal fins moderately long, the former behind the ventrals; adipose fin none; caudal forked; gills very narrow, pseudobranchiæ

present; gill-rakers long, lanceolate; pyloric appendages in moderate number; ova rather small. *B. microlepis*, p. 249, off Cape St. Vincent, *rostratus*, p. 250, off Pernambuco, Günther, Ann. N. H. (5) ii. spp. nn.

Xenodermichthys, g. n. Body rather elongate, compressed, without true scales; skin rather tough, finely longitudinally wrinkled, with numerous nodules, regularly arranged; minute, rudimentary, scale-like productions embedded in the skin, especially on the trunk; mouth very small, with feeble jaws and rudimentary teeth in intermaxillary and mandible, and a few in maxillary; palate toothless; dorsal and anal fins equal in length; caudal forked; gill-opening wide, but not much extending above level of pectoral; gills well developed, with long gill-rakers; pseudobranchiæ. *X. nodulosus*, sp. n., *id. l. c.* p. 250, south of Yeddo.

Alepocephalus niger, sp. n., *id. l. c.*, p. 248, N. Australia.

Alepocephalus rostratus, Risso: on the bones of the head; Gegenbaur, Morph. JB. iv. suppl. pp. 1–42, pls. i. & ii.

Halosauridæ.

Halosaurus macrochir, p. 250, *rostratus*, p. 251, Atlantic, spp. nn., Günther, *l. c.*

Gymnotidæ.

Fritsch, —. Considerations on the Position of the *Gymnotini* in the System. SB. nat. Fr. 1878, pp. 5–7.

A further remark is added by E. von Martens, *l. c.* p. 10.

Sternarchus balænops, sp. n., Cope, P. Am. Phil. Soc. xvii. p. 682, Peru.

Muræniдæ.

Tiegel, E. Vom Rückenmark der Schlangen und der Aale. Arch. ges. Phys. xvii. pp. 594–600.

An account of experiments on the spinal marrow of [snakes and] the eel conducted in the Physiological Laboratory at Tokio in Japan.

Diagnoses, synonymy, and figures of the Indian *Muræniдæ*, belonging to 10 genera; Day, Fishes of India, pp. 658–675, pls. clxviii.–clxxii.

Saurenchelys petersi, sp. n., *id. l. c.* p. 663, pl. clxxviii. fig. 6, Orissa.

Ophichthys microcephalus, sp. n., *id. l. c.* p. 669, pl. clxx. fig. 2, Malabar.

Ophichthys episcopus, sp. n., Castelnau, P. Linn. Soc. N. S. W. ii. p. 244, Moreton Bay.

Nemichthys infans, sp. n., Günther, Ann. N. H. (5) ii. p. 251, Atlantic.

Cyema, g. n. Type of a new group of *Muræniдæ* allied to the *Nemichthyina*. Combines the form of snout of a *Nemichthys* with soft short body of a *Leptocephalus*; but the gill-openings are very narrow and

close together on the abdominal surface; vent in about middle of length of body; vertical fin well developed, confined to and surrounding the tail; pectoral fins well developed; eye very small. *C. atrum*, sp. n., Günther, *l. c.* p. 251, Pacific and Antarctic.

F. Putnam has a note on the spawning of the eel (*Anguilla bostoniensis*). P. Bost. Soc. xiv. p. 279.

Also on the economy of the eel: Schmidt, Arch. Ver. Mecklenb. xxxi. pp. 102–110; and on Nematoid parasites mistaken for young eels, W. Sellin, *l. c.* pp. 111 & 112.

LOPHOBRANCHII.

The Indian genera and species are described by Day, *op. cit.* pp. 676–683, pls. clxxiii.–clxxvi.

Ichthyocampus annulatus, sp. n., Macleay, P. Linn. Soc. N. S. W. ii. p. 364, pl. x. fig. 6, Port Darwin.

Doryichthys falkensteini, sp. n., Reichenow, SB. nat. Fr. 1878, p. 92, Loango Coast.

PLECTOGNATHI.

Indian *Plectognathi* by Day, *op. cit.* pp. 684–708, pls. clxxv.–clxxix.

Monacanthus guttulatus, sp. n., Macleay, *op. cit.* iii. p. 37, pl. iv. fig. 2, King George's Sound.

Monacanthus yagoi, p. 245, *santi-joanni*, p. 246, *peroni*, p. 247, Castelnau, *l. c.*, Australia, spp. nn. *M. obscurus*, Cast., = *margaritifer*, id. *l. c.* p. 247.

Tetrodon bibroni and *staigeri*, spp. nn., *id. l. c.* pp. 247 & 248, Brisbane River.

Tetrodon fasciatus, sp. n., Macleay, *op. cit.* ii. p. 365, pl. x. fig. 5, Port Darwin.

Tetrodon. A species figured as *Bondaroo kappa* by Russell is named *T. leopardus* by Day, *op. cit.* p. 706, pl. clxxx. fig. 2.

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BY

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Anatomy and Physiology.

Huxley discusses the *Mollusca* in his valuable Manual of the anatomy of invertebrated animals, 1877, pp. 470-542.

L. Fredericq discusses the physiology of *Octopus vulgaris*. According to him, its blood amounts to about one-twentieth of the weight of the body, it is blue, salt in taste, but less bitter than sea-water, and contains colourless globules, which agglutinate together when taken out of the body; but it appears that there is no fibrin in the blood. Analyses of the blood are given. The heart beats about thirty-five times to the minute; its movement is retarded by electric irritation of the visceral nerve which follows the vena cava, and accelerated by section of the same. The blood passes from the arteries to the veins by true capillary vessels, not by lacunæ. The renal organs do not serve to convey water from without into the interior of the body, as has been supposed by former authors; chemical analyses of their secretion are given. The centre of the respiratory movements is in the posterior part of the infra-œsophagean ganglion; they are not accelerated by obstacles to the normal circulation of the blood, as in the *Vertebrata*, but only retarded. The change of colour by the chromatophores is a case of mimicry, but depends on the pallial nerves; their section paralyses the dilator muscles of the chromatophores and renders the animal pale; irritation darkens its colours by expansion of the same; intense light paralyses them also temporarily. The secretions of the salivary glands and that of the liver are distinctly acid; the former containing no digestive ferment, but the latter dissolves fibrin and changes amidon into glycose, it therefore resembles the pancreatic fluid of the *Vertebrata*. The nervous string in each arm of the Cephalopods is a centre for reflex movements, in the same manner as the spinal marrow in the *Vertebrata*, and these movements show the character of protection and defence, like the movements of a decapitated frog. The muscles contain much taurine, but apparently no glycogene. Arch. Z. expér. vii. pp. 535–583.

M. Fürbringer has microscopically examined the cartilages in the head of the Cephalopods, and states that their structure more resembles that of the bones of the higher animals than hyaline cartilage. Morph. JB. iii. [1877] pp. 456–458, with a woodcut.

1. *Muscular System and Movement.*

H. Simroth has examined the manner of creeping in *Limax cinereoniger* (Wolf), *Arion ater* (L.), and *Helix pomatia* (L.): he distinguishes two systems of fibres within the foot, those which he calls locomotive, or extensile, are the true active part during creeping, but they act by extension, not by contraction, and can only do so when the lacunæ within the foot are filled with blood; they begin their activity only when excited by the influence of the pedal nerves, but continue it independently of the nerves; their extension causes the undulating aspect at the lower side of the foot; they are all disposed in the longitudinal direction and move the

animal only in a straightforward direction. The other system consists of true muscular fibres, acting by contractions and only under the simultaneous influence of the nerves; they are disposed in an oblique direction and alone cause the lateral bending in the gait of the animal and the real shortening of the foot. In *Arion* and *Limax*, the locomotive fibres occupy only the middle longitudinal area of the lower surface of the foot; in *Helix pomatia*, they are intermingled with the others through its whole breadth. A small *Helix* can move along even when burdened with a weight ninefold its own. Z. wiss. Zool. xxx. suppl. vol. pp. 166–224, pl. viii.; abstract and some additions in Z. ges. Naturw. (3) iii. pp. 381–383.

A. Coutance [*supra*] has made various interesting experiments on the muscular contraction in Bivalves, chiefly *Pecten maximus*. A weight of about 10,000 grammes, or somewhat more, is needed for opening by force a contracted *Pecten*, the weight of which with the shells is 200, without the shells, 85 grammes; and then the adductor is suddenly rent, not extended. The borders of the mantle are the most sensitive part of the animal; they contract when irritated four days after the removal of one valve, and also after extirpation of the heart. The heart itself is less sensitive than the adductor muscle. A *Pecten* kept closed for nineteen consecutive hours, by imposition of a weight of 600 grammes, and then released, never opened itself, but proved after four days to be dead in the contracted state. A heat of 35°–45° C. annuls the contractility of the adductor muscle by galvanic irritation, cold of —5° C. for twenty minutes renders the animal stiff and insensible; the sensibility is restored for a short time by heat of 35°–40°, but after some hours it ceases totally. Injections of toxical substances destroy the muscular sensibility only slowly and uncertainly; mechanical irritation has only local effects, puncture by a red-hot needle has no more effect than a cold one; galvanic irritation exhibits the most sure and extensive effect. The mode of contraction, chiefly in the borders of the mantle, is different according to the modes of irritation. The adductor muscle is composed of two parts; one, consisting of striated fibres, has its natural volume, and is therefore at rest when the valves are a little opened; the other one being nacreous, consisting of smooth fibres, is even extended when the valves are closed, and has therefore always a tendency to contraction, and so the muscle as a whole is never totally at rest during the life of the animal. In the Oyster, the same two parts of the adductor muscle can be distinguished, but both consist of smooth fibres, those of the non-nacreous part being undulated and transparent. An Oyster of 144 grammes, without shell 12 grammes, yielded to the closing of its valves only under the traction of 10 kilogrammes. In *Anomia*, both muscles, the external fixed to a foreign object and the internal closing the valves, are composed of both these elements. In most *Dimyaria*, for instance *Venus* and *Tapes*, both adductors are also composed of both elements; but in *Pectunculus* one adductor consists only of the nacreous element, in the other the transparent much prevails.

H. v. Ihering also distinguishes the same two parts in the posterior adductor muscles of several Bivalves, and in that of *Pecten*, and calls the one of yellowish colour the muscular, the other (of whitish-blue colour)

the ligamentous part; according to him, the first serves to close the valves rapidly, the second to keep them closed. Z. wiss. Zool. xxx. suppl. vol. pp. 15–20, & 26.

Note on the movement of the radula in the Gastropods, by P. Geddes, P. Z. S. 1878, p. 212.

2. *Digestion and Secretion.*

The secretion of the so-called liver in *Arion rufus* dissolves fibrin very slowly, but contains a diastatic ferment by which amidon is changed into glycose; it can therefore best be compared with the pancreatic liquid of the *Vertebrata*; the secretion of the liver of *Mya arenaria* and *Mytilus edulis*, on the contrary, is distinctly acid. L. Fredericq, Arch. Z. expér. vii. pp. 397–399. See also the same author's paper on the *Cephalopoda*, extracted *suprà*.

Chemical notes on the digestion in several *Mollusca*; Krukenberg, Untersuch. d. physiol. Instituts in Heidelberg, ii. p. 271. Manganese, without iron, found in the renal organ ("organ of Bojanus") of *Pinna squamosa*; id. *l. c.* pp. 287–289.

3. *Circulation and Respiration.*

W. Flemming maintains his views on the vascular system in the Bivalves [Zool. Rec. xiv. *Moll.* p. 9], and states that their blood-cells show moveable expansions, like the pseudopodia of the *Rhizopoda*. Arch. mikr. Anat. xv. pp. 243–252, with a plate.

J. Kollmann gives a short note on the form of what he thinks to be lacunæ in the vascular system of the *Mollusca*. MT. morph. Ges. München. 1878, p. 10.

Notes on nerves in the heart of some *Mollusca*; J. Dogiel, Arch. mikr. Anat. xv. pp. 95–97.

"Hæmocyanin," a new substance containing copper, found in the blood of the Cephalopods, by L. Fredericq, C. R. lxxxvii. pp. 996–998. For the same author's observations on the circulation in *Octopus*, see *suprà*.

J. Carrière discusses the chink-like opening in the edge of the foot of many Bivalves, and comes to the conclusion that it is not the orifice of the so-called aquiferous vessels, but of a peculiar gland, analogous to the byssal glands of other Bivalves; Zool. Anz. i. p. 55. H. v. Ihering has also observed that what have been described as aquiferous vessels in the foot of *Cyclas* [*Sphærium*], are only cutaneous glands in the shape of bags, without posterior orifice; *tom. cit.* pp. 274 & 275.

C. P. Sluiter has examined the structure of the gills in *Mytilus*, *Donax*, *Mactra*, *Mya*, *Venus gallina*, *Ostrea*, and *Solen*. He comes to the conclusions that their filamentous form is to be regarded as the primitive, that various degrees and modifications to the lamellar form are to be found, and that a knowledge of them must be extended over many more genera before an attempt at classification based on these differences can be successful. Thus the structure of the gills is very similar in *Ostrea* and *Solen*, although these genera stand far apart in the usual systems. Concerning the question of vascular lacunæ, he states that in *Mytilus*

edulis, without doubt the vascular system within the gills is closed throughout, without lacunæ, and he thinks that very probably it is so also in the other Bivalves. Niederl. Arch. Zool. iv. pp. 75–103, pl. vii.

C. Semper mentions incidentally that in several air-breathing Gastropods, as *Siphonaria*, *Ampullaria*, and some species of *Neritina*, the distribution of the respiratory vessels is similar to that observed by him in a terrestrial Crustacean, *Birgus latro*, viz., the respiratory cavity contains gills and an air-breathing part, and the vessels of both come from the body and go to the heart, and are therefore truly respiratory. Z. wiss. Zool. xxx. p. 287.

4. *Organs of Sense.*

Optical purple (seh-purpur) in the rodlets (stäbchen) of the eye of Cephalopods, stated by C. F. W. Krukenberg, Untersuch. physiol. Inst. Heidelberg, ii. pp. 58–61; in the eyes of *Pecten jacobæus* (L.), by v. Hensen, Zool. Anz. i. p. 30. The existence of a crystalline lens in the eyes of the same species, described by Keferstein, confirmed by v. Hensen, *tom. cit.* p. 30.

J. Schöbl describes the blood-vessels in the eye of *Sepia*, and discusses the homology of its eye-membranes with those of other animals; Arch. mikr. Anat. xv. pp. 215–243, with 2 pls.

C. Claus gives some observations concerning the otocysts of the *Heteropoda*, and opposes some of Ranke's assertions [Zool. Rec. xii. p. 136]; Arch. mikr. Anat. xv. pp. 341–348, with a pl.

5. *Genital Organs.*

The genital organs of *Sepia*, *Loligo*, *Sepiola*, *Eledone*, and *Octopus* have been studied histologically and morphologically by J. Brock: he comes to the result that the glandular appendages in the males, however different in shape and situation, are essentially identical in microscopical structure and function, secreting the spermatophore, and that the nidamental glands of the females exhibit nearly the same microscopical changes during activity as these male glands; these changes are fully described. Some of E. Ray Lankester's statements are questioned or denied (the presence of a vitelline membrane is confirmed). The aquiferous vessels connecting the genital organs with the urinary sac, are really homologous in the Octopods and Decapods, however externally different; their function is unknown. Z. wiss. Zool. xxxii. pp. 1–116, 4 pls. An abstract in SB. Soc. Erlang. x. pp. 204–209.

The existence of a special duct, connecting the stalk of the receptaculum seminis (stalked vesicle) with the uterus, pointed out in *Clausilia plicatula*, *plicata*, *cana*, *biplicata*, *lineolata*, *nigricans*, *ventricosa*, *pumila*, and *Balea fragilis*, by F. Wiegmann, JB. mal. Ges. v. pp. 165–167, with woodcut. A similar duct is stated by G. Pfeffer in *Trochomorpha ibuensis* and *percarinata*, in the former no external orifice of the penis could be found; the author therefore thinks that this duct is destined for self-fecundation. Arch. f. Nat. xliv. pp. 421–423, pl. xiii. figs. 5 & 6.

Several observations on the spermatophore of some *Pulmonata* (chiefly

Naninidæ), and its formation in a cœcal appendage of the penis, termed by C. Semper "Kalksack" [sac containing calcareous particles], and essentially identical with the "flagellum," by G. Pfeffer, JB. mal. Ges. v. pp. 264–271. The spermatophore of several species of *Nanina* and *Macrochlamys* described; *id.*, Arch. f. Nat. xliv. pp. 424–426, pl. xiii. figs. 7–14.

A paper on spermatogenesis in the *Pulmonata*, by Duval, Rev. Montp. vii. pp. 277–302 [not seen by the Recorder].

6. *Embryology.*

The development of *Anodonta* after leaving the gills of the parent has been studied by Max Braun and Carl Schierholz, and the considerable gap hitherto existing in our knowledge of its young state filled up for the greater part. The larva fixes itself to the fins, gills, or barbels of living fishes, grasping the skin by the two strong hooks situated at the margins of the embryonal shell. The byssal thread serves, according to Schierholz, not only as a feeler, but also for interlacing several individuals together, and bringing all to the fish when one of them has grasped it. The bundles of bristles are probably sensitive organs. The young animal is then enclosed in a cyst, formed by a growth of the fish's skin at the infested spot, passing therein, according to Braun, 71–73 days. During this time, the young shell does not grow in size, but the whole organization of the animal, including the histological composition of the mantle, is changed. Both observers agree in the statement that the foot, intestine, ganglia, and gills are definitively formed during this stage, at which the genital organs have not made their appearance. Schierholz, differing from Braun, says that the first traces of these organs can be distinguished in the embryo in the gills of the parent, and that the two adductor muscles are found in the enclosed stage, the larva having only one central adductor; but Braun avers that the latter disappears and the anterior and posterior are both newly formed. Schierholz maintains that the old central adductor is transformed into the anterior, and that only the posterior is newly formed; the fore and hind parts of the embryo, according to him, have been mistaken by former observers, the mouth and vent being situated far backwards in the embryo. If the young animal is fixed to a fin ray, this weakened and thinned; Braun thinks that the Mollusk draws a supply of calcareous matter from it, which is not admitted by Schierholz. The latter describes also the embryonal development in the egg, and points out how that part of the yelk in which the multiplication of cells is the more energetic is prevented from touching the egg-shell by something like a directive vesicle, as long as the embryo floats in the egg. He also states that the young of *Anodonta* grows much more rapidly than that of *Unio*, the former reaching at the end of the first year the size of about 15, of the second 22, and of the third 26 mm., whereas *Unio* only reaches about 7, 12, and 14 mm. The observed species of *Anodonta* left the fish in April or May, those of *Unio* in July or August. C. Schierholz, "Zur Entwicklungsgeschichte der Teich- und Fluss-muschel," Berlin: 1878, 71 pp. 3 pls.; a short abstract in Z. wiss.

Zool. xxxi. pp. 482–484. M. Braun, Zool. Gart. xix. 1878, pp. 161–170; also JB. mal. Ges. v. pp. 307–319, and Zool. Anz. i. pp. 7–9; abstract in Verh. Ges. Würzb., May, 1878.

Observations on the development of *Purpura lapillus* by Robin, Mém. Ac. Sci. xl. [1876] No. 9, pp. 72, 141, 273–278, 298, 316–322, pls. xvii. & xviii.; of *Limnæa* and *Ancylus fluviatilis*, tom. cit. pp. 54, 65–79, 141, 273–278, 344–369, pl. xix.

Eggs of *Limnæa stagnalis* (L.), hatch in 17 days in violet light, in 19 in blue, 25 in yellow, 27 in white, 36 in red light, 33 in darkness. E. Yung, Arch. Z. expér. vii. pp. 273 & 274.

The calcareous eggs of *Bulimus* are distinct from those of birds and reptiles in their vitreous transparent surface, which is either entirely smooth or only slightly roughened at the extremities by flat granules and sharply defined pores. König-Warthausen, Mal. Bl. xxv. pp. 176–178.

7. *Biology.*

G. S. Tye gives some very interesting observations on the spinning of several *Mollusca*, chiefly *Limnæidæ*, but also slugs and *Pectinibranchia*, partly from his own observation, with special regard to Warington's paper on the same subject in the "Zoologist," 1852. Q. J. Conch. 1878, No. 17, pp. 401–415.

Limax agrestis spinning slimy threads, T. Eimer, Zool. Anz. i. p. 123; a short account of similar observations by several previous authors, from Lister (1678) to Harte (1865), on different species of *Limax*, on *Megalomastoma suspensum* (Guilding), on *Potamides obtusus*, *Physa*, *Valvata*, and *Rissoa*, by the Recorder, *tom. cit.* pp. 249–251.

Natica perforating other shells; Leidy, P. Ac. Philad. 1878, p. 332.

Patella abrading the surface of rocks, observed by J. Clarke Hawkshaw, J. L. S. xiv. pp. 406–411 [*infrà*].

Notes on birds as enemies of bivalve Mollusks, by W. A. Durnford, Zool. 1878, pp. 223–225.

8. *Abnormities.*

S. Clessin discusses some of Leydig's [Zool. Rec. xiii. *Moll.* p. 5] observations upon the differences of the cuticle in several land-shells, and remarks that the development of this part, which gives the surface sculpture to many shells, depends on the supply of fresh vegetable food, and that where snails live in layers of decayed leaves their shell becomes unusually thin, because they have no access to calcareous substances. Mal. Bl. xxv. pp. 143–148.

Albino varieties. V. Gredler enumerates a rather large number in various Alpine species of *Hyalina*, *Helix*, *Bulimus*, *Pupa*, and *Clausilia*; he inclines to think them hereditary, but acknowledges that they are somewhat morbid, the albino being often smaller than the coloured specimens, and found chiefly near the vertical or horizontal boundary of distribution of their species. Nachr. mal. Ges. 1878, pp. 33–37. Some other instances of albinism in land-shells mentioned by Oberdorfer, *tom. cit.* p. 69.

P. Hesse has observed some instances of albinism on Mt. Wittekind,

Westphalia, and thinks with Hartmann (Gastropoden d. Schweiz, 1840–44, p. xvii.) that they are caused by moisture, cold, and want of sunshine. The albino offspring of an albino parent recorded by COLBEAU, Bull. Soc. mal. Belg. vii. p. lxxxix., Nachr. mal. Ges. 1878, pp. 70 & 71.

Sinistral specimen of *Valvata piscinalis* (Müll.), JEFFREYS, Ann. N. H. (5) ii. p. 382; of *Cionella lubrica* and *Pupa muscorum*, OBERDORFER, Nachr. mal. Ges. 1878, p. 68; of *Helix* (*Patula*) *humilis* (Hutton), NEVILL, Handl. Ind. Mus. p. 66.

Scalarid abnormity of *Succinea pfeifferi* (Rossm.) observed in Styria; Tschapeck, Nachr. mal. Ges. 1878, p. 137, woodcut.

Some observations opposed to those of Ihering, on the connection between the spiral direction of the shell, left or right, and the situation of the inner organs; G. PFEFFER, JB. mal. Ges. v. pp. 260 & 261. Note on normal or exceptional left or right direction of the whorls in spiral shells; E. v. MARTENS, SB. nat. Fr. 1878, p. 81.

Deformity of *Helix hortensis* (Müll.) with channelled suture, caused by a small pebble pinched in the shell; P. HESSE, Verh. Ver. Rheinl. xxxv. p. 88.

Abnormity of *Cylindrella raveni* (Bland), provided with two apertures placed almost back to back, observed and rightly explained from accidental fracture by J. S. GIBBONS, Q. J. Conch. 1878, No. 15, p. 340. [Similar specimens of *Clausilia* described, and even produced artificially, by W. HARTMANN, Gastropoden d. Schweiz, 1844, p. 173, pl. lx.]

Monstrous growth of *Cyprœa pease*i (Sow.), EDGAR A. SMITH, P. Z. S. 1878, p. 731, pl. xlvi. figs. 13 & 14.

Specimen of *Pupa muscorum* (L.), with rudimentary male, but well-developed female organs; F. WIEGMANN, JB. mal. Ges. v. p. 159.

GEOGRAPHICAL DISTRIBUTION.

a. LAND AND FRESHWATER MOLLUSCA.

C. P. GLOYNE continues his paper on the geographical distribution of terrestrial *Mollusca*, going through the different geographical provinces and sub-regions, and noting the genera and number of species found hitherto in them. Q. J. Conch. 1878, No. 14, pp. 289–320.

1. *Northern and Central Europe.*

The second fascicle of WESTERLUND's Fauna Europ. Moll. extramer. contains the genera *Cionella*, *Stenogyra*, *Pupa*, *Balea*, and the greater part of *Clausilia*.

S. CLESSIN enumerates 30 [so-called] species and 20 varieties of land- and freshwater-shells, which according to him live in Sweden, and not in more southern regions, and he adds to them seven new varieties, collected by C. Anderson in the province Dalarne [most of them appear to be very local variations of widely distributed species]. Mal. Bl. xxv. pp. 67–79.

Norway. A list of 71 terrestrial and 40 freshwater species, of which

only 2 terrestrial and 3 freshwater species are found in the Arctic part of Norway or Finmark (viz., *Margaritana margaritifera*, *Limnæa peregra*, *Succinea putris*, *Zonites hammonis*, and *Helix arbustorum*), and 23 terrestrial and 3 freshwater in middle Norway, near Trondhiem, is given by G. O. Sars, Moll. arct. Norveg. pp. 369–372.

Russia. Nine species of terrestrial and 27 freshwater species, collected by C. Polenhoff, in the government Tambow, at an affluent of the Don, enumerated by E. v. Martens, with some observations on the distribution of land and freshwater mollusks in the different faunistic subdivisions of European Russia which have been distinguished by Bogdanow. Generally the fauna of terrestrial shells is rather poor and uniform from the shores of the White Sea to the Southern Provinces, and it is only at the shores of the Black Sea, at Odessa, and chiefly in the Crimea, that distinct species of South European type make their appearance. Among the freshwater shells there are some distinct southern species and genera, generally common to all Russian rivers emptying into the Black Sea, and also to the Danube, such as *Lithoglyphus* and *Melanopsis*; these extend much more northwards than the southern terrestrial shells. SB. nat. Fr. 1878, pp. 82–89.

41 species of *Clausilia* observed in Russia are enumerated by O. Böttger, Mél. Biol. x. pp. 159–198. 26 of them are found only in the Crimea, Caucasus, or Transcaucasia; the following are more or less generally spread over middle Europe, and occur also in the Baltic provinces of Russia:—*C. perversa* (L., *Balea*), *laminata* (Mont.), *commutata* (Rossm.) (?), *orthostoma* (Menke), *plicata* (Drap.), *biplicata* (Mont.), *cana* (Held.), *parvula* (Stud.) ?, *dubia* (Drap.) ?, *nigricans* (Pult.), *cruciata* (Stud.), *pumila* (Ziegl.), *plicatula* (Drap.), *ventricosa* (Drap.), and *filograna* (Ziegl.).

Poland. A. Slosarski gives a list of 52 terrestrial and 53 freshwater species observed in Russian Poland. The most common terrestrial species near Warsaw are *Helix arbustorum*, *hispida*, and *pulchella*; near Zloty Potok, *H. austriaca* and *fruticum*; near Ojcow, *H. faustina* and *rufescens*. Only 4 species of *Pupa* (*avenacea*, *muscorum*, *minutissima*, and *doliolum*) are enumerated; but 8 of *Clausilia*: *bidens* [*laminata*], *similis* [*biplicata*], *rugosa* [?], *plicata*, *plicatula*, *commutata*, *parvula*, and *ventricosa*. Freshwater mollusks are much more copious in number of individuals than terrestrial. Among the more remarkable of them are *Limnæus silesiacus*, *Planorbis septemgyratus*, *Amphipeplea glutinosa*, *Valvata naticina*, *Hydrobia viridis* [?] and *dunkeri*, *Lithoclypus fuscus*, in the river Bug; and *Cyclas rivicola*. *Dreissena polymorpha* is common in the Vistula near Morysinek. Bull. Soc. Z. Fr. i. [1876], pp. 291–299.

Galizia. 90 terrestrial and 64 freshwater species enumerated by J. Król, Verh. z.-b. Wien, xxviii. pp. 1–10.

New species for the British fauna: *Succinea virescens* (Morelet) = *putris* var. *vitrea* (Jeffreys, Brit. Conch.), and *Vertigo lilljeborgi* (Westerlund); new British localities for *Vertigo moulinsiana* (Dupuy), and *angustior* (Jeffr.); Jeffreys, Ann. N. H. (5) ii. p. 382.

Yorkshire. W. Nelson's and J. W. Taylor's paper on the land and

freshwater *Mollusca* of Yorkshire, Trans. Yorksh. Nat. Un., sect. c. (1877 ?), has not yet been seen by the Recorder.

Sussex. 48 terrestrial, 27 freshwater Gastropods, and 9 Bivalves, by J. E. HARTING, Zool. ii. pp. 84–94, 122–126, 161–166, & 180 & 181.

Guernsey. 28 land-shells and 11 freshwater *Mollusca* observed by A. H. COOKE and H. M. GWATKIN, Q. J. Conch. 1878, No. 15, pp. 321–324 *Helix rufescens*, *sericea*, and *rupestris* are wanting. *Helix pisana*, abundant at Vazon Bay, and decidedly large, introduced from Jersey in 1850 (p. 332).

France, Département du Nord. Synoptical table of its land and freshwater *Mollusca*; A. LELIÈVRE, Bull. Sci. Nord (2) i. pp. 84 & 85, 143–153, 178–183.

Oldenburg. Notes on some terrestrial and freshwater shells, including *Helix cantiana* (Mont.); H. v. HEIMBURG, Nachr. mal. Ges. 1878, pp. 4–6.

Westphalia. 44 terrestrial and 47 freshwater species observed by P. HESSE, Verh. Ver. Rheinl. xxxv. pp. 83–109; the most remarkable among them are *Pupa doliolum*, *Bulimus montanus*, and *Cyclostoma elegans*.

Cassel. Lists of Mollusks found in its neighbourhood by F. H. DIEMAR, in "Führer durch Cassel und seine nächste Umgebung," Festschrift zur 51. Versammlung deutscher Naturforscher und Aerzte. Cassel: 1878, pp. 95–97. Some species collected on the Garenberg, near Cassel, mentioned by S. CLESSIN, Mal. Bl. xxv. p. 143.

Thuringia. 22 terrestrial and 1 freshwater species from Meiningen and Coburg, enumerated by BÖTTGER, Nachr. mal. Ges. 1878, pp. 1–3. A few shells from Ilmefeld mentioned; *id. l. c.* p. 131.

Some species of land-shells occurring in the *Valley of the Rhine*, between Bingen and Coblenz, wanting in most other parts of Germany, e.g., *Cyclostoma elegans* (Müll.), *Amalia marginata* (Drap.), *Daudebardia rufa* and *brevipes* (Drap.), and *Helix carthusiana* (Müll.) are discussed by F. C. NOLL, Jahres-Bericht des Frankfurter Vereins für Geographie und Statistik, 1878, pp. 41–45.

New or confirmed localities for several species of *Clausilia* in Western Germany, by BÖTTGER, Nachr. mal. Ges. 1878, pp. 131–137.

Note on some *Clausiliæ* collected on the Vogelsberg Mountains, in Hesse; *id. l. c.* p. 108.

Note on some slugs found in the province Oberfranken, Bavaria; *id. l. c.* p. 86. 30 species of *Mollusca*, collected in the province Unterfranken; *id. l. c.* pp. 106–108.

List of 18 terrestrial species found in the Vosges Mountains by A. ANDREAE, Nachr. mal. Ges. 1878, pp. 87 & 88.

Alps. S. CLESSIN discusses Alpine species, distinguishing (1) those found also in other mountains and northern countries, e.g., *Vitrina elongata*, *Hyalina glabra*, *Helix holoserica*, &c., they are also found in pleistocene formations and had a wider distribution in former times; (2) those confined to the Alps and not found in pleistocene, e.g., *Vitrina annularis*, *Helix ichthyomma* [this, on the contrary, is found in a semifossil state in Thuringia, Zool. Rec. xiv. *Moll.* p. 26] and *preslii*, &c. He observes that many species cannot be found high up in the Alps, only because fit

localities, such as ponds, slowly-flowing rivulets, and leafy woods, &c., are not found there, and describes 5 peculiar Alpine varieties of land-shells, and 3 apparently new Alpine species. Mal. Bl. xxv. pp. 81–89.

F. A. Forel recapitulates his observations on the deep fauna of the lakes in Switzerland; he has found the following species in Lake Leman, in depths from 15 to 334 mètres, where only a few cryptogamic plants grow; *Limnæus stagnalis, abyssicola* (Brot), *foreli* (Clessin), *Valvata obtusa*, *Pisidium foreli* and *profundum* (Clessin). Z. wiss. Zool. xxx. suppl. vol. p. 386.

Some land-shells collected at Culoz, Dép. Ain, by W. Kobelt, Nachr. mal. Ges. 1878, p. 97.

Transylvania. The known species of *Hyalina* treated by C. Jickeli, Verh. siebenb. Ver. xxviii. pp. 122–125.

2. *Southern Europe.*

Many little-known species of *Helix*, subgenus *Xerophila* and *Fruticicola*, of *Hyalina*, with some of *Unio* and *Anodonta*, from Southern Europe and the Mediterranean shores of Asia and Africa, are treated and figured in Kobelt's continuation of Rossmässler's Iconographie, vi. pts. 1–3, pls. 151–165.

Pyrences. P. Fischer gives a second supplement to his malacological fauna of the valley of the Cauterets [Zool. Rec. xiii. *Moll.* p. 11], adding 3 more species, and various notes to those already enumerated; J. de Conch. xxvi. pp. 137–143. De St. Simon has published a paper on the *Mollusca* of the Dép. Haute-Garonne; 19 species are found only in the mountains, 51 both in mountains and plains, 65 only in the plains. Those peculiar to the mountains are:—*Vitrina elongata, Zonites radiatulus, Helix rupestris, carascalensis, Azeca trigonostoma, Pupa cylindracea, triplicata, doliolum, avenacea, bigorriensis, jumillensis, Planorbis lævis, Limnæa peregra, Pomatias marquetianus, Paludinella simoniana, guranensis, reyniesi, baudoniana*, and *Pisidium thermale.* Bull. Soc. Toulouse, 1876; abstract in J. de Conch. xxxvi. p. 194. Folin & Berillon have published a "Contribution à la faune malacologique de la région extrême du S.-O. de la France" (Dax, 1876, second fascicle, Bayonne, 1877), containing notes on the snails found at Jean-Pied de Port, Dép. Basses Pyrénées, and descriptions of *Cryptazeca monodonta* [Zool. Rec. xiv. *Moll.* p. 67], *Acme micronema*, and *Zua lubrica* var. *dentata*; abstract in J. de Conch. xxvi. pp. 194 & 195. P. Fagot has found a number of rare terrestrial species, hitherto only known in the alluvial plains of the Garonne, alive on the eocene and chalk between Cazères and St. Martory, including a new *Clausilia*. Bull. Soc. Toulouse, xi. [1877]; abstract, J. de Conch. xxvi. p. 201.

D. Dupuy has observed 40 species living on a little alluvial island of the Gironde, including *Helix cornea* (Drap.) and *Limnæa glabra* (Müll.); Rev. agric. et hort. du Gers, 1878.

Southern France. Dubrueil publishes a new paper on the terrestrial and fluviatile *Mollusca* of the Dép. de l' Hérault (Montpellier); Rev. Montp. vii. pp. 52–60, 209–216, 329–336. Some notes on the malaco-

logical fauna of the small island in Marseilles roads are given by J. Chareyre; Bull. Soc. Mars. sep. copy, 8 pp.

Balearic Islands. G. Hidalgo enumerates 72 terrestrial species, including 1 *Truncatella* and 5 *Auriculidæ*; three-fourths of them occur also in Spain, about a half in Sicily, Algeria, and Southern France; 1 species of *Limax*, 12 *Helix*, and 1 *Alexia* are peculiar to the group, but most of them are nearly allied to Spanish species; the most characteristic are some species of *Helix*, section *Jacosta*, among which some are new. J. de Conch. xxvi. pp. 213–247.

Mme. Paulucci has exhibited at Paris her rich collection of Italian land-shells and published a catalogue of it (*suprà*), containing a complete enumeration of all species known to occur in Italy, amounting to 534, with geographical observations and descriptions of new species; the last also in JB. mal. Ges. v. pp. 355–359. Critical observations by Kobelt, JB. mal. Ges. v. pp. 285–287.

Lombardy. Malacological notes from the environs of Lake d'Idro, by V. Gredler, Nachr. mal. Ges. 1878, pp. 17–24.

Notes on land-shells observed at Genoa, Carrara, and Terni, by W. Kobelt, Nachr. mal. Ges. 1878, pp. 98–101, 117–120.

List of 46 terrestrial and only two freshwater species collected near Ascoli, in Umbria, Middle Italy, by A. Mascarini, with notes on their geographical distribution by W. Kobelt; Nachr. mal. Ges. 1878, pp. 81–85.

Pelagosa Island, in the Adriatic. *Helix vermiculata, aspersa, variabilis, pyramidata, pisana, cellaria, naticoides* [*aperta*], *Bulimus acutus*, *B. pupa* and a peculiar variety of *Clausilia gibbula* observed by M. Stossich, Boll. Soc. Adr. iii. p. 191.

Naples. Some species of *Hyalina* and *Helix*, subg. *Campylæa* and *Macularia*, discussed by N. Tiberi, Moll. terr. Nap. (Bruxelles: 1878, 8vo).

Thirty-six species of land-shells collected by Enr. d'Albertis at several small and little-known islands of the Mediterranean, as Pianosa, Galita, Lampedusa, and some points of Greece and Turkey are enumerated by A. Issel, Ann. Mus. Genov. xi. pp. 451–456.

Greece. Böttger on the known species of *Clausilia*, sect. *Albinaria* (see *infrà*, in the special part).

3. *Northern and Middle Asia.*

Caucasia. A list of 146 terrestrial and 40 freshwater *Mollusca* from the Caucasus and Transcaucasia, with original notes on many of these, is given by O. Schneider in his "Naturwissenschaftliche Beiträge zur Kenntniss der Kaukasus-länder," 1878, pp. 20–30. New Caucasian land-shells described by O. Böttger, Nachr. mal. Ges. 1878, pp. 120–124. Transcaucasian *Clausiliæ* enumerated; *id.* Mél. Biol. 1878, pp. 159–198.

Persia. Some shells collected by W. T. Blanford in Persia, most of them near Mazanderan, are mentioned in G. Nevill's Handlist of the Indian Museum, Calcutta, pt. i.

Japan. The Japanese species of *Corbicula* discussed by REINHARDT, JB. mal. Ges. v. pp. 185–194, pl. v.

China. R. P. HEUDE, Conch. fluv. de Nank. pt. iv., continues to figure new species of *Unionidæ* from the provinces Ngan-hoei and Kiangsu. EDGAR A. SMITH figures some new species of *Melania* from Formosa; P. Z. S. 1878, p. 728, pl. 46. Seven species of terrestrial, 2 new, and 8 of freshwater shells collected by the missionary Fuchs, in the Valley of the Yangtsekiang, province Hupe, are enumerated by V. GREDLER, Nachr. mal. Ges. 1878, pp. 101–105.

The *Mollusca* collected by the late Dr. Stoliczka during the second Yarkand Expedition are described by G. Nevill; he says, "the change from the Indo-Malayan to the so-called European molluscous fauna at the northern watershed of the Kashmir Valley is most abrupt and distinct, every species found at Sonamurg belonging to the former, while at only two days' march from thence, at Mataian, every shell belongs to the latter. Also the aspect of the country entirely changes, the forest-clad hills of Kashmir disappear and, instead, one enters a sterile, dry country of higher elevation, altogether Tibetan in character." 13 terrestrial and 18 freshwater species have been found from thence unto Yarkand and Kashgar, 5 terrestrial and 11 aquatic of these are widely distributed European species, the rest either new or already known from Samarcand or its neighbourhood by Fedchenko. The European species are:—*Vitrina pellucida* (Müll.), *Hyalina fulva* (Drap.), *Helix costata* (Müll.), *Pupa muscorum* (L.), *Succinea pfeifferi* (Rossm.), *putris* (L.), *Limnæa auricularia* (L.), *lagotis* (Schrank), *truncatula* (Müll.), *Planorbis albus* (Müll.), *lævis* (Alder), *subangulatus* (Phil.), *nitidus* (Müll.), *complanatus* (L.), *nautileus* (Müll.), *Valvata piscinalis* (Müll.), *Pisidium obtusale* (Pf.). Some offer local varieties. The new species will be mentioned below. The genera *Nanina*, or *Macrochlamys*, and *Buliminus* are not represented in the collection, although occurring in Russian Turkestan. "Scientific Results of the Second Yarkand Expedition," *Mollusca*, pp. 1–16, with a plate.

4. *Africa.*

The late T. VERNON WOLLASTON has published a valuable volume, "Testacea Atlantica," treating upon the land and freshwater shells of the Azores, Madeira, Salvages, Canaries, Cape Verdes, and St. Helena, from personal research made in the years 1847–1875, for a great part in company with the late R. T. Lowe. Although this "is not intended to be a monograph, but rather a critical enumeration of all the forms which have been recorded up to the present date," the author has spared no labour in sifting the evidence for the exact localities, and has been "less anxious to erect new species than to clear up difficulties concerning the old ones;" he also gives "diagnostic remarks which will be found useful . . . to supplement the published descriptions, and to point out more particularly in what the species differ from their intermediate allies." He enumerates 67 terrestrial species from the Azores, 163 from Madeira and Portosanto, 1 from the Salvages, 177 from the Canaries, 33 from the Cape Verdes, and 29 from St. Helena (the extinct ones included). A great majority of these

species are peculiar to a single group of Islands, respectively 33, 127, 0, 152, 23, and 22, many are even peculiar to single islands; 23 species are common to the Azores and Madeira, 18 common to Madeira and the Canaries, only 4 common to the Canaries and Cape Verdes. Of European species, 25 are found on the Azores, 22 on Madeira, 15 on the Canaries, 1 on the Cape Verdes; in all, 37 European species among the 417 existing on the Atlantic islands, most of them probably imported by man. The Madeiran group is the most completely examined, and exhibits therefore the greatest proportion of peculiar species; the Canaries have the largest extension and more relations to the South European fauna than the others; the Azores and Cape Verdes are rather poor, and still more St. Helena, which has no relations to the other groups. The section *Leptaxis* is characteristic for Madeira, the Azores, and Cape Verdes, but fails in the Canaries; *Hemicycla* is peculiar to the Canaries; *Hystricella*, *Caseolus*, *Placentula*, *Tectula*, &c., only occur in Madeira; *Bulimus* is found on the Azores, Canaries, and Cape Verdes, but wanting in Madeira, except the imported *B. ventricosus*; *Lovea* (*Ferussacia*) is found only in Madeira and the Canaries, *Craspedopoma* in the Azores, Madeira, and Cape Verdes. St. Helena has no relation to the other groups; it is distinguished by some peculiar species of *Succinea* and by two extinct sections of *Bulimus*. The freshwater shells are everywhere remarkably few, there are only 17 species known from the Atlantic islands, occurring in nearly equal number in Madeira, the Canaries, and Cape Verdes; 7 of these are European and 3 also inhabit the African continent. The Azores, Salvages, and St. Helena have no freshwater shell. Of submarine species (*Auriculida*, *Truncatella*, and *Assiminea*), 11 species are enumerated, the majority (8) of which are found on several of the groups, 2 are European, 2 others also found on the continent of Africa; in the Salvages they form the great majority ($\frac{3}{4}$) of the known species, the only other is a peculiar variety of widely-distributed *Helix pisana* (Müll.).

The malacological fauna of the African islands from the Azores to Madagascar and Socotra is discussed, and the known species are enumerated by W. Kobelt, JB. mal. Ges. v. pp. 10–32 & 170–185.

Sahara. *Limnæa limosa* (L.), *Physa brocchii* (Ehrenb.), *Planorbis duveyrieri* (Desh.), *Melania tuberculata* (Müll.), and *Corbicula saharica*, sp. n., found in a subfossil state in a lake dried up near Temacinin, S.W. of Ghadames, by L. Say; J. Fischer, J. de Conch. xxvi. pp. 74–81, with notes on similar occurrences in the Sahara.

Abyssinia. The land-shells collected by W. T. Blanford are mentioned in G. Nevill's Handlist of the Indian Museum, Calcutta, pt. i.

Edgar A. Smith's list of shells from Lake Nyassa repeated by W. Kobelt, Nachr. mal. Ges. 1878, pp. 85 & 86.

Eastern Africa. Sixteen terrestrial and 7 freshwater species collected by J. M. Hildebrandt in the interior of the coast of Zanzibar enumerated, and some new described by E. v. Martens, MB. Ak. Berl. 1878, pp. 288–299, with 2 pls. A new genus, *Zingis*, and 2 spp. of *Paludomus* [*Cleopatra* ?] are remarkable.

Western Africa. Note on some land-shells, chiefly from Liberia, by H. Dohrn, JB. mal. Ges. v. pp. 151–156.

Seven species of *Galatea* found in the rivers Bengo and Quanza (Angola), 4 new, are described by F. de Brito Capello in a separate pamphlet.

South Africa, Transvaal, and Natal. New species of *Achatina* by Edgar A. Smith, Q. J. Conch. 1878, No. 15, pp. 346–352.

5. *Southern Asia.*

G. Nevill's Handlist of the India Museum, Calcutta, pt. i. contains much valuable information on the terrestrial and air-breathing fresh-water *Mollusca* of British India and the adjacent regions, as to synonymy, systematic arrangement, and geographical distribution; the shells found by the late Dr. Stoliczka in his voyage to Yarkand are included. The new species are mentioned below.

Twenty-seven species of terrestrial *Mollusca* collected by the late Dr. Stoliczka in Kashmir and the Northern Punjab, including some new, all of Indian type, are enumerated, and respectively described by G. Nevill in "Scientific Results of the Second Yarkand Expedition," *Mollusca*, pp. 14–21, with some notes on the synonymy and Hutton's types of Himalayan land-shells.

The shells collected by J. Anderson during the Yunnan Expedition are enumerated in his "Anatomical and Zoological Researches," pp. 873–903, pl. lxxx. by G. Nevill; the new species have been already described by the latter in J. A. S. B. 1877, but are figured here for the first time, the most remarkable is the genus *Margarya* [Zool. Rec. xiv. *Moll.* pp. 20 & 42.]

Ceylon, Nicobars, and the islands of the Malayan Archipelago. W. Kobelt discusses their malacological fauna and gives lists of the known species of land and freshwater species, drawn from published works. JB. mal. Ges. v. pp. 322–350.

6. *Australian Region.*

New land-shells from New Guinea, including the new genus *Perieria*, by Tapparone-Canefri, C. R. lxxxvi. p. 1149; also Ann. N. H. (5) ii. p. 111.

New Guinea and Solomon Islands. Notes on their land-shells from personal observation, by W. G. Petterd, Q. J. Conch. 1878, No. 17, pp. 394–398.

New Caledonia. New land and freshwater shells by Gassies, J. de Conch. xxvi. pp. 330–347.

Australia. Species of the genus *Limnæa* found in Queensland; A. Brown, Ann. N. H. (5) ii. p. 493.

New Zealand. New slugs by F. W. Hutton, Tr. N. Z. Inst. xi. pp. 331 & 332.

Tasmania. Notes on its land-shells by W. G. Petterd, *l. c.* No. 17, p. 399.

7. *North America.*

W. G. Binney has published a new and comprehensive treatise on the North American terrestrial Mollusks as vol. iv. of Bull. Mus. C. Z.; it contains descriptions, synonymy, indications of localities, and woodcuts of all known species, very often also woodcuts of the jaw and radula, and in a separate volume, 74 copper-plates representing the shells, and also a living animal of each genus (reproduced from the work of the author's father, Amos Binney), and 16 new lithographic plates representing the genital organs, and jaws and teeth of the radula on a larger scale than the woodcuts. The whole is brought up to the level of the state of knowledge in January, 1878, and the same may be said with regard to the introduction, which treats of the habits and faculties, geographical distribution [Zool. Rec. xii. p. 143], and special anatomy of these animals. The work contains 283 species, distributed in 51 genera or subgenera, and 5 families. 19 species are also European, 11 of them evidently introduced; 8 on the contrary circumpolar, viz., *Zonites nitidus*, *viridulus*, *fulvus*, *Ferussacia subcylindrica* [*lubrica*], *Pupa muscorum*, *Acanthinula harpa*, *Vallonia pulchella*, and *Punctum pygmæum*.

T. Bland has printed a catalogue of the terrestrial air-breathing Mollusks of the United States and adjacent territories of North America (New York: Oct. 1878, 4 pp.).

Nova Scotia. Seven species of freshwater Bivalves, 15 freshwater Gastropods, and 12 land-snails, including 5 *Hyalina*, 5 *Helix*, and 2 *Succinea*, enumerated by M. Jones, Pr. Nov. Scot. Inst. iv. pp. 423, 427, 429 & 430; *Helix hortensis* is common in the whole country. 4 freshwater-shells collected in Nova Scotia by Verkrüzen, JB. mal. Ges. v. pp. 213 & 217.

Iowa. List of *Mollusca* collected by F. M. Witter, Q. J. Conch. 1878, Nos. 16 & 17, pp. 385–394.

Colorado. A special report on the *Mollusca* by E. Ingersoll, published in 1875 in Bull. U. S. Geol. Surv. ii. pp. 128–136, containing 24 terrestrial and 21 freshwater species, has been omitted in former Records; the new species will be mentioned in the special part.

Texas. Some notes on its land-shells by W. G. Wetherby, Am. Nat. xii. pp. 184 & 185.

8. *Central and South America.*

Mexico and Central America. Fischer & Crosse have completed the first volume of their "Études sur les Mollusques terrestres et fluviatiles de la Mission Scientifique au Méxique," treating in the seventh part of it *Leptinaria*, 2 sp., *Subulina*, 9 sp., *Succinea*, 15 sp., *Vaginula*, 1 sp., and *Oncidella*, 1 sp.

Costa Rica. 7 new species of land-shells, collected by A. Boucard, described by G. F. Angas, P. Z. S. 1878, pp. 72–74, pl. v.

West Indies. Lists of land-shells from the Bermudas, Bahamas, Cuba, Hayti, Jamaica, and the Lesser Antilles, in Poulsen's Catalogue of West India Shells, pp. 1–5.

Venezuela. List of 26 land and 36 freshwater *Mollusca*, taken from the Recorder's paper of 1873 [Zool. Rec. x. p. 125], in A. Ernst's "Estudios sobre la flora y fauna de Venezuela:" Caracas: 1877, 4to, pp. 225–230.

New Granada. 2 new land-shells, by Edgar A. Smith, Ann. N. H. (5) ii. pp. 482 & 483.

Ecuador. 125 terrestrial shells, some with doubt, enumerated, and those collected by Dr. Wolf & P. Boetzkes discussed, and some new among them described, by K. Miller, Mal. Bl. xxv. pp. 153–199, pls. vii. & viii.

Argentine Confederation. Döring gives a list of 79 terrestrial *Pulmonata*, all inoperculate, 15 freshwater *Pulmonata*, 21 freshwater *Pectinibranchia* (*Ampullariidæ* and *Paludestrina*), and 58 freshwater Bivalves hitherto observed in the Argentine States; JB. mal. Ges. v. pp. 130–142. Some new species of the terrestrial among them are described and figured, pp. 143–150.

b. Marine Mollusca.

1. *Arctic Seas.*

Smith Sound. 2 Pteropods, 19 Gastropods, 16 Bivalves, collected by H. W. Feilden during Sir G. Nares's voyage to the Polar Sea, in 1875–76, in or near Smith Sound, 79° 25′–82° 30′ N. lat., enumerated by Edgar A. Smith in the Narrative of that voyage, ii. pp. 223–233. The new forms among them have been already described in Ann. N. H. 1877.

Jan Mayen Island. 19 species of Bivalves, 2 Pteropods, 24 Gastropods (1 *Rissoa*, new), and 1 Cephalopod: *Leachia hyperborea* (Steenstr.), found at this island by the Norwegian Arctic Expedition, enumerated by H. Friele, N. Mag. Naturv. 1878, also in J. de Conch. xxvi. pp. 397–399.

Novaya Zemlya. 110 marine species, among which are 36 Bivalves, 71 Gastropods, and 2 Pteropods, with about 40 remarkable varieties, collected by the Swedish Expeditions in the years 1875 and 1876, are enumerated and described by W. Leche. They exhibit the general type of the circumpolar Arctic fauna, and some varieties are remarkable from their large size; 90 of them have been found in the Kara Sea and Matosschin-scharr, 83 on the western shore of Novaya Zemlya; 60 species are common with Spitzbergen, 86 with Greenland, 48 with Iceland, 69 with Massachusetts, 53 with Behring Sea. Sv. Ak. Handl. xvi. (2) 85 pp. 2 pls.

G. O. Sars has published a very valuable treatise on the marine *Mollusca* of Arctic Norway, describing 390 species, and figuring most of them, especially the radula and operculum. In an appendix, all Norwegian species (567) are enumerated, and their vertical and horizontal distribution indicated, pp. 351–368; 401 of them occur in the arctic region of Norway, Lofoden Islands, and Finmark. Finally, he comes to the conclusion that an Arctic origin may be ascribed to the following species:—

1. All those which live in Eastern Finmark, east of the North Cape.
2. All those which are not found, or only exceptionally found, south of the polar circle.

3. All those which are more strongly developed or more numerous in the Arctic part of Norway than in its southern parts.
4. All those which live near the surface in the Arctic part, and at a greater depth in the southern part.
5. Those which exhibit several varieties in the Arctic region, and are more uniform in the southern part.
6. Those which are more strongly developed in the large fjords than in the open sea.
7. Those which occur in the cold area of the sea, beyond the littoral banks.
8. All those which are observed in the Polar Sea of the northern coast of Siberia, Novaya Zemlya, Spitzbergen, Jan Mayen, or Greenland.
9. Generally all those which are found also on the east coast of North America.
10. The species which are found also in the Behring Sea.
11. All those which are found in the older glacial beds in a fossil state.
12. All which are found more strongly developed in the fossil state than living at the same latitude.

According to these rules, 275 out of the 401 species now living in the Arctic part of Norway are originally Arctic; the rest, 126, are boreal; pp. 392–404. Only those species will be mentioned *infrà* which have not been figured or are not generally known.

2. *Seas of Northern Europe.*

The *Mollusca* of the Firth of Clyde are treated by A. Browne, *suprà*.

Holland. List of *Mollusca* observed at the zoological station at the Helder, by D. van Haren-Noman; Tijdschr. Ned. Dierk. iii. pp. 21–32.

Note on the Mollusks of the littoral zone at Etretat, Dép. Seine-Inférieure, by P. Fischer, J. de Conch. xxvi. pp. 309–310. Sub-terrestrial region, first *Alexia denticulata*, lower *Litorina rudis*; region of *Balanus*; region of *Patella vulgata*, above with *Litorina litorea*, lower with *L. obtusata*; last region that of *Purpura lapillus*.

Guernsey. A number of marine *Mollusca*, enumerated by A. H. Cooke & H. M. Gwatkin, Q. J. Conch. 1878, No. 15, pp. 324–332. *Haliotis* abundant, *Buccinum undatum* rare, *Litorina litorea* did not occur to the authors.

3. *Mediterranean Sea.*

T. A. de Monterosato gives a new enumeration of the shells of the Mediterranean, amounting to 1021 species, viz., 302 Bivalves, 15 *Dentaliidæ*, 685 Gastropods, 19 Pteropods, and 2 Cephalopods. He inclines much to keep the species of the Mediterranean distinct from those of the northern seas of Europe, in many cases in which they have been identified by former authors; for example, *Mytilus galloprovincialis* (Lam.) distinct from *edulis* (L.), *Cardium lamarcki* (Reeve) from *edule* (L.), &c. Giorn. Sc. Palerm. xiii. 55 pp.

Note on the periodical appearance or frequence of some *Mollusca* in

the Bay of Naples, from three years' observations, by R. Schmidtlein, MT. z. Stat. Neap. i. pp. 132–135.

J. Brugnone has published two pamphlets, describing some new recent and fossil pliocene species from Sicily in 1873 and 1876, which have hitherto escaped the knowledge of the Recorder; the new recent species will be mentioned in the special part.

Monterosato enumerates 161 species dredged near Palermo and gives critical notes concerning some of them; J. de Conch. xxvi. pp. 143–160.

215 species of sea-shells, collected by E. d'Albertis on his cruise in the middle and eastern parts of the Mediterranean, between Genoa, Tunis, and Constantinople are enumerated, with indication of the localities and depths, by A. Issel, Ann. Mus. Genov. xi. pp. 416–450.

64 marine species, rather rare and some new, observed on the coast of Algeria, enumerated by Monterosato, J. de Conch. xxvi. pp. 313–321, chiefly *Rissoidæ*, *Pyramidellidæ*, and *Bullidæ*.

Marine shells from the island Pelagosa, in the Adriatic, mentioned by Stossich, Bull. Soc. Adr. iii. p. 192.

Caspian Sea. Notes on its shells, chiefly taken from Grimm's work [Zool. Rec. xiii. & xiv.], in O. Schneider's "Beiträge zur Kenntniss der Kaukasus-länder," pp. 32–34.

4. *East Coast of North America.*

Nova Scotia and Newfoundland. List of 105 species dredged there, with some general observations and descriptions of apparent new species of *Buccinum* and *Bela*, by T. A. Verkrüzen, JB. mal. Ges. v. pp. 208–230. A list of 83 Bivalves and 72 Gastropods from Nova Scotia, most of which are Arctic species, by M. Jones, Pr. N. Scot. Inst. iv. pp. 421–430.

Carolina. 2 species of Cephalopods, 15 Gastropods, 1 Pteropod, and 14 Bivalves, observed at Fort Macon, North Carolina, by E. Coues & H. C. Yarrow, P. Ac. Philad. 1878, pp. 301–303.

Florida. A paper on marine shells of Florida, by Calkins, in P. Davenport Ac. is known to the Recorder only by a quotation of R. Stearns, who corrects some determinations in it; P. Cal. Ac., Apr. 1879.

5. *West Indies and Tropical Atlantic.*

West Indies. A list of 899 species of West India sea-shells, in Poulsen's catalogue of West India shells, pp. 7–16; their determination revised by the late O. A. Mörch.

Preliminary notes on the *Mollusca* obtained during the cruise of the U.S. Coast Survey steamer 'Blake,' in the Gulf of Mexico, March and April, 1878, by W. H. Dall, Bull. Mus. C. Z. v. No. 6, pp. 60 & 61. The shore fauna extends to various depths, but rarely in a living condition below 250 fath., the true deep sea species range from 1,920 to 200 fath., according to temperature, many of them coming much nearer the surface, when the temperature is cool enough, than has commonly been taken for granted. *Lyonsia bulla*, from 1,920 fath., species of *Limopsis*, *Arca*,

Leda, *Gouldia*, *Dentalium*, and *Trochus* (*Minolia*), from more than 1000 fath.

Cape Verde Islands. 9 species of *Marginellidæ*, two new, enumerated by Jousseaume, Bull. Soc. Z. Fr. i. pp. 268–270.

Coast of Western Africa. T. Studer publishes some observations on Mollusks dredged during the expedition of the Prussian ship 'Gazelle,' between 16° N. and 6° S. lat., at depths from 30 to 360 fath.; SB. nat. Fr. 1878, pp. 136–139. Four new species of them described by the Recorder; *tom. cit.* pp. 134 & 135 [see *Nassa*, *Xenophora*, *Dentalium*, and *Voldia*].

5. *Indo-Polynesian Seas.*

Andaman Islands. 70 species of marine shells, collected by Capt. Wilmer, determined by Edgar A. Smith, with critical notes, several new. P. Z. S. 1878, pp. 804–821, pl. l.

Philippines. 86 species of *Nudibranchia*, collected by C. Semper, determined and enumerated by R. Bergh, in the former's Reis. Philippin. ii. part 14, pp. 1 & 2.

New Guinea. Tapparone-Canefri continues his contributions to the malacology of the Papuan Islands, enumerating the shells collected by Beccari & D'Albertis on the coast of New Guinea and adjacent islands, and describing some new species among them. Ann. Mus. Genov. vii. pp. 1028–1033, viii. pp. 323–332, & xii. p. 99. General note on them by the same; C. R. lxxxvi. p. 1149, translated in Ann. N. H. (5) ii. p. 111.

New Caledonia. Supplement to the list of the species of *Turbo*, *Calcar*, and *Trochus*, and list of the known species of *Delphinula* (1), *Liotia* (2), and *Phasianella* (1 sp.), by P. Fischer, J. de Conch. xxvi. pp. 205–210.

A number of Polynesian shells enumerated by J. D. E. Schmeltz, Verh. Ver. Hamb. iii. pp. 159–174.

6. *Northern Pacific.*

California. Notes on some marine shells, by R. Stearns, P. Ac. Philad. 1878, pp. 395–401, pl. vii.

Alaska and Aleutian Islands. *Chitonidæ*, by W. Dall, Pr. U. S. Nat. Mus. 1878.

Korea Strait. Some shells dredged by St. John Jeffreys, J. L. S. xiv. pp. 418–423.

7. *South Australian and Antarctic Seas.*

A. Gould's descriptions of Australian shells, in P. Bost. Soc. ii. & iii., are copied by J. E. Tenison-Woods, P. Linn. Soc. N. S. W. ii. pp. 250–261. He also describes some new shells dredged off Port Jackson Heads, 45 fath., *tom. cit.* pp. 262–266, including a recent species of the genus *Raulinia*, hitherto only known as fossil from the Eocene.

South Australia. G. F. Angas describes 16 new species of marine *Mollusca*, and adds 75 species to his former list, published in P. Z. S.

1865, with notes on their habitats and geographical distribution. P. Z. S. 1878, pp. 861–871.

New Zealand and Chatham Islands. F. W. Hutton reviews the known marine *Mollusca*, enumerating 8 species of Cephalopods, 1 Pteropod, 3 Heteropods, 260 Gastropods, and 137 Bivalves, most of which are also contained in his former list [Zool. Rec. x. p. 124], adding many corrections in synonymy, partly from notes given by the Recorder, and giving fresh descriptions of most of his own species. J. de Conch. xxvi. pp. 1–57.

Stewart Island. Note on its marine *Mollusca* : 791 species known, 131 the same as in Cook's Straits, 99 also at Auckland ; Filhol, C. R. lxxxvi. p. 702.

Auckland Islands. List of known marine shells, 27 species, by F. W. Hutton, Tr. N. Z. Inst. xi. pp. 341 & 342. *Modiola areolata* (Gould), *Mytilus magellonicus* (Gmel.) and *latus* (Chemn.), *Purpura striata* (Martyn), *Patella luctuosa* (Gould), *Trochus spectabilis* (A. Adams), and some other species, collected by H. Krone, determined, and their analogy with northern species, and the distribution of some of them in the southern regions, pointed out by E. v. Martens, SB. nat. Fr. 1878, pp. 20 & 21.

Campbell Island. 12 marine species mentioned by F. W. Hutton, Tr. N. Z. Inst. xi. pp. 341 & 342.

Kerguelen Island. New species collected by the Prussian Transit of Venus Expedition ; E. v. Martens, SB. nat. Fr. 1878, pp. 21–26.

Palæontology of Recent Species.

1. *Land and Freshwater Species.*

J. Bourguignat's "Catalogue des Mollusques terrestres et fluviatiles de Paris à l'époque quaternaire," 1869, is discussed by S. Clessin, Mal. Bl. xxv. pp. 99–102 ; 76 species, of which 41 according to the author, but only 26 according to Sandberger, are extinct ; all the genera are still living in Middle Europe, but two, *Belgrandia* and *Lartetia*, are very rare, and only occur in more southern countries.

In the quaternary tufa of La Celle, dép. Seine-et-Marne, 40 species have been found, about half the number of which are still alive in the same country, *Helix limbata* and *bidens*, *Buliminus montanus*, and *Pomatias septem-spiralis* are living species, but foreign to the country, the first more southern, the three others eastern. Turnouer, Bull. Soc. Géol. (3) v. [1877].

Helix lapicida (L), *Zonites crystallinus* (Müll.), *Planorbis complanatus* (L.), found in freshwater *molasse* strata, near Lyon. Locard, Arch. Mus. Lyon, ii.

Helix vermiculata and *aspersa* found within Travertin layers on the small island of Galita, south of Sardinia. Issel, Bull. Soc. Mal. Ital. iii. p. 463.

Dead shells found copiously in a calcareous tufa near Lake Chad, at the northern extremity of the Bahr-el-Rhasal, by Nachtigal, are iden-

tical with freshwater species living in the Nile and Abyssinia. MARTENS, SB. nat. Fr. 1878, pp. 169 & 170.

In the Pankong Lake, 50 feet above the level of the water, in a stratified shaly and sandy deposit, *Limnæa lagotis* (Schranck), *Valvata piscinalis* (Müll.), and *Pisidium obtusale* (Pfr.), found by F. Stoliczka; Nevill, Moll. Yarkand Exped. pp. 1, 8, 12, & 13.

The land, freshwater, and brackish water shells found in the "Laramie" group of deposits, in the central region of North America, enumerated by C. A. White, Bull. U. S. Geol. Surv. iv. pp. 721–724; they are, with few exceptions, still living species.

2. *Marine Species.*

Subfossil marine Mollusks from the mouth of the Yenissei, 16 Bivalves and 26 Gastropods, all recent species, enumerated by Leche, Sv. Ak. Handl. xvi. (2) p. 84.

M. TURNOUER discusses the marine shells found in the "Chotts" of the Sahara, enumerating the various explorers who have found them, beginning with Martin and V. d. Linth, 1863; most of the shells are *Cardium edule*, several forms of which are figured, but a perforated and very worn specimen of *Nassa gibbosula* (L.), *Cypræa moneta*, and a species of *Conus*, not *mediterraneus*, have been found. The deposits seem rather to be torrential and fluviatile, than marine. The author doubts very much whether they prove the existence of a Saharan sea in later than diluvial times, and thinks that the last-named shells may have found their way hither by human agency. Assoc. Fr. vii. pp. 608–622, pl. vi.

E. W. HILGARD & F. HOPKINS, Washington: 1878, report on many recent species of the Caribbean Sea, and some others new, obtained by borings made in 1874 between the Mississippi River and Lake Borgne in depths between 57 & 72 feet.

Postpliocene fossils, all still living species, near San Luis Rey, coast range of California, 12 miles from the sea; Dall, Pr. U. S. Nat. Mus. 1878, p. 3.

Some few tertiary fossils from New Guinea, including the recent *Dolium costatum* (Desh.), J. E. TENISON-WOODS, P. Linn. Soc. N. S. W. ii. pp. 267 & 268.

Historical Changes in Faunas.

A. H. GRAY has observed a living specimen of *Unio complanatus* (Barnes) attached by the closed valves to the feet of a duck, *Querquedula discors*, and discusses the possibility of transplantation of shells by birds; Nature, xviii. pp. 220 & 221. The same subject is treated by R. CALL, Am. Nat. xii. pp. 472 & 473.

Successful introduction of *Helix pisana* from Jersey into Guernsey, by Dr. Lukis, Q. J. Conch. 1878, No. 15, pp. 332 & 333.

Lyons. *Helix trochoides*, *acuta*, and *Pupa quinque-dentata* are found at a particular spot associated with southern plants, probably acclimatized.

but perhaps independently of human agency; *Vitrina annularis*, *Helix personata*, *arbustorum*, *depilata*, *rufescens*, have probably immigrated from the Alps; *Dreissena polymorpha* is of recent arrival. LOCARD, Ann. Soc. Agric. Lyon, 1878, 28 pp.; abstract in J. de Conch. xxvi. pp. 377 & 378.

In *South Western France* some terrestrial species, such as *Helix pomatia*, *strigella*, *incarnata*, and *Zonites olivetorum*, are disappearing on account of the destruction of the woods; and some Algerian species, such as *Helix lactea*, *terveri*, and *cespitum*, and *Leucochroa candidissima*, have been acclimatized by G. Debeaux during the last 15 years. CR. des travaux du congrès des Orientalistes de Marseille, 1877; abstract in J. de Conch. xxvi. p. 305.

The semi-fossil land-shells of *Madeira* and *Portosanto*, the Canaries, Cape Verdes, and St. Helena are also included in WOLLASTON's "Testacea atlantica." There are only three beds well-known and rigidly circumscribed, and may therefore be safely reasoned upon in "discussing the geological structure," viz., Canical in Madeira, Portosanto, and the extreme summit of the Southern Deserta; these gave 12 quite extinct species, all nearly allied to living Madeiran species, and the well-known European *Helix lapicida* never found living on any of the Atlantic islands. The Canaries and Cape Verdes also have some species, hitherto only known as extinct. In St. Helena nearly half (13) of the known species, and the more peculiar of them, are extinct.

Mauritius. The indigenous terrestrial species are rapidly diminishing, while the introduced or those of wider geographical distribution become more numerous; *Achatina panthera* (Fér.) for example, introduced about twenty years ago, now replaces *A. fulica* (Fér.) nearly everywhere. Two new extinct species, *Pupa majuscula*, 41 mill., and *Helicina undulata*; Dupont, J. de Conch. xxvi. p. 171.

North America. *Zonites* [*Hyalina*] *cellaria*, *Limax maximus*, *flavus*, *agrestis*, *Cæcilianella acicula*, *Stenogyra decollata*, *Helix* (*Fruticicola*) *hispida* and *rufescens*, (*Turricula*) *terrestris*, (*Tachea*) *hortensis*, and (*Pomatia*) *aspersa*, introduced from Europe in various spots of North America; Binney, Terr. airbr. Moll. of U. S. pp. 112, 143, 145, 147, 190, 192, 345, 346, 349, 378, & 381.

Use by Man.

A few notes on the *Mollusca* sold at the "halles" of Paris for food; E. FRIEDEL, Zool. Gart. xix. p. 307.

A shell-mound in Japan, at Omori, near Tokio (Yeddo) observed by E. MORSE, Am. J. Sc. (3) xv. p. 157.

List of those mollusks in the United States which are useful as food, bait, nacre, &c., or injurious as predatory on useful mollusks, or boring in wood or stone, in G. BROWN-GOODE's classification of the collection to illustrate the Animal resources of the United States; Washington: 1876, p. 19 (Bull. U. S. Nat. Mus. No. 6, and Sm. misc. coll. xiii.).

Pieces of *Oliva biplicata*, *Busycon*, and *Murex* found as ornaments employed by the ancient tribes of Utah and Arizona; E. A. BARBER, Bull. U. S. Geol. Surv. ii. p. 67.

Helix juno and *Cyclotus quitensis* used as ornaments on cloths by the natives at the River Napo, South America; Crosse, J. de Conch. xxvi. p. 296.

Shells of *Spondylus pictorum* (Gmel.) found in Peruvian graves at Ancon by Dr. VELTEN; they only live farther north on the coast of Panama. Verh. Ver. Rheinl. xxxiv. [1877] p. 158.

Classification, Nomenclature, &c.

A 3rd edition of Woodward's well-known "Manual of the Mollusca" has been issued with appendix, by R. Tate, in 1878.

The papers, in which the general type or class Molluscous animals, and its subdivisions into Cephalopods, Gastropods, &c., were originally established by Cuvier in 1793, are reprinted with introductory remarks by H. v. IHERING, Mal. Bl. xxv. pp. 37–67.

The original specimens described by I. v. Born in his "Testacea Musei Cæsarei Vindobonensis," 1780, have been found in the Museum of Vienna and determined by F. Brauer, SB. Ak. Wien, lxxvii. Abth. i. pp. 117–192 [sep. copy, pp. 76]. Some cases, in which the received synonymy must in consequence be changed, will be mentioned *infrà*.

W. KOBELT has published a rather incomplete collection of the diagnoses of new genera and species published in 1877, excluding the land-shells and all *Mollusca* without shell; Synopsis, &c., *suprà*, p. 4.

The natural type of a genus or species represented by a form intermediate between extreme forms or by a geographically widely spread one, is to be distinguished from the historical or name type; in ALBERS's "Heliceen," second edition, the natural, not the historical, or rather bibliographical types of the several subgenera are indicated. Martens, Nachr. mal. Ges. 1878, p. 38.

Collecting and Preserving.

Notes and hints on collecting land and freshwater *Mollusca* by D. DUPUY, Bull. Soc. Toulouse, 1878. [Not seen by the Recorder].

A method of preserving anatomical preparations of land-shells, coloured with carmine, varnished with dammar-resin in a dry state on glass slides, by M. BRAUN, Nachr. mal. Ges. 1878, pp. 49–52, and Zool. Anz. i. pp. 56 & 57.

CEPHALOPODA.

A general account by K. HENRICH, Verh. siebenb. Ver. xxviii. pp. 28–43.

Octopus. For FREDERICQ's paper on its general physiology, see *suprà*, p. 8.

The changes of colour in the Cephalopods have been studied by R. KLEMENSIEWICZ, who comes to the result that the expansion of the chromatophores is effected actively by radial fibres, and that in this state the colour of the pigment is pale pink or yellowish, while the con-

traction is the state of tranquillity, and during it the pigment is blackish. This is opposed to the statement by Harting [Zool. Rec. xiii. *Moll.* p. 20], but coincides with that by Fredericq. The expansion is caused either by the will of the animal, or by reflection from the optic nerve, or from centripetal cutaneous nerves. SB. Ak. Wien, lxxviii. Abth. iii. 44 pp. 2 pls.

G. Fritsch states that a dorsal anastomosis between nervous branches of both ganglia stellata has been actually observed by O. Mantey in *Eledone*, and that Pfeffer [Zool. Rec. xiv. *Moll.* p. 28] has mistaken a blood-vessel for a nerve in describing a lower commissure near the gill. SB. nat. Fr. 1878, pp. 7–9.

Note on the cartilages of the head in the Cephalopods by Fürbringer, *suprà*, p. 8.

Notes on the eye of the Cephalopods by Krukenberg and Schöbl, *suprà*, p. 11.

Notes on the genital organs by Brock, *suprà*, p. 11.

DIBRANCHIATA.

Some observations on *Octopus vulgaris* living in the aquarium at Hamburgh by H. Bolau, Zool. Gart. xix. p. 151.

Octopus bairdi (Verrill), Sars, Moll. arct. Norveg. p. 339, pl. xxxiii. radula, pl. xvii. fig. 8, Finmark and Lofoden Islands, 60–200 fathoms.

Argonauta. Some remarks concerning the history of its knowledge by N. Tiberi, Bull. Soc. mal. Ital. iii. pp. 160–164.

Loligo media (L.). Radula; Sars, *l. c.* pl. xvii. fig. 3.

Gonatus amœnus (Möller); *id. l. c.* p. 336, pl. xxxi., radula, pl. xvii. fig. 2, Porsangerfjord, Arctic Norway.

Rossia glaucopis (Lovén) = ? *papillifera* (Jeffr.); *id. l. c.* p. 337, pl. xxxii., radula, pl. xvii. fig. 6, Lofoden Islands and Finmark, 60–200 fath.

Ommastrephes todarus (Raf.); *id. l. c.* p. 334, pl. xxx., radula, pl. xvii. fig. 1, Lofoden Islands.

Ommastrephes or *Loligo*? measuring 1.64 metres from tip of arms to tail, observed at Venice by H. Baumgartner, Zool. Gart. xix. p. 190.

TETRABRANCHIATA.

R. Owen maintains and, by fresh observations, confirms his view that the spiral coiling is quite opposite in *Nautilus* and *Spirula*, the former being coiled over the back, or "revolute," and the ventral side of the animal corresponding to the periphery of the spiral shell in it, and to the centre in *Spirula*; in both genera the upper (dorsal) jaw is overlapped by the under (ventral), so the relative position of the jaws to the spiral of the shells appears also opposed. In *Ammonites*, the peripherical or ectomarginal position of the sipho, different from its endomarginal position in *Spirula*, favours the supposition that the shell is revolute as in *Nautilus*; and the relatively large size of the dwelling chamber, the instances

of repair of a fractured part by the formative border of the mantle, the similar porcellano-nacreous structure of the shell, and the entire want of any trace of an ink-bag, prove surely that *Ammonites* has nearer relations to *Nautilus* than *Spirula*. The author also maintains his view that the so-called *Aptychus* (Meyer, 1831), or rather *Trigonellites* (Parkinson, 1811), is a calcified external layer of what is called the hood in *Nautilus*, not the cover of the nidamental glands, as Keferstein supposed, because the size of these glands must be very variable, as they are only periodically active, and the shape and contiguity of the shelly or horny plates corresponds in a remarkable degree better with that of the hood, than that of the glands; this being accepted, a further near relation between *Nautilus* and *Ammonites* results. Finally, OWEN treats of the formation and function of the sipho, describing a gradual series from the simple internal septa of *Vermetus*, through the hollow chambers with central adhesion at the spot of the adductor muscle in the shell of *Spondylus*, to the chambers and hollow sipho of the shells of the Cephalopods; he states that the soft sipho in *Nautilus* contains an artery and is often coated by a thin calcareous deposit which he thinks is destined to maintain the vitality of the shell. P. Z. S. 1878, pp. 955–975, pl. lx.

Note on abnormal chambering by resistance of the sipho in some Silurian Cephalopods, by H. DEWITZ, Z. ges. Naturw. li. pp. 295–310.

PTEROPODA.

Clio limacina (Phipps), Sars, Moll. arct. Norveg. p. 332, pl. xxix. fig. 4, radula, pl. xvi. fig. 21.

[*Cleodora*] *Clio pyramidata* (Brown); radula, *id. l. c.* pl. xvi. fig. 20.

Limacina helicina (Phipps); *id. l. c.* p. 328, pl. xxix. fig. 1, radula, pl. xvi. fig. 17.

Spirialis balea (Möller) *gouldi* (Stimps.) and *S. retroversa* (Fleming) = *stenogyra* (Phil.); *id. l. c.* pp. 329 & 330, pl. xxix. figs. 2 & 3, radula, pl. xvi. figs. 18 & 19.

HETEROPODA.

Note on the auditory organ by CLAUS, *supra*, p. 11.

GASTROPODA.

PECTINIBRANCHIA.

MURICIDÆ AND PURPURIDÆ.

Murex pereger, sp. n., Brugnone, Misc. mal. i. [1873] p. 10, fig. 17. Probably from African sponges; perhaps identical with *hybridus* (Aradas & Benoit, 1876), but distinct from *erinaceus* (L.); *id. op. cit.* ii. [1876] p. 25.

Murex (*Ocinebra*) *erinaceoides* (Valenc.) = ? *lugubris* (Brod.) = ? *californicus* (Hinds); Stearns & Tryon, P. Ac. Philad. 1878, pp. 395–397.

Murex (*Muricidea*) *rusticus* (Reeve) ?, E. A. Smith, P. Z. S. 1878, p. 806, pl. l. fig. 5, Andaman Islands. Critical note on *M. tetragonus* (Brod.) and *breviculus* (Sow.) confounded by Reeve, the latter from the Andamans; *id. l. c.* p. 806.

Trophon. Monograph of this genus, including as subgenera *Urosalpinx* (Stimps.), *Eupleura* (H. & A. Ad.) and *Meyeria* (Dunker), 57 species described and 40 of them figured by W. Kobelt in Küster's Conch. Cab. pt. 275, pp. 274–313, pls. lxxi.–lxxvi. The following are new or not before described:—*T. philippianus* (Dunker, MS.), p. 277, pl. lxxii. figs. 4 & 5, South America; *spiratus* (H. & A. Ad., 1863), p. 279, pl. lxxiii. figs. 6 & 7, New Zealand; *crassus* (A. Ad., 1851), p. 288, pl. lxxii. figs. 8 & 9, locality unknown; *dalli*, sp. n., p. 289, pl. lxxiv. figs. 1 & 2, Behring's Straits; *orpheus* (Gould), p. 290, pl. lxxiv. figs. 3 & 4, Behring's Sea, Japan, Puget Sound; *lebbecki*, sp. n., p. 294, pl. lxxiv. figs. 13 & 14, locality unknown; *maltzani*, sp. n., p. 301, pl. lxxv. figs. 17 & 18, Alaska; *tenuisculptus* (Carpenter), p. 306, pl. lxxvi. figs. 9 & 10, Sitka.

Trophon clavatus, sp. n., Sars, Moll. arct. Norveg. p. 249, pl. xv. fig. 12, pl. xxiii. fig. 14, Lofoden Islands, 120–200 fath. Radula and that of *T. clathratus* (L.), *truncatus* (Ström.), and *barvicensis* (Johnst.), *ibid.* pl. ix. figs. 14–17, operculum of *clathratus*, pl. xviii. fig. 46.

Trophon dubius, sp. n., Hutton, J. de Conch. xxvi. p. 13, New Zealand.

Polytropa retiaria and *biconica*, spp. nn., *id. l. c.* p. 20, New Zealand.

Latiaxis elegans, sp. n., Angas, P. Z. S. 1878, p. 74, pl. v. figs. 1 & 2, locality unknown [= *Murex tectum-sinense*, Deshayes, J. de Conch. v. pl. iii. figs. 1 & 2, 1856, from Algeria].

Meyeria (Dunker & Metzger), *pusilla* (M. Sars, *Tritonium*) = *Latirus albus* (Jeffr.) = *L. albellus* (Metzger), pillar-lip obscurely plaited, median plate of the radula 3-toothed, lateral plates 1-hooked, Northern Norway, 100–200 fath.; Sars, Moll. arct. Norveg. p. 240, pl. xiii. fig. 8, radula, pl. ix. fig. 13, operculum, pl. xviii. fig. 45.

[*Hemifusus*] *Murex gigas* (Born) = *Fusus proboscidiferus* (Lam.); Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 171.

Buccinidæ.

Neptunea. W. Kobelt continues the monograph of this genus in Küster's Conch. Cab. part 276, pp. 97–120, pls. xxxiv.–xxxix., including *Sipho* and *Siphonorbis* (Mörch). The species not before figured are *N. stimpsoni* (Mörch), var. from Newfoundland, p. 105, pl. xxxv. figs. 4 & 5; *N. antiquata*, var. *bicarinata*, p. 106, pl. xxxvi. fig. 1, var. *striata*, from Iceland, p. 109, pl. xxxviii. fig. 1, *N. turgidula* (Jeffr.), p. 110, pl. xxxviii. figs. 2 & 3, *turrita*, Sars, p. 111, pl. xxxviii. fig. 4, *crebricostata* (Dall, MS.), sp. n., p. 116, pl. xxxix. fig. 1, Unalaska, *kroyeri* (Möller), var. from Unalaska, p. 117, pl. xxxix. figs. 4 & 5, *tenebralis* (Gould) = *spitsbergensis* (Reeve), p. 118, pl. xl. figs. 2 & 3, *togata* (Gould), var., p. 119, pl. xl. figs. 4 & 5.

[*Neptunea*] *Fusus fornicatus* (Reeve), *tornatus* (Gould), and *deformis*

(Beck), from Novaya Zemlya ; Leche, Sv. Ak. Handl. xvi. (2) pp. 66–68, pl. ii. figs. 26–28.

Chrysodomus (Swains.), restricted by G. O. Sars to *Fusus turtoni* (Bean), on account of the radula, in which the median plate is small, square, without teeth, lateral plates with one large hook and two small teeth. Sars, Moll. arct. Norveg. p. 269, pl. xiv. fig. 3, pl. xxv. figs. 9 & 10 ; radula, pl. x. fig. 16 ; operculum, pl. xviii. fig. 53. [The type of *Chrysodomus*, Swains., is *Fusus antiquus* = *Neptunea* (Bolten).]

For *Fusus burniciensis* (Johnst.), see FASCIOLARIIDÆ.

Volutopsis norvegicus[-*a*](Chemn.), median plate of the radula 4-toothed, lateral plate 2-hooked ; Sars, Moll. arct. Norveg. p. 268, pl. xv. fig. 1 ; radula, pl. x. fig. 17 ; operculum, pl. xviii. fig. 54 ; throughout the arctic coast of Norway, everywhere rare.

[*Volutopsis*] *Neptunea largillierti* (Petit), from Newfoundland ; Verkrüzen, JB. mal. Ges. v. p. 229.

Sipho islandicus (Chemn.), *glaber* (Verkrüzen), *tortuosus* (Reeve), with var. *turrita* (M. Sars), and *attenuata* (Jeffr., var.), *lachesis* (Mörch), *sarsi* (Jeffr.), = *mœbii* (Dunker & Metzger), *latericeus* (Möller) = *Trit. incarnatum* (M. Sars), and *fusiformis* (Brod.) = *fenestratus* (Turt.) ; Sars, Moll. arct. Norveg. pp. 270–277, pl. xv. figs. 2–8, and pl. xiv. fig. 1, radula of all seven, pl. x. figs. 19–25, operculum of the first, pl. xviii. fig. 55.

Sipho ebur (Mörch), *turgidulus* (Jeffr.), *togatus* (Mörch), *turritus* (Sars), *lachesis* (Mörch), and *mohni* (Friele), all arctic ; Kobelt, JB. mal. Ges. v. pp. 276–282, pl. ix. figs. 1–7. *S. curtus* (Jeffr.) = *stimpsoni* (Mörch) = *americanus* (Stimps.) ; Verkrüzen, *l. c.* p. 351.

Sipho spitzbergensis (Reeve), from Newfoundland ; Verkrüzen, *l. c.* p. 224.

Sipho sabini (Grey), Leche, Sv. Ak. Handl. xvi. (2) p. 69, pl. i. fig. 23, Kara Sea ; perhaps = *tortuosus* (Reeve, Kobelt), radula examined.

Euthria (Gray), list of 16 known species by Kobelt, JB. mal. Ges. v. pp. 237 & 238.

Euthria chlorotica, sp. n., Kerguelen, and *lineata* (Martyn), var. n. *pertinax*, Auckland Isles, Martens, SB. nat. Fr. 1878, pp. 22 & 23.

Euthria martensiana, new name for *littorinoides*, Hutton, 1873, *nec* Reeve ; Hutton, J. de Conch. xxvi. p. 16, New Zealand.

Pollia (*Tritonidea*) *papuana*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1028, Aru Islands.

Buccinum conoideum, *pulchellum*, *tumidulum*, spp. nn., Finmark, *undatum* (L.), with varr. *littoralis*, *cærulea*, and *pelagica*, *parvulum* (Verkrüzen), *donovani* (Gray), *fragile* (Verkrüzen, MS.), *groenlandicum* (Chemn.) = *cyaneum* (Brug.), with var. *tenebrosa* and *patula*, *hydrophanum* (Hanc.), *finmarchicum* (Verkrüzen), varr. nn. *attenuata* and *scalaris*, and *humphreysianum* (Bennet), all from the arctic coast of Norway ; Sars, Moll. arct. Norveg. pp. 254–264, pl. xxiv. figs. 2–9, and pl. xxv. figs. 1–8, radula of nine of them, pl. x. figs. 6–14.

Buccinum terræ-novæ (Beck) = *undatum*, var. *clathratum* (S. Wood), and *ciliatum* (Fabr.), var. *turrita* (Mörch), Novaya Zemlya ; Leche, Sv. Ak. Handl. xvi. (2) pp. 61–63, pl. ii. fig. 30, and pl. i. fig. 24 ; radula of

the latter, pl. ii. fig. 31. Notes on other species and varieties from the same locality; *id. l. c.* pp. 63–66.

Buccinum belcheri (Reeve), var., shell figured, and *sericatum* (Hancock), radula figured, both from Dobbin Bay, Grinnell Land, 79° 40′ N. lat.; E. A. Smith in Nares's Narrative, &c. ii. pp. 224 & 225.

Buccinum turritum, *amaliæ*, and *elegans*, spp. nn., Verkrüzen, JB. mal. Ges. v. pp. 217–221, Newfoundland. The last = *polare* (Gray), and note on *B. totteni* (Stimps.) = *ciliatum* (Gould, *nec* Fabr.); *id. l. c.* pp. 350 & 351. *B. belcheri* (Reeve), var. *fragile*, Finmark, *B. finmarkianum* (Verkrüzen), different varieties in colour, and *B. undatum*, var. n. *sulcatum*, Newfoundland; *id. l. c.* pp. 352 & 353.

Buccinum marchi (Friele) figured; Kobelt, JB. mal. Ges. v. pl. ix. fig. 8.

Buccinum ovum (Turt.) = *dalei* (Forb. & Haul.) = *tenebricosum*, var. *diaphana* (Midd.), from Finmark and Novaya Zemlya; Leche, Sv. Ak. Handl. xvi. (2) pp. 59 & 60; radula, p. 61, pl. ii. fig. 29.

Buccinopsis eburnea (M. Sars, as *Tritonium*), G. O. Sars, Moll. arct. Norveg. p. 265, pl. xiii. fig. 13; radula, pl. x. fig. 15; operculum, pl. xviii. fig. 51.

Cominella, Gray, list of known species (34), by Kobelt, JB. mal. Ges. v. pp. 231–235. *C. huttoni*, new name for *quoyana* (A. Ad.), nec *quoyi* (Kien.), *id. l. c.* p. 233. [*C. nodicincta* (Martens) and *tennicostata* (T. Woods) are omitted.]

Cominella nodicincta, sp. n., Martens, SB. nat. Fr. 1878, p. 23, Auckland Islands.

Chlanidota, subg. n. of *Cominella*; shell thin, swollen like *Dolium*, whitish, with woolly periostracum, operculum very small, median plate of the radula 5-toothed. *Com. (Chl.) vestita*, sp. n., Kerguelen Island; Martens, SB. nat. Fr. 1878, pp. 23 & 24.

Hindsia (Ad.), monograph, including descriptions of 15 and figures of 14 species, by Kobelt, in Küster's Conch. Cab. part 275, pp. 314–325, pl. lxxvii.

Pseudoliva (Swains.): list of known species (11), by Kobelt, JB. mal. Ges. v. pp. 235 & 236.

Adamsia (Dunker): the like (2 sp.), *id. l. c.* p. 236.

Macron æthiops (Reeve) = *kelleti* (Hinds), California, Stearns, P. Ac. Philad. 1878, p. 397, pl. vii. figs. 3–5. *M. lividus* (A. Ad.), is perhaps a dwarf form of it; p. 398, fig. 6.

Nassidæ.

Nassa frigens, sp. n., Martens, SB. nat. Fr. 1878, p. 134, West Africa, 10° N. lat. 17° W. long., 360 fath.

Nassa bifaria (Baird), *marrati* (Smith), *echinata* (A. Ad.), and *sistroides* (Nevill); notes from Andamanese specimens by E. A. Smith, P. Z. S. 1878, pp. 808–810, the three former pl. l. figs. 7–9.

Nassa seminulum, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1029. Kei Bandan, Papuan Islands.

Nassa (*Cyclonassa*) *neritea* (L.): *Nanina unifasciata* (Risso) is its

young state; *Nassa italica* (Issel) is the young of a peculiar more elevated variety, for which the name *italica* may be retained; *Cyclope asteriscus* (Michaud) = *pellucida* (Risso) is another variety. Issel, Ann. Mus. Genov. xi. p. 426.

Bullia persica, sp. n., E. A. Smith, P. Z. S. 1878, p. 730, pl. xlvi. fig. 11, Bushire, Persian Gulf.

Olividæ.

Oliva. H. C. Weinkauff has concluded his monograph of this genus, including *Olivella*, bringing up the number of described species to 163, in Küster's Conch. Cab. part 268, pp. 121–172, pls. xxxiv.–xxxix.; the greater part of the descriptions and figures are copied from Sowerby's Thes. Conch., no new or previously unfigured species is contained in it. Weinkauff also gives a list of the known species, with synonyms, quotations of figures, and indication of localities, including also *Agaronia*; JB. mal. Ges. v. pp. 108–123.

Olivella (Swains.): list of the known species (51) with same indications (see *Oliva*), and three subdivisions; *Dactyliola*, type *nana* (Lam.), *Olivella* s. str., type *nivea* (Gmel.), and *Olivina* (Orb.). Weinkauff, JB. mal. Ges. v. pp. 123–130.

Ancillaria. Weinkauff has published a monograph of this genus in Küster's Conch. Cab., parts 269 & 273, pp. 1–44, pls. i.–xii., describing and figuring 49 known species; many figures are copied from Reeve's Conch. Icon.

Fasciolariidæ.

Fusus bruijni, sp. n., Tapparone-Canefri, Ann. Mus. Genov. viii. [1876], p. 323, Geelvink Bay, New Guinea.

Fusus? abnormis, sp. n., E. A. Smith, P. Z. S. 1878, p. 811, pl. l. fig. 10, Andaman Islands [looks something like a *Nassa*].

Boreofusus, g. n., for *Fusus berniciensis* (King), on account of the radula, in which the lateral plates are broad and many-toothed, as in *Fusciolaria*. Sars, Moll. arct. Norveg. p. 278, pl. xiv. fig. 2; radula, pl. x. fig. 26; operculum, pl. xviii. fig. 56, Finmark, 50–80 fath.

Tudicula inermis, sp. n., Angas, P. Z. S. 1878, p. 610, Singapore?.

Latirus crenulatus (Kien., *nec* Reeve), Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1029, Aru Islands.

Latirus cayohuesonicus, sp. n., Sowerby, P. Z. S. 1878, p. 796, pl. xlviii. fig. 4, Key West.

Latirus decoratus (A. Adams) and *fastigium* (Reeve), from Andaman Islands, E. A. Smith, P. Z. S. 1878, p. 812, pl. l. figs. 11 & 12.

Meyeria [see among the Muricidæ].

Mitridæ.

Mitra tricolor (Gmel.), var. n. *pallida*, Issel, Ann. Mus. Genov. xi. p. 419, woodcut, Isola dei Cani, Mediterranean Sea.

Mitra wrighti, sp. n., Crosse, J. de Conch. p. 57, pl. i. fig. 1, Japan.

Mitra berthæ, *fulvo-lirata*, and *acuta*, China Sea, *deburghiæ*, Tahiti, and *punctuvata*, locality unknown, spp. nn., Sowerby, P. Z. S. 1878, p. 797 & 798, pl. xlviii. figs. 5–12. *M. mœsta* (Reeve) and *mariæ* (A. Adams), Andamanese specimens, E. A. Smith, P. Z. S. 1878, p. 813, pl. l. figs. 13 & 14. *M. tatei*, Angas, P. Z. S. 1878, p. 861, pl. liv. fig. 8, *M. schomburgki* and *M.* (*Costellaria*) *lincolnensis*, id. *l. c.* pl. xviii. figs. 10–13, spp. nn., South Australia.

Volutidæ.

Voluta prævostiana, sp. n., = *lyriformis*, Kiener, *nec* Swains.; Crosse, J. de Conch. xxvi. p. 165, Japan.

Volutomitra grœnlandica (Beck); radula, with one row of plates which are bifurcate at the base, and have a large point, Northern Norway, 80–100 fath., very rare. Sars, Moll. arct. Norveg. p. 244, pl. xxiii. fig. 12; radula, pl. ix. fig. 12.

Columbellidæ.

Columbella (*Anachis*) *nigricostata*, sp. n., E. A. Smith, P. Z. S. 1878, p. 807, pl. l. fig. 6, Andaman Islands.

Strombina terquemi, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876], p. 265, pl. v. figs. 1 & 2, locality unknown.

Pyrene rosacea (Gould) = *Columbella holbœlli* (Möller) and *P. costulata* (Cantraine) = *C. haliaeti* (Jeffr.): Sars, Moll. arct. Norveg. p. 251, pl. xvi. fig. 1, and pl. xxiii. fig. 16; radula of both, pl. x. figs. 1 & 2; operculum of the first, pl. xviii. fig. 50; Lofoden Islands, the latter in nearly 400 fath.

Pyrene flexuosa, sp. n., Hutton, J. de Conch. xxvi. p. 25, New Zealand.

Pyrene eustomus, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876], p. 266, pl. v. figs. 3 & 4.

Marginellidæ.

Marginella. H. C. Weinkauff begins a monograph of this genus, describing and figuring 48 known species, in Küster's Conch. Cab. part 278, pp. 1–40, pls. v.–x. *M. lœbbeckeana*, new name for *burchardi* (Reeve, *nec* Dunker), p. 33, pl. v. figs. 9 & 12, East Indies. [Jousseaume's monograph of this genus, R. Z. 1875, appears to be unknown to the author.]

Marginella (*Granula*) *microscopica*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1030, Sorong, N.W. New Guinea.

Serrata caledonica, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876], p. 267, pl. xii. figs. 8–10, New Caledonia.

Volvarina bouvieri, sp. n., *id. l. c.* p. 268, pl. xii. figs. 5–7, Cape Verde Islands.

Gibberula lucia, sp. n., *id. l. c.* p. 269, pl. xii. figs. 11–13, Cape Verde Islands.

Conidæ.

Conus ermineus (Born) = *narcissus* (Kien.), and *pennaceus* (Born) =

prælatus (Hwss.), not the *pennaceus* of subsequent authors; Brauer, SB. Ak. Wien, lxxvii. Abth. i. pp. 147 & 149.

Conus pastinaca (Lam.): critical note about it, three distinct species being united in the Delessertian collection under this name, by E. A. Smith, P. Z. S. 1878, pp. 731 & 732.

Conus melvilli, Key West, *carnalis*, locality unknown, *catenatus*, Panama ?, spp. nn., Sowerby, P. Z. S. 1878, pp. 795 & 796, pl. xlviii. figs. 1–3.

Conus andamanensis, sp. n., E. A. Smith, P. Z. S. 1878, p. 804, pl. i. figs. 1 & 1 *a*, Andaman Islands.

Conus crosseanus (Bernardi), var. n. *lineata*, Crosse, J. de Conch. xxvi. p. 168, pl. iii. fig. 3, New Caledonia.

Pleurotomidæ.

Pleurotoma novaia-semliensis, sp. n., *impressa* (Beck), *pyramidalis* (Ström) var. n. *jenisseensis*, *violacea* (Mighels) var. n. *mærchi* = *gigas* (Verkrüzen) and var. *gigantea* (Mörch), Novaya Zemlya and Kara Sea, Leche, Sv. Ak. Handl. xvi. (2) pp. 53–57, pl. i. figs. 15–19. *P. pyramidalis*, var. n. *lævior*, and *violacea*, var. n. *brevis*, id. *l. c.* pp. 55 & 56, Novaya Zemlya.

Pleurotoma incrassata (Brocchi) = *maravignæ* (Bivona) recent in the Mediterranean, Island Galita; Issel, Ann. Mus. Genov. xi. p. 420, woodcut.

Pleurotoma studeriana, sp. n., Martens, SB. nat. Fr. 1878, p. 22, Kerguelen Island, 120 fath.

Pleurotoma (*Candelabrum*) *cathedralis*, sp. n., Dall, Bull. Mus. C. Z. v. p. 61, Gulf of Mexico, below 200 fath. (Not described.)

Pleurotoma (*Drillia*) *wilmeri*, sp. n., and *variabilis* (E. A. Smith, 1877); E. A. Smith, P. Z. S. 1878, p. 805, pl. l. figs. 2–4, Andaman Islands.

Drillia tricarinata, sp. n., Tenison-Woods, P. Linn. Soc. N. S. W. ii. p. 265, Port Jackson Heads, 45 fath.

Drillia cheesemani, sp. n., Hutton, J. de Conch. xxvi. p. 16, New Zealand.

Clathurella leufroyi (Mich.); radula, Sars, Moll. arct. Norveg. p. 348, pl. viii. fig. 2; in *C. linearis* (Mont.) no radula was found.

Mangelia nebula (Mont.), *brachystoma* (Phil.), *attenuata* (Mont.), and *costata* (Donov.), radula; *id. l. c.* pl. viii. figs. 4–7.

Raphitoma (Bellardi) restricted by G. O. Sars to the species which show only spiral sculpture, in opposition to *Clathurella*, in which the plaited or latticed species will remain; outer margin of the aperture simple, with a deep notch near the suture; no radula could be found. Type, *R. anceps* (Eichwald) = *Pleurotoma boreale* (Lovén) = *Defrancia teres* (Forbes), Lofoden Islands, 200–300 fath., and *amœna*, sp. n., Finmark, 60–110 fath. Sars, Moll. arct. Norveg. pp. 218–220, pl. xvii. figs. 9 & 10.

Taranis mærchi (Malm, as *Trophon*); Sars, Moll. arct. Norveg. p. 220, pl. xvii. fig. 7, Coast of Norway from Vadsö to Christiania.

Thesbia (Jeffreys, MS.), g. n. Shell thin, nearly smooth, apex irregularly twisted, outer lip of the aperture thin with distinct notch, and short

channel; radula with two rows of hooks which are flattened and bifurcate at the base, lanceolate towards the tip. *T. nana* (Lovén, as *Tritonium*) = *Columbella nana* of some authors; coast of Norway, 40–100 fath. Sars, Moll. arct. Norveg. p. 221, pl. xvi. fig. 2, radula, pl. viii. fig. 3.

Bela obliqua, angulosa, scalaroides, assimilis, conoidea, expansa, spp. nn., *pyramidalis* (Ström.) = *rahli* (Beck) with var. n. *semiplicata, pingeli* (Beck), *cancellata* (Migh.), *declivis* (Lov.) var., *elegans* (Möll.), *cinerea* (Möll.), *nobilis* (Möll.), *scalaris* (Möll.) with var. n. *ecarinata, rugulata* (Möll.), *exarata* (Möll.), *mitrula* (Lov.), *harpularia* (Couth.) = *woodiana* (Möll.) with var. *rosea, trevelyana* (Turt.), *viridula* (Möll.), *tenuicostata* (M. Sars), *bicarinata* (Couth.) with var. *rufescens, violacea* (Migh.) = *cylindrica* (Möll.) with var. *levior, simplex* (Middend.) = *lævigata* (Dall.) = *gigas* (Verkr.), all from the Arctic Coast of Norway. Sars, Moll. arct. Norveg. pp. 222–240, pl. xvi. figs. 3–20, and pl. xvii. figs. 1–4; radula, pl. viii. figs. 1–17, pl. ix. figs. 1–9; operculum of *B. nobilis*, pl. xviii. fig. 42.

Bela gilpini, multicostata, and *undata*, spp. nn., Verkrüzen, JB. mal. Ges. v. pp. 226–229, Bay of Fundy.

Typhlomangelia (M. Sars) *nivalis* (Lovén); Sars, Moll. arct. Norveg. p. 241, pl. xvii. fig. 1, radula, pl. ix. fig. 10, operculum, pl. xviii. fig. 43, coast of Norway, from Christiania to Finmark, 80–300 fath., rare.

Daphnella cancellata, sp. n., Hutton, J. de Conch. xxvi. p. 18, New Zealand.

Spirotropis, g. n. Shell with blunt mamillar apex and numerous keeled whorls, aperture with a deep notch far from the suture and an elongate channel; operculum distinct; radula with rudimentary median plates, semilunar toothed lateral and lanceolate marginal plates. *S. carinata* (Philippi, as *Pleurotoma*), Northern Norway, 80–300. fath., and Hebrides. Sars, Moll. arct. Norveg. p. 242, pl. xvii. fig. 5; radula, pl. ix. fig. 11; operculum, pl. xviii. fig. 44. [Radula very different from that of the other *Pleurotomidæ*.]

Terebridæ.

Terebra lauretanæ, sp. n., Tenison-Woods, P. Linn. Soc. N. S. W. ii. p. 262, Port Jackson Heads, 45 fath.

Cancellariidæ.

Admete viridula (Fabr.) varr. nn. *undata, levior, elongata*, and *distincta*, Novaya Zemlya, Leche, Sv. Ak. Handl. xvi. 2, pp. 47 & 48, the two latter pl. i. figs. 13 & 14.

Admete viridula (Fabr.) with var. *undato-costata* (Verkrüzen) and var. n. *producta*, Sars, Moll. arct. Norveg. p. 217, pl. xiii. figs. 1 & 2.

Cerithiopsidæ.

Cerithiopsis scalaris, sp. n. (described Atti Ac. Palerm. 1875, as *corona* var.), Monterosato, J. de Conch. xxvi. p. 319, Coast of Algeria.

Cerithiopsis contigua, sp. n., *id. l. c.* p. 156, Palermo.

Cerithiopsis costulata (Möller) = *Cerithium arcticum* (Mörch), Sars, Moll. arct. Norveg. p. 189, pl. xv. fig. 7, pl. vii. fig. 5, operculum, pl. xviii. fig. 28.

Cassididæ and Ranellidæ.

[*Dolium*] *Buccinum sulcosum* (Born) = *Dolium fasciatum* (Lam.), not *Cassis sulcosa* (Brug.); Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 159.

Oniscia (Sow.); list of 10 known species by Kobelt, JB. mal. Ges. v. pp. 238 & 239.

Triton [*Tritonium*; *Triton* is pre-occupied in *Reptilia*]. W. Kobelt concludes his monograph in Küster's Conch. Cab. pt. 272, pp. 239–273, pls. lxviii.–lxx., bringing up the number of known and figured species to 119; the following have not been before figured: *T. waterhousii* (Adams & Angas, 1864), p. 257, pl. lxix. figs. 1 & 2, Port Lincoln; *africanus* (A. Adams, 1854), p. 258, pl. lxix. figs. 3 & 4, Ichaboe; *poulseni* (Mörch, 1877), p. 264, pl. lxx. figs. 1 & 2, *krebsi* (Mörch, 1877), p. 265, pl. lxx. figs. 3 & 4; *testaceus* (Mörch, 1852), p. 266, pl. lxx. figs. 7 & 8, all three from the West Indies. A list of known species, 125 spp., with critical remarks on the subdivisions; *id.* JB. mal. Ges. v. pp. 241–250 & 360–369.

Tritonium (*Simpulum*) *strangii* (A. Ad.), from Andaman Islands, E. A. Smith, P. Z. S. 1878, p. 816, pl. l. fig. 16.

Persona (Montf.); list of the known 6 species by Kobelt, JB. mal. Ges. v. p. 370.

Ranella pusilla (Brod.) from the Andaman Islands, and on its synonyms; E. A. Smith, P. Z. S. 1878, p. 815, pl. l. fig. 15.

Ranella polychloros, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875] p. 1028, Aru Islands.

Cypræidæ.

Cypræa ingloria, sp. n., Crosse, J. de Conch. xxvi. p. 166, pl. iii. fig. 2, Southern Africa.

Cypræa artuffeli, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876] p. 81, Japan, near *clandestina* (L.) *C. erronea* (L.), distinct from *ovum* (Gmel.) = *olivacea* (Lam.), *id. l. c.* p. 79. New Caledonian specimens of *C. arabica*, *eglantina*, *tabescens*, *erronea*, *stolida*, *lynx*, and *icterina* differ from the typical forms by flattened sides, more prominent extremities and blacker coloration; *C. crossii*, *caledonica*, and *barthelemii* are such New Caledonian varieties of *stolida*, *lynx*, and *icterina*; id. *l. c.* p. 78.

Cypræa spadicea (Gray) occurs near S. Diego, California; Button, J. de Conch. xxvi. p. 67, pl. i. fig. 2.

Cypræa controversa (Gray) from California is distinct from *isabella* (L.); Stearns, P. Ac. Philad. 1878, p. 399.

Cypræa peasii (Sow.). Monstrous growth; E. A. Smith, P. Z. S. 1878, p. 731, pl. xlvi. figs. 13 & 14.

Naticidæ.

Natica heros (Say) bores round holes in *Mactra solidissima* (Chemn.) in order to feed upon it; Leidy, P. Ac. Philad. 1878, p. 332.

Natica clausa (Brod. & Sow.), forma typica and *elatior* (Middend.) and *N. affinis* (Gmel.) distinct from the preceding; Sars, Moll. arct. Norveg. pp. 159 & 160, pl. xii. fig. 1; pl. xxi. figs. 12–14, radula, pl. v. figs. 15 & 16, operculum of the former, pl. xviii. fig. 12.

Natica grisea and *sculpta*, spp. nn., Martens, SB. nat. Fr. 1878, p. 24, Kerguelen Island.

Natica. A sinistral undetermined species subfossil from Novaya Zemlya; Leche, Sv. Ak. Handl. xvi. (2) p. 50.

Natica subcostata, sp. n, Tenison-Woods, P. Linn. Soc. N. S. W. ii. p. 263, Port Jackson Heads, 45 fath.

Lunatia grœnlandica (Beck) and *nana* (Möller), Sars, Moll. arct. Norveg. pp. 158 & 159, pl. xxi. figs. 15 & 16; radula, pl. v. figs. 13 & 14; operculum of *L. intermedia* (Phil.), pl. xviii. fig. 11.

Lunatia australis, sp. n., Hutton, J. de Conch. xxvi. p. 23, New Zealand.

Neverita (*Lunatia*) *parvula*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. viii. [1876] p. 325, Geelvink Bay, New Guinea.

Mamma zoologica, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876] p. 272, pl. xii. fig. 16, locality unknown.

Ampullina smithi (Brown) = *Natica flava* (Gould) = *N. aperta*, (Lovén); Sars, Moll. arct. Norveg. p. 155, pl. xii. fig. 2, pl. xxi. fig. 18, living animal very voluminous, without eyes, p. 346; radula, pl. v. fig. 9, operculum, pl. xviii. fig. 9.

Natica (*Amauropsis*) *perscalpta*, sp. n., Martens, SB. nat. Fr. 1878, p. 25, Kerguelen Island, 120 fath.

Amaurella glabrata and *semistriata* (A. Adams) are, by a remarkable mistake, figured by Sowerby in the continuation of Reeve's Conch. Icon. pts. 340 & 341 in the genus *Stylifer*, figs. 18 & 20, but what Sowerby calls *S.* (*Amaurella*) *japonica* (H. Adams), fig. 9, is no *Amaurella*, but a true *Stylifer*.

Haliotinella patinaria (Guppy, 1876). The author persists in thinking this is not the internal shell of *Pleurobranchus*, but a distinct genus probably belonging to the *Naticidæ*; J. de Conch. xxvi. pp. 321 & 322, pl. x. fig. 1, West Indies. [*Cf.* Zool. Rec. xiii. *Moll.* p. 13.]

Velutinidæ.

Velutina lanigera (Möller), Sars, Moll. arct. Norveg. p. 146, pl. xii. fig. 3; radula of *V. lævigata* (Penn.), pl. v. fig. 3.

Morcillia undata (Brown) = *Velutina zonata* (Gould), with var. n. *expansa*; id. *l. c.* p. 147, pl. xxi. figs. 6 & 7; radula of the first, pl. v. fig. 4.

Velutella flexilis (Mont.) = *plicatilis* (Lov., Jeffreys, *nec* O. F. Müller), and *cryptospira* (Middend.); *id. l. c.* pp. 148 & 149, pl. xxi. figs. 8 & 9; radula of the first, pl. v. fig. 5.

Allerya = *Scutulum*, see Pulmonata Thalassophila.

Marseniidæ.

Lamellaria latens (Müll.), Sars, *l. c.* p. 150, pl. xii. fig. 4; radula, pl. v. fig. 6.

Marsenina prodita (Lovén), *micromphala* (Bergh), and *grœnlandica* (Möller); *id. l. c.* pp. 150–152, pl. xii. fig. 5, pl. xxi. figs. 10 & 11; radula of the first, pl. v. fig. 7.

Onchidiopsis glacialis (M. Sars), *id. l. c.* p. 153, pl. xii. fig. 6.

Trichotropidæ.

Trichotropis tenuis (E. A. Smith, 1877), off Cape Louis Napoleon, Grinnell Land, 79° 38′ N. lat., 25 fath., is not an abnormally grown specimen of *bicarinata*; E. A. Smith, in Nares's Narrative, &c., ii. pp. 226 & 227, with figure.

Trichotropis krœyeri (Philippi) = *Cancellaria arctica* (Middend.) = *T. dolium* (Mörch), from Novaya Zemlya; Leche, Sv. Ak. Handl. xvi. (2) p. 47, pl. i. fig. 12.

Trichotropis borealis (Brod. & Sow.), var. n. *turrita*; id. *l. c.* p. 46, Kara Sea.

Trichotropis conica (Möller), Sars, Moll. arct. Norveg. p. 163, pl. xiii. fig. 3; radula of *T. borealis*, ibid. pl. v. fig. 2; operculum, pl. xviii. fig. 13.

Torellia vestita (Jeffr.), var., *id. l. c.* p. 162, pl. xxii. fig. 1; radula, pl. vi. fig. 1; operculum, pl. xviii. fig. 14.

Lœocochlis granosa (Wood) = *Triferis macandreæ* (H. Ad.) = *nivea* (M Sars) = *pommeraniæ* (Dunker & Metzger), one specimen found alive at the Lofoden Islands, 300 fath.; Sars, Moll. arct. Norveg. p. 190, pl. xiii. fig. 6; operculum, pl. xviii. fig. 29, resembling that of *Cerithium*.

Struthiolariidæ.

Struthiolaria (Lam.), list of 6 known species by Kobelt, JB. mal. Ges. v. pp. 239 & 240.

Strombidæ.

Rostellaria luteostoma, sp. n., Angas, P. Z. S. 1878, p. 313, pl. xviii. figs. 8 & 9, Kurrachi.

Xenophoridæ.

Xenophora digitata, sp. n., Martens, SB. nat. Fr. 1878, p. 135, Western Africa, 10° N. 170° W. 150 fath.

Aporrhaidæ.

[*Aporrhais*] *Chenopus pes-pelecani* (L.), several varieties; Issel, Ann. Mus. Genov. xi. p. 428, woodcuts.

Aporrhais serresianus (Mich.), adult and juvenile forms; Sars, Moll.

'arct. Norveg. pp. 192 & 193, pl. xxii. fig. 7, and pl. xiii. fig. 4; radula, pl. vii. fig. 7; operculum, pl. xviii. fig. 30; very young specimens at the Lofoden Islands, 300 faths.

Cerithiidæ.

Cerithium (*Vertagus*) *kochi* (Phil.) and *turritum* (Sow.), from the Andaman Islands; E. A. Smith, P. Z. S. 1878, p. 817, pl. l. figs. 18 & 19.

Lovenella, g. n.; shell subulate, whorls numerous, sculptured, base flattened, aperture prolonged into a distinct open channel; operculum ear-shaped, with minute lateral spire; median plate of the radula 3-toothed, marginal plates short, hooked, without teeth. *L. metula* (Lovén, as *Cerithium*), Sars, Moll. arct. Norveg. p. 187, pl. xiii. fig. 5; radula, pl. vii. fig. 4; operculum, pl. xviii. fig. 27.

Triforis perversa (L.), radula, Sars, Moll. arct. Norveg. pl. vii. fig. 8; operculum, pl. xviii. fig. 31.

Triforis perversa (L.), distinct by its larger size and the different shape of the summit from *adversa* (Montagu), both dredged at Palermo; Monterosato, J. de Conch. xxvi. p. 155.

Cerithiopsis [suprà, p. 39].

Turritellidæ.

Turritella infra-constricta, sp. n., E. A. Smith, P. Z. S. 1878, p. 817, pl. l. fig. 20, Andaman Islands.

Turritella incisa, sp. n., Tenison-Woods, P. Linn. Soc. N. S. W. ii. p. 262, Port Jackson Heads, 45 fath.

Turritellopsis, g. n., distinct from *Turritella* only by the radula, in which the median plate is thin, membranaceous, bilobate, without hooked tip. *T. acicula* (Stimpson, as *Turritella*), Vadsö. Sars, Moll. arct. Norveg. p. 186, pl. x. fig. 14; radula, pl. vii. fig. 2; operculum, pl. xviii. fig. 25.

Melaniidæ.

[*Melania*] *Helix plicaria* (Born) = *Melania costata* (Quoy & Gaim.), and *H. maculata* (Born) = *M. flammulata* (V. d. Busch); Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 184.

Melania formosensis, *dicksoni*, *obliquigranosa*, and *subplicatula*, spp. nn., E. A. Smith, P. Z. S. 1878, pp. 728 & 729, pl. xlvi. figs. 4–10, Formosa.

Melania recentissima, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1030, Aru Islands.

Melania rossiteri, sp. n., Gassies, J. de Conch. xxvi. p. 340, New Caledonia.

Dorysa consolidata (Brug.) = *decollata* (Chemn.) = *circumsulcata* (Busch) = *scarabus* (Reeve), Marañon and Rio Branco, *inconspicua*, sp. n., Brazil, and four other known species, described by A. Brot, in Küster's Conch. Cab. part 271, pp. 353–358, pl. xxxvi.

Claviger (Haldeman, 1842 [preoccupied in *Coleoptera*]) = *Vibex* (Gray, 1847, not 1840, *nec* Oken, 1817), adopted as the generic name for *Melania aurita* (Müll., Fér.), and seven known species described, by A. Brot, in Küster's Conch. Cab. part 271, pp. 359–368, pls. xxxvi. & xxxvii.

Melanatria (Bowdich), some species figured, but not yet described, by Brot, *l. c.* part 271, pl. xlii.

Hemisinus (Swains.). Monograph of this genus ; 36 species described, including as new *H. martorellii*, Cuba, *muzensis*, Colombia, *planogyrus*, Lima, *schneideri*, Marañon, and *distortus*, locality unknown, Brot, *l. c.* part 271, pp. 367–399, pl. xxxviii.–xli. [The author continues to place the European *Melanopsis acicularis* (Fér.) in the same genus with the typical South American species, which the Recorder thinks very artificial.]

Paludomus burmanica (Nevill, 1877), Anderson, Zool. Researches during the Yunnan Expedition, p. 895, pl. lxxx. fig. 2, Yaylaymaw.

Paludomus grandidieri (Crosse & Fischer, 1872), Madagascar, figured by the authors, J. de Conch. xxvi. pl. i. figs. 3 A–C.

Paludomus africana and *exarata*, spp. nn., Martens, MB. Ak. Berl. 1878, p. 297, pl. ii. figs. 11–16, Finboni, coast of Zanzibar. [Perhaps congeneric with *Cleopatra bulimoides*.]

Litorinidæ.

Litorina. H. C. Weinkauff continues Küster's monograph of this genus, with additions to the species described, and description of other known species ; Conch. Cab. part 269, pp. 25–40.

Litorina litorea (L.), *rudis* (Donov.). var. *grœnlandica*, *palliata* (Say), and *obtusata* (L.), radula ; Sars, Moll. arct. Norveg. pl. vi. figs. 3–6 ; operculum of *L. rudis*, pl. xviii. fig. 15.

Litorina palliata (Say) distinct from *obtusata* ; Verkrüzen, JB. mal. Ges. v. p. 350.

Litorina intermedia (Phil.) and *angulifera* (Lam.) live in mangrove swamps, in brackish water, the specimens become less solid as the water in which they live is less salt ; J. S. Gibbons, Q. J. Conch. 1878, No. 15, pp. 339 & 340. [The occurrence of *L. scabra*, L., on the leaves of mangroves was indicated by Rumph, in his "Amboinsch Rariteitkamer," p. 98, under the name of *Buccinum foliorum*, and has been also observed by the Recorder in Mal. Bl. 1863, p. 80.]

Littorina beccarii, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1031, Sorong, N.W. New Guinea.

Tectaria montrouzieri, sp. n., P. Fischer, J. de Conch. xxvi. p. 212, Art Island, New Caledonia.

Lacuna divaricata (Fabr.), and *pallidula* (Dacosta), radula, Sars, Moll. arct. Norveg. pl. vi. figs. 7 & 8 ; operculum of the latter, pl. xviii. fig. 16.

Fossarus granulum, sp. n., Brugnone, Miscell. Mal. i. [1873] pl. xiii. fig. 25, Trapani.

Plesiotrochus, g. n. "Testa imperforata, conico-elongata, non varicosa ; anfractus numerosi : apertura subrhombea, intus lævigata, haud margaritacea, ad basin in canalem brevem producta, labro medio subrostrato, columella simplici, edentata." *P. souverbianus*, sp. n., Fischer, J. de Conch. xxvi. p. 212, Lifu Island, Loyalty Archipelago.

Raulinia (Mayer, J. de Conch. xii., 1864, p. 180) *badia*, sp. n., J. E.

'Tenison-Woods, P. Linn Soc. N. S. W. ii. (3) p. 264, Port Jackson Heads, 45 fath., the first known recent species.

Rissoellidæ.

Jeffreysia globularis (Jeffr.), Sars, Moll. arct. Norveg. p. 347, pl. xxxiii. fig. 8, radula, pl. vi. fig. 16, Tromsö, Norway.

Rissoidæ.

Rissoina. Sowerby, in the continuation of Reeve's Conch. Icon. parts 340 & 341, figures in the genus *Rissoa* the following species, apparently not before figured: *R. instricta* (Menke), fig. 87, *lævissima* (C. B. Ad.), fig. 93, *princeps* (C. B. Ad.), fig. 95, *flexuosa* (Gould), fig. 97, *villica* (Gould), fig. 98, *triticea* (Pease), fig. 102, *woodwardi* (Carp.), fig. 104, *trochlearis* (Carp.), fig. 105. *Rissoa buriana*, fig. 90, and *catesbiana*, fig. 94, are new names for *Rissoina concinna* (A. Ad.) and *scalarella* (C. B. Ad.), which are preoccupied in the genus *Rissoa* [but not in *Rissoina*; the latter, moreover, = *chesneli* (Mich.)]. *R. sulcifera* (Troschel), fig. 96, is wrongly indicated from Belgium, it comes from Peru; see Arch. f. Nat. 1852.

Rissoina cretacea and *cylindracea*, spp. nn., J. E. Tenison-Woods, P. Linn. Soc. N. S. W. ii. (3) p. 265, Port Jackson Heads, 45 fath.

Alvania jeffreysi (Waller), *cimicoides* (Forbes) = *sculpta* (Lovén) and *abyssicola* (Forbes); Sars, Moll. arct. Norveg. pp. 175 & 176, pl. x. figs. 3–5; radula of the second, pl. vi. fig. 12; operculum, pl. xviii. fig. 20.

Rissoa. The monograph of this genus in Reeve's Conch. Icon. parts 340 & 341, concluded by Sowerby, pls. x.–xiii.: species, pp. 86–123. Most of the species contained here belong to *Rissoina*. *R. australis*, sp. n., fig. 123, Australia.

Rissoa interrupta (Ad.), with var. n. *bifasciata*, and var. *exilis* (Jeffr.), *R. inconspicua* (Alder), var. and *R. turgida* (Jeffr.); Sars, Moll. arct. Norveg. pp. 180–183, pl. x. figs. 9–12, and pl. xxii. figs. 5 & 6; radula of *R. violacea* (Desm.), *ibid.* pl. vi. fig. 13; operculum of the same, pl. xviii. fig. 21.

Rissoa sibirica, sp. n., Leche, Sv. Ak. Handl. xvi. 2, p. 38, pl. l. fig. 10, Kara Sea; near *R. crassistriata* (S. Wood). *R. sulcosa* (Mighels, as *Phasianella*), from Novaya Zemlya; *id. l. c.*

Rissoa jan-mayeni, sp. n., Friele, N. Mag. Naturv. 1878, Jan Mayen Island, Arctic Sea.

Rissoa ambigua, sp. n., Brugnone, Miscell. Mal. i. [1873] p. 9, fig. 14, Trapani; = *alleryana* (Aradas & Benoit, 1874), *id. op. cit.* ii. [1876], p. 25.

Rissoa flammulata, sp. n., Hutton, J. de Conch. xxvi. p. 28, New Zealand. [Probably a *Phasianella*.]

Rissostomia, g. n., proposed for *Rissoa membranacea* (Adams), on account of differences in the radula, by Sars, Moll. arct. Norveg. p. 179; radula, pl. vi. fig. 14; operculum, pl. xviii. fig. 22.

Onoba (including *Ceratia* and *Hyala*) *striata* (Mont.), *aculeus* (Gould) = *saxatilis* (Möller) = *arctica* (Lovén), and *proxima* (Alder). Sars, Moll.

arct. Norveg. pp. 171–173, pl. ix. fig. 12, & pl. xxii. figs. 3 & 4; radula of the first, pl. vi. fig. 10; operculum, pl. xviii. fig. 18.

Cingula tumidula, sp. n., Vardö, and *castanea* (Möller), *id. l. c.* pp. 174 & 173, pl. x. figs. 1 & 2; radula of *C. cingillus* (Mont.), *ibid.* pl. vi. fig. 11; operculum, pl. xviii. fig. 19.

Skenea planorbis (Fabr.), radula, *id. l. c.* pl. vi. fig. 15; operculum, pl. xviii. fig. 23.

Hydrobia (Hartmann, 1821) = *Paludestrina* (Orb., 1839); *Littorinella* (Braun, 1842); *Paludinella* (Pfr., 1841) = *Assiminea*; *Amnicola* (Gould), probably a distinct genus, *Bythinella* (Moq. Tand., 1855), and *Peringia* (Paladilhe). P. Fischer discusses the value and original signification of these genera, and comes nearly to the same results as the Recorder gave in Arch. f. Nat. xxiv. 1858, pp. 187–193, which paper was unknown to him; a further rival name, *Leachia* (Risso, 1826), is not mentioned: J. de Conch. xxvi. pp. 133–137.

Hydrobia ulvæ (Penn.) and *minuta* (Totten) = *balthica* (Nilss.), are specifically distinct, the former being rather rare on the coast of Norway, the latter abundant in the inlets and sounds; Sars, Moll. arct. Norveg. pp. 170 & 171, pl. xxii. fig. 2, & pl. ix. fig. 11; Radula of the first, pl. vi. fig. 9; operculum of the second, pl. xviii. fig. 17.

Hydrobia baltica (Nilss.), with whorls more convex than usual, in a pond near the shore at the mouth of the river Jade; *H. ulvæ* (Penn.) in salter water of the sea itself in the same district: H. v. Heimburg, Nachr. mal. Ges. 1878, p. 4.

Hydrobia achaia, sp. n., Clessin, Mal. Bl. xxv. p. 121, pl. v. fig. 3, Eubœa.

Amnicola globosa, *stossichi*, both from Dalmatia, *negropontina*, Eubœa, *elevata*, Welebit Mountains, Croatia, *apennina*, Apennines, *numidica*, Algeria, spp. nn., Clessin, Mal. Bl. xxv. pp. 115–119, pl. iv. figs. 1–5, & pl. v. fig. 4.

Somatogyrus trothis, sp. n., Doherty, Q. J. Conch. 1878, No. 15, p. 341, Ohio River.

Bythinella schmidti (Charp.): anatomical description by S. Clessin, Mal. Bl. xxv. pp. 149–152, pl. vi. (radula).

Bythinella welebitana, Clessin, Mal. Bl. xxv. p. 121, pl. iv. fig. 10, Welebit Mountains, Croatia.

Vitrella tschapecki, sp. n., Clessin, Nachr. mal. Ges. 1878, p. 10, cave near Sauriack, in Carinthia.

Frauenfeldia, new generic name (without generic characters) proposed for *Hydrobia lacheineri* (Pars.) by Clessin, Nachr. mal. Ges. 1878, p. 130.

Belgrandia (Bourg.). Note on the living species by Clessin, Mal. Bl. xxv. p. 101, & Nachr. mal. Ges. 1878, pp. 127–130; he refers to this genus also *Bythinia saviana* (Issel) [which is, according to the locality, the true *Turbo thermalis*, Linn., *nec* auctt.].

Belgrandia occidentalis, sp. n., Clessin, Mal. Bl. xxv. p. 120, pl. iv. figs. 7–9, Coimbra.

Diana [||. Risso, *Pisces*, 1826], subg. n. of *Pyrgula*; first whorls very small, the three last nearly of equal height. *P. (D.) thiesseana*, sp. n., Missolunghi, Clessin, Mal. Bl. xxv. p. 127, pl. v. fig. 8.

Lartetia (Bourg., 1869) = *Micromelania* (Brusina) = *Goniochilus* (Sandberger, 1870). One living species, *L. bourguignati* (Paladilhe), exists in Southern France, and there are perhaps others in or near the Caspian Sea; it seems to be nearly allied to *Baicalia* (Martens), and both belong perhaps rather to the *Melaniidæ*. Sandberger & Clessin, Mal. Bl. xxv. p. 102, & Nachr. mal. Ges. 1878, pp. 125–127.

Homalogyra atomus (Phil.) = *Skenea nitidissima* (Forb. & Haul.). Shell nautiliform, operculum circular, horny; radula quite peculiar, narrow, with three rows of plates, the median strong, with a large tooth reclined backwards, the marginals thin, flat, transverse. Sars, Moll. arct. Norveg. p. 215, pl. xxii. fig. 21; radula, pl. viii. fig. 1. The author establishes for it a new sub-order of the Gastropods, PRIONOGLOSSA; *l. c.* p. 214.

PALUDINIDÆ.

Paludina heliciformis (Frauenfeld); Anderson, Zool. Researches during the Yunnan Exp., p. 892, pl. lxxx. fig. 1.

Margarya melanioides (Nevill, 1877); *id. l. c.* p. 891, pl. lxxx. fig. 5, Lake Tali, Yunnan.

Bithynia tentaculata, var. *bottnica* (Anderson in litt.); Clessin, Mal. Bl. xxv. p. 71, Northern part of the Baltic Sea.

Bithynia turrita (Blanford, 1869); Nevill, in Anderson's Zool. Researches during the Yunnan Exp., p. 890, pl. lxxx. fig. 4, Upper Burma.

VALVATIDÆ.

Valvata stoliczkana, sp. n., Nevill, Moll. Yark. Exp. p. 12, figs. 34–36, Yarkand.

AMPULLARIIDÆ.

Note on air-breathing, by Semper, *suprà*, p. 11.

Lanistes ciliatus, sp. n., Martens, MB. Ak. Berl. 1878, p. 296, pl. ii. figs. 8–10, Finboni, coast of Zanzibar.

VERMETIDÆ.

Vermetus gigas (Bivona): simple internal septa; Owen, P. Z. S. 1878, p. 966, woodcut.

CÆCIDÆ.

Cæcum obsoletum (Carp.) found on the coast of Algeria; Monterosato, J. de Conch. xxvi. p. 315.

CAPULIDÆ.

Pilidium radiatum (M. Sars); G. O. Sars, Moll. arct. Norveg. p. 144, pl. viii. fig. 6; radula, pl. v. fig. 1.

Calyptræidæ.

Crepidula aculeata (Chemn.) observed in the Marquesas Islands, with a note on its very wide geographical distribution; Garrett, Q. J. Conch. 1878, No. 15, p. 335, & No. 17, p. 416.

Solariidæ.

Solarium trisulcatum, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876] p. 270, pl. xii. figs. 14 & 15, New Caledonia.

Torinia perspectiviuncula (Chemn.), var. from Andaman Islands; E. A. Smith, P. Z. S. 1878, p. 816, pl. l. fig. 17.

[*H*] *Omalaxis supra-nitida* (Wood, as *Adeorbis*); Sars, Moll. arct. Norveg. p. 214, pl. xxii. fig. 20, Lofoden Islands, 200 fathoms.

Trachysma (Jeffreys, MS.), g. n. Shell globular, nearly smooth, resembling *Cyclostrema* in shape, but much thinner, aperture wide, peristome not continuous, outer margin thin, simple. *T. delicatum* (Philippi, as *Cyclostoma*), Lofoden Islands, 200–300 fathoms. Sars, Moll. arct. Norveg. pp. 211 & 212, pl. xxii. figs. 17 & 18.

Scalariidæ.

Scalaria groenlandica (Chemn.), with var. *loveni* and *crebricostata*, and *S. obtusicostata* (Wood); Sars, Moll. arct. Norveg. pp. 194 & 195, pl. x. figs. 15 & 16, pl. xxii. fig. 9, & pl. xxiii. fig. 1. *S. varicosa* (Wood) [*nec* Lam.] found alive at Molde, Norway, 100–150 fathoms, *id. l. c.* p. 348, pl. xxxiii. fig. 9; radula of the first and three other European species, pl. vii. figs. 9–12; operculum of the first, pl. xviii. fig. 30.

Scalaria communis, var. n.? *jolyi*, coast of Algeria; Monterosato, J. de Conch. xxvi. pp. 315 & 316.

Scalaria striatissima, sp. n., *S. celesti* (Aradas, 1853) = *soluta* (Tiberi, 1868) = *frondosa* (Monterosato, *nec* Sow.), Palermo; *id. l. c.* p. 151.

Scalaria symphylla, sp. n., Martens, SB. nat. Fr. 1878, p. 25, Kerguelen Island, 120 fathoms.

Acirsa subdecussata (Cantraine, as *Scalaria*) = *Turritella philippii* (Aradas) = *Mesalia striata* (A. Adams), Palermo: living animal described by Monterosato, J. de Conch. xxvi. p. 151.

Aclis exigua, sp. n., and *walleri* (Jeffr.), Lofoden Islands; Sars, Moll. arct. Norveg. p. 196, pl. xxii. fig. 8, & pl. xi. fig. 18. Radula with numerous simple very minute hooklets; that of *A. supra-nitida* (Wood) figured, pl. vii. fig. 10; operculum, pl. xviii. fig. 33. The author establishes for it a new family, *Aclidæ*, to be placed in the *Ptenoglossa*.

Hemiaclis, g. n. Distinct from *Aclis* by the broader conical shape and less numerous whorls of the shell, and very thin hair-like hooklets of the radula. *H. ventrosa* (Jeffr., MS.) and *glabra*, spp. nn., Lofoden Islands; *id. l. c.* pp. 197 & 198, pl. xi. figs. 14–16; radula of the first, pl. vii. fig. 11; operculum, pl. xviii. fig. 34.

Pyramidellidæ.

Odostomia turgida, sp. n., Lofoden Islands, *unidentata* (Mont.), *acuta* (Jeffr.), *turrita* (Hanl.), and *pallida* (Mont.), with var. n. *crassa*; Sars, *l. c.* pp. 201–203, pl. xi. figs. 5–9 & 12, & pl. xxii. figs. 10–12; operculum of *O. conoidea* (Brocchi), pl. xviii. fig. 37.

Odostomia (*Auriculina*) *fusulus* and (*Pyrgulina*) *nanodea*, spp. nn., Monterosato, J. de Conch. xxvi. pp. 316 & 317, Coast of Algeria.

Auriculina coarctata, sp. n., Finmark, and *insculpta* (Mont.); Sars, *l. c.* pp. 204 & 205, pl. xi. figs. 10–12; operculum of the latter, pl. xviii. fig. 38.

Raulinia [see Litorinidæ].

Liostomia, g. n. Near *Odostomia*; shell smooth, without any trace of columellar fold or tooth; operculum very thin, with minute terminal spire. *L. eburnea* (Stimpson, as *Rissoella*) and *clavulus* (Lovén, as *Turbinella*), Sars, *l. c.* pp. 205–207, pl. x. fig. 13, & pl. xi. fig. 13; operculum of the latter, pl. xviii. fig. 39.

Menestho humboldti (Risso, as *Turbonilla*) and *M. dissimilis* (Tiberi, 1868, as *Odostomia*) = *Turbo striatus* (Brocchi), Palermo; Monterosato, J. de Conch. xxvi. pp. 152 & 153.

Turbonilla rufa (Phil.): Sars, Moll. arct. Norveg. p. 199, pl. xi. fig. 1; operculum, pl. xviii. fig. 35.

Turbonilla undecimsulcata, sp. n., sub-fossil, Hilgard & Hopkins, Rep. Boring Mississippi, 1878 [see p. 28].

Parthenia eximia (Jeffr.), with var. *elongata*, *interstincta* (Mont.), and *spiralis* (Mont.); Sars, Moll. arct. Norveg. pp. 199 & 200, pl. xi. figs. 2–4, & pl. xxii. figs. 13 & 14; operculum of the second, pl. xviii. fig. 36.

Parthenia gracilis, sp. n., Angas, P. Z. S. 1878, p. 862, pl. liv. fig. 9, South Australia.

Chemnitzia calameli, sp. n., Jousseaume, Bull. Soc. Z. Fr. i. [1876], p. 273, Djijelli, Algeria.

Cingulina australis, sp. n., J. E. Tenison-Woods, P. Linn. Soc. N. S. W. ii. p. 263, Port Jackson Heads, 45 fath.

Eulimella scillæ (Scacchi), *compactilis* (Jeffr.), and *ventricosa* (Forbes) = *affinis* (Forb. & Hanl., *nec* Phil.), Sars, Moll. arct. Norveg. pp. 207–209, pl. xi. figs. 17 & 19, pl. xxii. figs. 15 & 16; operculum of the first, pl. xviii. fig. 40.

Odostomia (*Eulimella*) *pointeli* (Folin), two new varieties from Algeria; Monterosato, J. de Conch. xxvi. p. 318.

Mathilda cochleæformis [*cochleif-*], *grano-lirata*, and *retusa*, spp. nn., Brugnone, Misc. Mal. i. [1873] pp. 5 & 6, figs. 1–3, Palermo. The first = *elegantissima* (Costa, 1861), the second a variety of the same; *id. op. cit.* ii. [1876], p. 23.

Aclis [see *suprà*, Scalariidæ].

Eulimidæ.

Eulima intermedia (Cantr.), *distorta* (Desh.), *bilineata* (Alder), and *stenostoma* (Jeffr.), Sars, Moll. arct. Norveg. pp. 210 & 211, pl. xi. figs. 20–24; operculum of the former, pl. xviii. fig. 41.

Eulima piriformis, sp. n., Brugnone, Misc. Mal. i. [1873]. p. 7, fig. 5, Trapani.

Eulima beryllina and *cionella*, spp. nn., Monterosato, J. de Conch. xxvi. p. 154, Palermo.

Styliferidæ.

Stylifer. Monograph by Sowerby, in Reeve's Conch. Icon., parts 340 & 341, 2 pls., 20 species. *S. camingiana* [*-us*], fig. 5, *dubia* (Baird, MS.), New Caledonia, fig. 8, *attenuata*, fig. 11, *thomasiæ*, St. Thomas, West Indies, fig. 15, *bulbiformis*, spec. 18, fig. 17, are apparently new species; *solida*, *barroni*, *speciosa*, *subangulata*, *exarata*, *fastigiata*, figs. 2, 6, 7, 10, 13, 14, & 16, probably not figured before.

SCUTIBRANCHIA.

Neritidæ.

Nerita. Troschel discusses the subgenera, and proposes to distinguish them chiefly by the teeth in the aperture of the shell, rather than by the sculpture of the operculum; the radula exhibits some differences, but they are scarcely available for characterizing the subgenera; he describes and figures the radula of *N. polita* (L.), *peloronta* (Lam.), *lineata* (Chemn.), *birmanica* (Phil.), *multijugis* (Menke), *marmorata* (Reeve), *picea* (Recl.), *yoldii* (Recl.), *plicata* (L.), *ornata* (Sow.), *versicolor* (L.), *plexa* (Chemn.), *exuvia* (L.), *bernhardi* (Recl.), *tessellata* (Gmel.), *exarata* (Pfr.), *planospira* (Anton), *signata* (Macleay), *stella* (Chemn.), *beaneana* (Recl.), *variegata* (Chemn.), *nigerrima* (Chemn.), *commanotata* (Reeve), and *albicilla* (L.). Gebiss d. Schnecken, ii. pp. 183–196, pl. xvii. figs. 3–20, pl. xviii. figs. 1–7.

Neritina. The Recorder has continued his monograph of this genus in Küster's Conch. Cab. part 277, pp. 145–208, pls. xv.–xix., describing and figuring 32 species of the subgenus *Clithon*, with a synoptical table of their chief differences, and beginning the subgenus *Theodoxus*. This part contains *N. discors*, sp. n., p. 160, pl. xvii. figs. 7, 8, & 11, Larentuka, Flores, in warm water; *retro-picta*, sp. n., p. 169, pl. xvii. figs. 18–20, Japan; *hamastoma*, sp. n., p. 167, pl. xiii. figs. 6 & 7, Philippine Islands; *N. squarrosa* (Recl.), varieties *major*, *media*, *cruenta*, *nigro-fasciata*, *nigricans*, and *spinifera*, p. 162, pl. xvi. figs. 13–18, Malayan Archipelago; *N. sowerbiana* (Recl.), var. *polysticta*, *lactiflua*, *maculo-fasciata*, and *intermittens*, p. 171, pl. xviii. figs. 1–4 & 10, Formosa, China, Siam, and Philippines; *N. avellana* (Recl.), var. *typica*, *petholata*, *chlorosticta*, *interrupta*, and *isseliana*, p. 174, pl. xviii. figs. 5–9, 11, & 12, Philippines, Borneo, and Formosa; *N. faba* (Sow.), var. *fasciata*, *sagittata*, and *strigosa*, p. 176, pl. xviii. figs. 14–17, Singapore and Bali; *N. subpunctata* (Recl.), var. *tricolor*, *glandiformis*, and *moluccensis*, p. 179, pl. xviii. figs. 19–24, Malayan Archipelago; *N. retifera* (Beus.) = *reticularis* (Sow.), = *michaudi* (Recl.), with var. *capillulata*, p. 189, pl. xix. figs. 8, 9, & 13–15, East Indies; *N. valanciensis* (Less.) = *mertoniana* (Recl.), var. *conferta*,

polydelta, *diremta*, *frondicincta*, *nigro-bifasciata*, and *parce-picta*, p. 193, pl. xx. figs. 1–24, Malayan Archipelago and Fiji Islands, marine; *N. danubialis* (Mühlfield), Lower Danube, with var. *stragulata* (Mühlf.), and *carinata* (Kokeil), Carniola, *serratilinea* (Ziegl.), Upper Italy, and *chrysostoma* (Kutschig), Dalmatia, pp. 200–204.

Neritina incerta, *flexuosa*, *lifouana*, and *savesi*, spp. nn., Gassies, J. de Conch. xxvi. pp. 341–346, New Caledonia. *N. subauriculata* (Recl.), found also in New Caledonia; *id. l. c.* p. 346.

[*Smaragdia*] *Neritina semen*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1031, Sorong, N.W. New Guinea.

Trochidæ.

Phasianella: radula of *bulimoides* (Lam.), *pullus* (L.), *kochi* (Phil.), *capensis* (Dkr.), *speciosa* (Mühlf.), *flammulata* (Phil.), *lincolata* (Wood), and *variegata* (Lam.), distinct from other *Trochidæ* by the very thin and tender median plate, which is wanting in some species. Troschel, Gebiss d. Schnecken, ii. pp. 200–203, pl. xviii. figs. 9–16.

Turbo smaragdus (Martyn), radula; *id. l. c.* p. 204, pl. xix. fig. 1.

Senectus distinguished from *Turbo* by the rounded and not flattened columella, and by a peculiar thickened appendage at the median plate of the radula. *S. cornutus* (Gmel.), *petholatus* (L.), *argyrostomus* (L.), *margaritaceus* (L.), *chrysostomus* (L.), *nivosus* (Reeve), *chemnitzianus* (Reeve), *concinnus* (Phil.), *sparverius* (Gmel.), and *ticaonicus* (Reeve), radula described; *id. l. c.* pp. 205–208, pl. xix. figs. 2–11.

Turbo (*Senectus*) *jobiensis*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. xii. p. 97, Jobi, New Guinea.

Turbo helicinus (Born) = *cidaris* (Gmel.), and *cinereus* (Born) = *versicolor* (Chemn.); Brauer, SB. Ak. Wien, lxxvii. Abth. i. pp. 176 & 177.

Sarmaticus classiarius (Gray), radula similar to that of *Ninella*; Troschel, *l. c.* p. 209, pl. xix. fig. 14.

Callopoma fluctuatum (Gray), radula very near that of *Ninella*; id. *l. c.* p. 209, pl. xix. fig. 13.

Ninella torquata (Gmel.), radula somewhat similar to that of *Senectus*; id. *l. c.* p. 208, pl. xix. fig. 12.

Lunella: radula of *versicolor* (Gmel.), *porphyretica* (Martyn), *hemprichi* (Troschel), *smaragdina* (auct. ?), and *coronata* (Gmel.), upper edge of the median plate reflected; *id. l. c.* pp. 210 & 211, pl. xx. figs. 1–5.

Astralium phœbia (Baltén), radula; *id. l. c.* p. 214, pl. xx. fig. 8 (rather similar to that of the *Turbininæ*).

Uvanilla gibberosa (Chemn.), radula; *id. l. c.* p. 215, pl. xx. fig. 9.

Pachypoma imbricatum (Gmel.), *rhodostoma* (Lam.), and *calatum* (Chemn.), no jaw, radula described; *id. l. c.* p. 215, pl. xx. figs. 10–12.

Lithopoma tuber (L.), radula similar to that of *Pachypoma*, but median plate longer; *id. l. c.* p. 216, pl. xx. fig. 13.

Delphinulopsis, g. n.; sinistral, discoidal, umbilicate, spirally ridged, last whorl crowned with spines, aperture rounded, nacreous within, columellar margin not nacreous. *D. lesourdi*, sp. n., Wright, J. de Conch.

xxvi. p. 161, pl. iii. fig. 1, and also in his printed catalogue of objects for sale, pl. viii., Japan. [Perhaps a monstrous form of a species of *Turbo*.] Name preoccupied among fossil shells, by Laube, 1870, and changed into *Angarina* by E. Bayle ; *tom. cit.* p. 325.

Amyxa nigra (Gray), no jaw, radula described ; Troschel, *l. c.* p. 212, pl. xx. fig. 6.

Leptothyra coccinea (Desh.), from Monterey, no jaw, radula similar to that of *Amyxa* ; id. *l. c.* p. 213, pl. xx. fig. 7.

Turbo corallinus (Reeve) = *sangarensis* (Schrenck), *corallinus* (Risso) = *sanguineus* (Linné), *californicus* (Troschel, in Philippi's new edition of Chemnitz, 1846) = *Leptothyra sanguinea* (Carp.) ; Martens, Nachr. mal. Ges. 1878, pp. 38 & 39.

Trochus : notes on the synonymy and geographical distribution of some New Caledonian species, by P. Fischer, J. de Conch. xxvi. pp. 205–207 & 210.

Trochus goudoti and *suarezensis*, Madagascar, *freycineti*, *flindersi*, and *baudini*, Southern Australia, *pudibundus*, New Guinea, spp. nn., *id. l. c.* pp. 62–67. *T.* (*Tectus*) *fabrei* (Montrouzier, MS.), sp. n., *id. l. c.* p. 64, Loyalty Islands.

Trochus (*Clanculus*) *flosculus*, sp. n., *id. l. c.* p. 211, Seychelle Islands.

Trochus (*Clanculus*) *microdon*, sp. n., E. A. Smith, P. Z. S. 1878, p. 818, pl. l. p. 21, Andaman Islands.

Trochus (*Euchelus*) *stellio*, sp. n., Fischer, *l. c.* p. 63, locality unknown.

Trochus (*Monilea*) *lifuanus*, sp. n., *id. l. c.* p. 63 Loyalty Islands.

Trochus fasciatus (Born) is a distinct species, apparently not redescribed, and *T. crocatus* (Born) = *crassus* (Dacosta) ; Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 172.

Trochus (*Thalotia*) *yokohamensis*, sp. n., Bock, P. Z. S. 1878, p. 727, pl. xiv. fig. 3, Yokohama.

Trochus (*Cantharidus*) *gilberti* (Montrouzier, MS.), and *artensis*, spp. nn., Fischer, J. de Conch. xxvi. pp. 207 & 208, New Caledonia.

Zizyphinus jucundus, sp. n., Sowerby, P. Z. S. 1878, p. 798, pl. xlviii. fig. 6, Japan.

Trochus striatus (L.), var. *depictus* (Desh.), and var. n. *elenchoides*, with woodcut, *T. exiguus* (Pulteney), and *fermoni* (Par.), some varieties, from various spots in the Mediterranean ; Issel, Ann. Mus. Genov. xi. pp. 436–438.

Conulus (Nardo) distinct from *Trochus*, s. str., by the elongate radula with rudimentary lateral plate ; *C. millegranus* (Philippi, as *Trochus*), Sars, Moll. arct. Norveg. pp. 142 & 143 ; radula, pl. iv. fig. 3 ; operculum, pl. xviii. fig. 17. [The genus *Conulus*, as established by Nardo, 1840, did not contain this species, but *zizyphinus* (L.), which is left as *Trochus* by G. O. Sars, and the name is preoccupied by Fitzinger, 1833.]

Calliostoma trochus, sp. n., Dall, Bull. Mus. C. Z. vi. p. 61, Gulf of Mexico. (Not described.)

Trochus (*Forskalia*) *pulcherrimus* (A. Ad.) from the Andaman Islands ; E. A. Smith, P. Z. S. 1878, p. 818, pl. l. fig. 22.

Trochus drepanensis, sp. n., Brugnone, Misc. Mal. i. [1873] p. 13, fig. 24, Trapani [subgen. *Gibbula*].

Trochus (*Gibbula*) *scamnatus*, sp. n., Fischer, J. de Conch. xxvi. p. 66, Oceania.

Gibbula appressa, sp. n., Hutton, J. de Conch. xxvi. p. 34, New Zealand.

Margarita (Leach). Monograph by SOWERBY in the continuation of REEVE'S Conch. Icon. pts. 340 & 341, 3 pls., 27 species. *M. maxima*, sp. n., fig. 24, locality unknown. *M. sandwichiana*, *pulcherrima*, *punctata*, *carinata*, *aspecta*, and *triangulosa* (A. Ad.), figs. 8, 11, 14, 22, 25, & 26, and *zelandica* (Hutton), fig. 17, apparently not before figured.

Margarita grœnlandica (Chemn.) var. *lævigata* (Möller), var. *rudis* (Mörch), var. n. *intermedia*, *M. cinerea* (Couthony) var. *grandis* (Mörch), *argentata* (Gould) var. n. *gigantea* and *obscura* (Couth.), var. n. *intermedia*, and var. n. *cinereaformis* [*cinereif-*] Novaya Zemlya, Leche, Sv. Ak. Handl. xvi. 2, pp. 40–45, *argentea* var. *gigantea*, pl. i. fig. 11, *obscura* var. *intermedia*, pl. ii. fig. 25.

Margarita olivacea (Brown) = *argentata* (Gould), and *M. cinerea* (Couthony) var. *typica* and var. *grandis* = *striata* (Brod. & Sow.), Sars, Moll. arct. Norveg., pp. 134 & 135, pl. ii. fig. 6, pl. ix. fig. 1, & pl. xxi. figs. 4 & 5; radula, pl. iii. figs. 7–11; operculum of *M. grœnlandica* (Chemn.), pl. xviii. fig. 4. *M. helicina* (Phipps): very young specimens described, *id. l. c.* p. 132, pl. xxi. fig. 3, under the name *Delphinoidea serpuloides* (Mont.); this error corrected, p. 345.

Machæroplax (Friele) *obscura* (Couth.), *bella* (Verkrüzen), *albula* (Gould), and *varicosa* (Mighels); *id. l. c.* pp. 137–139, pl. ix. figs. 2–5; radula of the two latter, pl. iii. figs. 12 & 13; operculum of the last, pl. xviii. fig. 5.

Mœllería costulata (Möller), *id. l. c.* pp. 127 & 343, pl. v. fig. 8, pl. xxxiii. fig. 4; radula, pl. iii. fig. 5; operculum, pl. xviii. fig. 2.

Rotella (Lam.). Monograph by SOWERBY in the continuation of REEVE'S Conchologica Iconica, pts. 340 & 341, 4 pls. 20 spp. *R. infraplanata*, sp. n., fig. 10, locality unknown. *R. depressa* and *zealandica* (A. Adams), figs. 2 & 11.

Rotella (*Ethalia*) *striolata*, *candida*, *perspicua*, *brazieri*, and *polita* (A. Adams); *id. l. c.* figs. 13–17.

Cyclostrema basistriatum, *rugulosum*, *lævigatum*, and *trochoide* (Jeffreys, MS.), spp. nn., with var. *petterseni* (Friele) and *areolatum*, sp. n., Sars, Moll. arct. Norveg. pp. 128–131, 344 & 345, pl. viii. figs. 8 & 9, pl. xxi. figs. 1 & 2, pl. xxxiii. figs. 5 & 6; radula of the first, pl. iii. fig. 6; operculum, pl. xviii. fig. 3. *C. serpuloides* (Montagu), note on its radula; *id. l. c.* p. 346.

Cyclostrema tatei, sp. n., Angas, P. Z. S. 1878, p. 862, pl. liv. fig. 10, South Australia.

Circulus formosissimus, sp. n., Brugnone, Misc. Mal. i. [1873] p. 12, figs. 21 & 22, Trapani, = *Cyclostrema jeffreysi* (Monterosato), which was only named, not described; *id. op. cit.* ii. [1876] p. 25.

Adeorbis fragilis, sp. n., Sars, Moll. arct. Norveg. p. 213, pl. xxii. fig. 19, Lofoden Islands, 60–80 fath.

Haliotidæ.

Scissurella crispata (Flem.) var. = *angulata* (Lovén) = *aspera* (Phil.) Sars, *l. c.* p. 126, pl. viii. fig. 7 ; radula, pl. iii. fig. 4 ; operculum, pl. xviii. fig. 1.

Scissurella, subgenus *Schizotrochus* : operculum very thin ; Monterosato, J. de Conch. xxvi. p. 149.

CYCLOBRANCHIA.

G. O. Sars proposes the name "*Onychoglossa*" instead of *Docoglossa* for an order of Gastropods, including the *Patellidæ*, *Tecturidæ*, and *Lepetidæ*, but excluding the *Chitonidæ*; he characterizes it by the radula being very long and narrow, its median and lateral part rather indistinct, middle plates with a recurved solid opaque unguiform tip, marginal hooks 2, 3, or 0. Moll. arct. Norveg. p. 118.

Acmæidæ.

Tectura rubella (Fabr. as *Patella*), Sars. Moll. arct. Norveg. p. 121, pl. viii. fig. 5 ; radula, pl. ii. fig. 11.

Tectura unicolor (Forbes), Mediterranean, distinct from *virginea* (Müll.), Monterosato, J. de Conch. xxvi. p. 148.

Patellidæ.

Patella vulgata (L.). J. Clarke Hawkshaw has observed the method in which it sinks pits in and abrades the surface of the chalk at Dover, probably by action of the radula ; the limpets do more to destroy the rock surface than the sea ordinarily does ; they rasp close round any hard object such as a piece of shell or flint imbedded in the chalk and return regularly to the same resting-place, to which their shell becomes perfectly adjusted. ' J. L. S. xiv. pp. 406–411.

Patella oculus (Born) = *schræteri* (Krauss), *radiata* (Born) = *capensis* (Krauss), and *fusca* (Born) = *ænea* (Martyn) ; Brauer, SB. Ak. Wien, lxxvii. Abth. i. pp. 188 & 190.

Nacella parva, sp. n., Angas, P. Z. S. 1878, p. 863, pl. liv. fig. 12, South Australia.

Scutellina fulva (Müll.), radula ; Sars, Moll. arct. Norveg. p. 122, pl. ii. fig. 12.

Lepeta cæca (Müll.), radula ; *id. l. c.* p. 123, pl. ii. fig. 13.

Propilidium ancyloide (Forb.) ; *id. l. c.* p. 121, pl. xx. fig. 18.

Chitonidæ.

H. v. Ihering describes the muscular fibres, and the renal and genital organs of *Chiton* ; Morph. JB. iv. pp. 128–146, with 2 pls.

The known species from the Mediterranean (13) enumerated with their synonymy by N. Tiberi, Bull. Soc. mal. Ital. iii. [1877] pp. 136–145.

Clathropleura, subg. n. Margin of the mantle apparently reticulated; *Chiton laevis* (Penn.), *corallinus* (Risso), and *sulcatus* (Risso) = *siculus* (Gray); *id. l. c.* pp. 136 & 143–145.

Lophyrus exaratus, sp. n., G. O. Sars, Moll. arct. Norveg. p. 113, pl. viii. fig. 1, Norway, 100–200 fath.; radula of it and of *L. albus* (L.), *id. l. c.* pl. i. fig. 8, & pl. ii. fig. 1.

Lepidopleurus arcticus, sp. n., *id. l. c.* p. 112, pl. vii. fig. 7, Finmark, 20–100 fath.; radula of *L. alveolus* (Sars) and *cancellatus* (Sow.), *id. l. c.* pl. i. figs. 7 & 8.

Callochiton laevis (Penn.), radula; *id. l. c.* pl. ii. fig. 6.

Craspedochilus, g. n. for *Chiton marginatus* (Penn.); mantle beset above with small globose-conical non-imbricate corpuscles and fringed at the edge by long spines; lateral plates of the radula tricuspidate, the median cuspid longer. Sars, *l. c.* p. 114, pl. xx. fig. 16; radula, pl. ii. fig. 2.

Leptochiton belknapi, sp. n., Dall, Pr. U. S. Nat. Mus. 1878, p. 2, Alaska.

Trachydrosia aleutica, subg. & spp. nn., *id. ibid.*, Alaska.

Tonicella saccharina, sp. n., *id. ibid.*, Alaska.

Boreochiton, g. n., for *Chiton ruber* (L.) and *marmoreus* (Fabr.); mantle nearly smooth or beset with minute granula, without conspicuous marginal spines; lateral plates of the radula with hatchet-shaped, obsoletely 3-toothed tip. Sars, *l. c.* pp. 115 & 116, pl. viii. figs. 3 & 4; radula, pl. ii. figs. 3 & 4.

[*Hanleya*] *Chiton abyssorum* (M. Sars); *id. l. c.* pp. 109 & 343, pl. vii. fig. 4, & pl. xxxiii. fig. 3; radula, pl. i. fig. 6; Stavanger, Norway, 150–200 fath. Allied to *C. hanleyi* (Bean).

Chlamydochiton, subg. n., for *Chiton amiculatus* (Pull.), Dall. Pr. U. S. Nat. Mus. 1878, p. 1.

Schizoplax, g. n., for *Chiton brandti* (Middend.); *id. l. c.* p. 2.

Acanthochites fascicularis (L.), radula, Sars, *l. c.* p. 117, pl. ii. fig. 6.

Chiton (*Acanthochites*) *aneus* (Risso, 1826) = *gracilis* (Jeffreys, 1859), and notes on the synonymy of other Mediterranean species of *Chiton*; Monterosato, J. de Conch. xxvi. p. 147.

TECTIBRANCHIA.

Tornatellidæ.

Actæon tornatilis (L.), radula; Sars, Moll. arct. Norveg. p. 280, pl. xi. fig. 1; operculum, pl. xviii. fig. 57.

Buccinulus intermedius, sp. n., Angas, P. Z. S. 1878, p. 862, pl. liv. fig. 11, South Australia.

Ringicula. L. Morlet gives a monograph of this genus, containing historical and geographical notes, a description of the radula examined by P. Fischer and accurate descriptions and figures of 25 living species, including *R. savignii* (Descript. de l'Egypte, pl. vi. fig. 7), Red Sea, and *folini*, Singapore, spp. nn., J. de Conch. xxvi. pp. 113–133, pl. v. A

second article, *tom. cit.* pp. 251–295, pls. vi.–viii., treats of the fossil species. The living animal of *R. auriculata*, observed by B. WATSON, resembles that of *Acteon*, posterior tentacular lobes folded [no operculum]; J. de Conch. xxvi. p. 312, pl. x. fig. 4.

Ringicula leptocheila [*-chila*], sp. n., Bruguone, Misc. Mal. i. [1873] fig. 18, Magnisi, Sicily.

BULLIDÆ.

Atys utriculus (Brocchi), radula: Sars, Moll. arct. Norveg. pl. xi. fig. 2.

Cylichna insculpta (Totten) var. n. *valida* = *solitaria* (Gould), *C. reinhardti* (Möller) = *occulta* (Mighels) and *scalpta* (Reeve), Novaya Zemlya, Leche, Sv. Ak. Handl. xvi. 2, pp. 62 & 63, the two latter, pl. i. figs. 21 & 22.

Cylichna propinqua (M. Sars); Sars, *l. c.* p. 284, pl. xviii. fig. 5; radula, pl. xi. fig. 5.

Utriculus truncatulus (Brug.) var. *pellucida* (Brown), *nitidulus* (Lov.), *umbilicatus* (Mont.), = *Cylichna strigella* (Lov.), *conulus* (Desh.), *pertenuis* (Mighels) = *Bulla semen* (Reeve) with var. *turrita* (Möller), and *obtusus* (Mont.), Sars, *l. c.* pp. 285–288 & 349, pl. xvii. figs. 17–20, & pl. xxvi. figs. 2 & 3; radula of the three former and the fifth, pl. xi. figs. 6–9.

Utriculus minutissimus (Martin, MS.), sp. n., Monterosato, J. de Conch. xxvi. p. 159, Palermo.

Utriculus semen (Reeve) var. n. *elongata*, Kara Sea; Leche, Sv. Ak. Handl. xvi. 2, p. 71.

Utriculopsis densistriata, sp. n., *id. l. c.* p. 74, pl. i. fig. 20, Kara Sea, 9–70 fath.

Diaphana (Brown) = *Amphisphyra* (Lov.), *D. hyalina* (Turt.) = *debilis* (Gould), *expansa* (Jeffr.), *globosa* (Lov.), and *hiemalis* (Gould); Sars, *l. c.* pp. 288–291, pl. xviii. figs. 1–4, 2 and 3 from living animals; radula of all three, pl. xi. figs. 10–12.

Acera bullata (Müll.), radula; *id. l. c.* pl. xii. fig. 17.

Scaphander puncto-striatus (Mighels) = *librarius* (Lovén); *id. l. c.* p. 292, pl. xviii. fig. 6; radula, pl. xi. fig. 14.

Philine fragilis, Finmark, *cingulata* and *velutinoides*, Lofoden Islands, spp. nn., *scabra* (Müll.), *catena* (Mont.), *loveni* (Malm), *finmarchica* (M. Sars), *vitrea* (M. Sars, as *Utriculopsis*), *sinuata* (Stimps.), *quadrata* (Wood) = *scutulata* (Lovén), *lima* (Brown) = *lineolata* (Couth.) and *pruinosa* (Clark), with a synoptical table of these species; Sars, *l. c.* pp. 293–302, pl. xviii. figs. 8–13, & pl. xxvi. figs. 5–10; radula, pl. xii. figs. 1–14, of *P. aperta* (L.), pl. xi. fig. 15.

Colpodaspis pusilla (M. Sars), radula; *id. l. c.* pl. xii. fig. 15.

Colobocephalus costellatus (M. Sars), radula; *id. l. c.* pl. xii. fig. 16.

LOPHOCERCIDÆ.

Oxynoe olivacea (Raf.) = *Lophocercus sieboldi* (Krohn), now rather common at Palermo; Monterosato, J. de Conch. xxvi. p. 158.

APLYSIIDÆ.

Dolabella californica, sp. n., Stearns, P. Ac. Philad. 1878, p. 395, pl. vii. figs. 1 & 2, Mulege Bay, Gulf of California.

Aclesia glauca, sp. n., Cheeseman, Tr. N. Z. Inst. xi. [for 1878, published in 1879] p. 379, pl. xvi. fig. 4; also P. Z. S. 1878, p. 277, pl. xv. fig. 4, Auckland Harbour, New Zealand.

Aplysia punctata (Cuv.), radula; Sars, *l. c.* pl. xii. fig. 18.

PLEUROBRANCHIDÆ.

Pleurobranchus plumula (Mont.), radula; Sars, *l. c.* pl. xiii. fig. 1.

Pleurobranchus. Note on some Mediterranean species; Monterosato, J. de Conch. xxvi. p. 320.

Pleurobranchus ornatus, sp. n., Cheeseman, Tr. N. Z. Inst. xi. p. 378, pl. xvi. figs. 1 & 2, also P. Z. S. 1878, p. 275, pl. xiii. figs. 1 & 2, New Zealand.

Pleurobranchæa novæ-zealandiæ, sp. n., *id.* Tr. N. Z. Inst. xi. p. 378, pl. xvi. fig. 3, also P. Z. S. 1878, p. 276, pl. xv. fig. 3, New Zealand.

NUDIBRANCHIA.

All species described under the general name *Æolis* and *Doris* since the time of LINNÆUS and CUVIER, enumerated and referred to their modern genera by R. BERGH in SEMPER'S Reise Philippin. ii. pt. 14, pp. iii.–xx. & xxi.–xxxiii.

List of 86 species of *Nudibranchia* collected by C. Semper in the Philippines, and determined by Bergh, *l. c.* pp. i. & ii.

PLEUROPHYLLIDIIDÆ.

Pleurophyllidia loveni (Bergh): radula; Sars, Moll. arct. Norveg. pl. xv. fig. 2.

DORIDIDÆ.

Doris obvelata (Müll.) = *repanda* (Ald. & Hanc.) and *zetlandica* (Ald. & Hanc.); Sars, *l. c.* p. 305, the latter pl. xxvii. fig. 1; radula of them and of *D. tuberculata* (Cuv.), pl. xiii. figs. 2–4.

Archidoris, new name for *Doris* in its most restricted sense. Type, *D. tuberculata* (Cuvier). This and *D. montereyensis* (Cooper) anatomically described by R. Bergh, *l. c.* pp. 616–625, pl. lxiv. figs. 20–27, & pl. lxviii. fig. 24.

Asteronotus (Ehrenberg). Six species enumerated, *A. bertranus* (Bergh), Philippine and Pelew Islands, *marmoratus* (Bergh), from Zanzibar, and *mabillus* (Bergh), anatomically described; *id. l. c.* pp. 616–645, pl. lvii. figs. 10–22, & pl. lxviii. figs. 6–14.

Chromodoris (Ald. & Hanc.). The known species (17) enumerated;

anatomical description of *C. elegans* (Cantr.) = *schultziana* (Chiaje) and of *villafranca* (Risso) = *tenera* (Costa) given by R. Bergh, Mal. Bl. xxv. 1878, pp. 1–36, pls. i. & ii.

Lamellidoris (Ald. & Hanc.). Generic characters discussed; 17 known species enumerated; *L. bilamellata* (Linn.), with var. *liturata* (Beck), anatomically described; *varians* and *hystricina*, spp. nn., Kyska, Pacific, and *muricata* (Müll.). Bergh, *l. c.* pp. 603–615, pl. lxiv. figs. 12–19, pl. lxv. figs. 1–13, & pl. lxviii. figs. 15–23.

Lamellidoris bilamellata (Müll.) = *liturata* (Möller), *muricata* (Müll.), and *proxima* (Ald. & Hanc.); Sars, Moll. arct. Norveg. pp. 306–308; radula of the two former, pl. xiii. figs. 5 & 6; of *L. loveni* (Ald. & Hanc.) pl. xiv. fig. 1.

Acanthodoris pilosa (Müll.); Sars, *l. c.* p. 308; radula, pl. xiv. fig. 4.

Doridunculus, g. n. Mantle short, broad, with elongate spicula; two longitudinal ridges on its back; gills not retractile. *D. echinulatus*, sp. n., Lofoden Islands, 100 fath., Sars, *l. c.* p. 309, pl. xxvii. fig. 2; radula, pl. xiv. fig. 5.

Onchidoris luteo-cincta (Sars) and *pusilla* (Ald. & Hanc.), radula; *id. l. c.* pl. xiv. figs. 2 & 3.

Lophodoris danielsseni (F. & H.); *id. l. c.* pl. xiv. fig. 7.

Polyceridæ.

Goniodoris nodosa (Mont.), radula; Sars, *l. c.* pl. xiv. fig. 5.

Triopa lacer (Müll.); *id. l. c.* p. 311, pl. xxvii. fig. 4; radula, pl. xiv. fig. 12, of *claviger* (Müll.), fig. 13.

Triopella, g. n. Distinct from *Triopa* by the broad mantle, which is bilobated behind, and has two longitudinal ridges on the back; radula like that of *Ægirus*. Type, *T. incisa* (M. Sars, as *Triopa*). Sars, *l. c.* p. 310, pl. xxvii. fig. 3; radula, pl. xiv. fig. 9, Lofoden Islands, 120–200 fath.

Thecacera virescens (Ald. & Hanc.), radula; *id. l. c.* pl. xiv. fig. 17.

Plocamophorus levivarius, sp. n., locality unknown, and list of known species (10); Abraham, Bull. Soc. Z. Fr. i. [1876], pp. 287–290, with wood-cut.

Ægirus punctilucens (Lov.), radula; Sars, *l. c.* pl. xiv. fig. 10.

Polycera cornuta (Abildg.), *lessoni* (Orb.), and *ocellata* (Ald. & Hanc.), radula; *id. l. c.* pl. xiv. figs. 14–16.

Idalia pulchella (Ald. & Hanc.), radula; *id. l. c.* pl. xiv. fig. 8.

Tritoniidæ.

Tritonia plebeia (Johnst.), radula; Sars, *l. c.* pl. xv. fig. 1.

Dendronotidæ.

Dendronotus velifer, sp. n., Sars, *l. c.* p. 315, pl. xxviii. fig. 2; radula, pl. xv. fig. 4, Vadsö, 60–100 fath.

Doto coronata (Gmel.): anatomical description by R. Bergh, Verh. z.-b. Wien, xxviii. pp. 577 & 580, pl. viii. figs. 17–27.

Dotilla, g. n. Distinct from *Doto* by three rows of plates in the radula. Type, *Doto pygmæa* (Bergh, 1871), Sargasso Sea. Bergh, *l. c.* p. 574. [Name preoccupied among the *Crustacea*.]

Loma[to]notus: anatomical description of *L. genei* (Verany), and list of the known species; *id. l. c.* pp. 553–559, pl. vi. figs. 1–6, & pl. vii. figs. 1–17.

ÆOLIDIDÆ.

Favorinus branchialis (Müll.): anatomical description by Bergh, *l. c.* pp. 565 & 566, pl. viii. figs. 1–9.

Phidiana selenæ, sp. n., *id. l. c.* pp. 560 & 559, pl. vi. figs. 10–18, Brazil, with anatomical description and list of known species of the genus.

Hermissenda, g. n. Near *Phidiana*, but anterior angles of the foot tentaculiform; jaw with a single row of denticles; radula consisting of one row of plates, their edge serrulate; penis without hooks. Type, *Æolis opalescens* (Cooper, 1862), from San Diego and Sitka. Bergh, *l. c.* p. 573.

Spurilla neapolitana (Chiaje, 1841): anatomical and physiological description by S. Trinchesse, Mem. Acc. Bologn. (3) ix. pp. 405–450, with 12 pls.; abstract in Rend. Acc. Bologn. 1878, pp. 98 & 99.

Cuthona aurantiaca (Ald. & Hanc.); Sars, Moll. arct. Norveg. p. 321, pl. xxviii. fig. 6; radula, pl. xvi. fig. 7.

Coryphella bostoniensis (Couth.): anatomical description by R. Bergh, *l. c.* pp. 563–565, pl. vi. figs. 7–9, & pl. vii. figs. 23 & 24.

Coryphella salmonacea (Couth.) and *verrucosa* (M. Sars); Sars, *l. c.* pp. 319 & 320, pl. xxviii. figs. 4 & 5; radula of the former and 3 other species, pl. xvi. figs. 1–4.

Tergipes (Cuvier, Ald. & Hanc.): list of known species and anatomical description of *T. despectus* (Johnst.); Bergh, *l. c.* pp. 569–572, pl. viii. figs. 11–16.

Janus cristatus (Chiaje), radula; Sars, *l. c.* pl. xv. fig. 7.

Hero formosa (Lovén) = *Cladia trilineata* (M. Sars); Sars, *l. c.* p. 316, pl. xxviii. fig. 3; radula, pl. xv. fig. 5.

LIMAPONTIIDÆ.

Actæonia corrugata (Ald. & Hanc.), radula; Sars, *l. c.* pl. xvi. fig. 15.

PULMONATA.

Observations on the crawling of land-snails by SIMROTH [*suprà*, p. 8].

Notes on the genitals and spermatophore by PFEFFER and WIEGMANN [*suprà*, p. 11].

FISCHER & CROSSE, Moll. terr. et fluv. de Méxique, pp. 698 & 699, arrange the families of the suborder *Geophila* in the following manner:—

1. *Monotremata*; male and female orifices united:
   A. *Agnatha*: *Testacellidæ*.
   B. *Gnathophora*: *Limacidæ*, *Tebennophoridæ*, *Helicidæ*, *Cylindrellidæ*, *Orthalicidæ*, *Bulimulidæ*, *Stenogyridæ*, and *Succineidæ*.
2. *Ditremata*; male and female orifices widely separated: *Vaginulidæ*, terrestrial, and *Onchidiidæ*, aquatic.

Agnatha.

G. Pfeffer gives a general account of the external and anatomical peculiarities. Neck commonly elongated, tail rather short, lips often developed into feeler-like appendages; shell-lobes of the mantle present in *Testacella* and *Glandina*, cervical lobes in all genera. Back of the neck peculiarly furrowed. Pharynx elongate behind. No jaw; teeth of the radula aculeiform, in angulate rows, median tooth less developed or wanting. Intestine only once twisted, with anal gland. Male organ directly receiving the vas deferens, and provided with a cœcal appendage for the insertion of the retractor muscle. Hermaphrodital gland tubulose in the *Streptaxidæ*; acinose in the rest. Ganglia less concentrated than in other *Pulmonata*. Carnivorous. He distinguishes three sub-divisions: *Streptaxidæ* (including *Ennea*), *Testacellidæ* (including *Daudebardia*), and *Glandinidæ*. JB. mal. Ges. v. pp. 62–84, with woodcuts.

A membranaceous homologue of the jaw is found in *Daudebardia*, and a still more indistinct chitinous thickening in its place in *Testacella*, *Ennea*, and *Streptaxis*; Pfeffer, Nachr. mal. Ges. 1878, pp. 41 & 42.

Testacella haliotidea (Dr.): note on the outer appearance of the animal and its genital organs, by G. Pfeffer, *l. c.* pp. 74–77.

Daudebardia. S. Clessin, Mal. Bl. xxv. pp. 98 & 99, enumerates the known (16) species, placing them in 2 subgenera:—

1. *Rufina*, subg. n., shell umbilicated: *D. rufa* (Drap.), &c.
2. *Libania* (Bourg., 1870), with covered umbilicus: *D. langi* (Pfr.), *transsylvanica* (Bielz), *saulcii* (Bourg.), and *sicula* (Benoit).

Daudebardia transsylvanica (Bielz): note on its pharynx and genital organs; Pfeffer, *l. c.* pp. 77–79.

Daudebardia hassiaca, Clessin, Mal. Bl. xxv. p. 96, Cassel; *D. heydeni*, Böttger, Nachr. mal. Ges. 1878, p. 120, Kasbek, Caucasus: spp. nn.

Glandina liebmanni (Pfr.), note on the male genital organs; Pfeffer, *l. c.* pp. 80 & 81.

Glandina ecuadoriana, sp. n., Miller, Mal. Bl. xxv. p. 159, pl. vii. fig. 1, Val de Pilaton, Ecuador.

Streptaxis and *Ennea*: their alliance asserted by J. S. Gibbons, Q. J. Conch. 1878, No. 15, p. 336 [long ago known to malacologists].

Streptaxis apertus (Mart.), anatomical note, and *dejectus* (Petit), radula; Pfeffer, JB. mal. Ges. v. pp. 69 & 70, with woodcut.

Streptaxis denticulatus, Mombas, and *schweitzeri*, Liberia, Dohrn, JB. mal. Ges. v. pp. 152 & 153; *S. enneoides*, Martens, MB. Ak. Berl. 1878, p. 295, pl. ii. figs. 5 & 6, Ukamba, near Zanzibar: spp. nn.

Ennea insignis (Pfr.), anatomy given by G. Pfeffer, with notes on

the radula of *E. complicata*, *quadridentata* [= *dupuyana* (Crosse), *conica* and *stylodon* (Martens)]. Median teeth of the radula wanting in some species, or present only in the younger part of the radula in *E. insignis*, well developed in *E. complicata*. Structure of male organ invaginated in a complicated manner. JB. mal. Ges. v. pp. 62–69, with woodcuts.

Ennea liberiana (Lea), living animal green, in spirits red; Dohrn, JB. mal. Ges. v. p. 154.

Ennea monodon (Morelet, 1871) = *conica* (Martens, 1876); *monodon* (Martens) is a distinct species; *id. l. c.* pp. 153 & 154.

Streptostele (Dohrn) is distinct from *Elma* (H. Ad., 1868), which appears to belong to *Gibbulina*; id. *l. c.* p. 155.

[*Ennea*] *Pupa* (*Gibbus*) *majuscula*, sp. n., Morelet, J. de Conch. xxvi. p. 171, Mauritius, extinct.

Oxygnatha.

G. Pfeffer publishes some interesting observations on the anatomy of this family generally, drawn from numerous special observations; he adopts for it the name *Vitrinacea*, characterized as follows: jaw smooth, often with a median projection; lateral teeth of the radula never with more than three cuspids, marginal teeth elongate, one or two cuspidated; the second cuspid of the latter corresponding to the outer one of the median and lateral teeth. He admits three subdivisions:—

1. *Naninidæ*: a mucus caudal pore; genital orifice very near the left feeler; outer cuspid of the lateral and marginal teeth gradually approaching the tip, when examined in the direction from the median line to the lateral margin of the radula.
2. *Zonitidæ*: a mucous caudal pore; genital orifice far behind the left feeler; outer cuspid of the lateral teeth gradually approaching the base and disappearing very soon, marginal teeth therefore unicuspidate.
3. *Vitrinidæ*: no mucous caudal pore.

The underside of the foot in the *Naninidæ* is either simple or tripartite, the lateral parts being transversely striate. Cervical and shell lobes of the edge of the mantle are usually present; the outside of the shell-lobe, rough and coloured, is continuous with the soft and pale inside of the mantle itself, as the lobe is reflected over the shell; the right cervical lobe is larger than the left, and often extends on the left side, being also sometimes subdivided. The different modifications of the genital appendages and radula are discussed and exemplified. JB. mal. Ges. v. pp. 251–276.

Limax agrestis (L) spinning slimy threads, by which it descends from plants; Eimer, Zool. Anz. i. p. 123. [Long ago made known by Hoy (1790) and others.]

Limax molestus, sp. n., Hutton, Tr. N. Z. Inst. xi. 1878 [1879], p. 331, New Zealand. Near *L. agrestis* (L.).

Limax castaneus, sp. n., Ingersoll, Bull. U. S. Geol. Surv. ii. [1875], pp. 130 & 131, Colorado, = *L. montanus* (Ingersoll, 1874), var. according to Binney, Terr. airbreath. Moll. p. 153.

Milax emarginatus, sp. n., Hutton, Tr. N. Z. Inst. xi. 1878 [1879], p. 331, New Zealand.

Urocyclus flavescens (Keferstein, as *Parmarion*), spermatophore; Pfeffer, Arch. f. Nat. xliv. p. 425, pl xiii. fig. 14.

Vitrina albina (Ziegler, MS.), *membranacea*, and *hiemalis*, spp. nn., Koch, Zeitschr. d. deutsch-östreich. Alpenvereins, vii. pp. 217 & 218, and Mal. Bl. xxv. pp. 88 & 89, Oetzthal, Tirol, 2600 meters above the sea.

Vitrina (*Oligolimax*) *paulucciæ*, sp. n., Fischer, in Paulucci's Matériaux, and JB. mal. Ges. v. p. 355, Aspromonte, Calabria.

Vitrina subconica, sp. n., Böttger, Nachr. mal. Ges. 1878, p. 121, Kasbek, Caucasus.

Vitrina mammillata (Martens), note on the living animal; W. T. Blanford, in Nevill's Handl. Ind. Mus. p. 18.

Vitrina latissima, sp. n., Lewis, P. Ac. Philad. 1875, p. 336, pl. xxiii. fig. 7, and Binney, Terr. airbr. Moll. p. 136, fig. 51, Bald Mountain, Tennessee.

[*Vitrina*] *Lampadia lederi*, sp. n., Böttger, Nachr. mal. Ges. 1878, p. 121, Kasbek, Caucasus.

Helicarion, rectification in the synonymy of some species; Nevill, Handl. Ind. Mus. pp. 14–16.

Helicarion austenianus, sp. n., Sonamarg, Kashmir, and *stoliczkanus*, Naini Tal, Himalaya, spp. nn., Nevill, Moll. Yarkand Exp. pp. 14 & 15, figs. 22–24 & 19–21.

Helicarion flemingi, var. n. (? sp.) *altivagus*, Theobald, J. A. S. B. xlvii. pt. 2, p. 143, Uri, Kashmir.

Helicarion resplendens (Nevill, 1877), figured by the author in Anderson's Zool. researches during the Yunnan Exped. p. 883, pl. lxxx. fig. 6, Sawady.

Austenia, subg. n. of *Helicarion*, without description; type, *Vitrina gigas* (Benson): G. Nevill, Handl. Ind. Mus. p. 16.

Paryphanta busbii (Gray), with abnormal flexible shell; E. A. Smith, Zool. 1878, p. 61.

Nanina (*Microcystis*?) *sonamurgensis*, sp. n., Nevill, Moll. Yarkand Exp. pp. 16 & 17, Sonamarg, Kashmir.

Nanina fulvizona (Mouss.), *wallacii* (Pfr.), and *resplendens* (Phil.); spermatophore described by Pfeffer, Arch. f. Nat. xliv. p. 425, pl. xiii. figs. 11–13; see also JB. mal. Ges. v. pp. 265 & 269.

Nanina sikrigallensis, sp. n., near *pansa*, Sikrigali in Behar, Nevill, Handl. Ind. Mus. p. 28, figured Conch. Ind. pl. cxxx. fig. 8. *N. camura* (Bens.) and *crossii* (Pfr.), note on the living animals; *id.* Handl. pp. 30 & 32.

Xestina, g. n., corresponding to *Xesta*, sect. c of Semper [see Zool. Rec. vii. p. 153], and comprising *Nanina siamensis* (Pfr.), *isabellina* (Pfr.), *bistrialis* (Desh.), *ligulata* (Fér.), and *maderaspatana* (Gray); Pfeffer, JB. mal. Ges. v. pp. 257 & 258.

Nanina (*Ariophanta*) *kadapaensis*, new name for *nicobarica* (Chemn.), because it does not live on the Nicobars; Nevill, Handl. Ind. Mus. p. 19. Eggs of *N.* (*A.*) *interrupta* (Desh.); *id. l. c.* p. 19.

Nanina (*Xesta* ?) *ligulata* (Fér.), note on the living animal; *id. l. c.* p. 50.

Nanina (*Rhyssota*) *haughtoni* (Bens.), note on the living animal; *id. l. c.* p. 46.

Hemiplecta jamuensis, sp. n., Theobald, J. A. S. B. xlvii. pt. 2, p. 142, Jawi Valley, Kashmir (? = *monticola*, Pfr.)

Nanina (*Hemiplecta* ?) *oxytes* (Bens.), note on the living animal; Nevill, *l. c.* p. 47.

Nanina (*Bensonia*) *monticola* (Hutt.), var. n. *murriensis*, Nevill, Moll. Yarkand Exp. p. 17, Murree, Punjab. Typical *monticola* (Hutton, 1838) = *labiata* (Pfr., 1845); *id. ibid.*

Macrochlamys sogdiana and *turanica* (Martens), and *sinica* (Martens): anatomical notes on them by G. Pfeffer, JB. mal. Ges. v. p. 263, and Arch. f. Nat. xliv. p. 425, pl. xiii. figs. 7 & 8 (spermatophore).

Nanina (*Macrochlamys*) *prona*, sp. n., Nevill, Moll. Yarkand Exp. p. 17, throughout North Western Himalaya.

Nanina (*Macrochlamys*) *semifusca* (Desh.) = *rufa*, auctt., *nec* Lesson, lives in Mauritius; Nevill, J. de Conch. xxvi. p. 59.

Nanina (*M.*) *woodiana* (Pfr.) = *semifusca*, auctt., *nec* Deshayes, lives at Trichinopoly; *id. l. c.* p. 60.

Nanina (*Durgella*) *honesta* (Gould) var. n. *andersoniana*, id. J. A. S. B. xlvi. [1877] pt. 2, p. 16, Yunnan and Chittagong.

Nanina (*Rotula*) *kashmirensis*, sp. n., *id.* Moll. Yarkand Exp. p. 16, figs. 13–15, Sonamarg.

Nanina, subgen. *Situla* (H. Ad.) = *Conulema* (Stoliczka), and partly = *Euplecta* (Semper); *id.* Handl. Ind. Mus. p. 34. *N.* (*S.*) *baconi* (Bens.), note on the living animal; Stoliczka, *op. cit.* p. 35.

Trochonanina mossambicensis (Pfr.), *radians* (Pfr.), *schmeltziana* (Mouss.), *filo-cincta* (Pfr.), *percarinata* (Martens), and *ibuensis* (Pfr.), anatomically examined by G. Pfeffer, Arch. f. Nat. xliv. pp. 420–424, pl. xiii. figs. 1–6; they differ considerably concerning the insertion of the vas deferens, the last-named seems even to be self-fecundating [*suprà*, p. 11].

Trichonanina bifilaris, sp. n., Dohrn, JB. mal. Ges. v. p. 155, Liberia.

Trochonanina pyramidea (Martens), var. n. *leucograpta*, Martens, MB. Ak. Berl. 1878, p. 290, pl. i. figs. 5–7, Ukamba, near Zanzibar.

Zingis, g. n. Shell heliciform, with simple peristome; hinder extremity of the foot with mucous pore and a little prominence above it; jaw smooth, with median projection; marginal teeth of the radula bicuspidate. *Z. radiolata*, sp. n., Taita, near Zanzibar. Martens, MB. Ak. Berl. 1878, pp. 290 & 291, pl. i. figs. 8–17.

Sesara infrendens (Gould): what Stoliczka described as "flagellum" is a spermatophore; Pfeffer, JB. mal. Ges. v. p. 272, & Arch. f. Nat. xliv. p. 429, pl. xiii. fig. 10.

Zonites pergranulatus, sp. n., Amorgo Island, and *verticillus*, var. n. *eubœica*, Eubœa; Kobelt, JB. mal. Ges. v. pp. 320 & 321.

Hyalina. General notes on the subgenera and European species; Kobelt, Iconogr. vi. pp. 14 & 15. *H. olivetorum* (Gmel.), *maurolici* (Benoit), *calcareæ* (Aradas), *incerta* (Drap.), *malinowskii* (Zelebor), *cypria* (Pfr.), *superlua* (Rossm.), *æquata* (Mouss.), *obscurata* (Porro), *fulgida*

(Parr.) = *obscurata* (Benoit), *balmii* (Potiez), *nitens*, var. *hiulca* (Jan.), *duboisi* (Charp.), *filicum* (Kryn.), *mingrelica* (Mouss.), *koutaisiana* (Mouss.), *selecta* (Mouss.), *natolica* (Albers), *cellaria*, var. *sancta* (Bourg.), *villæ* (Mortillet), *djurjurensis* (Debeaux), *draparnaldi* (Beck), with var. *blauneri* (Shuttl.), *farinesiana* (Bourg.), *septentrionalis* (Bourg.), *achlyophila* (Bourg.), *nitelina* (Bourg.), *jebusitica* (Roth), *camelina* (Bourg.), *ercica* (Bourg.) = *glaberrima* (Benoit), *planella* (Pfr.), *opaca* (Shuttl.), *margaritacea* (Ad. Schmidt), *alicurensis* (Benoit), *pictavica* (Bourg.), *novarrica* (Bourg.), and *alliaria* (Miller): Kobelt, Iconogr. vi. pp. 15–36, pls cliv.–clix. figs. 1568–1624, Europe and neighbouring shores of Asia and Africa.

Hyalina benoiti (Villa, MS.), Sicily, *icterica* (Tiberi, MS.), Naples, *moussoni*, sp. n., Constantinople, *draparnaldi*, var. n. *syriaca*, and *mingrelica*, var. n. *intermissa* (Mouss., MS.), Mingrelia; Kobelt, *l. c.* pp. 17, 19, 22, & 26, pls. clv.–clvii. figs. 1571, 1575, 1584, 1585, & 1597.

Hyalina icterica, sp. n., Tiberi, Moll. terr. Nap. p. 5, pl. i. fig. 1, Naples, Abruzzo, Calabria.

Hyalina pura (Ald.), *hammonis* (Ström), and *excavata* (Bean), distinguished by their radula; Shepman, Nachr. mal. Ges. 1878, pp. 52–54.

Hyalina. Six species from Transylvania characterized and discussed by C. Jickeli, Verh. siebenb. Ver. xxviii. pp. 122–125.

Hyalina mariannæ, sp. n., Westerlund, Nachr. mal. Ges. 1878, p. 108, Dép. Gers, France.

Hyalina etrusca, Arno River, *alleryi*, Sicily, *caretii* and *fragrans*, Calabria, spp. nn., Paulucci, Matériaux, &c. [not seen by the Recorder], & JB. mal. Ges. v. pp. 355 & 356.

Hyalina uziellii (Issel) found alive at S. Gemignano, Val d'Elsa, Tuscany; Paulucci, Bull. Soc. mal. Ital. iii. p. 165.

Hyalina osoriensis, Gran Canaria Island, and *mellissi*, St. Helena, spp. nn., Wollaston, Test. Atlantica, pp. 319 & 536.

Hyalina (*Vitrea*) *effusa*, sp. n., Böttger, Nachr. mal. Ges. 1878, p. 122, Transcaucasia, 4500 feet above the sea.

Ægopina, subg. n. for *Hyalina olivetorum* (Gm.) and allied European species, distinct from the North American *Mesomphix*; Kobelt, Iconogr. vi. p. 15.

Zonitoides nitidus, var. n. *borealis*, Clessin, Mal. Bl. xxv. p. 69, pl. iii. figs. 4 & 5, Galtström, Sweden, 62° N. lat.

Conulus fulvus (Drap.), variety [?], with internally and toothed aperture, observed at Cincinnati; the teeth may protect the living animal against the attacks of grubs: Doherty, Q. J. Conch. 1878, No. 15, pp. 344 & 345.

[*Conulus*] *Zonites stearnsi*, sp. n., Bland, Ann. Lyc. N. York, xi. [1875] p. 76, fig. 3, & Binney, Terr. airbr. Moll. p. 128, fig. 46, Astoria, Oregon.

Pfeifferia, see *Cochlostyla*.

Aulacognatha.

G. Pfeffer defines this family, which he calls *Helicacea*, as follows:—Jaw usually radiately sculptured; the lateral teeth inclined to multi-

plication of the cuspids ; marginal teeth usually broader than long, with several cuspids. JB. mal. Ges. v. p. 254.

Arion nivalis, sp. n., Koch, Z. deutsch-österreich. Alpenver. vii. p. 217, & Mal Bl. xxv. p. 87, Hangerer, Oetzthal, Tirol.

Arion incommodus, sp. n., Hutton, Tr. N. Z. Inst. xi. p. 331, New Zealand.

Helix. European species :—

[*Fruticicola*] *Helix aristata* (Kryn.), Transcaucasia, *brigantina* (Mengo), Portugal, *orsinii* (Porro), Abruzzi, *rothi* (Pfr.), Syra Island, *galloprovincialis* var., and *simplicita* (Parreyss, MS.), sp. n., locality unknown ; Kobelt, Iconogr. vi. pp. 36–39, pl. clx. figs. 1625-1637.

Helix fruticum, var. n. *andersoni*, Clessin, Mal. Bl. xxv. p. 68, pl. iii. fig. 2, Sater, prov. Dalerne, Sweden.

Helix hispida (L.) and *concinna* (Jeffr.) : critical note on the width of the umbilicus, as indicated by various authors ; Jeffreys, Ann. N. H. (5) ii. p. 379.

Helix unidentata [*Cobresiana*], var. n. *alpestris*, Clessin, Mal. Bl. xxv. p. 84, pl. iii. fig. 12, Schnee-alpe, in Carinthia, 2123 meters above the sea.

Helix erkeli, sp. n., Egypt, and *arcuata* (Ziegler, MS.), sp. n., Corfu ; Kobelt, Iconogr. vi. pp. 5 & 9, pl. clii. figs. 1541, 1542, & 1553.

[*Campylæa*] *Helix setulosa* (Briganti), Principato citeriore, *pubescens*, sp. n., Naples, Abruzzo, Calabria, and *frigida*, var. *nicatis* (Costa), Abruzzo, Tiberi, Moll. terr. Nap. pp. 8, 11, & 14, pl. i. figs. 2 & 3, and pl. iii. fig. 1.

Helix cingulata (Stud.) : varieties near Lago d'Idro ; Gredler, Nachr. mal. Ges. 1878, pp. 19 & 20.

[*Xerophila*] *Helix seetzeni* (Koch, var.), *oranensis* (Morelet), *sphærita* (Hartm.), *kabyliana* (Debeaux), *subrostrata* (Fér.), *simulata* (Fér.), var. *pellucens* (Shuttl.), *durieni* (Moq. Tand.), *berlieri* (Meric.), *candiota* (Friv.), *parva* (Parr.), *cistorum* (Morelet), *modica* (Morelet), *hipponensis* (Morelet), *variegata* (Friv.), *joppensis* (Mouss., var.), *improbata* (Mouss.), *langloisiana* (Bourg.), *chalcidica* (Blanc), *submeridionalis* (Bourg.), *zelebori* (Pfr.), *agreabilis* (Bourg.), *nubigena* (Charp.) ; Kobelt, Iconogr. vi. pp. 2–13, pls. cli.–cliii. figs. 1532–1565, Mediterranean province.

[*X.*] *Helix discrepans*, sp. n., and *bathyomphala* (Charp.), Abruzzo, Tiberi, *l. c.* pp. 14 & 15, pl. ii. figs. 2 & 3.

Helix bathyomphala (Charp.) : critical note by Kobelt, Nachr. mal. Ges. 1878, p. 40 [he regards this name as unpublished, although Pfeiffer, in Mon. Hel. i. 1848, p. 443, mentioned it as a distinctly characterized variety of another species].

Helix prietoi, Majorca, *ponsi*, Minorca, *pollenzensis*, Majorca, spp. nn., and *newca* (Dohrn), *majoricensis* (Dohrn), *homeyeri* (Heynem.), and *boissii* (Friv.) var., all from the Balearic Islands ; G. Hidalgo, J. de Conch. xxvi. pp. 230–235, pl. ix. figs. 1–7.

Helix solitaria (Poiret) is not = *conoidea* (Drap.), but a subscalarid variety of *unifasciata* (Poiret) ; Fagot, J. de Conch. xxvi. pp. 326 & 327.

Helix (*Campylæa*) *narentana* (Kleciach) ; Kobelt, Iconogr. vi. p. 13, pl. cliv. figs. 1566 & 1567.

Helix fœtens (Stud.) observed at the original locality in Wallis; Kobelt, JB. mal. Ges. v. p. 283.

[*Tachea*] *Helix nemoralis*. Specimens with more than five bands, six or even seven, found by Lademann, Verh. Ver. Rheink. xxxv. p. 87 [the supernumerary are only very faint and short, as if dismemberments of the normal bands]. Some experiments concerning the heredity of the number of the bands, made by C. Arndt. If both parents have similar bands, or no bands, about half the offspring exhibit the same bands, the other half disagreeing in a different direction; the former, breeding between themselves, yield an increasing heredity, 77 per cent. agreeing with their parents and grandparents. Arch. Ver. Mecklenb. xxxi. pp. 120–124.

Helix hortensis (Müll.) Albino six-banded variety; Oberdorfer, Nachr. mal. Ges. 1878, pp. 65–67; with notes on some other rare band-varieties, pp. 68 & 69.

[*Macularia*] *Helix vermiculata* (Müll.). Small variety (22 mm.) with solid shell and thickened mouth, in the island Pelagosa, Adriatic; Stossich, Boll. Soc. Adr. iii. p. 191.

Helix vermiculata (Müll.). Var. from the little island Galita, near Tunis; Issel, Ann. Mus. Genov. xi. p. 452.

Helix recondita (Westerlund) = *carsoliana* (Fér.) var., *H. circum-ornata* (Fér.), ex. typ., is a distinct species; Paulucci, J. de Conch. xxvi. pp. 247–249. A critical note thereon by E. Perrier, *tom. cit.* pp. 419 & 420.

Helix picæna [*picena*], and *marrucina*, spp. nn., and *carsoliana*, var. n. *persianii*, Abruzzo, Tiberi, Moll. terr. Nap. pp. 17–19, pl. ii. figs. 4–6.

[*Leptaxis* ?] *Helix raymondi* (Moq. Tand.); Kobelt, Iconogr. vi. p. 2, pl. cli. fig. 1531, Oran.

Helix (*Pomatia*) *godetiana*, Santorin and Amorgo Islands, and *thiesseana*, Eubœa, spp. nn., Kobelt, JB. mal. Ges. v. pp. 319 & 320.

Helix. African species :—

Patula garachicoensis, sp. n., Wollaston, Test. Atlantica, p. 326, Teneriffe.

Helix (*Gonostoma*) *crispo-lanata*, Palma, *beata*, Fuerteventura, and *gomera*, Gomera, Canarian Islands; *id. l. c.* pp. 387, 390, & 392.

Helix (*Hystricella*) *echinoderma* and *leacockiana*, spp. nn., Porto Santo, the latter semifossil; *id. l. c.* pp. 159 & 165.

Helix (*Coronaria*) *grabhami*, sp. n., Deserta Grande, near Madeira, *id. l. c.* p. 196.

Helix (*Lemniscia*) *watsoniana*, sp. n., Gran Canaria and Teneriffe, *id. l. c.* p. 411.

Helix (*Macularia*) *gibboso-basalis*, sp. n., very near *lactea* (Müll.), northern part of Teneriffe, *id. l. c.* p. 339.

Helix (*Hemicycla*) *vermiplicata* and *grano-malleata*, Palma, *nivaria*, Teneriffe, spp. nn., *id. l. c.* pp. 350, 357, & 367.

Helix (*Leptaxis*) *sub-roseotincta*, sp. n., *id. l. c.* p. 498, Brava, Cape Verde Islands.

Helix (*Leptaxis*) *forensis*, sp. n., *id. l. c.* p. 99, near *wollastoni* (Lowe), islet Fora, near Porto Santo.

[*Helicophanta*] *Helix guesteriana* (Crosse) : its difference from *cornu-giganteum* (Chemn.); Angas, P. Z. S. 1878, p. 312.

Helix. Asiatic species :—

Helix (*Vallonia*) *ladacensis*, Dras Valley, Ladak, and *costata* (Müll.), var. n. *asiatica*, Masanderan; Nevill, Moll. Yarkand Exp. p. 4.

[*Nummulina*] *Helix jasonis* (Dub.) and *genezarethana* (Mouss.) ; Kobelt, Iconogr. vi. p. 1, pl. cli. figs. 1529 & 1530, Mingrelia and Palestine.

Helix (*Fruticicola*) *mataianensis* and *stoliczkana* [see Zool. Rec. xiv. *Moll.* p. 63], spp. nn., Nevill, Moll. Yarkand Exp. p. 3, figs. 7–9 & 10–12, Mataian, in the Dras Valley, and Sasak Taka, W. of Yarkand; also *H. phæozona* and *plectotropis* (Martens), found at Sasak Taka by the late Dr. Stoliczka, and figured, *tom. cit.* figs. 1–3 & 4–6.

Helix assimilaris and *fuchsi*, spp. nn., Gredler, Nachr. mal. Ges. 1878, pp. 102 & 103, Utschangfu, prov. Hupe, China.

Trochomorphoides, subg. n., including *Helix acris* (Bens.) and *conulus* (Martens); Nevill, Handl. Ind. Mus. p. 80.

Helix (*Camena*) *congener*, *lewisi*, and *congenita*, spp. nn., E. A. Smith, P. Z. S. 1878, pp. 105, 496 & 497, with woodcuts, Japan, the first very near some varieties of *peliomphala* (Fér.).

Helix (*Eucochlias*) *ochthoplax* (Bens.). Note on the living animal; *H. pyrostoma* (Fér.) and *sulco-cincta* (Martens) probably belong to the same group: Nevill, Handl. Ind. Mus. p. 81.

Helix. Australian species :—

Helix raffrayi, sp. n., Tapparone-Canefri, C. R. lxxxvi. p. 1150, also Ann. N. H. (5) ii. p. 111, New Guinea.

Helix subtersa, sp. n., Gassies, J. de Conch. xxvi. p. 330, New Caledonia.

Helix brenchleyi, sp. n., Angas, P. Z. S. 1878, p. 861, pl. liv. fig. 7, Ysabel Island, Solomon Group.

Helix. North American species :—

Helix (*Microphysa*) *ingersolli*, sp. n., Bland, Bull. U. S. Geol. Surv. ii. [1875] p. 132, Colorado.

Microphysa lansingi (Bland, as *Zonites*, Ann. Lyc. N. Y. xi. 1875), Binney, Terr. airbr. Moll. p. 172, fig. 80, Astoria, Oregon.

Glyptostoma, subg. n. for *Helix newberriana* (Binn.), animal and shell like *Patula*, but jaw strongly ribbed as in true *Helix*; roof of aperture peculiarly sculptured in young specimens. Binney, Terr. airbr. Moll. p. 373, figs. 257 & 258; radula, pl. x. fig. A.

Helix chelhoweensis, sp. n., Wetherby, Am. Nat. xii. p. 290, North America.

Helix. South American species :—

[*Lysinoe*] *Aglaia higginsi*, new name for *farrisi* (Higgins, preoccupied), Ecuador; Miller, Mal. Bl. xxv. p. 165.

Helix boucardi and *adela*, spp. nn., Angas, P. Z. S. 1878, p. 72, pl. v.

figs. 5–10, Costa Rica. [The first = *costaricensis*, Roth., Pfr., Novitat. i. pl. xxi. figs. 15–17, 1857.]

Helix (*Eurycampta*) *monographa* (Burmeister), *hidalgonis*, with var. *minor*, (*Epiphragmophora*) *hieronymi*, (*Aglaia*) *yocotulana* and *tucumanensis*, spp. nn., Döring, JB. mal. Ges. v. pp. 143–149, pl. vi. figs. 1–6, all from La Plata States.

[*Isomeria*] *Dentellaria tridentula* and *latidentata*, spp. nn., Miller, Mal. Bl. xxv. pp. 165 & 166, pl. vii. fig. 5, & pl. viii. fig. 1, Ecuador. *Isomeria kolbergi*, *granulatissima*, and *parietidentata*, spp. nn., *id. l. c.* pp. 167–169, pl. viii. figs. 2 & 3, Ecuador.

[*Labyrinthus*] *Helix æsopus*, sp. n., Angas, P. Z. S. 1878, p. 72, pl. v. figs. 11 & 12, Costa Rica [= *triplicata*, Martens, Pfr., Novitat. Conch. iii. pl. ci. figs. 1–3, 1869].

Psadara, subg. n. of *Helix*, near *Solaropsis*, but smaller and thinner, hairy, not keeled, for *P. iris* and *bœtzkesi*, spp. nn., Ecuador; also *H. andicola*, *rosarium*, *sclenostoma* (Pfr.), and *monile* (Brod.). Miller, Mal. Bl. xxv. pp. 162 & 163, pl. vii. figs. 3 & 4.

Cochlostyla rufo-gastra (Less.), *metiformis* (Fér.), *fuliginata* (Martens), *dactylus* (Sow.), *chloroleuca* (Martens), *huegeli* (Pfr.), and *intorta* (Sow.); anatomical notes on them and on the genus generally by G. Pfeffer, JB. mal. Ges. v. pp. 195–201, pl. vii. Chiefly the teeth of the radula described; the lateral border of the foot distinct in some species, not in others; the under side of the foot is not tripartite in all species.

Pfeifferia micans (Pfr.), fully agrees with *Cochlostyla* in the anatomical characters, edge of the mantle, ribbed jaw, &c.; Semper, Nachr. mal. Ges. 1878, p. 24.

Beddomea, subg. n. of *Amphidromus*, comprising *Bulimus ceylanicus* (Pfr.), *intermedius* (Pfr.), *albizonatus* (Rve.), *physalis* (Bens.), *bontiæ* (Chemn.), and the sinistral *calcadensis* (Blanf.); Nevill, Haudl. Ind. Mus. p. 127.

Bulimus (*Borus*); König-Warthausen on its eggs, *suprà*, p. 13.

Borus garcia-moreni, new name for *popelairianus* var. *thammianus* (Martens, 1876), from Ecuador, fully described; Miller, Mal. Bl. xxvi. p. 172, also its eggs.

Achatina variegata (Lam.) and *knorri* (Jonas). Note on specimens from Liberia; the former has a ventricose and a slender variety. Dohrn, JB. mal. Ges. v. pp. 155 & 156.

Achatina albō-picta and *zebroides*, locality unknown, *dimidiata*, Transvaal, *bisculpta*, South Africa, *simplex*, Port Natal, *transvaalensis*, Transvaal, spp. nn., E. A. Smith, Q. J. Conch. 1878, No. 15, pp. 346–352.

Perideris flammigera (Fér.), ventricose and slender variety from Elmina; Dohrn, JB. mal. Ges. v. p. 156.

Buliminus (*Rhachis*) *rhodotænia* (Martens, 1869), redescribed from more perfect specimens, Taita, near Zanzibar, and *B.* (*R.*) *braunsi* var. n. *hildebrandti*, Turuma; Martens, MB. Ak. Berl. 1878, pp. 292 & 294, pl. ii. figs. 7, 1, & 2.

Buliminus (*Petræus*) *stoliczkanus*, Sonamarg, Kashmir, *mainwaringianus* and *beddomeanus*, Murree, Punjaub, spp. nn., Nevill, Moll. Yarkand Exp. pp. 19 & 20, figs. 25–29.

Buliminus deccanensis (Blanford MS.) new name for *malabaricus* (Pfr.), not being from Malabar; Nevill, Handl. Ind. Mus. p. 133. *B.* (*Cerastus*) *jickelianus*, sp. n., *id. ibid.*, Abyssinia.

[*Buliminus*] *Bulimus osoriensis*, *chrysaloides*, and *interpunctatus*, Gran Canaria, *lowei*, Teneriffe, *savinosa*[-æ], Gomero and Hierro, *palmensis* = *nanodes* var. *palmaensis* (Mouss.), Palma, and *flavo-terminatus*, probably from the Canaries, spp. nn., Wollaston, Test. Atlant. pp. 427–444.

Hapalus. Several species of British India referred to this genus; Nevill, Handl. Ind. Mus. p. 174.

Partula. Some special remarks on the synonymy and natural affinity of the species by C. P. Gloyne, Q. J. Conch. 1878, No. 15, pp. 337 & 338.

Achatinelloides, subg. n. of *Buliminus*, distinct from *Rhachis* by a distinct columellar fold. Type, *B. socotorensis* (Pfr.); Nevill, *l. c.* p. 131.

Glessula subfusiformis (Blanford, 1869), Anderson, Zool. researches Yunnan Exp. p. 886, pl. lxxx. fig. 3, Yunnan.

Cionella lubrica var. *pfeifferi* (Weinland) appears to be an abnormally elongate specimen of *lubrica*; Martens, Nachr. mal. Ges. 1878, p. 39.

Zua lubrica var. n. *subdentata*, Folin & Berillon, Contrib. à la faune malacol. du S.O. de la France, fasc. ii. Bayonne: 1877.

Cionella (*Zua*) *morseana*, sp. n., Doherty, Q. J. Conch. 1878, No. 15, p. 342, Kentucky and Ohio.

Ferussacia carnea (Risso). Specimen from the Island Pianosa, near Elba, figured by A. Issel, Ann. Mus. Genov. xi. p. 454, woodcut.

Ferussacia barclayi (Bens.) from Mauritius, very near *folliculus* (Gronov.) = *Glandina vesiculata*, Semper, Reis. Arch. Philippin.; Nevill, Handl. Ind. Mus. p. 161.

Lovea (*Amphorella*) *iridescens*, sp. n., Wollaston, Test. Atlan. p. 262, Madeira.

Cryptazeca, g. n.; shell like *Cionella*, with one columellar tooth; hinder end of the foot truncate, with several unicellular glands; mantle not extended beyond the shell. *C. monodonta*, sp. n., Bayonne. Folin, Verh. z.-b. Wien, xxviii. p. 183.

Azeca mabilliana, *bourguignati*, spp. nn., and *dupuyana* (Bourguignat, MS.), bringing up the number of French species of this genus to 8; Fagot, Bull. Soc. Pyrén. 1876 (No. 22).

Coelostele paladilhiana, sp. n., Aden, = *scalaris*, Paladilhe, *nec* Benson; Nevill, Handl. Ind. Mus. p. 161.

Leptinaria; 2 known species from Mexico, described by Fischer & Crosse, Mol. Méxique, pp. 625 & 626; jaw and radula of *L. lamellata* (Potiez & Mich.), *iid. l. c.* pl. xxviii. figs. 8–10.

Obeliscus cuneus (Pfr.), several varieties from Ecuador; Miller, Mal. Bl. xxv. p. 195.

[*Clavator*] *Bulimus watersi*, sp. n., Angas, P. Z. S. 1878, p. 311, pl. xviii. fig. 1, Madagascar. Near *obtusatus* (Gmel.).

Stenogyra (*Opeas*) *sinulabris*, sp. n., Martens, MB. Ak. Berl. 1878, p. 295, pl. ii. figs. 3 & 4, Ukamba, near Zanzibar.

Stenogyra involuta (Gould), eggs elongate; Dohrn, JB. mal. Ges. v. p. 156.

Opeas subula (Pfr.), radula and jaw: Fischer & Crosse, *l. c.* pl. xxix. figs. 1–3.

Opeas viviparum, sp. n., Miller, Mal. Bl. xxv. p. 197, Ecuador. [Several species are already known to be viviparous.]

Subulina (Beck). Generical characters discussed, with anatomy, jaw and radula of *S. octona* (Chemn.), and notes on geographical distribution; Fischer & Crosse, *l. c.* pp. 627–632, pl. xxviii. figs. 1–7.

Subulina lirifera and *cylindrella* (Morelet), *chiapensis* (Pfr.), *sargi* (Crosse & Fisch.), *octona* (Chemn.), Guatemala, and *trochlea* (Pfr.), Yucatan, described and figured; *iid. l. c.* pp. 633–642, pls. xxv. & xxvi.

Subulina melanoides, sp. n., Wollaston, Test. Atlant. p. 550, St. Helena.

Lia mougeri (Wood), varieties in colour; Nevill, Handl. Ind. Mus. p. 202.

Eucalodium sumichrasti, sp. n., and *blandianum* (Crosse), var. n., Crosse & Fischer, J. de Conch. xxvi. p. 250, Mexico.

Perrieria, g. n.; sinistral, fusiform, many-whorled, truncated at the summit, aperture elliptical, peristome continuous, expanded, columella twisted, subdentate, and truncated. *P. clausiliaformis* [*-liif-*], sp. n., Dorey, New Guinea, Tapparone-Canefri, C. R. lxxxvi. p. 1150, J. de Conch. xxvi. p. 169, and Ann. N. H. (5) ii. p. 111.

Clausilia. Several remarkable anatomical differences between some species, chiefly in the insertion of the retractor penis muscle, the situation of the sinstral upper tentacle, when retracted, at the side of the genital organs, and the existence of a peculiar duct between the uterus and the stalk of the receptaculum seminis (stalked vesicle), pointed out by F. Wiegmann, JB. mal. Ges. v. pp. 157–169, with woodcut. He also gives the anatomy of the large Japanese *C. reiniana*; it differs from the few anatomically known European species by the length of the penis, and the insertion of the retractor muscle quite at its hinder end; pp. 202–207, pl. viii.

Clausilia. O. Böttger gives a list of all known species, arranged in 32 primary sections, many of them with several subdivisions; they are: 1, *Balea* (Prid.); 2, *Reinia* (Kob.), type *variegata* (A. Ad.); 3, *Alopia* (H. & A. Ad.); 4, *Triloba* (Vest), type *C. sandrii* (Küst.); 5, *Clausiliastra* (Möll.), type *laminata* (Mont.); 6, *Herilla* (H. & A. Ad., modified), type *dacica* (Friv.); 7, *Siciliaria* (Vest), type *grohmanniana* (Partsch); 8, *Delima* (Hartm., modified), comprising *gibbula* (Ziegl.), *stigmatica* (Ziegl.), *itala* (Martens), *lævissima* (Ziegl.), &c.; 9, *Medora* (H. & A. Ad., modified); 10, *Agathylla* (H. & A. Ad., modified); 11, *Cristataria* (Vest), type *strangulata* (Fér.); 12, *Albinaria* (Vest); 13, *Carinigera* (Möllend.), *C. eximia* (Möllend.); 14, *Papillifera* (Hartm., modified); 15, *Dilataria* (Möllend.), type *succinea* (Rossm.); 16, *Phædusa* (H. & A. Ad.), India, Malayan Islands, China, and Japan; 17, *Serrulina* (Mouss.), type *serrulata* (Midd.); 18, *Fusulus* (Fitz., modified), type *interrupta* (Ziegl.); 19, *Pseudalinda* (Böttg.), type *montana* (Stentz.); 20, *Uncinaria* (Vest), type *turgida* (Rossm.); 21, *Mentissa* (H. & A. Ad., modified), type *gracilicosta* (Ziegl.); 22, *Euxina* (Böttg.), comprising *C. duboisi* (Charp.), *strumosa* (Friv.), *circumdata* (Friv.), *somchetica* (Pfr.), *mæsta* (Fér.); 23, *Alinda* (H. & A. Ad., modified), *C. plicata* (Drap.), and *biplicata* (Mont.);

24, *Strigillaria* (Vest), *C. cana* (Held.); 25, *Idyla* (H. & A. Ad., modified), *C. rugicollis* (Ziegl.), *socialis* (Friv.), &c.; 26, *Oligoptychia* (Böttg.), *C. brunnea* (Ziegl.), *bicristata* (Friv.), &c.; 27, *Pirostoma* (Möll.) = *Iphigenia* (Gray, preoccupied); 28, *Laminifera* (Böttg.), *C. pauli* (Mabille); 29, *Nenia* (H. & A. Ad.), American species; 30, *Macroptychia* (Böttg.), *C. sennariensis* (Pfr.); 31, *Boettgeria* (Heynem.), Madeiran species; 32, *Olympia* (Vest), *C. olympica* (Friv.). Ber. Offenb. Ver. xvii. & xviii., also as a separate pamphlet, 86 pp. 8vo.

Clausilia. C. A. Westerlund publishes an elaborate monograph of this genus, with historical, geographical, and critical introduction in Swedish, with Latin descriptions of the 509 known species and varieties. His arrangement of the subgenera is in many points similar to that given by Böttger, whose "Clausilien-studien" [Zool. Rec. xiv. *Moll.* p. 68] only came to his knowledge when two-thirds of his own monograph were printed. He excludes, however, not only *Balea perversa*, but also the Transylvanian *B. livida* from the genus, and admits the following subgenera: *Alopia*, *Triloba*, *Clausiliastra*, *Mentissa*, *Siciliaria*, *Medora*, *Albinaria*, *Herilla*, *Carinigera*, *Cristataria*, *Delima*, *Dilataria*, *Alinda*, *Crucita* (n.), *Papillifera*, *Isabellaria*, *Graciliaria*, *Tortula* (n.), *Fusulus*, *Erjavecia*, *Iphigenia*, *Uncinaria*, *Pirostoma*, and *Olympia*; most of these subgenera are adopted in the limitation given to them by Vest, Verh. siebenb. Ver. iv. (1867), and Möllendorf, *op. cit.* x. (1873), pp. 167 & 168, xi. (1874) p. 169, and xii. (1875) p. 190. The extra-European species, living in Transcaucasia, Asia Minor, and Syria are enumerated separately, pp. 162–184; those from Abyssinia and Japan are not mentioned.

Clausilia, sect. *Albinaria* (Vest): the known species examined and critically discussed, with numerous corrections of the synonymy, by O. Böttger. He gives full descriptions of 72 species, and several subspecies and varieties, nearly all of them from Greece or Asia Minor, some from the Ionian Islands, one from the island 'Lopadusa' (Lampedosa, between Sicily and Tunis), and arranges them into 19 subordinate groups; 23 species more, of which no typical or else sure specimens have been seen by the author, are mentioned in an appendix. The following are figured: *C. byzantina* (Charp.), var. n. *adspersa*, Crete, *pura*, sp. n., *deglupta*, sp. n., *cretensis* (Rossm.), *troglodytes* (A. Schmidt), *stricto-costata*, sp. n., *amalthea* (Westerl.), *bipalatalis* (Martens, MS.), sp. n., *striata* (Pfr.), *arthuri* (Blanc, MS.), sp. n., *hippolyti*, sp. n., all from Crete, *anaphiensis*, sp. n., Anaphi, *amorgia*, sp. n., Amorgo, *moreletiana* (Blanc, MS.), sp. n., Crete, *extensa* (Pfr.), Crete, *clara*, sp. n., Crete, *chia*, sp. n., Chios and Samos, with subsp. n. *submarginata*, Asia Minor, *unicolor*, sp. n., Crete, *virgo* (Mouss.), Cyprus, *ionica* (Pfr.), Cephalonia, *cyclothyra*, sp. n., Acarnania ?, *hians*, sp. n., Dalmatia ?, *dissipata*, sp. n., Lepanto, *incommoda*, sp. n., Zante, with subsp. *muraria* (A. Schmidt), Morea, *nævosa* (Fér.), var. *epirotica* (Mouss.), Epirus, *sericata* (Pfr.), var. *bifilosa* (Blanc, MS.), Eubœa, *menelaos* (Martens), subsp. n. *semicostulata*, Mount Taygetus, *maculosa* (Desh.), subsp. *arcadica* (Parr.), Arcadia. The greater number of the species are confined to one island, or one province of the continent, but *C. nævosa* (Fér.) and *contaminata* (Ziegl.) live in

Albania and on the Ionian Islands; *maculosa* (Desh.), in Rumelia, Morea, Ægina, and Eubœa; *cærulea* (Fér.) in Eubœa and many of the Cyclades, &c. Crete alone has 33 species, all limited to this island, so far as known. Novitat. Conchol. v. pp. 39–174, pls. cxlv.–cxlviii., also published separately.

Crucita, subg. n. for *Clausilia*: two palatal plaits, the upper punctiform, the lower rather long, forming the cross with the lunella or the clausilium, comprising *C. rothi* (Zeleb.), *bourguignati* (Charp.), *canaliculata* (Pfr.), *tetragonostoma* (Pfr.), *oxystoma* (Rossm.), &c. Westerlund, Mon. Clausil. pp. 110–113 (they are placed by Böttger among his *Oligoptychia*).

Tortula, subg. n. of *Clausilia*, for *C. pauli* (Mabille); *id. l. c.* p. 124 (forming part of Böttger's *Laminifera*).

Clausilia nigricans was first specifically named and published by Maton & Rackett in 1804, *C. rugosa* (Drap.) dates from 1801; Jeffreys, Ann. N. H. (5) ii. p. 381.

Clausilia dubia, var. n. *alpicola* and *plicatula*, var. n. *alpestris*, Clessin, Mal. Bl. xxv. pp. 86 & 87, pl. iii. figs. 14 & 15, Tirol, 2560 and 2130 mm. above the sea.

Clausilia andreanæ, sp. n., Fagot, Bull. Soc. Toulouse, 1877, Pyrenees.

Clausilia itala (Martens) and *baldensis* (Parr.), *rossmæssleri* and *costulata* (Jan), *cincta* (Brumati), and *letochæ* (Gredl.), form three series of smooth species, passing by nearly allied forms to distinctly ribbed species; Gredler, Nachr. mal. Ges. 1878, pp. 22–24.

Clausilia transitans and *deburghiæ*, Calabria, *bettgeriana*, Monte Majella, spp. nn., Paulucci, Matériaux, &c., and JB. mal. Ges. v. pp. 357 & 358.

Clausilia gibbula (Ziegl.) var. *pelagosana* (Böttg); Stossich, Bull. Soc. Ard. iii. p. 191.

Clausilia laminata, var. n. *triloba*, Carniola, *gibbula*, subsp. n. *pelagosana*, Pelagosa, in the Adriatic, *stossichi*, Dalmatia, *pirostoma*, Croatia, spp. nn., *tschetschenica* (Pfr.) = *ossetica* (Mouss., Böttg.), Transcaucasia, *thessalonica*, var. n. major, Macedonia; Böttger, JB. mal. Ges. v. pp. 33–41, pl. ii.

Clausilia perlucens, sp. n., Caucasus, *id. l. c.* p. 105, pl. iv. fig. 7.

Clausilia pleuroptychia, sp. n., Syria, *leuco*[*r*]*rhaphe* (Blanc, MS.), sp. n., Skiathos Island, *rudicosta*, Sicily, *digamma*, Antivari, *confusa*, Zante and Cerigo, spp. nn., *id. l. c.* pp. 291–306, pl. x.

Clausilia orsiniana, var. n. *orthopleura*, Biokovo, in Dalmatia, *lepida*, new name for *longicollis* (Westerlund, 1875, *nec* Küster), *amalthea*, sp. n., Crete, *rossmæssleri*, var. n. *ressmanni*, Carinthia, *letochana*, var. n. *gredleriana*, Tirol, *resinæ* (Kleciach, MS.), Dalmatia, *jucunda* (Küster, MS.), Dalmatia, *petrina* (Parr., MS.), Croatia, *archilabris* (Kustchig, MS.), *pachychilia* (Ziegl., MS.), *tenebricosa* (Küster, MS.), all from Dalmatia, *decattaniæ* (Villa, MS.), Southern Italy, *cristicollis*, sp. n., Argos, *moreletiana* (Blanc, MS.), Crete, *laconiæ* (Mouss., MS.), Missenia, Greece, *mathildæ* (Kleciach, MS.), Croatia, *tinei* (Benoit, MS.), Sicily, *coarctata* (Mousson, MS.), Bœotia, *kondourana* (Blanc, MS.), Greece, spp. nn.;

Westerlund, Monogr. Clausil. pp. 25, 31, 37, 68, 69, 77, 79, 80, 82, 111, 150, & 156.

Clausilia strauchi, sp. n., Böttger, Mél. Biol. x. p. 176, and JB. mal. Ges. v. p. 301, pl. x. fig. 6, Tiflis.

Clausilia lederi, Mount Suram, Transcaucasia, and *aggesta*, Kuban River, Cis-Caucasia, spp. nn., Böttger, Nachr. mal. Ges. 1878, pp. 123 & 124.

Clausilia martensi (Herklots, 1860) = *reiniana* (Kobelt, 1876); Martens, Nachr. mal. Ges. 1878, p. 90.

Clausilia subgibbera, *supra-nodularis*, *digonoptyx*, *tau*, *vasta*, *viridiflava*, *hickonis*, and *attrita*, spp. nn., from Japan, with some notes on other Japanese species; Böttger, JB. mal. Ges. v. pp. 41–61, pls. ii. & iii. *C. platydera*, var. n. *lambda*, *strictaluna*, *aurantiaca*, spp. nn., and *bilabrata* (E. A. Smith), var. n. *ptycholæma*, all from Japan; *id. l. c.* pp. 97–105, pl. iv. figs. 2–7.

Clausilia ptychochila, sp. n., *id. l. c.* p. 57, pl. iii. fig. 8, probably from China.

Clausilia aculus (Bens.), var. n. *labio*; Gredler, Nachr. mal. Ges. 1878, p. 104, Hankow.

Pupa. Monograph continued by Sowerby in Reeve's Conchologica Iconica, pts. 340 & 341, pls. xviii.–xx., species 163–192. No new or previously unfigured species. *P. dormeyeri* (Parr.), fig. 189, in error for *lindermayeri*.

Pupa avenacea and *megachiles*: intermediate form between both species and other varieties of these and *P. frumentum*, near Lago d'Idro; Gredler, Nachr. mal. Ges. 1878, pp. 20 & 21.

Pupa hassiaca (Pfr.) appears to be a specimen of *avenacea* (Brug.) deformed by fracture and abnormal restoration; Martens, Nachr. mal. Ges. 1878, p. 89.

Pupa eumicra (Bourg.) Clessin, Mal. Bl. xxv. p. 85, pl. iii. fig. 11, St. Moritz, Engadine, 1800 meters above the sea.

Pupilla alticola, sp. n., Ingersoll, Bull. U. S. Geol. Surv. ii. [1875] p. 128 (edit. 2, 1876, p. 391), figured, and Binney, Terr. airbr. Moll. p. 212, fig. 116, Colorado.

Pupa cincinnatiensis, sp. n., Judge, Q. J. Conch. 1878, No. 15, p. 343, with woodcut, Cincinnati.

Reinhardtia, subg. n. of *Pupa*; young shell with columellar and parietal plaits and radiately placed white thickenings [like *Planorbis nitidus*], which disappear in the adult. Type, *P. umbilicata* (Drap.). Böttger, Nachr. mal. Ges. 1878, p. 122 [= *Liostyla*, Lowe, 1833, *Charadrobia*, Albers, pt.].

Pupa (*Liostyla*) *loweana*, Madeira, (*Craticula*) *corneo-costata* and *degenerata*, Portosanto, *relevata*, Baixo Island, near Portosanto, spp. nn., Wollaston, Test. Atlant. pp. 217 & 227–231.

The type of *Isthmia* (Gray) is *Vertigo nitida* (Fér.) = *edentula* (Drap.); of *Truncatellina* (Lowe), *V. minutissima* (Hartm.). Martens, Nachr. mal. Ges. 1878, p. 38.

Pupa (*Vertigo*) *microscopica*, sp. n., = *Carychium mauritianum* of collectors, no description, Bourbon and Seychelle Islands; Nevill, Handl. Ind. Mus. p. 197.

Vertigo moulinsiana (Dupuy) and *lilljeborgi* (Westerlund), both British and specifically distinct. *V. tumida* (Westerlund) ? = *pusilla* (Müll.), var.: Jeffreys, Ann. N. H. (5) ii. pp. 380 & 381.

Pupa (*Cylindrus*) *insularis* (Ehrenb.), varieties and geographical distribution; Nevill, Handl. Ind. Mus. p. 195.

Goniognatha.

[*Placostylus*] *Bulimus subsenilis*, *arenosus*, and *gaudryanus* [*-ianus*], spp. nn., from New Caledonia, the last described formerly as *cannibal* var. *oviformis*; Gassies, J. de Conch. xxvi. pp. 331–336, with notes on other New Caledonian species, pp. 337 & 338.

Eurytus taylorioides and *aureo-nitens*, spp. nn., Miller, Mal. Bl. xxv. pp. 180 & 181, Ecuador.

Bulimus (*Eurytus*) *eros*, sp. n., Angas, P. Z. S. 1878. p. 312, pl. xviii. figs. 6 & 7, Ecuador.

[*Orthalicus*] *Zebra fulgur*, sp. n., Miller, Mal. Bl. xxv. p. 186, Ecuador.

[*Bulimulus*] *Bulimus josephus*, *irazuensis*, and *navarrensis*, spp. nn., Angas, P. Z. S. 1878, p. 73, pl. v. figs. 13–20, Costa Rica [the second very near if not identical with *tripictus*, Albers, 1857; the third probably = *virginalis*, Pfr., Novitat. Conch. iii. 96, 3 & 4].

[*Bulimulus*] *Bulimus stelzneri* (Dohrn, 1875, *nec* Döring), Cherro de Chepe, Argentine States; Kobelt, JB. mal. Ges. v. p. 149, pl. vi. fig. 7.

Bulimus (*Otostomus*) *quadrifasciatus* and *napo*, spp. nn., Angas, P. Z. S. 1878, p. 312, pl. xviii. figs. 2–5, Ecuador.

Drymæus petasites, sp. n., Miller, Mal. Bl. xxv. p. 189, Ecuador.

Simpulopsis corrugata (Guppy, 1866) redescribed by the author; J. de Conch. xxvi. p. 323, pl. x. fig. 3, Trinidad, W. Indies.

Elasmognatha (Succineidæ).

The characters of the family *Succineidæ* discussed, and the genera *Succinea*, *Homalonyx*, *Hyalimax*, and *Athoracophorus* (Gould) = *Janella* (Gray) admitted in it by Fischer & Crosse, Moll. Méxique, pp. 643–645.

Janella papillata, sp. n., Hutton, Tr. N. Z. Inst. xi. p. 332, New Zealand.

Konophera [*Co-*], g. n., like *Janella*, but the eye peduncles short and conical. *K.* [*C.*] *marmorea*, sp. n., New Zealand; Hutton, *l. c.* p. 332.

Homalonyx felinus (Guppy, 1872) redescribed by the author; J. de Conch. xxvi. pp. 324 & 325, pl. x. fig. 2, Trinidad.

Succinea. The generic characters discussed and two subgenera, *Brachyspira* and *Succinea* (s. stricto) admitted; Crosse & Fischer, *l. c.* pp. 645–654.

Succinea. Jeffreys criticises the new species described by Drouet & Baudon [Zool. Rec. xiv. *Moll.* p. 74] reducing *parvula* (Pascal) and *debilis* (Morelet) to *elegans* (Risso), *baudoni* (Drouet) and *acramblia* (Mabille) to *putris* (L.), and *arenaria* (Bouch.), *humilis* (Drouet), *crosseana* and *breviuscula* (Baudon) to *oblonga* (Drap.), but he acknowledges *S. virescens*

(Morelet) = *debilis* (Baudon, *nec* Morelet) = *putris* var. *vitrea* (Jeffr.), found also in England. Ann. N. H. (5) ii. pp. 377–379.

Succinea putris, var. n. *succica*, Clessin, Mal. Bl. xxv. p. 70, pl. iii. fig. 9, Medelpad, Sweden.

Succinea pfeifferi, var. n. *microstoma*, Clessin, Mal. Bl. xxv. p. 85, Bex, Switzerland.

Succinea oblonga (Drap.). Shell very variable in colour; Tschapeck, Nachr. mal. Ges. 1878, p. 138.

Succinea martensiana, sp. n., Kathiawad or Kattywar, Yarkand, and *pfeifferi* var. n. *subintermedia*, Yarkand, Nevill, Moll. Yark. Exp. pp. 5 & 6, figs. 30, 31, & 32, 33.

Succinea californica, sp. n., Crosse & Fischer, J. de Conch. xxvi. p. 68, San Tomes, peninsula of California.

Succinea brevis (Dunker), *undulata* (Say) varr. nn. *colorata*, *carmenensis*, and *cordovana*, *S. luteola* (Gould) = *texasiana* (Pfr.) = *citrina* (Shuttl.), *S. virgata* (Martens) var. n. *microspira*, *S. lineata* (Binney) var. n. *sonorensis*, *S. californica* (Crosse & Fisch.), *pueblensis* (Crosse & Fisch.), and *concordialis* (Gould), Mexico, *guatemalensis* and *horticola* (Morel.), Guatemala; Crosse & Fischer, Moll. Méxique, pp. 655–670, pls. xxvi. & xxvii.

Succinea (*Brachyspira*) *recisa* (Morelet), Guatemala and Nicaragua; *iid. l. c.* p. 654, pl. xxvi. fig. 13.

Camptoceras (Bens.), is allied to *Succinea*, not to *Physa*; G. Nevill, Handl. Ind. Mus. p. 215.

Vaginulidæ.

The characters of this family and of *Vaginula* discussed at length, with anatomical description of *V. occidentalis* (Guilding); Fischer & Crosse, Moll. Méxique, pp. 671–681, pl. xxviii. figs. 21–26, pl. xxix. figs. 6–14.

Vaginulus birmanicus (Theob.), note by Nevill, Handl. Ind. Mus. p. 199.

Vaginula moreleti (Crosse & Fischer), Tabasco and Tehuantepec, Southern Mexico; Fischer & Crosse, *l. c.* p. 682, pl. xxiv. fig. 14.

Veronicella, sp. n., from Yunnan, not described, Nevill, J. A. S. B. xlvi. [1877], pt. 2, p. 23.

Oncidiidæ.

Fischer & Crosse, Moll. Méxique, pp. 683–687, discuss the characters of this family and admit the following genera: *Oncidium* (Buchanan), without, and *Peronia* (Blainv.), with, ramified dorsal appendages, both only occurring on the shores of the Indo-Pacific seas; also *Oncidella* (Gray) [*infrà*], and the doubtful genus *Buchanania* (Less.), with anatomical figures of *Peronia verruculata* (Cuv.), pl. xxxi. figs. 13–15.

Oncidella (Gray, emend.). No jaw, median tooth of the radula tricuspid, lateral short, oblique, bicuspid; male organs more simple than in *Oncidium* and *Peronia*; large glands on the edges of the mantle. Includes *Oncidium celticum* (Cuv.), *parthenopeum* (Chiaje), and *nanum* (Phil.), all perhaps the same species. *incisum*, *patelloide*, and *nigricans* (Q. & G.),

irroratum (Gould), *boreale* (Dall), *marginatum*, and *indolens* (Couth.), and *armadillo* (Mörch). Anatomical description of *O. celtica* (Cuv.), and external description of *O. carpenteri* (Binney) from S. Lucas, California. The geographical distribution is in the European seas, the Atlantic and New Zealand. Fischer & Crosse, *l. c.* pp. 683–698, pl. xxxi. figs. 1–12.

Oncidella carpenteri (Binn.) common in the Gulf of California, described by Stearns, P. Ac. Philad. 1878, p. 399, pl. vii. figs. 7 & 8.

Auriculidæ.

Carychium mariæ, sp. n., Paulucci, Matériaux, &c., and JB. mal. Ges. v. p. 358, Lombardy. *C. mauritianum*: see *Pupa* (*Vertigo*).

Lomodonta (Nuttall) = *Plecotrema* (Ad.); Nevill, Handl. Ind. Mus. p. 221.

Auricula (*Alexia*) *denticulata* (Mont.) lives in the uppermost part of the littoral region, above *Litorina rudis*; it is air-breathing, its tentacles are only contractile, not retractile, and the young shell is crowned with hairs. P. Fischer, J. de Conch. xxvi. pp. 309–312.

[*Marinula*] *Auricula watsoni*, sp. n., Wollaston, Test. Atlant. pp. 269 & 294, Madeira and Great Salvages.

Marinula filholi, sp. n., Hutton, J. de Conch. xxvi. p. 42, New Zealand [very near *patula* (Lowe)].

Leuconia obsoleta, sp. n., Hutton, J. de Conch. xxvi. p. 43, New Zealand.

Melampus liberianus (A. Ad.) and its young state, *obovatus* (A. Ad.), Dohrn, JB mal. Ges. v. pp. 151 & 152.

Limnæidæ.

Observations on their spinning slimy threads in water, by which they ascend and descend; Sherriff-Tye, Q. J. Conch 1878, No. 17, pp. 402–404, 414 & 415.

Notes on the development of *Limnæa* and *Ancylus* by Robin. [See the general subject, *suprà*, p. 13.]

Limnæa steenstrupi, sp. n., Clessin, Mal. Bl. xxv. p. 79, pl. iii. fig. 16, Iceland. [Appears to be a dwarf form of *ovata*.]

Limnæa stagnalis, var. n. *bottnica*, *auricularia* var. n. *andersoni*, and *palustris* var. n. *maritima*, Northern part of the Baltic; Clessin, Mal. Bl. xxv. pp. 72–76. pl. figs. 6, 8, & 17.

Limnæa, banded specimens of *L. palustris* and *auricularia*; Kobelt, Nachr. mal. Ges. 1878, p. 11.

Limnæa delanati, sp. n., Folin, J. de Conch. xxvi. p. 329, pl. x. fig. 5, Passages, Spain, in a pond near the sea, of very small size.

Limnæa lagotis varr. nn. *yarkandensis* and *subdisjuncta*, Nevill, Moll. Yark. Exp. pp. 8 & 9, Yarkand, and *L. andersoniana* (Nevill) var. n. from North Tangitar and Kashgar, *l. c.* p. 9; named *rimata*, id. Handl. Ind. Mus. p. 254 [= *pervia* (Martens)], = *L. defilippii* (Issel) var. n. *sirikulensis*, Lake Sirikul, Moll. Yark. Exp. p. 7.

Limnæa, synonymy and distribution of the species from British India,

Tibet and Yarkand; *id.* Handl. Ind. Mus. pp. 232–237. Shells of 2 Mexican species figured by Fischer & Crosse, Moll. Méxique, pl. xxvii.

Physa. Five Mexican species figured; *iid. l. c.* pls. xxvii. & xxx.

Aplecta. Six Mexican species figured; *iid. l. c.* pls. xxvii. & xxx.

Planorbis. S. Clessin begins a monograph of this genus, enumerating 13 known subgenera, in Küster's Conch. Cab. pt. 270, pp. 30–36*a*.

Planorbis græcus, Eubœa, and *stossichi*, Dalmatia, spp. nn., Clessin, Mal. Bl. xxv. pp. 125 & 126, pl. v. figs. 5 & 9.

Planorbis albus, var. n., Lake Paukong, *lævis*, var. n., Ladak, and *subangulatus*, var. n., North Tangitar, Kashgar, perhaps a new species; Nevill, Moll. Yarkand Exp. pp. 10 & 11.

[*Planorbis*] *Helisoma plexata* [*-um*], sp. n., Ingersoll, Bull. U. S. Geol. Surv. ii. [1875], p. 136, Colorado.

Ancylus, 2 Mexican species figured; Fischer & Crosse, *l. c.* pl. xxx.

Thalassophila.

Amphibola. G. Schacko describes the radula of *A. fragilis* (Lam.), *solida* [see below], and *burmana* (Nevill), that of the type of the genus *avellana* (Gmel.) being still unknown. Median plate five-toothed, intermediate plates three-toothed, with a small accessory plate; lateral hooks 42–48, unciform. The radula considerably resembles that of *Physa*. J B. mal. Ges. v. pp. 1–9, pl. i.

Amphibola solida, sp. n., Martens, *tom. cit.* p. 2, footnote, Australia.

Siphonaria, air-breathing; see Semper, *suprà*, p. 11.

Siphonaria albida, sp. n., Angas, P. Z. S. 1878, p. 314, pl. xviii. figs. 14 & 15, South Australia.

Liriola peltoides (Carpenter, as *Nacella*), jaw and radula described by W. H. Dall, J. de Conch. xxvi. pp. 68–73, pl. ii. figs. 6 & 6 *a*. *Ancylus gussoni* (Costa, living in the Mediterranean) is perhaps the same species, which may be widely distributed, as it lives on floating seaweed. See *Scutulum*.

Gadinia reticulata (Sow.), found in the Society and Paumotu Islands; Garrett, Q. J. Conch. 1878, No. 15, p. 335.

Gadinia nivea, sp. n., Hutton, J. de Conch. xxvi. p. 36, New Zealand.

Scutulum (Monterosato, 1877) = *Allerya* (Mörch, 1877, preoccupied), *S. gussoni* (O. G. Costa, as *Ancylus*) = *Patelloida vitrea* (Cantraine), rather allied to *Siphonaria*; Monterosato, J. de Conch. xxvi. p. 320.

PULMONATA OPERCULATA.

Cyclophoridæ.

Cyclophorus zebrinus (Bens.), var. n. *aureo-labris*, Sibsagar, *bensoni* (Pfr.), var. n. *cryptomphaloides*, Naga Hills, *pearsoni* (Bens.), var. n. *subalabastrum*, Arakan Hills, *scurra* (Bens.), var. n. *davidsoniana*, Tenasserim, and *khasiensis*, new name for *siamensis* (Sow.), which is not from Siam, with other notes on various species and varieties from British India; Nevill, Handl. Ind. Mus. pp. 259–273.

Cyclophorus angolensis, sp. n., Dohrn, JB. mal. Ges. v. p 151, Angola.

Cyclophorus ? hildebrandti, sp. n., Martens, MB. Ak. Berl. 1878, p. 289, pl. i. figs. 1–3, Ukamba, near Zanzibar.

Theobaldius, subg. n. *Cyclophorus*, type *C. annulatus* (Troschel) ; Nevill, Handl. Ind. Mus. i. p. 275.

Leptopoma rœpstorffianum, sp. n., *id. l. c.* p. 280, Andaman Islands.

Leucoptychia, g. n., differs from *Leptopoma* by the presence of numerous transverse lamellar ribs ; operculum like that of *Leptopoma* ; arboreal. *L. tissotiana*, sp. n., New Guinea, Crosse, J. de Conch. xxvi. pp. 163 & 164.

Leptopomoides[*-matoides*], subg. n. for *Cyclophorus halophilus* (Bens.) ; Nevill, Handl. Ind. Mus. p. 273.

Lagochilus warnefordianus, sp. n., *id. l. c.* p. 284, Andaman Islands.

Cyclotus corpulentus, sp. n., E. A. Smith, Ann. N. H. (5) ii. p. 482, New Granada.

Cyclotus boucardi, sp. n., Angas, P. Z. S. 1878, p. 73, pl. v. figs. 3 & 4, Costa Rica.

Myxostoma (Troschel, 1847) agrees with *Pterocyclus* in the peristome, but differs by the thick horny operculum, the whorls of which have exteriorly lamellated margins. *Lituus brevis* (Martyn), *Cyclostoma planorbulus* (Lam.), and *Pterocyclus albersi* (Pfr.), and *Cyclophorus* (*Myx.*) *bathy*[*r*]*rhaphe*, sp. n., from Borneo, belong to this genus. E. A. Smith, P. Z. S. 1878, pp. 497–499, with woodcut.

Pterocyclus rupestris (Bens.), var. n. *puriensis*, Pooree, and *insignis* (Theob.), var. n. *planorbioides*, Kakhyen Hills ; Nevill, Handl. Ind. Mus. p. 261.

Pterocyclus (*Spiraculum*) *mastersi* (Theob.), var. n. *simplex*, Naga Hills, *id. l. c.* p. 263.

Spiraculum mastersi, sp. n., Blanford, J. A. S. B. xlvi. [1877], pt. 2, p. 313, Assam (figured in "Conchologia Indica").

Pupinidæ.

Mascaria, g. n. Operculum ovate, with few whorls, nucleus situated near the base of the columellar margin. Shell rimate, elongate-ovate, nearly smooth ; aperture angulate above, peristome continuous, single, outer lip thickened and slightly expanded. Limited to Mauritius and Madagascar. For *Megalomastoma croceum* (Sow.), and *litteratum* (Morelet). Angas, P. Z. S. 1878, pp. 310 & 311.

Pupina hungerfordiana, sp. n., Nevill, Handl. Ind. Mus. p. 300, Asadden River. *P. blanfordiana* (Theob.) = *artata* (Bens.) var., *P. blanfordi*, Conch. Ind., = *peguensis* (Bens.) ; *id. ibid.*

Cyclostomatidæ.

Cyclostoma (*Tropidophora*) *caldwellianum*, sp. n., Nevill, Handl. Ind. Mus. p. 305, Pouce Mount, Mauritius, semifossil. Note on *C. barclayanum* (Rv.) ; *id. l. c.* p. 306.

Cyclostoma (*Otopoma*) *fimbriatum* (Lam.), var. n. *major* and *semisculpta*,

Mauritius. *C.* (*O.*) *seychellense*, sp. n., Seychelles, Nevill, Handl. Ind. Mus. pp. 307 & 308.

Cyclostoma anceps, sp. n., Martens, MB. Ak. Berl. 1878, p. 288, pl. i. fig. 4, Taita, near Zanzibar.

Pomatias tergestinus, Trieste, and *plumbeus*, "Carinthia, Carniola, Istria, Austria, Italy, Hungary"; Westerlund, Nachr. mal. Ges. 1878, p. 109.

Pomatias hidalgoi, var. n. *laburdensis*, Folin & Berillon, Contrib. à la faune malacol. S. O. France, Dax, 1876, Pyrenees.

Pomatias cassiniacus, sp. n., St. Simon, in Paulucci's Matériaux, &c., and JB. mal. Ges. v. p. 359, Monte Cassino, Naples.

Omphalotropis aurantiaca (Desh., as *Cyclostoma*) lives in Mauritius; Nevill, J. de Conch. xxvi. p. 61.

Omphalotropis dupontiana, sp. n., *id.* Handl. Ind. Mus. p. 320, Pouce Mount, Mauritius, semifossil.

Truncatellidæ.

Acme cryptonema, sp. n., Folin & Berillon, *op. cit.* fasc. ii. Bayonne, 1877, J. de Conch. xxvi. p. 195. Pyrenees.

Acmella raepstorffiana, Nicobar Islands, and *moreletiana*, Batti Malvo, spp. nn., Nevill, Handl. Ind. Mus. pp. 251 & 252.

Truncatella punctata and *microlena* (Bourguignat, MS.), Monterosato, J. de Conch. xxvi. p. 321, Coast of Algeria; *T. subsulcata* and *cerea*, Gassies, J. de Conch. xxvi. pp. 338 & 339, New Caledonia: spp. nn.

Truncatella valida (Pfr.), var. *minor* and *parcicostata*, ? distinct species, various parts of the shores of the Indian Sea; Nevill, Handl. Ind. Mus. p. 254.

Assimineidæ.

Assiminea adriatica, sp. n., Clessin, Mal. Bl. xxv. p. 119, pl. iv. fig. 6, Görz.

Helicinidæ.

Helicina undulata, sp. n., Morelet, J. de Conch. xxvi. p. 172, Mauritius, extinct.

Helicina colombia [*-biæ*, or *-biana*], sp. n., E. A. Smith, Ann. N. H. (5) ii. p. 483, New Granada.

SOLENOCONCHÆ.

G. O. Sars regards this division as a class, and divides it into two orders, viz.:—

1. Scaphopoda. Posterior aperture of the shell entire or with a ventral slit, provided with a supplementary tube. Foot trilobate. Edge of the lateral plates of the radula indistinctly dentate.

   Gen. *Antalis* (Aldrovandi) [ante-Linnæan] = *Dentalium*, auctt., pt.

2. Siphonopoda. Posterior aperture of the shell entire or with several notches, and without supplementary tube. Foot elongated, worm-like, provided at the tip with a circular disc, the edges of which are beset with papillæ. Edge of the lateral plates of the radula distinctly tridentate.

Gen. *Siphonodentalium* (Sars), *Siphonentalis* [infrà], and *Cadulus* (Phil.).

Moll. arct. Norveg. pp. 100–107.

[*Dentalium*] *Antalis striolata* (Stimps.), whole coast of Norway; Sars, *l. c.* p. 101, pl. ii. fig. 1, & pl. xx. fig. 10; radula, pl. i. fig. 1.

Dentalium concinnum, sp. n., Martens, SB. nat. Fr. 1878, p. 134, Western Africa, 10° N. lat., 17° W. long., 360 fath.

Dentalium perlongum, sp. n., Dall, Bull. Mus. C. Z. v. p. 61, Gulf of Mexico, below 200 fath. (not described).

Dentalium lævе and *sexangulare*, spp. nn., subfossil, Hilgard & Hopkins, Rep. Boring Mississippi, 1878.

Siphonodentalium (M. Sars). Restricted to the species in which the posterior aperture has several notches; terminal disc of the foot concave, without median tentacle. Type, *S. vitreum* (M. Sars). G. O. Sars, *l. c.* pp. 106 & 342, pl. vii. fig. 2; radula, pl. i. fig. 2.

Siphonentalis, g. n. Shell elongate, posterior aperture entire, circular; terminal disc of the foot convex, with a single median tentacle. *S. lofotensis* and *affinis* (M. Sars, as *Siphonodentalium*) and *tetragona* (Brocchi, as *Dentalium*) = *D. quinquangulare* (Forbes). G. O. Sars, *l. c.* pp. 104 & 105, pl. xx. figs. 11–13; radula, pl. i. figs. 3 & 4, Norway.

Cadulus propinquus, sp. n., *id. l. c.* p. 106, pl. xx. fig. 15; radula, pl. i. fig. 5, Norway, 100–150 fath.

BIVALVIA, Linn.

(Lamellibranchia, Cuv.)

For observations on anatomy, and structure of gills, adductor muscles, and foot, see, in the General Subject, Anatomy and Physiology, *suprà*, pp. 9 & 10.

Pholadidæ.

Barnea beccarii, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875] p. 1032, Kei Bandan, Papuan Islands.

Corbulidæ.

Corbula fortisulcata, sp. n., E. A. Smith, P. Z. S. 1878, p. 819, pl. l. fig. 23, Andaman Islands.

Corbula haastiana, sp. n., Hutton, J. de Conch. xxvi. p. 44, New Zealand.

Neæra arctica (M. Sars), *obesa* (Lovén), *subtorta*, sp. n., *glacialis*, sp. n., and *jugosa* (Wood); G. O. Sars, Moll. arct. Norveg. pp. 85–88, pl. vi. figs. 5–9, Arctic Norway.

Poromya granulata (Nyst.) = *Embla korcni* (Lovén), W. coast of Norway, 100–300 fath.; *id. l. c.* p. 90, pl. v. fig. 1.

Pecchiola abyssicola (M. Sars), Lofoden Islands, 200–300 fath.; *id. l. c.* p. 82, pl. xx. fig. 5.

Saxicavidæ.

Saxicava pholadis (L.) and *arctica* (L.) are distinct species; *id. l. c.* pp. 95 & 96, pl. xx. figs. 7 & 8.

Arcinella plicata (Mont.) = *Saxicava fragilis* (Nyst.) = *Panopea plicata* (Jeffr.), Lofoden Islands, 100–300 fath.; *id. l. c.* p. 93, pl. xx. fig. 6.

Panopea norvegica (Spengl.), adult and young; *id. l. c.* p. 94, pl. vi. fig. 12.

Anatinidæ.

Thracia truncata (Brown) = *myopsis* (Beck), with var. *deveza*; id. *l. c.* p. 84, pl. vi. figs. 10 & 11, Finmark.

Lyonsia arenosa (Möller); *id. l. c.* p. 342, pl. xxxiii. fig. 2, Tromsö.

Lyonsia bulla, sp. n., Dall., Bull. Mus. C. Z. vi. p. 61, Gulf of Mexico, 1920 fath. (not described).

Pandora glacialis (Leach), Novaya Zemlya and Kara Sea, rather numerous at about 10 fath.; Leche, Sv. Ak. Handl. xvi. 2, p. 11, pl: i. fig. 1.

Tellinidæ.

Tellina lata (Gmel.), Novaya Zemlya, very variable; *id. l. c.* p. 13.

Tellina pusilla (Philippi) = *pygmæa* (Lovén); G. O. Sars, Moll. arct. Norveg. p. 18, Lofoden Islands, 4–6 fath.

Tellina wroblewskii, sp. n., Bock, P. Z. S. 1878, p. 727, pl. xlvi. figs. 1 & 2, China.

Donax fossor (Say): note on its life and *Entozoa*, by Leidy, P. Ac. Philad. 1878, pp. 382 & 383.

Galatea bocagii, *pseudo-radiata*, *aguairii*, and *quanzæ*, spp. nn., River Quanza, and varieties of *G. cumingi* (Dunker), River Bengo, Angola; F. de Brito Capello, "Description de quelques espèces de *Galatea*" (Lisbonne: 1878), pp. 7–10 & 13, the first, fourth, and varieties of the fifth, figured on two plates.

Paphiidæ.

[*Syndosmya*] *Abra longicollis* (Scacchi, Philippi); G. O. Sars, Moll. arct. Norveg. p. 74, pl. vi. fig. 3, & pl. xx. fig. 4, coast of Norway, in the southern part, 650 fath., Lofoden Islands, 100–300 fath.

Semele hanleyi, Japanese Seas, *aphrodite*, China Seas?, *aspasia* and *phryne*, localities unknown, G. F. Angas, P. Z. S. 1878, pp. 859 & 860, pl. liv. figs. 1–4.

Mactridæ.

Mactra solidissima (Chemn.): note on its habits and parasites, by Leidy, P. Ac. Philad. 1878, pp. 332 & 333.

Veneridæ.

Venus callipyga (Born) probably = *Lioconcha funiculata* (Römer), and *V. rivularis* (Born) = *Circe crocea* (Gray); Brauer, SB. Ak. Wien, lxxvii. Abth. i. pp. 130 & 132.

Venus ioenia [rectius *gioenia*] (Benoit & Grillo) figured; Bull. Soc. mal. Ital. iii. pl. iii. figs. 1 & 2.

Rupellaria amplectens, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vii. [1875], p. 1032, Aru Islands.

Cyrenidæ.

Bibliographical notes on the anatomy of the *Corbiculidæ*, and an English translation of Jacobsen's paper on that of *Cyclas* (*Sphærium*) *cornea* (L.), published in 1828, with figures, given by T. Prime, Bull. Mus. C. Z. v. No. 5, pp. 47–54, pl. iii. The general work of Moquin-Tandon on the land and freshwater *Mollusca* of France, and that of Lehmann on those of Pommerania [Zool. Rec. x. p. 125], ought also to be mentioned, as containing original information on the anatomy of *Sphærium* and *Pisidium*.

Cyrena pullastra (Mörch), Nicaragua; Prime, *l. c.* p. 43, pl. ii. fig. 3.

Velorita parvula (Prime, 1867); *id. l. c.* p. 44, pl. ii. fig. 4.

Batissa lævigata (Schumacher, 1817) = *childrenæ* (Gray, 1825), Philippines; *id. l. c.* p. 45, pl. ii. fig. 5.

Batissa. Some species figured, but not described, by S. Clessin, in Küster's Conch. Cab. pt. 270, pls. xxxiii.–xxxvii.

Corbicula. Clessin continues his monograph in Küster's Conch. Cab. pts. 270 & 274, pp. 161–200, pls. xxxi., xxxii., xxxviii., & xxxix. The following are new or not before figured :—*C. umbonata*, sp. n., p. 161, pl. xxviii. figs. 13–15, locality unknown; *jickelii*, sp. n., = *pusilla*, var. (Jickeli, Nordostafr.), p. 163, pl. xxix. figs. 1 & 2, Cairo; *subsulcata* (Dunker, MS.), sp. n., p. 164, pl. xxix. figs. 9 & 10, Formosa; *compressa* (Mousson, 1854), p. 165, pl. xxix. figs. 11 & 12, Java; *cashmirensis* (Desh., 1854), p. 166, pl. xxix. figs. 17 & 18, Cashmire; *ovata*, sp. n., ? = *fluminea* var., p. 167, pl. xxix. figs. 15 & 16, China; *hohenackeri*, sp. n., p. 177, pl. xxxi. figs. 1 & 2, Jalysch [Talysch] River, Caucasus; *nilotica*, sp. n., p. 177, pl. xxxi. fig. 3, Blue Nile; *surinamica*, sp. n., p. 178, pl. xxxi. figs. 7–9, South America; *picta*, sp. n., p. 179, pl. xxxi. figs. 12 & 13, East Indies; *inflata*, sp. n., p. 179, pl. xxxi. figs. 14 & 15, East Indies; *javana*, sp. n., p. 180, pl. xxxi. figs. 16 & 17, Java; *violacea*, sp. n., p. 180, pl. xxx. figs. 18 & 19, East Indies; *elongata*, sp. n., p. 186, pl. xxxii. figs. 19 & 20, Mindanao; *brasiliana* (Desh., 1854), p. 188, pl. xxxii. figs. 21 & 22, Brazil; *sulcata*, sp. n., p. 188, pl. xxxii. figs. 17 & 18, Java; *glabra*, sp. n., p. 192, pl. xxxix. fig. 3, locality unknown; *transversa* (Martens, 1877),

p. 195, pl. xxxviii. figs. 13 & 14, Japan; *martensi*, sp. n., = *fuscata*, var. *atrata* (Reinhardt, 1878), p. 196, pl. xxxviii. figs. 17 & 18, Japan; *reiniana*, sp. n., p. 196, pl. xxxix. figs. 8 & 9, Japan; *doenitziana*, sp. n., p. 197, pl. xxxix. fig. 4, Japan.

Corbicula saharica, sp. n., Fischer, J. de Conch. xxvi. p. 77, pl. ii. fig. 2, subfossil in a lake dried up near Temacinin, Sahara.

Corbicula sandai, sp. n., Japan, *straminea* (Reinh.), *biformis* (Reinh.), *fuscata* (Lam.), *ovalis* (Prime) = *transversa* (Martens), and *pexata* (Prime), all from Japan, described and discussed by Reinhardt, JB. mal. Ges. v. pp. 185–194, pl. v.

Corbicula yunnanensis (Nevill, 1877), Anderson, Anat. and Zool. Yunnan Exp., p. 902, with woodcut.

Corbicula moltkiana, sp. n., Prime, Bull. Mus. C. Z. v. No. 5, p. 43, pl. ii. fig. 2, Sumatra.

Cyclas rivicola (Leach): on its parasites, chiefly *Cercaria vesicata*; Ulicny, Arch. f. Nat. xliv. pp. 211–214, pl. vi. figs. 1–5.

Sphærium primeanum, Oregon, and *californicum*, California, spp. nn., Clessin, Mal. Bl. xxv. pp. 120 & 121, pl. v. figs. 1 & 2.

Sphærium. Several species figured, but not described, by Clessin, in Küster's Conch. Cab. pt. 274, pls. xl. & xli.

Pisidium steenbuchi (Möller, 1842), Greenland; Prime, *l. c.* p. 45, pl. ii. fig. 1.

Pisidium poulseni, sp. n., Clessin, Mal. Bl. xxv. p. 125, pl. v. fig. 6, Denmark.

Pisidium hydaspicola, sp. n., Theobald, J. A. S. B. xlvii. pt. 2, p. 147, Shypion, confluents of the Hydaspes, Kashmir.

Pisidium. Three new species from Yarkand described by Nevill, Moll. Yarkand Exp. pp. 12 & 13. [The author has given to these the MS. names *yarkandense*, *bourguignatianum*, and *appressum* in the copy presented to the Recorder.]

Cardiidæ.

Cardium elegantulum (Beck), Finmark, 30–50 fath.; G. O. Sars, Moll. arct. Norveg. p. 47, pl. v. fig. 5.

Cardium siculum (Sow.) = *stellatum* (Reeve); Monterosato, J. de Conch. xxvi. p. 165.

Cardium aquilaterale and *inæquilaterale*, spp. nn., subfossil, Hilgard & Hopkins, Rep. Boring Mississippi, 1878.

Cardium australe (Sow.) = *pulchrum* (Reeve), Andaman examples; E. A. Smith, P. Z. S. 1878, p. 819.

Verticordiidæ.

Euciroa elegantissima, g. & sp. n., not described, Dall, Bull. Mus. C. Z. v. p. 61, Gulf of Mexico, below 200 fath.

Lucinidæ.

Lucina schrammi, sp. n., near *edentula* (L.), Crosse, J. de Conch. xxvi. p. 328, pl. x. fig. 6, Guadeloupe.

Lucina citrina, locality unknown, and *rosea*, Natal, spp. nn., Angas, P. Z. S. 1878, p. 860, pl. liv. figs. 5 & 6.

Lucina (*Codakia*) *tatei*, sp. n., *id. l. c.* p. 863, pl. liv. fig. 15, South Australia.

Axinus flexuosus (Mont.), *sarsi* (Phil.), *gouldi* (Phil.), *obesus* (Verr.), *croulinensis* (Jeffr.) = *pusillus* (M. Sars), *cumyarius* (M. Sars), and *ferruginosus* (Forbes); G. O. Sars, Moll. arct. Norveg. pp. 59–63, pl. xix. figs. 4–10.

Axinus orbicularis (S. Wood, as *Scacchia*) found in the recent state at Jan Mayen Island; Friele, Nyt. Mag. Naturv. 1878.

Kelliidæ.

Kelliella miliaris (Phil., as *Venus*) = *K. abyssicola* (M. Sars) occurs copiously on the whole coast of Norway, from 40–650 fath., hundreds of specimens seen, all of equally small size, without any approach to *Isocardia*, which is very rare on this coast. G. O. Sars, Moll. arct. Norveg. p. 66, pl. xix. fig. 13.

Lepton lepisma, sp. n., Monterosato, J. de Conch. xxvi. p. 314, Algeria.

Lepton australis[-e], sp. n., Angas, P. Z. S. 1878, p. 863, pl. liv. fig. 14, Southern Australia.

Montacuta maltzani (Verkrüzen) and *tumidula* (Jeffr.); G. O. Sars, *l. c.* p. 69, pl. xix. figs. 18 & 19.

Tellimya nivea, sp. n., *id. l. c.* p. 71, pl. xx. fig. 2, Lofoden Islands, 100–120 fath.

Tellimya ovalis, sp. n., *id. l. c.* p. 341, pl. xxxiii. fig. 1, Lofoden Islands, 120 fath.

Mysella donaciformis, sp. n., Angas, P. Z. S. 1878, p. 863, pl. liv. fig. 63, South Australia.

Ungulinidæ.

Axinopsis, g. n. "Testa rotundata, sublævis, plicis nullis; cardo ad umbones non interruptus, dentibus primariis plus minusve distinctis, lateralibus obsoletis, cartilagine interna submarginali; linea pallialis integra." *A. orbiculata*, sp. n., G. O. Sars, Moll. arct. Norveg. p. 63, pl. xix. fig. 11, Finmark, 60–100 fath.

Astartidæ.

Astarte crebricostata (Forb. & Hanl.), *warhami* (Hanc.), *compressa* (L.), and *semisulcata* (Leach) var. *placenta* (Mörch) and var. *withami* (Wood), from Novaya Zemlya, their differences and varieties; Leche, Sv. Ak. Handl. xvi. 2, pp. 16–20; *compressa* and *semisulcata*, varr., pl. i. figs. 2–4.

Astarte crebricostata (Forbes), Lofoden Islands and Finmark, 30–120 fath.; Sars, *l. c.* p. 54, pl. v. fig. 7.

Nicania banksi (Leach) var. *globosa*, id. *l. c.* p. 51, pl. vi. fig. 1.

Kelliella, see Kelliidæ.

Cardita astartoides, sp. n., Martens, SB. nat. Fr. 1878, p. 25, Kerguelen Island, 60 & 100 fath.

UNIONIDÆ.

First development of some *Unionidæ* observed by SCHIERHOLZ & BRAUN [see in the general subject, *suprà*, p. 12].

Unio litoralis var. n. *acarnanicus*, Lake of Vrachori, and var. *pianensis* (Farines), *rothi* (Bourg.), *bosnensis* (Möllend.), *jacquemini* (Dupuy), *nanus* (Lam.), *elongatulus* (Mühlf.) var. *baudoni* (Drouet), *requieni* (Mich.), var., all from Southern Europe, and *phaseolus* (Held.), Inn River; Kobelt, Icon. vi. pp. 40–44, pls. clxi.–clxiii. figs. 1638–1649.

Unio andersonianus (Nevill, 1877), *foliaceus* (Gould) [var. *fragilis* (Nevill, 1877), *feddeni* (Theobald), and *bonneandi* (Eyd. & Soul.); Anderson, Zool. researches during the Yunnan Exp. pp. 900–902, pl. lxxx. figs. 8–12, Yunnan and Upper Burma.

Unio subrostratus (Say) distinct from *iris* (Lea), but identical with male specimens of *nashvillianus* (Lea), occurs in Indiana, Illinois, Iowa, Nebraska, Tennessee, Mississippi, and Alabama; Lewis, P. Ac. Philad. 1878, pp. 273–275.

[*Margaritana*] *Unio margaritifer* (L.) living in the aquarium at Dublin since April, 1872; Friedel, Zool. Gart. xix. p. 276.

Dipsas parvulus [*-a*], sp. n., Heude, Conch. fluv. de Nanking, iv. pl. xxxiii. fig. 65, China, province Ngan-houe.

Anodonta On its parasites, especially *Bucephalus*; Ulicny, Arch. f. Nat. xliv. pp. 215–217, pl. vi. fig. 5.

Anodonta complanata (Ziegl.), *moulinsiana* (Dupuy), = *piscinalis* var., *normandi* (Dupuy), and *coarctata* (Potiez & Mich.); Kobelt, Icon. vi. pp. 44–46, pls. clxiv. & clxv. figs. 1650–1659.

Anodon globosula, *piscatorum*, *doliolum*, *elliptica*, *fusca*, *friniana*, *torrentis*, *joreti*, *striata*, and *pacifica*, spp. nn., Heude, Conch. fluv. de Nanking, iv. pls. xxv.–xxxii., China, in the provinces Ngan-houe, Kiang-su. *A. fenouilii*, sp. n., *id. l. c.* pl. xxxi. fig. 64, Yunnan. *A. harlandi* (Baird, 1867) *l. c.* pl. xxv. fig. 55.

MYTILIDÆ.

Modiola fluviatilis, sp. n. (= *securis*, Hutton, 1873, *nec* Lamarck), Hutton, J. de Conch. xxvi. p. 53, New Zealand, mouth of rivers.

Modiolaria lævigata (Gray), distinct from *discors* (L.), and *corrugata* (Stimps.), G. O. Sars, Moll. arct. Norveg. pp. 29 & 30, pl. iii. fig. 3, and pl. xix. fig. 2.

Crenella lævigata (Gray) and *lævis* (Beck), Novaya Zemlya, the posterior striæ distinct in young shells, obsolete in adults; Leche, Sv. Ak. Handl. xvi. (2) p. 33.

Dacrydium vitreum (Möller), Lofoden, 200–300 fath., Finmark, 30–40 fath.; Sars, *l. c.* p. 28, pl. iii. fig. 2.

ARCIDÆ.

Arca glacialis (Gray) and *pectunculoides*, var. n. *grandis*, 13 mm. long, 9–10 high, both living in the Kara Sea; Leche, *l. c.* pp. 29–31, pl. i. figs. 8 & 9.

Arca nodulosa (Müll.), *pectunculoides* (Scacchi), var. n. *septentrionalis*, and *A. glacialis* (Gray); Sars, *l. c.* pp. 42 & 43, pl. iv. figs. 1–3.

[*Pectunculus*] *Arca scripta* (Born), perhaps only a worn specimen of *P. pilosus*; Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 134.

Limopsis minuta (Phil.) = *borealis* (Woodw., Jeffr.), Lofoden Islands, 400 fath.; Sars, *l. c.* p. 44, pl. iii. fig. 5.

Nuculidæ.

Nucula tumidula (Malm), *tenuis* (Mont.), var. n. *expansa* and *delphinodonta* (Mighels); *id. l. c.* pp. 33–35, pl. iv. figs. 5, 6, & 4.

Nucula micans, sp. n., Angas, P. Z. S. 1878, p. 864, pl. liv. fig. 16, South Australia.

Leda pernula (Müll.), Novaya Zemlya, fossil specimens passing gradually into *buccata* (Steenstrup); Leche, Sv. Ak. Handl. xvi. (2) pp. 27 & 28.

Leda (*Adrana*) *newcombi*, sp. n., Angas, P. Z. S. 1878, p. 314, pl. xviii. figs. 16 & 17. Aspinwall.

Portlandia arctica (Gray), *lucida* (Lovén), *intermedia* (M. Sars), *tenuis* (Phil.), *lenticula* (Möller), and *frigida* (Torell); Sars, *l. c.* pp. 37–40, pl. iv. figs. 7–10.

Yoldia hyperborea (Lovén), *arctica* (Gray), *pygmæa* (Munst.), var. *gibbosa* (Smith) = *abyssicola* (Torell), *intermedia* (Sars), var. n. *major*, *frigida* (Torell) = *nana* (Sars), and an allied probably new form, all from Novaya Zemlya; Leche, *l. c.* pp. 22–26, the three last, pl. i. figs. 5–7.

Yoldia pygmæa, var. n. *symmetrica*, Friele, Nyt. Mag. Naturvid. 1878, Jan Mayen Island.

Yoldia angulata, sp. n., Martens, SB. nat. Fr. 1878, p. 135, Western Africa, 10° N. lat., 17° W. long., 360 fath.

Malletia obtusa (M. Sars), Lofoden, 300–400 fath.; Sars, *l. c.* p. 41, pl. xix. fig. 3.

Pectinidæ.

Pecten. Many species have three impressions in the left valve, the posterior adductor pedis being only developed in one side; in *P. jacobæus* and *maximus* (L.), subgenus *Vola*, it is wanting on both sides. Ihering, Z. wiss. Zool. xxx. suppl. p. 21, pl. ii. fig. 7. Note on the swimming of *Pecten*, the hinge part being directed backwards, because the water is driven out at the little gaps near the hinge; *id. l. c.* p. 17, pl. ii. fig. 8.

Pecten maximus (L.). Physiological observations on it by Coutance (see in the general subject, *suprà*, p. 9; structure of the eyes, Hensen, *suprà*, p. 11).

(*Pecten*) *Ostrea coarctata* (Born, 1778) = *P. flexuosus* (Poli); Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 138.

Pecten aratus (Gmelin) = *sulcatus* (Müll.), with var. n. *crebricostata*, Lofoden Islands, 100–300 fath.; G. O. Sars, Moll. arct. Norveg. p. 17, pl. ii. fig. 3.

Pecten hoskynsi (Forbes) = *imbrifer* (Lovén), *vitreus* (Chemn.), *abyssorum* (Lovén), and *groenlandicus* (Sow.), Arctic Norway; *id. l. c.* pp. 20–23, pl. ii. figs. 1, 4, 5, & 6.

Spondylus varius [*varians* (Sow.)] has internal holes in the larger valve, from periodical removal of the mantle, but at the spot where the adductor muscle is inserted, the shell remains continuous; Owen, P. Z. S. 1878, p. 967, woodcut.

Spondylus wrightianus (Crosse, 1873), Wright, List of shells for sale, p. 75, pl. ix.

Ostreidæ.

The common Oyster occurs from the Bay of Biscay to the Shetland Islands, Bergen in Norway, and the Kattegat, in fact, on the shores of Europe that are touched more or less directly by the Gulf Stream; there is a degree of admixture of fresh water in which it is able to live and thrive, though unable to propagate, attaining a size and delicacy which could not be reached, if any part of the vital power were to be spent on propagation; this is important in considering the localities for artificial oyster banks. Winther, Ann. N. H. (5) i. pp. 185–189.

Guiquel publishes a translation of a Chinese treatise on oyster breeding; Bull. Soc. Acclim. 1878 (March), 8 pp.

Ostrea cristata (Born) = *plicata* (Chemnitz, Reeve), not the Mediterranean species taken by Philippi and others for it; Brauer, SB. Ak. Wien, lxxvii. Abth. i. p. 140.

Ostrea assuming the sculpture of another shell, *Trochus maculatus*, to which it adheres; E. A. Smith, P. Z. S. 1878, p. 730, pl. xlvi. fig. 12. [Similar instances are common in *Anomia*.]

Anomiidæ.

Anomia. The two muscles going from the left valve to the so-called plug are considered by H. v. Ihering as two portions, a muscular and a ligamentous one, of the posterior retractor pedis; at the root of the plug there is a "plaited organ" hitherto not described, forming part of the body, and covered by a layer of epithelium; the plug itself shows a lamellar structure. The plug and plaited organ may be compared to the byssus and byssal glands of other Bivalves, though differing in their unilateral situation on the right side, which, perhaps, is to be explained by shifting in the young stage. Z. wiss. Zool. xxx. suppl. pp. 13–15 & 19–26, pl. ii. figs. 1–6 & 9. See also Coutance, in the general subject, *supra*, p. 9.

Anomia aculeata (L.), a distinct species, Norway, in shallow and deep water; G. O. Sars, Moll. arct. Norveg. p. 15, pl. xix. fig. 1.

MOLLUSCOIDA.

BY

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LIST OF PUBLICATIONS.

BUSK, G. '*Polyzoa* in Sir G. S. Nares's Narrative of a Voyage to the Polar Sea during 1875–6 in H.M. Ships 'Alert' and 'Discovery.' London: 1878, 8vo, vol. ii. pp. 283–289.

GIARD, M. Les Bryozoaires: exposition des travaux les plus recents. R. Z. (3) vi. pp. 34–44.

HARTMANN, R. Einige Mittheilungen über Appendicularien. SB. nat. Fr. 1878, pp. 97–100.

HELLER, C. Untersuchungen über die Tunicaten des Adriatischen und Mittelmeers. III. Denkschr. Ak. Wien, xxxvii. [1877] pp. 241–274, with 7 plates.

——. Beiträge zur näheren Kenntniss der Tunicaten. SB. Ak. Wien, lxxvii. Abth. i. pp. 83–109, 6 pls.

HINCKS, T. Note on the Genus *Retepora*, with Descriptions of New Species. Ann. N. H. (5) i. pp. 353–365, pls. xviii. & xix.

——. Note on the Movements of the vibracula in *Caberea boryi*. Q. J. Micr. Sci. xviii. pp. 7–9.

JEFFREYS, J. G. On the *Mollusca* procured during the 'Lightning' and 'Porcupine' Expeditions, 1868–70. Part I. *Brachiopoda*. P. Z. S. 1878, pp. 393–416, pls. xxii. & xxiii.

PEACH, C. W. Observations on British *Polyzoa*. J. L. S. xiii. pp. 479–486, pl. xxiii.

REPIACHOFF, W. Ueber die ersten Entwicklungsvorgänge bei *Tendra zostericola*. Z. wiss. Zool. xxx. suppl. pp. 411–423, pl. xix.

——. Zur Kenntniss der Bryozoen. Zool. Anz. i. pp. 221–224.

SALENSKY, W. Ueber die Entwicklung der Hoden und über den Generationswechsel der Salpen. Z. wiss. Zool. xxx. suppl. pp. 275–293, pl. xiii.

SCHMIDT, O. Bemerkungen zu den Arbeiten über *Loxosoma*. Z. wiss. Zool. xxxi. pp. 68–80, with woodcuts.

SMITT, F. A. Recensio systematica animalium Bryozoorum quæ in itineribus annis 1875 et 1876 ad insulas Novaja Semlja et ad ostium fluminis Jenisei, duce Prof. A. E. Nordenskiöld, invenerunt Dr. A. Stuxberg et H. Theel. Œfv. Ak. Förh. 1878, pt. 8, pp. 11–26.

TENISON-WOODS, J. E. New Genus of *Polyzoa*. P. Linn. Soc. N. S. W. iii. p. 126.

On the *Brachiopoda*, see also the list of publications in MOLLUSCA.

HUXLEY, in his "Manual of the Anatomy of Invertebrated Animals" [1877], discusses the *Polyzoa* and *Brachiopoda*, pp. 452–470; the *Tunicata*, pp. 595–620.

BRACHIOPODA.

T. DAVIDSON ("What is a Brachiopod?") discusses the general characters and systematic position of the Brachiopods, and comes to the conclusion that they cannot be united either with the *Mollusca* or *Annulata*, but form a distinct class; Geol. Mag. (n.s.) iv. [1877] pp. 145–155, 199–208, 262–273, pls. vii.–x. table; also in Ann. mal. Belge, x. [1876], and published separately. A French abstract; J. de Conch. xxv. p. 309.

The change in the internal skeleton of the *Terebratulidæ* with age is exemplified by H. Friele in *Waldheimia cranium* and *septigera*, the loop being in young specimens much more simple, and the recurrent laminæ gradually detached from the main part: Arch. Math. Naturvid. 1877.

Otoliths in *Lingula*; Morse, Am. J. Sci. (3) xv. p. 156.

The species of *Brachiopoda* (22) known as living in the European seas are reviewed, their geographical and bathymetrical range pointed out, the localities where they were procured during the 'Lightning' and 'Porcupine' Expeditions, 1868–70, enumerated, and half the number of the species figured, by J. G. Jeffreys, P. Z. S. 1878, pp. 397–416, pls. xxii. & xxiii. Twelve species of Brachiopods living in the Mediterranean Sea enumerated by T. A. de Monterosato, Giorn. Sc. Palerm. xiii.

Norway. Eight species of Brachiopods found on the coast of Norway, including 6 in the Arctic part, probably of Arctic origin; G. O. Sars, Mollusca regionis arcticæ Norvegiæ, pp. 8–13, 351, & 395.

Nine species of *Brachiopoda* found in New Zealand enumerated by HUTTON, J. de Conch. xxvi. pp. 56 & 57. *Terebratula rubicunda* (Sow.) ? at the Auckland Islands; *id.* Tr. N. Z. Inst. xi. p. 342.

TEREBRATULIDÆ.

Terebratula tuberata and *trigona*, spp. nn., Jeffreys, P. Z. S. 1878, pp. 401–403, pl. xxii. figs. 2–4, Atlantic, off Portugal and Gibraltar, 300–600 fath.; the first also near west coast of Ireland, 795 fath.

Terebratula vitrea (Born). Its synonyms among the tertiary shells, and

varieties, 1, *minor* (Philippi) = *affinis* (Calcara), and 2, *sphenoidea* (Philippi); *id. l. c.* pp. 403 & 404, pl. xxii. figs. 5 & 6.

Terebratula arctica, sp. n., Friele, N. Mag. Naturvid. 1878, figured, Jan Mayen Island, near *T. minor* (Phil.).

Terebratula (*Waldheimia*) *cranium* (Müll.). Young specimens have been described by Dall as *Frenula* and *Ismenia jeffreysi*, 1871 (nec *Megerlia jeffreysi*, Dall, 1877); Jeffreys, P. Z. S. 1878, pp. 466 & 467.

Terebratula septata (Philippi, 1844) = *septigera* (Lovén, 1846), British, found in the Shetland Isles; *id. l. c.* pp. 405, 407 & 408. Also on the coast of Norway, never higher than 100 fath.; G. O. Sars, Moll. arct. Norveg. p. 11, pl. i. fig. 2.

Terebratulina caput-serpentis (L.) and *septentrionalis* (Couth.) are two nearly allied, but distinct, species, both living in Arctic Norway; Sars, *l. c.* pp. 10 & 11, pl. i. figs. 3 & 4.

Megerlia jeffreysi (Dall, 1877, *nec* 1871), Semidi Islands, N.W. America; Jeffreys, P. Z. S. 1878, p. 407, pl. xxiii. fig. 3.

Rhynchonellidæ.

Rhynchonella psittacea (Chemn.), Franklin Pierce Bay and Cape Napoleon, Smith Sound, 15–25 fath.; E. A. Smith, in Nares's Narrative, &c., ii. p. 233. Also at Novaya Zemlya; Leche, Sv. Ak. Handl. xvi. 2, p. 36.

Rhynchonella sicula (Seguenza, MS.), sp. n., Jeffreys, P. Z. S. 1878, p. 413, pl. xxiii. figs. 5 & 6, English Channel, 690 fath.; fossil in Sicily.

Atretia gnomon (Jeffr.) differs by the short gnomon-shaped central septum from the Jurassic *Dimerella* (Zittel); *id. l. c.* p. 413, pl. xxiii. fig. 4.

Craniidæ.

Crania anomala (Müll.), an unusually thick variety, off the coast of Tunis in from 40 to 120 fath., = *lamellosa* (Seguenza), from Sicilian Pliocene beds; Jeffreys, *l. c.* p. 414.

Discinidæ.

Discina atlantica (King) = *fallens* (S. Wood), off the west coast of Ireland, 1240 fath., &c.; its plug of attachment in the lower valve is at least analogical to that of *Anomia*: Jeffreys, *l. c.* p. 415, pl. xxiii. fig. 7.

Lingulidæ.

Lingula hians (Swains.) lives at the Andaman Islands in mud and sandy clay at low-water mark, the shell being buried about a foot from the surface; E. A. Smith (quoting Capt. Wilmer), P. Z. S. 1878, p. 820.

On the habits of *Lingula* in Japan; it buries itself very quickly in the sand, and the peduncle forms a sandy tube by agglutination: E. Morse, Am. J. Sc. (3) xv. p. 157. Otocysts described, habits of burrowing

observed, tenacity of life stated, the animal surviving for half a year in a small glass jar, the water being changed only twice, and brought alive from Japan to Boston ; *id.* P. Bost. Soc. xix. p. 266.

TUNICATA.

Arctic Seas. *Cynthia rustica* (Müll.), *Molgula arenosa* ? (Forb. & Hanl.), *Pelmæa corrugata* (Forb. & Hanl.), observed at Novaya Zemlya during the Swedish Expeditions; Leche, Sv. Ak. Handl. xvi. 2, p. 9. Some *Tunicata* from the Austrian Arctic Expedition shortly described and figured by C. Heller, Denk. Ak. Wien, xxxv. [1875] pp. 43 & 44, pl. v. (see special part).

Mediterranean Sea. C. Heller has continued his paper on the Ascidians of the Mediterranean and Adriatic, treating *Cynthia* and allied genera ; he gives also a list of all simple Ascidians known from these seas, 42 species observed by himself, and 9 others, doubtful, taken from previous authors : Denk. Ak. Wien, xxxvii. [1877] pp. 271–274, with 7 pls. (list, pp. 271 & 272). He also describes a number of new exotic Ascidians; SB. Ak. Wien, lxxvii. Abth. i. pp. 83–109, 6 pls.

Note on the periodical appearance of some *Tunicata* in the Bay of Naples, by R. Schmidtlein ; MT. zool. Stat. Neap. i. p. 132.

North America. 3 species of *Tunicata* and 17 of *Polyzoa* observed at Fort Macon, North Carolina, by E. Coues & H. C. Yarrow, P. Ac. Philad. 1878, pp. 303–305.

Ascidiæ simplices.

Ascidia canaliculata and *caudata*, Cape of Good Hope, *depressiuscula*, Ceylon, *incrassata*, Cape of Good Hope, *prostrata*, Jamaica, spp. nn. ; Heller, SB. Ak. Wien, lxxvii. Abth. i. pp. 84–91, pl. i. figs. 1–4, and pl. ii. figs. 8 & 9.

Ciona intestinalis (L.), from the Arctic Sea ; *id.* Denk. Ak. Wien, xxxv. p. 43, pl. v. fig. 6.

Cynthia : generic characters discussed, and *C. papillosa* (L.), *scutella*, sp. n., *dura*, sp. n., and *squamulosa* (Alder) described, all observed in the Adriatic and Mediterranean, by C. Heller, Denk. Ak. Wien, xxxvii. pp. 241–243 & 249–253, pl. ii. figs. 9–12, and pl. iii. figs. 1–6.

Cynthia aggregata (Müll.) ? and *rustica* (L.), from the Adriatic Sea ; *id. op. cit.* xxxv. p. 43, pl. v. figs. 7 & 8.

Cynthia stolonifera, Cape of Good Hope, *lævigata*, Jamaica, *arcuata*, New South Wales, *præputialis*, Sydney, *pallida*, Mauritius, Jamaica, Tahiti, *grandis*, Sydney, spp. nn. ; *id.* SB. Ak. Wien, lxxvii. Abth. i. pp. 92–98, pl. ii. figs. 10–12, pl. iii. figs. 16–18, pl. iv. fig. 22, and pl. v. fig. 26.

Microcosmus, g. n., distinct from *Cynthia* by the smooth dorsal fold without appendages, the closely turned up course of the intestine, and two well-developed lobular genital glands. *M. vulgaris* and *polymorphus*, spp. nn., corresponding to the old *Ascidia microcosmus* (L.) ; Heller, Denk. Ak. Wien, xxxvii. pp. 243–246, pl. i. figs. 1–11, and pl. ii. figs. 1–4,

Mediterranean and Adriatic. *M. scrotum* (Chiaje, as *Ascidia*) and *claudicans* (Savigny, as *Cynthia*), from the same seas; *id. l. c.* pp. 247 & 248, pl. ii. figs 5–8. *M. affinis*, New Holland, *exasperatus*, Jamaica, *variegatus*, West Indies, *distans*, Jamaica and New South Wales, *oligophyllus*, Cape of Good Hope, spp. nn., *id.* SB. Ak. Wien, lxxvii. Abth. i. pp. 98–101, pl. i. fig. 6, pl. iii. figs. 19–21, and pl. v. fig. 27.

Stycla (Sav.) is distinct from *Cynthia* by having only four branchial folds, simple, unbranched tentacles, and the want of a distinct liver; *S. canopoides* and *gyrosa*, spp. nn., Mediterranean and Adriatic; *id.* Denk. Ak. Wien, xxxvii. pp. 253–259, pl. iii. figs. 7–12, pl. iv. figs. 1–8, and pl. vi. figs. 1–5. *S. pupa*, Cape of Good Hope, *arcolata*, Ceylon, *humilis*, New Zealand, spp. nn., *id.* SB. Ak. Wien, lxxvii. Abth. i. pp. 107 & 108, pl. i. fig. 7, and pl. ii. figs. 13 & 14.

Polycarpa, g. n, characterized by numerous roundish or oblong bag-like genital glands scattered in the peribranchial cavity. *P. varians*, *gracilis*, *sabulosa*, spp. nn., *tuberosa* (Macq., as *Cynthia*) and *glomerata* (Alder), Mediterranean and Adriatic; *id.* Denk. Ak. Wien, xxxvii. pp. 259–265, pl. v. figs. 1–9. *P. nigricans*, Mauritius, *mollis*, locality unknown, *tumida*, Jamaica, *obscura*, South Australia and Samoan Islands, *stimpsoni*, Sydney, *pedunculata*, Bass Straits, *nebulosa* and *elata*, Bowen, Australia, spp. nn.; *id.* SB. Ak. Wien, lxxvii. Abth. i. pp. 102–107, pl. ii. fig. 15, pl. iv. figs. 23–25, pl. v. fig. 28, pl. vi. figs. 29–31.

Rhodosoma seminudum, sp. n., *id.* SB. Ak. Wien, lxxvii. Abth. i. p. 91, pl. i. fig. 5, Jamaica.

Gymnocystis (Giard) *ampulloides* (Beneden). *id.* Denk. Ak. Wien, xxxvii. pp. 265–267, pl. vi. figs. 4–13, also in the Mediterranean Sea.

Molgula occulta (Kupffer), *impura*, and *appendiculata*, spp. nn., Mediterranean and Adriatic, *id. l. c.* pp. 267–271, pl. vi. figs. 14 & 15, pl. vii. figs. 1–12.

Boltenia gibbosa, sp. n., Bass Straits, *id.* SB. Ak. Wien, lxxvii. Abth. i. p. 109, pl. vi. fig. 32.

Synascidiæ.

Didemnum sp. and *Leptoclinum* sp., from the Arctic Sea, Heller, Denk. Ak. Wien, xxxv. [1875] p. 44, pl. v. figs. 9 & 10.

Salpæ.

W. Salensky has observed in *Salpa democratica* that the testicles of *Salpa* are developed from a peculiar heap of cells, consisting of several strata, and situated near the rectum, somewhat to the right side, and not from the elæoblast, which is well developed next to it in the same chained individual. He discusses the principal differences between the theories of Brooks and Todaro [*cf.* Zool. Rec. xii. p. 210, and xiii. *Moll.* p. 65], and concludes, from personal observation, that the solitary individuals of *Salpa* have no organ of generation, and are the asexual form of the alternating generation, and that the eggs contained within the compound *Salpæ* are to be ascribed to these, and not to the solitary parent; and that, therefore, the compound *Salpæ* being the sexual form, the typical

form of alternate generation occurs in the *Salpæ*. He repeats his former suggestion that the cæoblast may be homologous with the chorda dorsalis of the Ascidian larvæ, and suggests that in general the asexual or nurselike (solitary) form of *Salpa*, is homologous with the larval stage of other *Tunicata*. Z. wiss. Zool. xxx. suppl. pp. 275–293, pl. xiii.

Appendiculariæ.

Note on the tail of *Appendicularia* very much resembling that of the larva of *Botryllus*; Reichert, SB. nat. Fr. 1878, p. 101.

Œcopleura malmi, sp. n., Hartmann, SB. nat. Fr. 1878, pp. 97–100, Kattegat, with detailed description of its structure.

POLYZOA.

A. Giard gives a general account of the present state of knowledge concerning the *Polyzoa*. R. Z. (3) vi. pp. 34–44.

T. Hincks has observed in *Cabarea boryi* (Audouin) that the vibracula of all animals are moved simultaneously "with perfect regularity," and thereby calls attention to F. Müller's observations relating to a "common colonial nervous system" in the *Polyzoa*. Q. J. Micr. Sci. xviii. pp. 7–9.

Abstracts of J. Barrois's treatise on the development of the *Bryozoa* [Zool. Rec. xiv. *Moll.* p. 92] are to be found in Arch. Sci. Nat. lxii. No. 244, pp. 81–86, in R. Z. (3) vi. pp. 34–44 (by Giard), and in Am. Nat. xii. pp. 617–620; of L. Joliet's paper [*l. c.* p. 91], also by Giard, *l. c.*; of W. Salensky's observations on the *Endoprocta* [l. c. p. 97], in Q. J. Micr. Sci. xviii. pp. 199–205, by T. Hincks.

J. Barrois publishes some new observations on the first development of some chilostomatous *Polyzoa*, tending to prove that the ectoderm of the embryo is the real germinative part, from which the whole animal has its origin, and that the internal layers serve only for its nutrition; C. R. lxxxvii. pp. 463–466.

W. Repiachoff gives some observations concerning the first development within the egg of *Tendra zostericola*, chiefly upon the germinative vesicle, the directive vesicle (Richtungs-bläschen), the mode of segmentation, the formation of the gastrula and the primary mouth-opening (properistome), and its disappearing. He comes to the conclusion that they exhibit some difference from the general mode of the development in the *Polyzoa chilostoma* and *ctenostoma*, as observed by Barrois in 1877. Z wiss. Zool. xxx. suppl. pp. 411–423, pl. xix.

The same author also publishes a shorter note on the first development and the larval stages of *Lepralia pallasiana* (Moll), and of two species of *Bowerbankia* observed at Sebastopol, maintaining his views as to the suctorial disk and the coarsely granulated mass, which Barrois has, according to him, misinterpreted as stomach and "oral mesoderm." Zool. Anz. i. pp. 221–224.

C. W. Peach makes some observations on British *Polyzoa*, which fix themselves by hooks or grapplers; J. L. S. xiii. pp. 479–486, pl. xxiii.

A. W. Waters insists on the importance of the opercula for the

classificatio n of the *Polyzoa*, they being constant in form and structure in the same colony, independent of age, which is not the case with the form of the cells themselves. [The Recorder knows this paper only from the abstract in Arch. Z. expér. vii. p. xlvi.]

Arctic Seas. 16 species of *Bryozoa*, collected by H. W. Feilden during Nares's voyage to the Polar Sea in 1875–76, in Smith Sound and northwards are enumerated, and 4 new among them described by G. Busk in the Narrative of that voyage, ii. pp. 283–289.

F. A. Smitt enumerates 58 known species of *Polyzoa* found at Novaya Zemlya and in the Kara Sea, during Nordenskiöld's expedition in 1875 and 1876; Œfv. Ak. Förh. 1878, part 8, pp. 11–26.

British Seas. Some new species, and others not before known as British, described by C. W. Peach, J. L. S. xiii. pp. 479–486, pl. xxiii.

Mediterranean. Note on *Bryozoa* found on the shore at Venice, by A. Manzoni, Atti Soc. Tosc. ii. part i. 2 pp.

North America. 3 species of *Tunicata*, and 17 of *Polyzoa*, observed at Fort Macon, North Carolina, by E. Coues & H. C. Yarrow; P. Ac. Philad. 1878, pp. 303–305.

CHILOSTOMATA.

Canda reptans (L.), attached by hooks to a sponge, Cornwall, and another attached by grappling roots to *Flustra foliacea*, Firth of Forth; Peach, J. L. S. xiii. p. 480, pl. xxiii. figs. 2 & 3.

Scrupocellaria scruposa (L.) attached with hooks to *Halichondria panicea*, Firth of Forth; *id. l. c.* p. 479, pl. xxiii. fig. 1.

Menipea gracilis, sp. n., Busk, in Nares's Narrative, vol. ii. p. 284, Franklin Pierce Bay, Smith Sound, 79° 29′ N. lat., 13–15 fath.

Flustra serrulata, sp. n., *id. l. c.* p. 285, Franklin Pierce Bay, 15 fath.

Eucratea elongata, g. n. Near *Selenaria*; "polyzoary free, upper surface convex, covered with cells, lower surface divided into five portions, each containing large pores; in the centre of the base a vermiculate quinquepartite body." *E. ducalis*, sp. n., alt. 6, diameter 8 mm., Darnley Island, Australia, 10–20 fath.; J. Tenison-Woods, P. Linn. Soc. N. S. W. iii. p. 126.

Eschara stellata, sp. n., Peach, J. L. S. xiii. p. 481, pl. xxiii. fig. 5, Shetland. *E. skenei* var. *tridens* (Busk) and *rosacea* (Busk) found also in Shetland; *id. l. c.* pp. 480 & 481, the former pl. xxiii. fig. 4.

Eschara perpusilla, sp. n., Busk, *l. c.* p. 287, Franklin Pierce Bay, 13–15 fath.

Escharella (Smitt) restricted to the species in which the proximal border of the aperture is toothed, and those species in which it is sinuate transferred to *Hippothoa* (Lamx.); Smitt, Öfv. Ak. Förh. 1878, pt. 8, pp. 20 & 21. *Escharella pertusa* (Busk, as *Lepralia*) = *porifera* (Smitt); *id. l. c.* p. 21.

Retepora. The known species and their geographical distribution enumerated, and the following described and figured:—*R. rouchi*, sp. n., = *beaniana* (Hincks & Manzoni), Mediterranean and British Channel,

pl. xviii. figs. 1–6; *pratensis*, sp. n., Red Sea ?, pl. xix. figs. 6–8; *plana*, sp. n., Red Sea ?, pl. xviii. figs. 7 & 8; *tessellata*, sp. n., South Australia, pl. xix. figs. 9–12; *robusta*, sp. n., South Australia, pl. xviii. figs. 9 & 10; *monilifera* (Macgillivray, 1860), *phœnicea* (Busk), and *granulata* (Macgill.), South Australia, pl. xix. figs. 1–5 & 13–15. Hincks, Ann. N. H. (5) i. pp. 353–365, pls. xviii. & xix.

CYCLOSTOMATA.

Discopora meandrina, sp. n., Peach, J. L. S. xiii. p. 482, Shetland.

Domopora truncata (Jameson), *D.* (*Defrancia*) *stellata* (Goldf.) and *Defrancia lucernaria* (Sars), found in the Out Haaf of Shetland by J. G. Jeffreys; *id. l. c.* pp. 483–485.

CTENOSTOMATA.

Amathia. An undetermined species from Fort Macon, North Carolina, shortly described by Coues & Yarrow, P. Ac. Philad. 1878, p. 304.

Farrella arctica, sp. n. ?, Busk, in Nares's Narrative, ii. p. 289, Franklin Pierce Bay.

ENDOPROCTA.

Loxosoma. O. Schmidt enumerates and characterizes comparatively the 8 known species, with *L. pes*, sp. n., = *singulare* (Schmidt, 1875, *nec* Keferstein); he acknowledges to having mistaken a bud for an egg, but maintains that the bud also originates from an internal organ (Keimstock), and not merely from cells of the ectoderm, as Nitzsche avers. Z. wiss. Zool. xxxi. pp. 68–80, with woodcuts.

C. Vogt states that Hatschek has misunderstood some parts of his paper on *Loxosoma*, chiefly concerning his "organe en lunette," his "papilles tactiles" and the formation of the buds. Z. wiss. Zool. xxx, pp. 374–378, with 2 woodcuts.

CRUSTACEA.

BY

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Anatomy and Physiology.

E. YUNG has made some valuable histological researches and physiological experiments upon the nervous system in the lobster and in *Carcinus mænas*, *Cancer pagurus*, and *Portunus puber*. The following are some of his chief results :—The ventral chain of ganglia and the connecting strings are sensible in their whole extent; the roots of nerves coming from these ganglia are altogether sensible and motory; each ganglion, thoracic or ventral, is the centre of motion and sensibility for its corresponding segment, but when separated from those before it, can only produce unconscious sensibility and reflex movements; the infra-œsophageal ganglion is the motory centre for the jaws and maxillipeds; the supra-œsophageal ganglion or brain is the motory and sensitive centre for the eyes and antennæ, and is also sensible for its whole extent, and the seat of will and co-ordination of movements for the whole animal. The right half of the brain and of the ventral ganglions and connecting strings influences the right half of the body; and so with the left: there is no crossing in the course of the nerve-fibres. The brain does not act directly on the heart; the movement of the latter is accelerated by electric irritation of the connection of the infra-œsophageal and stomato-

gastrical ganglia, and is retarded by electric irritation of the thoracic ganglia; the heart has its own nervous cells in its walls. Curare (a poisonous vegetable substance, made from *Strychnos*, used by American savages and by physiologists) acts slowly, retarding, or even paralysing, the movements of the body and members; strychnine acts very violently, provoking tetanus for a comparatively short time; sulphate of atropine causes slowness and trembling, but does not kill the animal. A chemical analysis of the ganglia of the lobster is added. Arch. Z. expér. vii. pp. 401–534, pl. xxvii.

The brain (suprapharyngeal ganglia) of the crayfish and of *Squilla mantis* described, and transverse sections of it figured, by M. J. Dietl, SB. Ak. Wien, lxxvii. Abth. i. pp. 584–603, pl. i.

Digestion and Secretion.

Chemical notes on the digestion in *Crustacea*; Krukenberg, Untersuch. phys. Inst. Heidelb. ii. pp. 261–272.

E. Wassiliew states that the renal organ of the common crayfish, usually called "the green gland," consists of three apparently different parts: a lobular brown-coloured part, situated above; a green cake-shaped part, situated beneath and laterally; and a white convolute efferent duct; these form a continuous tube, the hinder blind end of which is formed by the lobular part; he distinguishes, therefore, three degrees in the renal organ of the *Crustacea*: 1, a long equal smooth tube in Copepods; 2, a tube with several peculiar dilatations in *Leptodora* and some Phyllopods; 3, a lobular compound gland with convolute duct in *Astacus*.

Circulation and Respiration.

Note on the anatomical and microscopical structure of the heart of the common crayfish and lobster, by B. Dezső, Zool. Anz. i. pp. 126 & 127. The number of lateral slits in the heart or dorsal vessel is, in the *Crustacea*, equal to the number of the gills; *id. l. c.* p. 274.

F. Plateau publishes some observations on the normal movements of the heart of the crayfish, its innervation, and the effect of some toxical substances upon it. Assoc. Franc. vii. (Paris: 1878), pp. 731–739.

C. Semper has examined the respiratory cavity of *Birgus latro*, a terrestrial crustacean; it is divided into two compartments, the lower containing the gills, the upper (much the larger) containing always only damp air, and having on its roof numerous arborescent excrescences richly provided with blood-vessels. These vessels originate from a common stem, situated at the lower part of the head, and unite into another stem which goes towards the pericardium, uniting there with the efferent vessel of the gills; there can be no doubt that they are an air-breathing organ or lung. In the terrestrial species of *Thelphusa*, and *Sesarma*, and *Gecarcinus*, the gill-cavity also contains air. Z. wiss. Zool. xxx. pp. 282–287, with woodcuts.

J. van Rees [*suprà*] after recapitulating the observations on the respiration of terrestrial *Crustacea* by F. Müller [Zool. Rec. i.],

Jobert [*op. cit.* xiv. *Crust.* p. 15], and Semper [*supra*], relates some experiments made by himself upon *Carcinus mœnas* (L.), which often spontaneously leaves the sea water. When confined to sea water without renewal of oxygen, it lifts up its forepart above the water and takes air into the gill-cavity through the openings near the mouth, by which ordinarily the respiratory water is expelled, and this air leaves the cavity through the orifices at the base of the first pair of feet, by which ordinarily the respiratory water is taken in; the mechanical course of the movement is given by the inward appendage of the second maxilla. The same mode of respiration also takes place when the whole animal is out of the water. Kept immersed under water without renewal, these crabs seldom live longer than one or two weeks; but when enabled to breathe air, as above mentioned, they can live for two or three months. Kept without water in damp air, they can live more than 5–8 days; and if put into water every third or fourth day for a quarter of an hour, in order to moisten the gills, they survive for two or three weeks. As it has been proved by physiologists that in normal respiration the quantity of consumed oxygen is greater than that of the expirated carbonic acid, but that in dyspnœa both quantities are nearly equal, the author has measured both constituents in the air-breathing crab; and, having found the quantity of carbonic acid much the lesser (54–76 per cent.), concludes that this air-breathing may be regarded as normal, and equivalent to the aquatic respiration.

In the paper by F. Jolyet & P. Regnard, "Sur la respiration des animaux aquatiques," Arch. Physiol. (2) iv. [1877], pp. 44–62, & 584–633, experiments on the respiration of several Decapod Crustaceans are also related.

Leidy has observed *Ocypode arenaria* (Say) to survive in good condition for eight days, without once having been in water. P. Ac. Philad. 1878, p. 337.

Nervous System and Organs of Sense.

Histological and morphological notes on the central ganglion of the common crayfish, by R. Krieger, Zool. Anz. i. pp. 340–342.

G. Bellonci describes the microscopical structure of the central ganglia in *Squilla mantis*. He distinguishes small, middle-sized, and large cells. The first are the most important; they have only a very thin protoplasmatic envelope round their nucleus, are situated chiefly on the lateral protuberances of the cerebral ganglion, and seem to be eminently sensitive, "representing the centres of the psychical individuality." All nerves originating from the median ganglia have two roots, an upper and an under one, as in the *Vertebrata*; in those of the cerebral ganglion only, the upper one is sensitive and the under one motory, in the others this is reversed. The cerebral or supra-œsophageal ganglion is composed of three pairs of ganglionous masses, corresponding with the three segments of the head; the anterior pair supplies the optic nerves, the middle the inner antennæ, the posterior the outer antennæ. Ann. Mus. Genov. xii. pp. 518–545, pls. iv.–x.; a previous summary by the author in Rend. Acc. Bologn. 1878, pp. 88–96.

J. Chatin continues his researches on the optic elements in the *Crustacea* [Zool. Rec. xiv. *Crust.* p. 5], describing the structure of the eyes of the following genera :—

Decapods : *Astacus*, *Homarus*, *Galatea*, *Pagurus*, *Eupagurus*, *Paguristes*, *Eurynome*, *Typton*.
Stomapods : *Squilla*.
Amphipods : *Lysianassa*, *Isæa*, *Epimeria*.
Læmodipods : *Caprella*.
Branchiopods : *Apus*.
Ostracoda : *Cypridina*.
Copepods : *Notopterophorus*, *Lichomolgus*.

He insists upon the observation that in most of these Decapods the optic rod (bâtonnet) is composed of many disks placed one above the other ; that this structure is simplified in *Cypridina*, *Typton*, *Lysianassa*, and *Caprella*, and most simple in *Epimera* and *Lichomolgus*. Ann. Sci. Nat. (6) vii. No. 1, pp. 1–22 & 31 & 32, pls. i.–iii.

O. Schmidt describes the minute structure of the nervous parts in the eyes of *Phronima*, *Palæmon*, *Astacus*, and *Homarus*; he states that the so-called crystalline cones, or more rightly pyramids, are of very unequal and irregular form, and judges that *Phronima* at least cannot see any distinct image, but only distinguish different degrees of light and colour. Z. wiss. Zool. xxx. suppl. pp. 1–12, pl. i.

Genital Organs.

C. Grobben publishes various observations on the position and structure of the male genital organs, spermatophores, and spermatozoids of the Decapods, comparing them with those of *Squilla* and the *Cumacea*. Arb. Zool. Inst. Wien, i. pp. 57–150, 6 pls.

Rudiment of female orifice in the third pair of feelers in the males of *Pagurus deformis* (M. Edw.), observed by F. Hilgendorf, Tagbl. Versamml. deutsch. Naturf. (Cassel) 1878, p. 186; MB. Ak. Berl. 1878, p. 818, pl. iii. figs. 6 & 7 ; and SB. nat. Fr. 1878, p. 186. [This has been observed in *Astacus plebeius* (Hesse) by the Recorder; SB. nat. Fr. 1870, p. 1.]

Description of the spermatophores of the *Calanidæ*, their formation and translocation, by A. Gruber, Süsswass. Calanid. pp. 16–33, pl. ii. A supplementary note on the material for the egg-bags being formed in the oviduct of the female in these Copepods; *id.* Zool. Anz. i. p. 247.

Embryology.

C. S. Bate recapitulates the history and present state of our knowledge concerning the first stages of the *Crustacea*, beginning with the description of *Zoea*, and Fritz Müller's paper on the *Peneus* ; he introduces the term *Brephalus* for the larval stage, in which the Crustacean is hatched from the egg, reserving the names *Zoea*, *Nauplius*, etc., for distinct structural stages in the development, e.g., *Zoea* for the stage in which both pairs of antennæ but no thoracic or abdominal feet are

developed. He states that the most *Brachyura* and all *Anomura* of which the development is known, leave the egg in the stage of *Zoea*, but only a few *Macrura* (for instance, *Crangon*) do so; *Gecarcinus* among the *Brachyura*, and *Astacus* among the *Macrura*, are hatched in a later stage, that of *Megalopa*; *Peneus* and *Euphausia* in an earlier one, that of *Nauplius*; *Palinurus* in a quite special stage, that of *Phyllosoma*. Rep. Br. Assoc. Dublin, 1878, pp. 193–209, pls. v.–vii.; part of the figures copied from Müller and Metschnikoff.

F. Müller repeats his reasons for considering the *Nauplius*, which he caught as free-swimming animals, to be the larva of *Peneus*; Z. wiss. Zool. xxx. p. 163, translated Ann. N. H. (5) i. p. 481. C. S. Bate states that this is a mere supposition, not founded as yet on direct observation, and as no other Macrurous Decapod is known to be hatched in the *Nauplius* form, he suggests that the larva observed by Müller may be that of some Schizopod, or even of a Suctorian Cirriped; Ann. N. H. (5) ii. pp. 79–85. A. Giard replies to this that the development and the males of *Sacculina* and *Peltogaster* are known (*cf.* Zool. Rec. xi. p. 220), and that Müller's *Nauplius* cannot be related to any of them; *tom. cit.* pp. 233 & 234.

Reichenbach's paper on the embryology of the common Crayfish [Zool. Rec. xiv. *Crust.* p. 3] is abstracted in Q. J. Micr. Sci. xviii. pp. 85–94, pl. vi.

A. Giard states that the larva of a species of *Entoniscus* living on *Grapsus varius* has a distinct median eye besides vestiges of the lateral eyes, which he regards as an indication of the *Nauplius* stage hitherto not known in the Isopods. Assoc. Fr. vii. Paris, 1878, p. 747, also C. R. lxxxvii. pp. 299–301, and Bull. Sci. Nord. (2) i. pp. 237–240, translated Ann. N. H. (5) ii. p. 347.

P. Mayer (MT. zool. Stat. Neapel, i. 2, pp. 165–179, pl. v.) fully confirms Bullar's discovery that in the *Cymothoidæ* each individual is in its early stage male, and afterwards female [Zool. Rec. xiv. *Crust.* p. 5]. The genital organs make their first appearance as one piece on each side, consisting of four lobes; three of these become the testes, and very soon (in *Cymothoa* at a size of 8–14 mm.) are filled with spermatozoids, all stages of development of which can clearly be seen. At this time the two vasa deferentia and the two penes at the seventh thoracic segment are open, and the young *Cymothoa* is still swimming, its abdominal feet being provided with natatory bristles. Afterwards, when the animal is fixed on fish, the fourth lobe developes itself into an ovary, the vasa deferentia are closed, and after one or more moults, the external male organs are lost; meanwhile, the oviduct and the female orifice at the fifth thoracic segment are formed. Self-fecundation is not effected (true hermaphroditism), as the spermatozoids pass out at the side of the not yet fully developed ovary without entering it, but each individual, when young and free, fecundates an elder one, and is later, when fixed, fecundated by a younger one (protandry). This is corroborated by the fact that in young individuals the stiliform appendage in the abdominal feet is present, which is seen in other Isopods, and seems auxiliary to copulation; and that a younger and an elder individual are often found near

each other in the same fish. These observations have been made in *Cymothoa æstroides* (Risso), *Nerocila bivittata* (Risso), and *Anilocra mediterranea* (Leach). In some allied genera, which do not fix themselves for their whole life on the same fish, as *Cirolana* and *Conilera*, males and females are quite distinct, but at the end of the ovary there is a filiform appendage resembling a rudimentary vas deferens.

J. C. Schiödte publishes preliminary notes on the propagation, metamorphoses, and moults of the *Cymothoidæ*; in many of them, especially those that are aberrant, the young are very large in proportion to the adult, and not very numerous; in others they exist to the number of 2000, and are of extreme minuteness. C. R. lxxxvii. pp. 52–55; also Ann. N. H. (5) ii. pp. 195–197.

Observations on the first development of the egg in *Cymothoa æstroides* and *parallela*, by J. F. Bullar, P. R. Soc. xxvii. pp. 284–286. The same on the egg of *Balanus*, by A. Lang, Jen. Z. Nat. xii. pp. 671–674, with 2 pls.

Biology.

S. Jourdain has observed remarkable changes in the colour of *Nica edulis* (Risso). It is commonly very pale brown, but becomes intensely red in the dark or when its eyes are destroyed; the influence of light on the chromatophores is therefore not direct, but through the sense of seeing; in a cold temperature, approaching the freezing point, this change goes on very slowly. C. R. lxxxvii. pp. 302 & 303; abstract in Naturforscher, xi. p. 376.

Note on stridulating *Crustacea* by J. Wood-Mason, Nature, xviii. p. 53. Stridulating organ in *Neptunus vocans*, sp. n., by A. Milne-Edwards, Bull. Soc. Philom. 1878, p. 6 [*infrà*]; in *Palinurus vulgaris*, by T. J. Parker, P. Z. S. 1878, pp. 292, 442–444, pl. xx. [*infrà*].

The vitality of eggs of some *Cladocera* and *Copepoda* preserved, when frozen for a fortnight: Norman, in Nares's Narrative, &c., ii. p. 250.

Geographical Distribution.

(*a*) Freshwater Crustaceans.

The geographical distribution of the freshwater crayfishes, especially the generic difference between those of the Northern and Southern hemisphere and their relative scarcity in tropical regions, is pointed out by Huxley, P. Z. S. 1878, pp. 752–755, 786–788.

Yunnan. Four species of *Telphusa* and one of *Paratelphusa*, but no Macrurous Crustacean, collected by Anderson, described by Wood-Mason, *l. c.* pp. 931–936 (previously described in J. A. S. B. xl. 1871, pt. 2).

Mozambique. Telphusa obesa (M. E.), *Caridina nilotica* (Roux), *Virbius* sp. n., and *Palæmon* 3–4 spp. (the last ne r Tette), collected by W. Peters, MB. Ak. Berl. 1878, pp. 802, 828, & 837.

Brazil. Note on the occurrence of *Palæmon*, *Atya*, and *Æglea*, in

fresh water, the latter in small rivers about 1000 metres above the sea; F. Müller, Ann. N. H. (5) ii. p. 427. [The same already known from the collections of Dr. Hensel; Arch. f. Nat. 1869, pp. 1–32.]

New Zealand. 11 species of terrestrial *Isopoda* and some subterrestrial *Amphipoda* are to be found in Miers's Catalogue of the Stalk- and Sessile-eyed *Crustacea* of New Zealand, 1876, pp. 94–103 & 122. [It is to be regretted that it does not appear from this Catalogue which genera or species live in the fresh waters of New Zealand]. *Palæmon* (*Leander*) *fluviatilis*, *Calliope fluviatilis* (Amphipod), and *Idotea lacustris*, spp. nn., fresh waters of New Zealand, the two latter the first freshwater species of their genera; Thomson, Tr. N. Z. Inst. xi. pp. 231, 240, & 251.

F. A. Forel discusses the fauna of the Swiss lakes, distinguishing (1) The littoral region. (2) Pelagic region, in the water of Lake Leman: *Leptodora hyalina*, *Bythotrephes longimanus*, *Daphnia hyalina* and *mucronata*, *Bosmina longispina*, *Sida crystallina*, *Cyclops brevicaudatus*, *Diaptomus castor*; they live during night near the surface, during the day in depths of 10–50 metres, swimming. (3) Deep region at the bottom of Lake Leman, 15–334 metres where only a few cryptogamic plants exist, such as *Oscillaria*, *Pleurococcus*, and 21 *Diatomaceæ*; the *Crustacea* of this region are—*Niphargus puteanus*, var. *foreli* (Humb.), *Asellus sieboldi* (Rougem.), *Lynceus lamellatus*, *macrurus* and *striatus*, *Candona reptans*, *Acanthopus* sp. (Vernet), *Cypris* sp., *Cyclops* sp., and *Canthocamptus staphylinus*. Those of the pelagic region are the same in the different lakes, and may be easily transported from one to the other by water-birds, &c.; those of the depths are peculiar in each lake, and are derived from nearly allied species living in the littoral region of the same lake. Z. wiss. Zool. xxx. suppl. pp. 383–391.

Thirty-five species of *Cladocera* observed near Leipsic by A. Lutz, SB. Ges. Leipzig, v. pp. 36–41.

North America. 37 species of freshwater *Cladocera*, of which 17 are identical with European and one represents a new genus, are described by E. A. Birge (Wisconsin: 1878, 8vo, 34 pp., 2 pls.); they have been in Wisconsin and Massachusetts.

Colorado. Some new Phyllopods described by Verrill, Bull. U. S. Geol. Surv. iii. pp. 171–181, woodcuts.

New Zealand. Some species of *Lepidurus*, *Daphnia*, *Chydorus* (*Lynceidæ*), *Cypris*, and *Cyclops*, most of them new, from fresh water, described observed by Thomson, Tr. N. Z. Inst. xi. pp. 253–262.

Kerguelen Island. Four species of *Cladocera*, 1 Ostracode, and 2 *Cyclopidæ* found in freshwater ponds, all new, but belonging to European genera; Studer, Arch. f. Nat. xliv. pp. 102–111, pls. 2 & 3.

A. Gruber, Süsswass. Calanid. pp. 3 & 9 enumerates the known fresh water *Calanidæ*, viz., 3 species of *Diaptomus*, 2 of *Heterocope*, 1 *Limnocalanus*, and 1 *Temora*; two of them have been observed by himself in the lakes of Southern Germany, and he remarks that the *Entomostraca* which live in great lakes are generally more pellucid and less prolific than those living in small ponds.

(*b*) Marine Crustacea.

1. *Arctic Seas.*

Smith Sound and Grinnell Land. Nine species of *Decapoda Macrura* 1 Mysid, 4 Isopods (2 parasitic), 13 Amphipods, 1 Phyllopod, 20 *Ostracoda*, 5 free and 3 parasitic Copepods, 1 Cirriped, and 3 Pycnogonids, collected by H. W. Feilden during Nares's voyage to the Polar Sea in 1875–76, determined by E. Miers, A. Norman, and G. Brady, in Nares's Narrative, &c., ii. pp. 240–256.

Arctic specimens of Copepods much larger than British; 3 new species found by Moss, in midwinter under ice-floes at the winter quarters of the 'Alert,' lat. 82° 27': Norman, *l. c.* p. 253.

Six macrurous Decapods, 1 Cumacean, 13 Amphipods, 3 Isopods, 1 Cirriped, and 3 Pycnogonids, collected by J. Payer during the Austro-Hungarian Arctic Expedition, described by C. Heller, Denk. Ak. Wien, xxxv. pp. 25–42, have been omitted from former vols. of Zool. Rec.; the new or figured species will be mentioned *infrà*.

G. O. Sars enumerates 156 species of *Crustacea*, most of them *Amphipoda* and *Isopoda*, observed by the Norwegian Expedition in the Northern Sea towards Iceland, including some new; 71 were found in the great depth of the cold zone, outwards from the west coast of Norway, and their geographical distribution in the Arctic Seas is indicated. Arch. Math. Naturvid. 1876, pp. 337–371.

2. *Seas of Northern Europe.*

G. Zaddach gives a general sketch of animal life on the Prussian coast of the Baltic near Königsberg, with special regard to the *Crustacea*, including full detailed descriptions and woodcuts of the (4) Amphipods of that coast, all well known species. Schr. Ges. Königsberg, 1878, pp. 9–39.

Temora longicornis (Müll.), *Mysis flexuosa* (Müll.), *Gammarus locusta* (L.), and more rarely *Idotea tricuspidata* (Desm.), found in the stomach of the herring; Möbius, JB. Comm. wiss. Untersuch. deutschen Meere, vi. pp. 173 & 174.

Some notes on British *Amphipoda* and *Isopoda* (one new), by T. R. Stebbing, Ann. N. H. (5) i. pp. 31–37, and ii. pp. 364–369; a new British Cumacean and Amphipod, by C. S. Bate, *tom. cit.* pp. 409–411.

Monograph of British *Copepoda*, by G. S. Brady (see *infrà*).

Crustacea from Cornwall, by T. Cornish, Zool. 1878, pp. 423–426.

Hesse continues his descriptions of lower *Crustacea* observed on the shores of France; Ann. Sci. Nat. (6) vii. Nos. 3 & 15.

3. *Mediterranean Sea.*

Paragalene, g. n., and *Clibanarius mediterraneus*; Kossmann (*infrà*).

Notes on the habits of various *Crustacea*, observed in the zoological station at Naples, by R. Schmidtlein, MT. zool. Stat. Neap. i. pp. 20–28.

On the periodical appearance or frequence of many *Crustacea* at Naples; from three years' observations; *id. l. c.* pp. 129–132.

Some marine *Crustacea* from the island Pelagosa, including *Pandalus pristis* (Haan), not before found in the Adriatic; STOSSICH, Boll. Soc. Adr. iii. p. 190.

Caspian Sea. Some notes on a few *Crustacea*, collected by O. Schneider on the shores; E. v. MARTENS and HARTMANN, in O. SCHNEIDER'S "Naturwissenschaftliche Beiträge zur Kenntniss der Kaukasusländer," Dresden: 1878, p. 35 [see *Telphusa* and *Porcellio*].

4. *East Coast of North America.*

The North American species of the suborder *Carides*, 119 in number, enumerated by J. S. KINGSLEY, Bull. Essex Inst. x. Nos. 4–6, pp. 53–71; such as are new described, *id.* Pr. Ac. Philad. 1878, pp. 89–98.

New species of Isopods from New England; HARGER, Am. J. Sc. (3) xv. pp. 373–377.

Decapods observed at Cape May, New Jersey; LEIDY, P. Ac. Philad. 1878, p. 336.

Sixteen species of *Crustacea* observed at Fort Macon, North Carolina; E. COUES & H. C. YARROW, P. Ac. Philad. 1878, pp. 297–299.

List of Decapod *Crustacea* ranging to Fort Macon, including 5 species of *Maioidea*, 17 *Cancroidea*, 11 *Ocypoidea* (*Cotometopa*), 4 *Leucosoidea*, 1 Raninoid, 3 *Porcellanoidea*, 2 *Hippoidea*, 4 *Paguroidea*, 3 *Thalassinoidea*, 1 Astacoid, and 11 *Caridioidea*, with several notes on their geographical range; J. S. KINGSLEY, *tom. cit.* pp. 316–330.

A list of useful and injurious *Crustacea* of the United States, in GOODE'S "Classification of the Collection of Animal Resources," Washington: 1876, p. 10 (Bull. U. S. Mus. No. 6, and Sm. misc. coll. xiii. 1878).

5. *West Indies and Tropical Atlantic.*

Some new species and genera of Decapods from the West Indies and Cape Verde Islands described by A. MILNE-EDWARDS, Bull. Soc. Philom. June, 1878, pp. 3–13.

The very interesting and valuable notes on deep-sea *Crustacea* by the late R. von WILLEMÖES-SUHM in Tr. L. S. (2) i. [1875] pp. 23–59, were not duly noticed in Zool. Rec. xii., but will be mentioned *infrà*.

A. MILNE-EDWARDS commences descriptions and illustrations of numerous Decapod Crustaceans from the West Indies and the Pacific Coast of Mexico and California, with the *Brachyura Oxyrrhyncha*, in "Mission scientifique au Méxique," 5 partie.

6. *Indian Ocean.*

Red Sea. Diagnoses of the new species described by KOSSMANN [Zool. Rec. xiv. *Crust.* 2] are reprinted in Arch. f. Nat. xliv. pp. 250–256; *Epidromia*, g. n., *l. c.* p. 256. Notes on 9 species of Decapods and on *Tetra-*

clita porosa collected by R. Burton in the Gulf of Akaba; E. Miers, Ann. N. H. (5) ii. pp. 406–411.

Coast of Mozambique. One hundred species of *Crustacea* collected by W. Peters in 1843–47 have been determined, and such as are new described by F. Hilgendorf, MB. Ak. Berl. 1878. pp. 782–851, pls. i.–iv. Many of these species live also in the East Indies and even in North Australia and New Caledonia, from careful comparison of specimens from both localities by the author.

7. *Pacific.*

Twenty-six species of Decapodous *Crustacea*, common to the Eastern and Western Coast of North America, are enumerated by Kingsley, Bull. U. S. Geol. Surv. ix. pp. 191 & 192.

The *Porcellanidæ*, *Thalassinidæ*, and *Palinuridæ* known from the Pacific Coast of North America reviewed by W. N. Lockington, Ann. N. H. (5) ii. pp. 299–302 & 394–406. The species of *Alpheus*; id. *op. cit.* i. pp. 465–480, with descriptions of new species.

Four species of *Brachyura*, 2 of *Anomura*, and 1 of *Macrura* from California; 31 *Brachyura*, 5 *Anomura*, and 3 *Macrura* from the Hawaiian and some other islands in the North Pacific; 3 pelagic *Macrura*, 3 *Schizopoda*, 11 *Amphipoda*, and 6 *Copepoda* from the Northern Pacific, and 3 *Copepoda* from the Southern Pacific, enumerated, and several new among them described, by T. H. Streets, Bull. U. S. Nat. Mus. No. 7, 1877, pp. 103–141.

On Pelagic *Amphipoda* collected in the Pacific by W. H. Jones; they approach the surface about twilight and remain at or near the surface for two or three hours, especially in cloudy or squally nights, or in warm and sultry weather with a smooth sea; in the daytime very few can be captured. Streets, P. Ac. Philad. 1878, pp. 276 & 277.

8. *Australian Seas.*

New Zealand. Twelve species of *Oxyrrhyncha*, 21 *Cyclometopa*, 27 *Catometopa* (including 8 *Pinnotheridæ*, 16 *Grapsidæ*, and 1 *Cardisoma*), 2 *Oxystomata*, 13 *Anomura*, 18 *Macrura*, 2 *Stomatopoda*, 18 marine *Isopoda* (including 2 *Serolis*), and 15 *Amphipoda*, altogether 140 spp., are enumerated and described by E. J. Miers in his "Catalogue of the stalk- and sessile- eyed *Crustacea* of New Zealand" (1876), chiefly from the collection in the British Museum and from published books, a few of them also from specimens given by J. Hector. The author remarks that some of these are distributed throughout the Indopacific or Oriental region, others are common with South America, or South Africa, and may be called Antarctic, whilst some find their nearest relations in Europe. The species figured here for the first time will be mentioned below.

Twenty-two species, viz., 2 *Macrura*, 14 *Amphipoda*, and 6 *Isopoda*, including 19 new, are added to the New Zealand fauna by G. M. Thomson, Tr. N. Z. Inst. xi. pp. 230–248, pl. x. T. W. Kirk makes further additions, altogether 4 Brachyurous, 2 Anomurous, 3 Macrurous Decapods,

2 Stomatopods, 2 Amphipods, and 2 Læmodipods; *tom. cit.* pp. 392–396, 401 & 402, the former also in Ann. N. H. (5) ii. pp. 465–467. In the latter paper, some British and Arctic species as *Calocaris andreæ* (Bell), *Portunus pusillus* (Leach), *Podocerus cylindricus* (Bate), and *Pleustes panoplus* (Kröy.), are indicated as obtained in New Zealand, which appears very problematical.

Marine *Entomostraca* from New Zealand by G. M. Thomson, *l. c.* pp. 254–257 & 259.

List of New Zealand Cirripeds, among which 3 new species, by F. W. Hutton, *tom. cit.* pp. 328–330.

Auckland Islands. Eight species enumerated by F. W. Hutton, *l. c.* pp. 340 & 341.

DECAPODA.

T. H. Huxley has compared the number and position of the gills of the *Astacidæ* (infrà) with those in other *Crustacea*. In the majority of the *Macrura* the number of the podobranchiæ is diminished, in *Peneus*, *Gebia*, and *Callianassa* they are entirely wanting; the nine gills of the regular *Brachyura* consist of a podobranchia on the second and third maxillipeds, an anterior arthrobranchia on the second maxilliped, two arthrobranchiæ on the third maxilliped and on the first thoracic foot, finally a pleurobranchia on the second and third thoracic feet. On account of these differences he distinguishes three types:—

1. *Caridomorpha*, characterized by the predominance of the pleurobranchiæ and the diminution in number and importance of the arthrobranchiæ and podobranchiæ. This comprises the *Carides*, excluding the *Peneidæ*.
2. *Anomomorpha*, distinguished by the almost complete abortion of the podobranchiæ and the presence of ten arthrobranchiæ attached in pairs to the middle thoracic segments; corresponding nearly with Haan's *Anomala*, and comprising *Porcellana*, *Galatea*, *Lithodes*, *Pagurus*, *Remipes*, *Callianassa*, and *Gebia*.
3. *Carcinomorpha*, characterized by only two podobranchiæ, viz., on the second and third maxilliped, comprising the true *Brachyura*, and *Ranina*, *Homola*, and *Dromia*.

All these are *Phyllobranchiata*, having lamellar gills, whereas another and more lower division is formed by those in which the gills consist of a stem beset with numerous cylindrical filaments; these are called *Trichobranchiata* and comprise the *Peneidæ*, *Euphausidæ*, *Thalassinidæ*, *Homaridæ*, *Potamobiidæ*, *Parastacidæ* (infrà), and *Palinuridæ*. The last-named two groups, being devoid of male appendages in the first abdominal segment, and agreeing in the disposition of the gills, are termed *Astyla*, distinguished from the *Abranchiata* (*Mysidæ*), the rest of the *Trichobranchiata* and the *Phyllobranchiata*, which are all "*Stylophora*," P. Z. S. 1878, pp. 776–785. [These divisions seem rather artificial.]

BRACHYURA.

V. Czerniavsky (Hor. Ent. Ross. xi.) gives a general account (in

Russian) of the animals hitherto called *Megalopa* and *Monolepis*, and allied forms, which are all the larvæ of Brachyurous *Crustacea*; and he describes (in Latin) a number of such forms observed in the Black Sea, giving them generic and specific names and guessing in some instances as to the genus of *Brachyura*, of which they may be the larvæ; these names are *Protomonolepis subquadratus*, g. & sp. nn., p. 18, pl. ii. fig. 1, *Heterograpsus lucasi*?; *Paramonolepis intermedius*, g. & sp. nn., p. 19, pl. ii. fig. 2, *Euchirograpsus*?; *Pseudomonolepis ponticus*, g. & sp. nn., p. 22, pl. ii. fig. 3; *Protodesmarestia maculata*, g. & sp. nn., p. 23, pls. ii. & iii. fig. 4, *Eriphia spinifrons*?; *Paradesmarestia* (g. n.) *prototypa*, two varieties from the Black Sea, a third from the Sandwich Islands, pp. 35–37, pl. iii. figs. 5 & 6; *Dohrnia cornuta*, g. & sp. nn., two forms, p. 28, pl. iii. figs. 7–9. He also gives short descriptions of all known forms of this kind, or the so-called genera *Megalopa* (Leach), *Cyllene* (Dana), *Desmarestia* (Dana), *Monolepis* (Say), and *Tribola* (Dana), proposing also here some new generic names for larval forms, as:—

Spinaria, g. n., for *Megalopa armata* (Leach) and *valdiviana* (Phil.), the one belonging to *Carcinus mœnas* (L.) and the other to *Cancer irroratus* (Say), pp. 29 & 30.

Cyllenula thompsoni, g. & sp. nn., for the larva of *Portunus* (*marmoreus*?) (Leach), described by Thompson, 1836, p. 32.

Tricuspidella, g. n., for *Megalopa sculpta* (Leach), p. 38.

Acanthotribola steno[*r*] *rhyncha*, g. & sp nn., for Thompson's larva of *Macropodia* [*Stenorrhynchus*] *phalangium*, p. 39.

Paratribola, g. n, for the larva called *Cancer ferroensis* by O. Fr. Müller, p. 43.

Quadribola, g. n., for *Megalopa maculata* (Leach).

Hemisphærium spinosum, g. & sp. nn., for a larva not before described from the East Indies, p. 40.

Hyadella rathkei, g. & sp. nn., for the larva of *Hyas araneus*, described by Rathke, 1840, p. 41.

Dromiella, g. n., for the *Megalopa* of *Dromia*, described by Claus, 1876, p. 44.

Pseudocyllene, g. n., for the *Megalopa* of *Portunus*, described by Claus, 1876, p. 44.

A synoptical table shows the chief differences of all these forms.

Inachidæ.

Metoporrhaphis forficulatus, sp. n., A. Milne-Edwards, Miss. scientif. Méxiq. v. p. 174, pl. xxxi. fig. 3, Guiana.

Collodes depressus and *obesus*, spp. nn., Florida, *rostratus*, Coast of Patagonia, 41° 41′ S. lat., and *inermis*, sp. n., Brazil, *id. l. c.* pp. 176–179, pl. xxxii. figs. 1–5.

Arachnopsis filipes (Stimps.), *id. l. c.* p. 181, pl. xxxiii. fig. 1, Florida, 35–45 fath.

Euprognatha rastellifera, *inermis*, and *gracilipes*, spp. nn, West Indies, 80–95 fath., *id. l. c.* pp. 182–184, pl. xxxv. figs. 1–3.

Apocremnus, g. n., *id. l. c.* p. 184 (commencement only).

Maiidæ.

Thoe sulcata and *puella* (Stimps.), Milne-Edwards, *l. c.* pp. 121 & 122, pl. xix figs. 3 & 5, the former from California, the latter from Tortugas.

Sisyphus compressus, sp. n., *id. l. c.* p. 124, pl. xxiv. fig. 1, Guadeloupe.

Tyche emarginata (White) = *Platycremnus trituberculatus* (Schramm); *id. l. c.* p. 126, pl. xiii. fig. 1, Tortugas.

Libinia dubia (M. E.) = *distincta* (Guérin); *id. l. c.* p. 129, pl. xviii. fig. 5, West Indies.

Nibilia, g. n. Beak, gnathopods, and feet as in *Libinia*: cephalothorax narrower, antenno-orbital region as in *Herbstia*. *N. erinacea*, sp. n., Guadeloupe. *Id. l. c.* pp. 132–134, pl. xxv.

Sphenocarcinus, g. n., near *Menætius* and *Huenia*, two frontal horns united (accolés) one to the other. *S. corrosus*, sp. n., Barbadoes, 100 fath. *Id. l. c.* pp. 135 & 136, pl. xvii. fig. 5.

Epialtus: list of known species, *E. dilatatus*, sp. n., St. Thomas, West Indies, *bituberculatus* (M. E.) and *longirostris* (Stimps.), West Indies, *sulcirostris* (Stimps.), California, figured; *id. l. c.* pp. 138–141, pl. xxvii. figs. 1–6

Acanthonyx petiveri (M. E.) from the West Indies, not specifically distinct from *emarginatus* (M. E.) and *debilis* (Dana), from Chili and Peru; *id. l. c.* pp. 144 & 145, pl. xxvii. fig. 7.

Mimulus foliatus (Stimps.); *id. l. c.* p. 145, pl. xviii. fig. 4, Monterey and Mendocino.

Amathia crassa, sp. n., *id.* Bull. Soc. Philom. June, 1878, p. 5, between Cuba and Florida, 239 fath.

Libinia canaliculata (Say) observed in the aquarium at Hamburg to pluck with its claws pieces of seaweed or sponges and place them on its back, where they are attached and grow; H. Bolau, Zool. Gart. xix. p. 149.

Libinia semizonale[*-is*], sp. n., Streets, Bull. U. S. Nat. Mus. No. 7 [1877], p. 103, Lower California.

Pisa erinacea, sp. n., A. Milne-Edwards, Bull. Soc. Philom. June, 1878, p. 4, between Florida and Cuba, 37 fath.

[*H*]*Oplopisa*, g. n. Allied to *Pisa*, but third maxillipeds much dilated at their antero-external angle. *O. spinipes*, sp. n., Gulf of Mexico, *id. l. c.* p. 3.

Podopisa, g. n. Near *Naxia* and *Pisa*, external antennæ not covered by the rostrum, their basal article with three teeth; feet very long. *P. petersi*, sp. n., Mozambique, Hilgendorf, MB. Ak. Berl. 1878, pp. 784 & 785, pl. i. figs. 1–5. [The author has afterwards recognized that this is *Naxioides*, M. Edw.]

Leptomithrax longimanus (Miers); Miers, Crust. New Zeal. pl. i. fig. 3.

Paramithrax barbicornis (Latr.); *id. l. c.* p. 6, pl. i. fig. 2.

Pericera cælata, sp. n., A. Milne-Edwards, Bull. Soc. Philom. June, 1878, p. 5, Cuba, 175 fath.

Halimus hectori (Miers); Miers, *l. c.* p. 4, pl. i. fig. 1.

Parthenopidæ.

Lambrus divided into several genera, *L. pourtalesi* and *agonus* (Stimps.), from Florida, *triangulus* and *hyponcus* (Stimps.), California and Mazatlan, figured; A. Milne-Edwards, Miss sci. Méx. v. pp. 146–153, pl. xxviii. fig. 2, pl. xxx. figs. 2 & 3, pl. xxxi. fig. 1.

Platylambrus, g. n. for *Lambrus serratus* (M. E.) = *crenulatus* (Saussure); *id. l. c.* p. 156, pl. xxx. fig. 1, West Indies.

Pisolambrus, g. n. Eyes very large, protruding out of the orbit; external antennæ very small. *P. nitidus*, sp. n., Barbadoes, 100 fath. *Id. l. c.* p. 157, pl. xxx. fig. 4.

Solenolambrus fastigatus, sp. n., *belli*, sp. n., and *typicus* (Stimps.), all from the Caribbean Sea and the Gulf of Mexico; *id. l. c.* pp. 159–163, pl. xxix. figs. 5 & 6, & pl. xxviii. fig. 4.

Heterocrypta granulata and *macrobrachia* (Stimps.); *id. l. c.* pp. 166 & 167, pl. xxix. figs. 3 & 4, West Indies.

Cryptopodia concava (Stimps.); *id. l. c.* p. 168, pl. xxix. figs. 1 & 2, Gulf of Mexico, 34 fath.

Œthra scruposa (L.) var. *scutata* (S. Smith); *id. l. c.* p. 170, pl. xxxi. fig. 2, Mazatlan.

Cancridæ.

Cancer borealis (Stimps.) distinct from *irroratus* (Say), ranges from Nova Scotia to the West Indies; Kingsley, P. Ac. Philad. 1878, p. 317.

Actæa cavernosa, sp. n., Milne-Edwards, Bull. Soc. Philom. June, 1878, p. 7, Cape Verde Islands.

Actæa rueppelli (Krauss.) = *rugata* (White) = ? *kraussi* (Heller), and occurs from Mozambique to New Caledonia; Hilgendorf, MB. Ak. Berl. 1878, p. 787.

Hypocælus sculptus (M. E.) = ? *Melissa diverticulata* (Strahl); very equal in coloration, somewhat different in sculpture; the large notch on the hand may be intended for alluring and catching small animals, like the hole in the hand of *Carpoporus*. Id. *l. c.* p. 789.

Lophactæa granulosa (Rüpp.). Note on its relation to *cristata* (M. E.); *id. l. c.* p. 787.

Lophozozymus dodone (Herbst) = *Xantho radiatus* (M. E.), Mozambique; *id. l. c.* p. 789.

Xantho spino-tuberculata (Lockington), from New Zealand; Kirk, Tr. N. Z. Inst. xi. p. 397.

Etisus laevimanus (Randall) = *macrodactylus* (M. Edw., Lucas) = *maculatus* (Heller) = *convexus* (Stimps.), Mozambique; Hilgendorf, *l. c.* p. 791.

Paragalene, g. n.; external antennæ as in *Menippe* and *Galene*, but endostome provided with a crest. Cephalothorax with very developed epimeral region, convex, smooth. *P. neapolitana*, sp. n., Naples. Kossmann, Arch. f. Nat. xliv. pp. 253–255.

Myomenippe, subg. n. of *Menippe*, but the inner edge of the orbit quite

closed, as in *Rueppellia*. *Men.* (*Myom.*) *fornasinii* (Biancome), Mozambique, and *duplicidens*, sp. n., Celebes; Hilgendorf, *l. c.* pp. 795 & 796.

Eurycarcinus natalensis (Krauss, as *Galene*); notes on specimens from Mozambique; *id. l. c.* p. 792.

Pilumnus longicornis, sp. n., *id. l. c.* p. 794, pl. i. figs. 8 & 9, Inhambane, S.E. Africa.

Epimelus, g. n.; allied to *Pilumnus*, but eye-stalks very long, orbits extended to the hepatic region. *E. cessaci*, sp. n., Cape Verde Islands. Milne-Edwards, Bull. Soc. Philom., June, 1878, p. 8.

Eriphia lævimana (Latr.), var. *smithi* (Macleay). Number of frontal teeth variable; Hilgendorf, *l. c.* p. 797.

Trapezia ferruginea (Latr.) = *carulea* (Rüpp.) = *cymodoce* (Dana) = *subdentata* (Gerst.), and *T. cymodoce* (Herbst.) = *dentifrons* (Latr.) = *hirtipes* (Lucas), both in the Red Sea. Critical notes; Miers, Ann. N. H. (5) ii. pp. 407–409.

Portunidæ.

Carcinus mœnas (L.), almost cosmopolitan, from Cape Cod to New Jersey, at Panama, Sandwich Islands, Red Sea, Brazil, &c.; Kingsley, P. Ac. Philad. 1878, p. 321, and Streets, Bull. U. S. Nat. Mus. No. 7, p. 109. Observations on its air breathing, by Van Rees (see in General Subject, *suprà*, p. 6).

Assecla, g. n. Carapace broader than long, convex, smooth; antero-lateral border five-lobed; hiatus of the internal angle of the orbit completely closed, tarsus of the fifth pair of feet lanceolate-ovate, as in *Carcinus*. *A. holothuri*[*i*]*cola*, sp. n., Palmyra Island, North Pacific, living in the cloaca of a *Holothuria* and *Lissocarcinus orbicularis* (Dana); Streets, Bull. U. S. Nat. Mus. No. 7 [1877] pp. 110–113.

Thalamita. Some notes on the differences of several species; Hilgendorf, *l. c.* pp. 800 & 801.

Thalamita integra (Dana) is distinct from *T. admete* (Herbst), Sandwich Islands; Streets, *l. c.* p. 107.

Neptunus vocans, sp. n., A. Milne-Edwards, Bull. Soc. Philom. 1878, p. 6, Cape Verde Islands; pterygostomic region provided with a row of 25 parallel ridges, against which the upper edge of the hands is rubbed.

Neptunus pelagicus (L.). Some specimens from Mozambique approach *N. tritubereulatus* (Miers); Hilgendorf, *l. c.* p. 799.

Telphusidæ.

Telphusa fluviatilis. No metamorphosis, as in *Astacus*; R. von Willemöes-Suhm, Tr. L. S. (2) i. p. 48.

Telphusa. Hilgendorf calls attention to a linear impression in the second joint of the external maxilliped, the situation of which is different in different species. MB. Ak. Berl. 1878, p. 802.

Telphusa fluviatilis, var. = *Cancer iberus* (Güldenstedt, Eichwald), at Borschom and Lenkoran, Transcaucasia; E. v. Martens, in O. Schneider's Naturwiss. Beiträge zur Kenntniss der Kaukasus-lander, p. 35. [First

mentioned as *Cancer ibericus*, Bieberstein, Mém. Mosc. ii. 1809, p. 4, pl. ii.]

Telphusa edwardsi, *andersoniana*, *hispida*, and *tumida* (Wood-Mason, 1871), described and discussed by the author in Anderson's "Anatomical and zoological researches during the Yunnan Expedition," pp. 931–934, Yunnan.

Paratelphusa dayana (Wood-Mason, 1871); *id. l. c.* p. 935, Upper Burma.

Gecarcinidæ.

Cardisoma [probably *armatum* (Herklots)]. The young leaves the egg in the form of *Zoea*, somewhat more advanced than that of *Carcinus mænas*; Willemöes-Suhm, Tr. L. S. (2) i. p. 47, pl. xi. figs. 1–3.

Gonoplacidæ.

Discoplax pagenstecheri, sp. n., Kossmann, Arch. f. Nat. xliv. p. 255, South Sea.

Ocypodidæ.

Ocypode arenaria (Say). On its habits; Leidy, P. Ac. Philad. 1878, p. 337 (see also in General Subject, *suprà*, p. 7).

Gelasimus annulipes and *chlorophthalmus* (M. E.); their differences pointed out by Hilgendorf, MB. Ak. Berl. 1878, pp. 803–805. *G. pugilator* (Desh.), on its habits in the aquarium at Hamburg; Bolau, Zool. Gart. xix. p. 149.

Grapsidæ.

Grapsus tenuicrustatus (Herbst); note on the original specimens, by Hilgendorf, *l. c.* p. 807.

Grapsus æthiopicus (Hilgend.) = *Metopograpsus messor* (Forsk.); *id. l. c.* p. 808.

Plagusia. The known 7 species enumerated, and their differences, synonymy, and geographical distribution pointed out; Miers, Ann. N. H. (5) i. pp. 148–152.

Leiolophus [*Lio-*], Miers, Cat. Crust. New Zeal. 1876, p. 46, new name for *Acanthopus* (Haan, 1835, preoccupied); the synonymy and geographical distribution, &c., of the 3 known species given; Miers, Ann. N. H. (5) i. pp. 153 & 154.

Cyclograpsus occidentalis, sp. n., A. Milne-Edwards, Bull. Soc. Philom. June, 1878, p. 9, Cape Verde Islands.

Heterograpsus lucasi (M. E.). A membranaceous globular callosity at the base of the moveable finger in the male described; P. Mayer, MT. zool. Stat. Neap. i. pp. 51–53, woodcut. A peculiar apparatus consisting of a crest with two tubercles behind the infra-orbital edge, and another crest at the lower anterior angle of the brachium, which slides forwards easily over the first, but is retained by the tubercles when moving backwards; Hilgendorf, SB. nat. Fr. 1878, p. 185.

Pinnoteridæ.

Elamene [*-na*] *whitei* (Miers) : Miers, Cat. Crust. New Zeal. p. 52, pl. i. fig. 4, New Zealand.

Elamena producta, sp. n., Kirk, Tr. N. Z. Inst. xi. p. 395, woodcut, also Ann. N. H. (5) ii. p. 466, New Zealand.

Calappidæ.

Matuta. Hilgendorf, having examined the original specimens of Fabricius and Herbst, states that *M. planipes* (Herbst) = *rubro-lineata* (Miers), *planipes* (Fabr.) = *lunaris* (Herbst), and that *victor* (Fabr) is rightly interpreted by Miers; MB. Ak. Berl. 1878, p. 810.

Leucosiidæ.

Myra coalita, sp. n., Zanzibar, *M. subgranulata* (Kossmann) = *fugax* (Fabr.); the original specimen of *Cancer punctatus* (Herbst) belongs really to this genus; Hilgendorf, *l. c.* pp. 811 & 812, pl. i. figs. 6 & 7.

ANOMURA.

Dromiidæ.

Dromia vulgaris (Lam.). Its habits observed in the aquarium at Hamburg; Bolau, Zool. Gart. xix. p. 149.

Dromia (*Cryptodromia*) *pentagonalis*, sp. n., and *tomentosa* (Heller), Ibo, S.E. Africa, Hilgendorf, MB. Ak. Berl. 1878, pp. 813 & 814, pl. ii. figs. 1–5, with notes on the pterygostomial teeth of some other species, p. 812.

Epidromia, g. n "Cephalothorax præsertim dimidio anteriore valde convexus; margo anterolateralis usque ad angulum labialem productus; palatum colliculo instructum. Pedes *Cryptodromiæ* similes." *E. granulata*, sp. n., Red Sea. Kossmann, Arch. f. Nat. xliv. p. 256.

Lithodidæ.

Lithodes arctica (Lam.) [*maia* (L.)]. Note on its habits in the aquarium at Hamburg; Bolau, Zool. Gart. xix. p. 150.

Hippidæ.

E. Miers gives a review of the known species, dividing them into *Hippidæ* (gg. *Remipes*, *Mastigochirus*, *Hippa*) and *Albuneidæ* (gg. *Albunea*, *Lepidops*, *Blepharopoda*), and enumerating 6 genera and 22 species, with notes on their geographical distribution and habits; J. L. S. xiv. pp. 312–336.

Albunea microps (White, MS.) and *oxyophthalma* (Leach, MS.), spp. nn., Miers, *l. c.* pp. 328 & 329, pl. v. figs. 12–15, West Indies.

Lepidops (more correct than *Lepidopa*) *myops* (Stimps.), California; *id. l. c.* pp. 332 & 333, pl. v. fig. 16.

Hippa emerita (? L., Desm.) = *Cancer testudinarius* (Herbst) = *H. talpoidea* (Say), Cape Cod to Brazil; *H. analoga* (Stimps.), California to Chili; *asiatica* (M. E.), Indian Ocean; *id. l. c.* pp. 323–326, pl. v. figs. 9–11.

Hippa talpoidea (Say) burying in the sand, observed at Cape May, New Jersey; Leidy, P. Ac. Philad. 1878, p. 337.

Mastigochirus, new name for *Mastigopus* (Stimpson, preoccupied) *gracilis* (Stimps.), China Sea, and *quadrilobatus*, sp. n., Philippines, Miers, *l. c.* pp. 321 & 322, pl. v. figs. 7 & 8.

Remipes testudinarius (Latr.) = *emeritus* (Herbst) = *pacificus* and *hirtipes* (Dana) = *marmoratus* (Lucas) = *pictus* (Heller) = *ovalis* (A. Milne-Edw.), whole Indo-Pacific region; var. *denticulatifrons* (White), same distribution; *scutellatus* (Fabr.) = *cubensis* (Saussure) = *barbadensis* (Stimps.), Tropical Atlantic and West Indies; *strigillatus* (Stimps.), California; *truncatifrons*, sp. n., China. *Id. l. c.* pp. 316–321, pl. v. figs. 1–6.

Paguridæ.

Some observations on living *Pagurus bernhardus* (L.), by C. Terne, Zool. Gart. xix. pp. 250 & 251; a specimen living in a shell fixed by the byssal threads of a *Mytilus*, left it for taking food, but returned rapidly to it; another emptied a shell full of sand by knocking it with its claws before taking possession.

Eupagurus spinimanus (Miers); Miers, Cat. Crust. New Zeal. p. 63, pl. i. fig. 6.

Pagurus (s. strict.) *pavimentatus*, sp. n., Ibo, S.E. Africa, *pedunculatus* (Herbst), *hungarus* (Herbst), and *strigatus* (Herbst), described from the original specimens, the first and third also found at Ibo, the second without doubt from the East Indies. Hilgendorf, MB. Ak. Berl. 1878, pp. 815–820, pl. iii. figs. 1–5, and pl. ii. fig. 8.

Pagurus deformis (M. E.), rudiment of female orifice in the male, observed by Hilgendorf (see General Subject, *suprà*, p. 8).

Clibanarius mediterraneus, sp. n., Kossmann, Arch. f. Nat. xliv. p. 257, Mediterranean Sea.

Pagurus (*Clibanarius*) *eurysternus*, sp. n., Hilgendorf, *l. c.* p. 822, pl. iii. figs. 9 & 10, Mozambique.

Cœnobita rugosa [*-us*] (M. E.) inhabits shells of 14 quite different genera; Miers, Ann. N. H. (5) ii. p. 410.

Cœnobita panamensis (Streets, 1871) = *intermedia* (Streets, 1871); Streets, Bull. U. S. Nat. Mus. No. 7, p. 117, Lower California.

Birgus latro (L.). Note by Grube, JB. schles. Ges. 1878, pp. 76–78. On its respiration, by C. Semper, see General Subject, *suprà*, p. 6.

Porcellanidæ.

Petrolisthes. Synoptical table of the distinguishing characters of twelve species, living on the West Coast of North America, and descriptions of

several of them, including *P. hirtipes* and *crenulatus*, *P.* (*Pisosoma*) *sinuimanus*, *gibbosicarpus*, *setimanus*, and *biocellatus*, spp. nn., Gulf of California, W. N. Lockington, Ann. N. H. (5) ii. pp. 395–403.

Porcellana (*Petrolisthes*) *mossambica*, sp. n., and ? *rufescens* (Heller), Hilgendorf, MB. Ak. Berl. 1878, p. 825, pl. ii. figs. 6 & 7, Mozambique.

Petrocheles spinosus (Miers), Miers, Crust. New Zeal. p. 61, pl. i. fig. 5.

Pachycheles tuberculifera, sp. n., Lockington, *l. c.* p. 404, Gulf of California.

Pachycheles barbatus, sp. n., A. Milne-Edwards, Bull. Soc. Philom. June, 1878, p. 9, Cape Verde Islands.

Porcellana cessaci, sp. n., *id. l. c.* p. 10, Cape Verde Islands. *P. rupicola* (Stimps.), from New Zealand; Kirk, Tr. N. Z. Inst. xi. p. 396, with woodcut.

Porcellana transversilineata, sp. n., Lockington, *l. c.* p. 405, Gulf of California.

Polyonyx nitidus, sp. n., *id. ibid.* Lower California.

MACRURA.

Galateidæ.

Galatea strigosa (F.). Habits observed in the aquarium at Hamburg; Bolau, Zool. Gart. xix. p. 150.

Galatea bocagii, *pseudo-radiata*, *agniarii*, and *quanzæ*, spp. nn., Brito Capello, "Description de quelques espèces du genre *Galatea*," Lisbonne: 1878, with 4 pls. pp. 7, 8, 9, & 10, pls. iii. & iv., Quanza River, Angola. *G. cumingi* (Beck), several varieties; *id. l. c.* p. 13, pls. i. & ii.

Munida speciosa, sp. n., Martens, SB. nat. Fr. 1878, p. 133, Western Africa, 10° N. lat., 17° W. long., 150 fath.

Palinuridæ.

T. J. Parker describes the stridulating organ of *Palinurus vulgaris*, consisting of a ridged pad, a minutely hairy flap, and a guiding tubercle situated in the basicerite of the antenna and a lateral ridge on the antennulary sternum or clypeus. The stridulation and the friction of the antenna against the clypeus have been already observed by Leach, and the organ has been described by K. Möbius, Arch. f. Nat. 1867; but the author differs from the latter in ascribing the friction to the pad and not to the flap. P. Z. S. 1878, pp. 292 & 442–444, pl. xxx.

G. Pouchet states the existence of a "muscle vibrant" at the base of the large feelers in *Palinurus*. Assoc. Fr. vii. (Paris: 1878) p. 756.

Young specimens of *Palinurus*, probably *fasciatus* (Fabr.), from Amboina, only 25 mill. long, but resembling the adult in form; E. v. Martens, SB. nat. Fr. 1878, p 132.

Palinurus penicillatus (Olivier) = *ehrenbergi* (Heller), Red Sea; Miers, Ann. N. H. (5) ii. p. 410.

Palinurellus, g. n., distinct from *Palinurus* by the rostriform front

extremity of the cephalothorax covering the base of the antennæ and eye-stalks, the feeble antennæ, and the nearly smooth surface of the cephalothorax; therefore more resembling *Astacus* at first sight. *P. gundlachi*, sp. n., Cuba, Martens, SB. nat. Fr. 1878, p. 131.

Eryonidæ.

Willemoesia [Zool. Rec. xi. p. 207] *leptodactyla*, Atlantic in 21° N. lat. and in 35° S. lat., 1900 fath., and *crucifera*, Sombrero Island, West Indies, 450 fath.; genital opening of the male in the latter at the base of the fifth pair of feet, as usually, but in the former at that of the third; both species described and figured, and the relation to the fossil *Eryon* pointed out; Willemöes-Suhm, Tr. L. S. (2) i. pp. 50–56, pl. xii. fig. 10, & pl. xiii. The first of these species dredged near Juan Fernandez, 1375 fath.; C. S. Bate, Ann. N. H. (5) ii. p. 280, pl. xiii. figs. 4 & 5; male organs described, *id. l. c.* p. 486, woodcut.

C. S. Bate discusses the peculiarities of the genera *Polycheles* (Heller), *Pentacheles*, g. n. (*infrà*), and *Willemoesia* (Grote, 1873), and enumerates their species, giving geographical and bathymetrical distribution, ranging from 310 (near Patagonia, only 120) to 1900 fath. They probably burrow in the soft mud of the deep sea; Rep. Brit. Assoc. Dublin, 1878, pp. 561–564, and Ann. N. H. (5) ii. pp. 273–282.

Polycheles crucifer (Willemöes-Suhm, as *Willemoesia*), West Indies, 450 fath., *helleri*, sp. n., Kermadec Island, 520 fath., and *baccatus*, sp. n., Fiji Islands, 310–315, fath.; *id.* Ann. N. H. (5) ii. pp. 277 & 278, the first, pl. vi. fig. 8.

Pentacheles, g. n. All thoracic feet chelate; eyes in a notch of the carapace, projecting. *P. lævis*, sp. n., Philippine Islands, 500 fath., *suhmi*, sp. n., Patagonia, 120 fath., *gracilis*, sp. n., Fiji, 210–610 fath., *obscurus*, sp. n., New Guinea, 1070 fath., *auriculatus*, sp. n., Fiji, 610 fath., and *euthrix*, sp. n. (Willemöes-Suhm, MS.), New Hebrides, 315 fath.; *id. l. c.* pp. 276 & 278–280, the last pl. xiii. figs. 1–3.

A. M. Norman thinks that perhaps *Pentacheles* may perhaps be the other sex of *Polycheles*; Ann. N. H. (5) ii. pp. 382 & 383. Bate replies that he has examined males and females of all three genera; *tom. cit.* p. 484.

Astacidæ.

T. H. Huxley (P. Z. S. 1878, pp. 752–776) has examined the structure and position of the gills in the freshwater crayfishes. He distinguishes podobranchiæ placed on the coxopodite, arthrobranchiæ on the articular membrane uniting the coxopodites to the thorax, and pleurobranchiæ on the epimeron or side-wall of the thorax. A podobranchia is found on the second and third maxilliped and all the thoracic feet, except the last; one or two arthrobranchiæ (one anterior, the other posterior) on the same limbs; one generally on the second maxilliped; two on the third maxilliped and the first, second, third, and fourth thoracic foot. The posterior arthrobranchia of the fourth foot in *Paranephrops* and *Parastacus*, the

one (anterior) of the second maxilliped, and all those of the thoracic feet in *Astacoides*, are rudimentary; pleurobranchiæ are found only on the segments corresponding with the second, third, fourth, and fifth thoracic feet, they are entirely wanting in *Cambarus*, and are fully developed only in the segment corresponding to the fifth pair in the European crayfish *Astacus*, s. strict., and *Astacoides*. The first maxilliped never has a well-developed gill, but in all subgenera it has a rudimentary appendage (epipodite) analogous to a podobranchia. *Astacopsis*, *Cheraps*, and *Engæus* have therefore twenty-one well-developed functionary gills, *Paranephrops* and *Parastacus* twenty, *Astacus* s. str. eighteen, *Cambarus* seventeen, *Astacoides* only twelve. On account of these differences and others in the development of the gills themselves, Huxley establishes two groups of freshwater crayfishes:—

1. *Potamobiidæ*. Apices of the podobranchiæ separated into a branchial plume and a well-developed lamina; no well-developed pleurobranchia on the second, third, and fourth thoracic foot. First abdominal segment bearing appendages, invariably in the males, usually in both sexes; telson usually completely divided by a transverse suture. *Astacus* and *Cambarus*, both belonging to the Northern Hemisphere.

2. *Parastacidæ*. Podobranchiæ with only the rudiment of a lamina, some of their branchial filaments hooked, the epipodite of the first maxilliped bearing a certain number of branchial filaments; pleurobranchiæ of the second, third, and fourth thoracic foot present and well developed (except *Astacoides*). First abdominal segment without appendage in either sex. Telson never completely divided by a transvere suture. *Astacopsis*, *Cheraps*, *Engæus*, *Paranephrops*, *Parastacus*, and *Astacoides*, all belonging to the Southern Hemisphere.

He characterizes the 2 following new genera:—

Parastacus, g. n., p. 771: number of gills twenty, the same as in *Paranephrops*, in other respects like *Cheraps*; comprises the South American species *Astacus brasiliensis* and *pilimanus* (Martens).

Astacopsis, g. n., p. 764: number of gills twenty-one, the same as in the two other Australian genera *Cheraps* and *Engæus*, but in other respects resembling rather *Astacoides*. Typical species, *Astacus franklini*, Australia.

Homarus vulgaris, moult described by W. A. Lloyd, "Field," May 25th, 1878; abstract, Zool. 1878, p. 225.

[*Thaumastocheles* (Wood-Mason, 1874)]. *Astacus zaleucus* (Zool. Rec. xi. p. 208), fully described by Willemöes-Suhm, Tr. L. S. (2) i. pp. 48–50, pl. x. fig. 1. Eyes and eye-stalks entirely wanting; chelæ very unequally developed; eight spines at the squamiform appendage of the outer antennæ; genital opening of the male at the base of the third pair of feet. Sombrero Island, West Indies, 450 fath., red coloured.

Thalassinidæ.

Gebia hirtifrons (Dana) from New Zealand; Kirk, Tr. N. Z. Inst. xi. p. 401.

Gebia rugosa, sp. n., Lockington, Ann. N. H. (5) ii. p. 300, Gulf of California. Note on *G. pugetensis* (Dana); *id. l. c.* p. 299.

Callianidea typus (M. E.) found in the Gulf of California; *id. l. c.* p. 302.

Crangonidæ.

Crangon australis (Hutton, MS.), sp. n., Thomson, Tr. N. Z. Inst. xi. p. 231, pl. x. fig. A 1, New Zealand, near *C. spinosus* (Leach).

Stiracrangon allmanni (Kinahan) probably not distinct from *Crangon vulgaris* (F.); Kingsley, P. Ac. Philad. 1878, p. 89.

Cheraphilus (Kinahan) reunited with *Crangon*; id. Bull. Essex Inst. x. p. 55.

Cheraphilus ferox, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 339, Northern Sea, 62° N. lat. 48° E., 412 fath.

Hippolysmata intermedia, sp. n., Kingsley, P. Ac. Philad. 1878, p. 90, Florida. *Hippolyte cubensis* (Martens) also referred to *Hippolysmata*; id. *l. c.* p. 89.

Tozeuma carolinensis, sp. n., *id. l. c.* p. 90, North Carolina.

Nica edulis (Risso); changes of colour, *suprà*, General Subject, p. 10.

Pasiphæidæ.

Hymenodora, g. n.; body not compressed, membranaceous, cephalothorax dilated, eyes very small, rudimentary, &c.; for *Pasiphæa glacialis* (Buchholz). G. O. Sars, Arch. Math. Naturv. 1876, p. 341, Northern Sea, 63° & 64° N. lat., 3° E.–5° W. long., 525–1861 fath.

Atyidæ.

Atya punctata, sp. n., Kingsley, P. Ac. Philad. 1878, p. 91, Haiti.

Atyoida glabra, sp. n., *id. l. c.* p. 93, Nicaragua.

Caridina nilotica (Roux)?, from Mozambique; Hilgendorf, MB. Ak. Berl. 1878, p. 828.

Alpheidæ.

Alpheus. The thoracic feet bear an accessory appendage terminating in a hooklet, by which a cluster of bristles at the base of the following leg is grasped; Hilgendorf, SB. nat. Fr. 1878, p. 186, and MB. Ak. Berl. 1878, p. 829, pl. iv. fig. 2.

Alpheus pugilator, *rugimanus*, *bouvieri*, spp. nn., and *streptochirus* (Stimpson). A. Milne-Edwards, Bull. Soc. Philom. June, 1878, pp. 10–12, Cape Verde Islands.

Alpheus longicarinatus and *deuteropus*, spp. nn., Zanzibar, Hilgendorf, MB. Ak. Berl. 1878, pp. 833 & 834, pl. iv. figs. 3–10. Note on *A. edwardsi* (Sav.), from the Red Sea and Mozambique; *id. l. c.* p. 830.

Alpheus novæ-zealandiæ (Miers); Miers, Crust. New Zeal. p. 82, pl. ii. fig. 2.

Alpheus. The known North American species enumerated, and the

following described as new : *panamensis*, Panama, *sulcatus*, Panama and Peru, *floridanus*, Florida, *affinis*, *parvimanus*, and *cylindricus*, all from Panama, *transverso-dactylus* and *harfordi*, California ; J. S. Kingsley, Bull. U. S. Geol. Surv. iv. pp. 189–199.

W. N. Lockington, Ann. N. H. (5) i. pp. 465–480, gives a synoptical table for distinguishing the North American species, with descriptions of several of them ; 15 belong to the Pacific coast, 2 to the Atlantic, 1, *heterocheles* (Say), is according to him, common to both coasts. *A. tenuimanus*, *lævisculus*, *spinicaudus*, and *fasciatus*, spp. nn., Gulf of California, *barbara*, sp. n., Santa Barbara, *clamator*, *bellimanus*, and *æquidactylus*, spp. nn., *id.* P. Cal. Ac. vii. [1876], pp. 35–43, California.

Alpheus minus [*-or*] (Say), recorded from S.W. Colorado ; Ingersoll, Rep. U. S. Geol. Surv. 1874, p. 388, and S. J. Smith, P. Ac. Philad. 1878, p. 329.

Alpheus heterocheles (Say) = *armillatus* (M. E.) = *lutarius* (Saussure), ranges from North Carolina to Brazil, and is also found on the West coast of Nicaragua ; Kingsley, P. Ac. Philad. 1878, p. 329.

Alpheus affinis, sp. n., *id.* Bull. U. S. Geol. Surv. iv. p. 195, Panama. This name, being pre-occupied, is changed into *normani* ; id. P. Ac. Philad. 1878, p. 93.

Betæus æquimanus and *longidactylus*, spp. nn., Lockington, P. Cal. Ac. vii. [1876], pp. 35–43, California. The former commensal under the mantle of *Haliotis rufescens* ; id. Ann. N. H. (5) i. p. 467.

Palæmonidæ.

J. S. Kingsley distinguishes the subfamilies *Pontoninæ* and *Palæmoninæ* as follows :—

Pontoninæ : second pair of thoracic feet larger than the first, carpus never annulate, mandible without palpus : *Pontonia*, *Coralliocaris*, *Harpilius*, *Eurycrhynchus*, *Anchistia*, *Palæmonetes*, *Urocaris*, *Typton*.

Palæmoninæ : mandible with palpus ; the other characters the same : *Leander*, *Palæmon*, *Hymenocera*, and *Cryphiops*.

Hippolyte restrictus [*-a*], sp. n., A. Milne-Edwards, Bull. Soc. Philom. 1878, p. 12, Cape Verde Islands.

Hippolyte payeri, sp. n., Heller, Denk. Ak. Wien, xxxv. p. 26, pl. i. figs. 1–4, Arctic Sea, 182 metres. Placed in *Bythocaris* ; G. O. Sars, Arch. Math. Naturv. 1876, p. 340.

Virbius mossambicus, sp. n., Hilgendorf, MB. Ak. Berl. 1878, p. 836, pl. iv. fig. 1, Zambezi River.

Virbius bifidirostris (Miers) ; Miers, Crust. New Zeal. p. 81, pl. ii. fig. 1.

Bellidia (Gosse, 1877, Zool. Rec. xiv. *Crust.* p. 21) = *Hippolyte prideauxi* (Leach) ; C. S. Bate, Ann. N. H. (5) ii. pp. 135 & 136, woodcut.

Bythocaris, see *Hippolyte*.

Pandalus franciscorum, sp. n., Kingsley, P. Ac. Philad. 1878, p. 94, San Francisco.

Pontonia domestica (Gibbes, 1851) ; *id. l. c.* p. 95.

Conchodytes tridacnæ (Peters, 1851) = *Pontonia tridacnæ* (Dana, 1852), distinguished from *Pontonia* by the short external flagellum of the antennæ; Hilgendorf, MB. Ak. Berl. 1878, p. 835.

Anchistia americana, sp. n., Kingsley, *l. c.* p. 96, Key West, Florida.

Palæmonetes paludosus (Gibbes, 1851, as *Hippolyte*) = *exilipes* (Stimps.), *id. l. c.* p. 97, fresh water of South Carolina.

Palæmon (Fabr., Stimps.) = *Macrobrachium* (Bate), occurs both in salt and fresh water; list of North American species. *Id.* Bull. Essex Inst. x. pp. 66–68.

Palæmon lepi[*do*]*dactylus*, *mossambicus*, *dolichodactylus*, and *petersi*, spp. nn., Hilgendorf, MB. Ak. Berl. 1878, pp. 837–841, pl. iv. figs. 14–19, the first, third, and fourth from Tette, in the interior of Mozambique, the second from Quillimane, on the coast.

Palæmon (*Leander*) *concinnus* (Dana) ?, from Mozambique; *id. l. c.* p. 842.

Palæmon (*Leander*) *fluviatilis* (Hutton, MS.), sp. n., Thomson, Tr. N. Z. Inst. xi. p. 231, pl. x. fig. A 2, Waikato and Taieri Rivers, New Zealand.

Thor, g. n. Antennal spine; rostrum short, toothed above; antennulæ biflagellate, outer branch very stout. Mandibles without palpi, bifurcate, apical process narrow, proximal process with one acute and one obtuse tooth, and a pubescence of minute curved hooks. Feet of the first pair short, stout; of the second elongate, slender; carpus five-annulate. *T. floridanus*, sp. n., Kingsley, P. Ac. Philad. 1878, p. 95, Key West, Florida. A special sub-family, *Thorinæ*, proposed for it; *id.* Bull. Essex Inst. x. p. 64.

Peneidæ.

[*Peneus*] *Penæus*. The species in the collection of the British Museum enumerated and discussed. *P. hardwickii*, Indian Seas ?, *dobsoni*, Mangalore, spp. nn., described and figured, a synoptic table of the 25 known species given; Miers, P. Z. S. 1878, pp. 298–310, pl. xvii. figs. 1–3.

Peneus caramote (Desm.). Larvæ found in the central cavity of *Pyrosoma elegans* (Leseur) and described; P. Mayer, MT. zool. Stat. Neap i. pp. 49 & 50.

Peneus semisulcatus (Haan) var. *exsulcatus* = ? *monodon* (Fabr.), Quillimane, Hilgendorf, MB. Ak. Berl. 1878, p. 843.

Peneus brevirostris, sp. n., Kingsley, P. Ac. Philad. 1878, p. 98, Nicaragua.

Mangalura, g. n., proposed for *Peneus dobsoni* [see above], on the supposition that the rudimentary condition of the fifth pair of legs exists in both sexes, but further researches prove that these legs are rudimentary only in the female and fully developed in the male. Miers, *l. c.* p. 303.

Aristeus edwardsianus, Johnson (as *Peneus*), described and the generic difference between *Aristeus* (Duvernoy, 1841), and *Xiphopeneus* (Smith), pointed out; J. Miers, *l. c.* pp. 308 & 309, pl. xvii. fig. 3.

Funchalia woodwardi (Johnson, 1867). Note on its mandibles; *id. l. c.* p. 309.

Sicyonia furcata, Miers, *l. c.* p. 310, pl. xvii. fig. 4, Sulu Islands; *S. dorsalis*, Kingsley, P. Ac. Philad. 1878, p. 97, Florida: spp. nn.

Spongicola venusta (Haan) living within *Euplectella aspergillum*; Miers, J. L. S. xiii. p. 507, pl. xxiv. figs. 1 & 2.

Hoplophorus (M. E.). *Xiphocaris* (Martens) united with this genus; Kingsley, Bull. Essex Inst. x. p. 68.

Sergestidæ.

Sergia remipes (Stimps., 1860), described; Streets, Bull. U. S. Nat. Mus. No. 7, pp. 120 & 121, North Pacific Ocean.

SCHIZOPODA.

Willemöes-Suhm proposes the following arrangement of the families:

9 abdominal segments	8 legs . . .	Fam. 1.	*Nebaliidæ*.
7 abdominal segments	6 „ . . .	„ 2.	*Mysidæ*.
	8 „ . . .	„ 3.	*Euphausiidæ*.
	4 „ . . .	„ 4.	*Chalaraspidæ*.
	7 „ . . .	„ 5.	*Lophogastridæ*.

He adds a new deep-sea genus to both the *Mysidæ* and *Lophogastridæ*, distinct by the free dorsal shield, but there are also deep-sea Schizopods with fastened shield, as *Euphausia*. Tr. L. S. (2) i. [1875] pp. 44 & 45.

Nebalia longipes, sp. n., distinguished from the species hitherto known by the form of its legs more approaching the Schizopods than the Phyllopods; found in Harrison Sound, Bermudas. *Id. l. c.* pp. 26–28, pl. vi. ♂ & ♀ described.

Erythrops glacialis, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 342, Northern Sea, 64° N. lat. 5° E. long., 498 fath.

Parerythrops abyssicola and *spectabilis*, spp. nn., *id. l. c.* p. 343, Northern Sea, 61° and 63° N. lat. 4° E. long., 200–400 fath.

Petalophthalmus [Zool. Rec. xii. p. 225]. Carapace not connected with the five posterior segments of the pereion (thorax); breeding lamellæ on the seven pectoral appendages; legs simple, terminated by a claw; no branchiæ; no eyes, eye-stalks with spherical termination. Male with rudimentary carapace; the first antennæ, the mandibular palpus, and the first gnathopod transformed into prehensile organs. *P. armiger*, Mid-Atlantic, from 2° N. lat., 2500 fath., to Tristan d'Acunha, 100 fath., Willemöes-Suhm, *l. c.* pp. 40–44, pl. vii.

Chiromysis harpax, sp. n., Hilgendorf, MB. Ak. Berl. 1878, p. 845, pl. iv. figs. 11 & 12, Ibo, S.E. Africa.

Euphausia simplex, sp. n., distinct from all known species by the want of accessory eyes; very long olfactory hairs on the enlarged first antennæ. South Atlantic, 35° S. lat., 1900 fath., 84 mm. long. Willemöes-Suhm, *l. c.* p. 45.

Euphausia gibbosa, sp. n., Streets, Bull. U. S. Nat. Mus. No. 7, 1877, p. 122, North Pacific, 30° N. lat.

Cyrtopia rostrata (Dana). Specimens without the slightest evidence of gills; *id. l. c.* p. 123, Pacific, 3° N. lat.

Gnathophausia [Zool. Rec. xi. p. 210] fully described; distinct from *Lophogaster* (Sars) by the carapace being in no connection with the five posterior segments of the pereion (thorax), a palpus on the first maxilla, accessory eyes on the second maxilla, all the gnathopods and pereipods (maxillipeds and thoracic feet) leg-like, the latter showing subjoints on their penultimate joint. *G. gigas*, 142 mm. long, Atlantic between Bermudas and Azores, 2200 fath.; *zoea*, Atlantic from the Azores to Rio S. Francisco, Brazil, at various places, 750–1650 fath.; *gracilis*, sp. n., Atlantic 1° N. lat., 1500 fath., Willemöes-Suhm, *l. c.* pp. 28–37, pl. ix. & pl. x. figs. 2–4.

Chalaraspis, g. n., establishing a new family *Chalaraspi*[*di*]*dæ* agreeing with the *Lophogastridæ* in the position and shape of the branchiæ, the breeding lamellæ, and the pleopods (abdominal feet), but distinct by only four leg-like appendages and four maxillipeds. *C. unguiculata*, sp. n., the commonest deep-sea Schizopod in the mid-Atlantic down to 35° S. lat., 350–2500 fath., bright red, 35 mill. long. Willemöes-Suhm, *l. c.* pp. 37–40, pl. viii.

STOMAPODA.

Squilla monodactyla, sp. n., Milne-Edwards, 'Bull. Soc. Philom. June 1878, p. 13, Cape Verde Islands.

Squilla indefensa, sp. n., Kirk. Tr. N. Z. Inst. xi. p. 394, with woodcut; Ann. N. H. (5) ii. p. 466.

Squilla armata (M.-Edw.) var. from New Zealand; *id. l. c.* p. 401.

CUMACEA.

Diastylis spinulosa, sp. n., Heller. Denk. Ak. Wien, xxxv. p. 28, pl. i. fig. 5, Arctic Sea.

Diastylis bimarginatus[*-ta*], sp. n., C. S. Bate, Ann. N. H. (5) i. pp. 409 & 410, with woodcut, Coast of Aberdeen. This = *D. spinosa* (Norman, 1868); Norman, *op. cit.* ii. p. 383, footnote. Redescribed more accurately and considered specifically distinct; G. Sim, *tom. cit.* pp. 453–455, pl. xviii. figs. 3–5.

AMPHIPODA.

F. Leydig discusses the structure of the antennæ and their appendages (of which the feather-like bristles are supposed to be sensitive organs), the eyes, the intestine, &c., in *Gammarus*; Z. wiss. Zool. xxx. suppl. pp. 225–243, pls. ix. & x. figs. 11–13.

Amphipods in sponges; a large number enumerated by H. J. Carter, Ann. N. H. (5) ii. p. 157; and T. R. Stebbing, *tom. cit.* pp. 427 & 428.

Orchestiidæ.

Talitrus locusta (L.) fully described from Baltic specimens by Zaddach, Schr. Ges. Königsb. 1878, pp. 21–26, with woodcuts.

Talitrus novæ-zealandiæ (Dana) = *Talorchestia quoyana* (M.-Edw.) ♀; Thomson, Tr. N. Z. Inst. xi. p. 235.

Nicea novæ-zealandiæ, *fimbriata*, and *rubra*, spp. nn., Thomson. *l. c.* pp. 235 & 236, pl. x. fig. B 1–3, New Zealand.

Gammaridæ.

Lysianassa krøyeri (Bate) from New Zealand, described; Thomson, *l. c.* p. 237.

Aristias tumidus (Kröyer); Heller, Denk. Ak. Wien, xxxv. p. 30, pl. ii. figs. 1–7, Arctic Sea.

Anonyx lagena (Kröyer); *id. l. c.* p. 29, pl. i. figs. 6–15, Arctic Sea.

Anonyx gulosus (Kröyer ?); Miers, in Nares's Narrative, &c., ii. p. 244, pl. ii. fig. 2, Discovery Bay, Arctic America.

Onesimus edwardsi (Kröyer); *id. l. c.* p. 245, pl. ii. fig. 3, Discovery Bay and Floeberg Beach, 81°–82° N. lat.

Onesimus litoralis (Kröyer); Heller, *l. c.* p. 31, pl. ii. figs. 8–15, Arctic Sea.

Pterygocera (Latr., 1825, = *Sulcator*, Bate, 1854) *arenaria* (Slabber, 1778), found near Falsterbo and Sandhammaren in the South Baltic, and fully described by C. Bovallius; he establishes for it a distinct subfamily, *Pterygocerinæ*, distinguished from the *Pontoporinæ* and *Phoxinæ* by the body being not much compressed, by the unguiculate dactylus of the first pair of gnathopods and the double very small dactylus of the second pair, also by the spoon-shaped last articles of the first and second pairs of pereiopods, by the second joint of the mandibular palpi being larger and longer than the third; and by the telson not being bifid, but simple and only incised. Sv. Ak. Handl. Bihang, iv. No. 8, 27 pp. 4 pls.

Amphilochus sabrinæ, sp. n., Tenby, with descriptive and critical note on *A. concinna* (Stebbing) and *manudens* (Bate), Stebbing, Ann. N. H. (5) ii. pp. 364–367, pl. xv. figs. 1 & 2.

Lilljeborgia æquicornis, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 355, Northern Sea, 63° N. lat., 4° E. long., 417 fath.

Pleustes euacanthus, sp. n., *id. l. c.* p. 357, Northern Sea, 62° N. lat., 1° E. long., 412 fath.

Dexamine pacifica, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 238, pl. x. fig. B 4, New Zealand.

Atylus dania, sp. n., *id. l. c.* p. 238, pl. x. fig. C 1, New Zealand (named after Prof. Dana; rectius *danæ*).

Pherusa novæ-zealandiæ, sp. n., *id. l. c.* p. 239, pl. x. fig. C 2, New Zealand.

Halirages quadridentatus, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 357, Northern Sea, 63° N. lat., 3° E. long., 525 fath.

Calliope læviuscula (Kröyer) = *Amphithoe rathkii* (Zaddach) = *A.*

norvegica (Rathke), described from Baltic specimens; Zaddach, Schr. Ges. Königsb. 1878, pp. 36–39, with woodcut.

Calliope didactyla and *fluviatilis*, spp. nn., Thomson, *l. c.* p. 240, pl. x. figs. c 3 & 4, New Zealand, the former among kelp on the beach, the latter in freshwater round Dunedin.

Amphithopsis pulchella, sp. n., Sars, *l. c.* p. 358, Northern Sea, 64° N. lat., 10° W. long., 300 fath.

Cleippides quadricuspis, sp. n., Heller, Denk. Ak. Wien, xxxv. p. 32, pl. iii. figs. 1–16, Arctic Sea.

Gammarus pulex (L.), *roeseli* (Gervais), and *puteanus* (Koch). On their differences and distribution in Southern and Western Germany, with account of old and recent figures of them; F. Leydig, Z. wiss. Zool. xxx. suppl. pp. 244–251.

Gammarus locusta (Fabr.) described from Baltic specimens, and differences of the young state pointed out; Zaddach, Schr. Ges. Königsb. 1878, pp. 27–32, with woodcut.

Gammarus barbimanus, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 241, pl. x. fig. D 1, New Zealand.

Mœra tenella, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 359, Northern Sea.

Paramœra tenuicornis (Dana, as *Melita*), Miers, Cat. Crust. N. Zeal. p. 127. Must be replaced in *Melita*; Thomson, *l. c.* p. 241, pl. x. fig. C 5, New Zealand.

Melita palmata (Leach) described from Baltic specimens; Zaddach, *l. c.* pp. 32–35, with woodcut.

Amathillopsis spiniger, g. & sp. nn., Heller, Denk. Ak. Wien, xxxv. p. 35, pl. iii. figs. 17–22, pl. iv. figs. 1–8 (fully described, but generic characters not pointed out), Arctic Sea.

Stimpsonia chelifera (Bate), from Torbay, fully described and resemblance of the female to those of *Aora gracilis* and *Microdeutopus anomalus* pointed out; Stebbing, Ann. N. H. (5) i. pp. 31 & 35, pl. v. figs. 2–3.

Microdeutopus (Costa) may be united with *Aora* (Kröyer), *Autonoe* (Bruzelius), and *Stimpsonia* (Bate); Stebbing, *l. c.* p. 369.

Gammaropsis (Lilljeborg) = *Eurystheus* (Bate); *id. l. c.* p. 369.

Podoceropsis (A. Boeck) = *Nænia* (Bate), may also be united with the preceding; *id. l. c.* p. 369.

Podoceropsis intermedia, sp. n., Stebbing, *l. c.* p. 367, pl. xv. fig. 3, no locality indicated, but probably from Tenby.

Callimerus [Zool. Rec. xiii. *Crust.* p. 13]; generic characters stated by Stebbing, *op. cit.* i. p. 36. It is not sufficiently distinct from *Amphilochus*; id. *op. cit.* ii. p. 367.

Corophiidæ.

Clydonia longipes (Dana); complete specimen described by Streets, Bull. U. S. Nat. Mus. 1877, No. 7, p. 124, North Pacific.

Glauconome plumipes (Norman, as *Unciola*), ? doubtful specimens,

62°-63° N. lat., 412–417 fath., described; G. O. Sars, Arch. Math. Naturv. 1876, p. 360.

Dryope (Bate) is scarcely distinct from *Unciola* (Say), the secondary branch of the antennæ being present in *D. crenato-palmata*; Stebbing, Ann. N. H. (5) ii. p. 369.

Dulichiidæ.

Dulichia hirticornis, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 361, Northern Sea, 62° N. lat., 1° E. long., 412 fath.

Hyperiidæ.

Hyperia tricuspidata, sp. n., Streets, Bull. U. S. Nat. Mus. No. 7, 1877, p. 125, North Pacific.

Lestrigonus spinidorsalis, sp. n., C. S. Bate, Ann. N. H. (5) i. p. 411, Aberdeen. Is the male of *Hyperia*; Norman, *op. cit.* ii. p. 383, footnote: this acknowledged by Bate, *l. c.* pp. 487–489.

Cystisoma neptuni (Guérin, 1842) = *Thaumops pellucida* (Willemöes-Suhm, 1873). Maxillæ and maxillipeds described, and sexual difference pointed out; it may establish a new family, *Cystisom*[*at*]*idæ*. Willemöes-Suhm, Tr. L. S. (2) i. pp. 24 & 25, pl. xi. figs. 4–8.

Themisto antarctica (Dana), described from New Zealand specimens; the young, contained in the incubatory pouch of the female, have the gnathopoda not fully developed, but the pleopoda as in the adult, and approach *Hyperia* in general appearance. Thomson, Tr. N. Z. Inst. xi. pp. 242–244.

Phronimidæ.

Peculiar glands of unknown function in the sixth and seventh pair of thoracic appendages of this family described; P. Mayer, MT. zool. Stat. Neap. i. p. 40.

Phronima sedentaria (Forsk.) and *Phronimella elongata* (Claus, 1862) observed at Naples, with notes on their envelopes, those of the latter not showing the microscopical structure of the *Tunicata*; id. *l. c.* pp. 40–48, pl. i.

Phronima observed to enter into a living *Abyla* or *Salpa*, devour the polyp or nucleus, and use the empty envelope as a house for itself; *id. l. c.* p. 46.

Phronima pacifica, sp. n., Streets, Bull. U. S. Nat. Mus. No. 7, 1877, p. 128, Pacific, 4° and 21° N. lat.

Anchylonyx, g. n., very near *Phronima*; both pairs of antennæ present, long; gnathopods not subchelate, nor very reduced in size; chelæ of the third pair of thoracic feet less developed. *A. hamatus*, sp. n., Pacific, 34° N. lat. *Id. l. c.* pp. 130 & 131.

Typhidæ.

Platyscelus batei, sp. n., Streets, *l. c.* p. 133, Pacific, 21° N. lat.

Platyscelus intermedius, sp. n., Thomson, Tr. N. Z. Inst. xi. pp. 244 & 245, pl. x. fig. D 4, New Zealand.

Amphipronoe serrulata, sp. n., Streets, *l. c.* p. 134, Pacific, 21° N. lat.

Oxycephalidæ.

H. Streets characterizes this family, which is distinct from the *Phronimidæ* by the mandibular palpus being present in the male. P. Ac. Philad. 1878, p. 277.

Oxycephalus tuberculatus (S. Bate), *bulbosus*, and *scleroticus*, spp. nn., Streets, P. Ac. Philad. 1878, pp. 278–282, pl. ii. figs. 1–3, Pacific. The former also in Bull. U. S. Nat. Mus. No. 7, p. 136.

Leptocotis, g. n., intermediate between *Oxycephalus* and *Rhabdosoma* Body long and slender; superior antennæ curved in the male, straight in the female; the sixth abdominal segment (the fifth and sixth fused) elongated; the caudal appendages long, linear. *L. spinifera*, sp. n., Streets, Bull. U. S. Nat. Mus. No. 7, p. 137, and P. Ac. Philad. 1878, p. 283, pl. ii. fig. 6, Pacific.

Calamo[r]rhynchus, g. n., near *Rhabdosoma*. Body elongate, slender, head large, depressed, produced anteriorly to the eyes in a broadly expanded triangular rostrum; the sixth segment of the abdomen long and narrow; caudal appendages long and linear, telson short, triangular. *C. pellucidus*, sp. n., *id.* P. Ac. Philad. 1878, p. 285, pl. ii. fig. 5.

Rhabdosoma whitii (Bate) and *armatum* (M. E., Adams & White), from the Pacific, described; *id.* P. Ac. Philad. 1878, pp. 286–290, pl. ii. figs. 6 & 7.

Caprellidæ.

Caprella. A. Gamroth gives a full description of the external parts and anatomy of a species which lives in numbers on *Bugula neritina*, in the port of Trieste, probably *C. æquilibra* (Bate), and adds also some notes on its development. The young animal, just hatched from the egg, has the full number of extremities, but their shape and the number of the joints of the feelers is somewhat different from those in the adult. Z. wiss. Zool. xxxi. pp. 101–126, pls. viii.–x.

Caprella horrida, sp. n., = *spinosissima* (Norman, *nec* Stimpson); G. O. Sars. Arch. Math. Naturv. 1876, p. 362, Northern Sea, 62° N. lat., 1° E. long., 412 fath.

Caprella fretensis, sp. n., Stebbing, Ann. N. H. (5) i. p. 31, Salcombe. The author (p. 33) calls attention to the position of the pair of spines at the palm of the hinder legs, which is correlated to other generic characters in this family.

Caprella caudata, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 246, pl. x. fig. D 5, New Zealand.

Caprella novæ-zealandiæ, sp. n., Kirk, Tr. N. Z. Inst. xi. p. 393, also Ann. N. H. (5) ii. p. 465, New Zealand.

Caprellina, g. n., intermediate between *Cercops* and *Caprella*. Branchiæ attached to the second pair of gnathopoda; first two pairs of pereio-

poda represented by branchiæ, third pair feebly developed, two posterior pairs well developed, equal. First and second pairs of pleopoda rudimentary in the male, the rest obsolete. *C. novæ-zealandiæ*, sp. n., New Zealand. Thomson, *l. c.* p. 247, pl. x. fig. D 6.

ISOPODA.

TANAIDÆ.

Tanais islandicus, Reikiavik, Iceland, and *veringi*, Northern Sea, 63° N. lat. 4° E. long., 417 fath., spp. nn., G. O. Sars, Arch. Math. Naturv. 1876, pp. 346 & 347.

Paratanais algicola, *limicola*, and *cæca*, spp. nn., Harger, Am. J. Sc. (3) xv. pp. 377–379, New England.

Apseudes cæca, sp. n., Willemöes-Suhm, Tr. L. S. (2) i. pp. 23 & 24, pl. xii. figs. 1–9, Azores, 1000 fath.

ANTHURIDÆ.

Paranthura arctica, sp. n., Heller, Denk. Ak. Wien, xxxv. p. 38, pl. iv. figs. 9–12, Arctic Sea.

Ptilanthura, g. n. Flagellum of antennulæ multi-articulate, with dense whorls of fine slender hairs, interrupted on the inner side. Eyes distinct. Pleon imperfectly segmented, elongate. Maxillipeds two-jointed. *P. tenuis*, sp. n., Noauk Harbour, Connecticut, and Casco Bay, Maine. Harger, Am. J. Sc. (3) xv. p. 377.

PRANIZIDÆ.

Anceus stygius and *hirsutus*, spp. nn., G. O. Sars, Arch. Math. Naturv. 1876, pp. 348 & 349, Northern Sea, 63–65° N. lat., 4° E.–7° W. long., 400–1200 fath.

IDOTEIDÆ.

Idotea sabini (Kröyer) var., Sars, *l. c.* p. 350, Northern Sea.

Idotea elongata (Miers); Miers, Crust. New Zeal. p. 93, pl. ii. fig. 3. *I. affinis* (Miers); note by Thomson, Tr. N. Z. Inst. xi. p. 232. Both from New Zealand.

Idotea lacustris, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 251. Tomahawk Lagoon, near Dunedin, New Zealand, feeding on the ova of *Galaxias*.

Chiridotea, g. n. First three pairs of legs terminated by prehensile hands, in each of which the carpus is short and triangular, the propodus robust, and the dactylus capable of complete flexion. Antennæ with an articulate flagellum. Head dilated laterally. Operculum vaulted, with two apical plates. Type, *Idotea cæca* (Say), also *I. entomon* (L.), *sabini* (Kröyer), and *tuftsi* (Stimps.). Harger, Am. J. Sc. (3) xv. p. 374.

Synidotea, g. n. Antennæ with an articulated flagellum. Epimeral sutures not evident above. Pleon apparently composed of two segments,

united above, but separated at the sides by short incisions. Operculum with a single apical plate. Palpus of maxillipeds three-jointed. Type, *Idotea nodulosa* (Kröyer). Harger, *l. c.* p. 374.

Arcturus baffini, var. n. *feildeni*; Miers, in Nares's Narrative, &c., ii. p. 243, pl. ii. fig. 1, Floeberg Beach, 82° 27′ N. lat.

Arcturus linearis, new name for *gracilis* (Stebbing, Tr. Devon Ass. 1874); Stebbing, Ann. N. H. (5) i. p. 36.

Arcturus hystrix, sp. n., Sars, Arch. Math. Naturv. 1876, p. 350, Northern Sea, 62° N. lat., 1° E. long., 412 fath.

Leachia granulata, sp. n., *id. l. c.* p. 351, Northern Sea, same locality.

Astacilla (= *Leachia*, Johnst.) *americana*, sp. n., Harger, *l. c.* p. 374, St. George's Bank, New England, on *Primnoa*.

Munnopsidæ.

Eurycope gigantea, sp. n., Sars, *l. c.* p. 353, size 33 mill., Northern Sea, 63° N. lat., 3° E. long., 525 fath.

Eurycope robusta, sp. n., Harger, *l. c.*, p. 375, Gulf of St. Lawrence, 220 fath.

Asellidæ.

Asellus aquaticus (L.). Leydig gives anatomical and histological notes on the antennæ, eyes, skin, and respiratory organs; Z. wiss. Zool. xxx. suppl. pp. 251–265, pls. x.–xii. (partly). Rabl. Rückhard opposes the view that the fine featherlike bristles on the antennæ are sensitive; SB. nat. Fr. 1878, pp. 148 & 149.

Asellus cavaticus (Schiödte): differences from *aquaticus* (L.); Leydig, Z. wiss. Zool. xxx. suppl. p. 268.

Nannoniscus bicuspis, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 352, Northern Sea, 63–65° N. lat., 3° E.–7° W. long., 500–1100 fath.

Oniscidæ.

F. Leydig describes the structure of the antennæ and eyes, the sculpture of the skin the respiratory organs and their opercular plates, in the terrestrial *Isopoda* of Germany; Z. wiss. Zool. xxx. suppl. pp. 251–265, pl. x. figs. 14–25, & pls. xi. & xii. He also gives several interesting notes on the differences and habits of the known species occurring in Southern Germany, chiefly *Ligidium persooni* (Brandt), 3 species of *Itea*, *Oniscus murarius* (Cuv.), *Porcellio armadilloides* (Lereb.), *scaber* and *pictus* (Brandt); *l. c.* pp. 265–271.

Ligia quadrata (Hutton, MS.), sp. n., Thomson, Tr N. Z. Inst. xi. p. 232, pl. x. fig. A 4, Dunedin, New Zealand.

Oniscus punctatus, sp. n., *id. l. c.* p. 232, pl. x. fig. A 3, Dunedin, New Zealand.

Actoniscus, g. n. Eyes small; antennæ geniculate at the third and fifth segments; flagellum four-jointed; terminal segment of maxillipeds lamelliform; legs all alike; pleon of six distinct segments; basal segments of *Uropoda* dilated and simulating the coxæ of the preceding seg-

ments ; rami both styliform. *A. ellipticus*, sp. n., New Haven, Connecticut. Harger, Am. J. Sc. (3) xv. p. 373.

Porcellio reaumuri (Audouin), from Baku; Hartmann, in O. Schneider's Naturwiss. Beiträge zur Kenntniss der Kaukasus-länder, p. 35.

Porcellio graniger and *zealandicus* (Miers); Miers, Crust. New Zeal. pp. 99 & 100, pl. ii. figs. 6 & 7, New Zealand.

Armadillo inconspicuus (Miers); *id. l. c.* p. 95, pl. ii. fig. 4, New Zealand.

Cubaris rugulosus (Miers); *id. l. c.* p. 96, pl. ii. fig. 5, New Zealand.

Scyphax intermedius (Miers); *id. l. c.* p. 102, pl. ii. fig. 8, New Zealand.

Actœcia aucklandica, sp. n., Auckland Islands, and *A. euchroa* (Dana), Thomson, Tr. N. Z. Inst. xi. pp. 249 & 250.

Sphæromatidæ.

Sphæroma tuberculato-crinita [*-tum*], sp. n., Hilgendorf, MB. Ak. Berl. 1878, p. 846, pl. iv. fig. 13, Mozambique.

Isocladus spiniger (Dana, as *Sphæroma*); Miers, Crust. New Zeal. p. 113, pl. iii. fig. 6, New Zealand.

Cycloidura, name proposed for *Cyclura* (J. L. S. xii.), which is preoccupied; Stebbing, Ann. N. H. (5) i. p. 36.

Cymodocea granulata and *convexa* (Miers); Miers, *l. c.* p. 114, pl. iii. figs. 5 & 6.

Dynamena huttoni, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 234, pl. x. fig. A 6, New Zealand.

Nesea cuniculata, sp. n., *id. l. c.* p. 234, pl. x. fig. A 7, New Zealand.

Amphoroidea falcifer (Hutton, MS.), sp. n., *id. l. c.* p. 233, pl. vi. fig. A 5, New Zealand. Perhaps = *australiensis* (Dana).

Serolidæ.

Serolis latifrons (Miers); Miers, Crust. New Zeal. p. 117, pl. iii. fig. 7.

Cymothoidæ.

On their development and the sexual difference in relation to age, see General Subject, *suprà*, p. 9.

Cirolana multidigitata (Dana, as *Æga*) = *Æga hirta* (White), living in *Meyerina claviformis* (Gray) and in other sponges from the Philippines; Miers, J. L. S. xiii. p. 511, pl. xxiv. figs. 6–11.

Cirolana rossi (Miers); Miers, Crust. New Zeal. p. 109, pl. iii. fig. 3, New Zealand.

Æga spongiophila (Semper, 1867) living within *Euplectella aspergillum*; Miers, J. L. S. xiii. p. 500, pl. xxiv. figs. 3–5.

Nerocila rhabdota, sp. n., Senegal, on *Psettus sebæ*, and *N. dolichostylis*, sp. n., Amoy, Koelbel, SB. Ak. Wien, lxxviii. Abth. i. pp. 9 & 11, pl. ii. figs. 2 & 3.

Emphylia, g. n. Near *Nerocila*, but with the basal joints of the inner antennæ touching each other; first two abdominal segments provided

with spiniform epimera. *E. ctenophora*, sp. n., *id. l. c.* pp. 13–15, pl. ii. fig. 4, Akyab, East Indies.

Anilocra allocerca, sp. n., *id. l. c.* p. 7, pl. ii. fig. 1, Sumatra.

Livoneca pterygota, Amboina, and *sinuata*, Sicily, on *Cepola rubescens*, spp. nn., *id. l. c.* pp. 5 & 6, pl. i. figs. 4 & 5.

Livoneca novæ-zealandica (Miers); Miers, Crust. New Zeal. p. 106, pl. iii. fig. 2, New Zealand.

Ceratothoa oxyrrhynchæna, Japan, and *steindachneri*, Lisbon, on *Pagrus vulgaris*, spp. nn., Koelbel, *l. c.* pp. 1 & 3, pl. i. figs. 1 & 2; *C. trigonocephala* (Leach), p. 2, fig. 3.

Ceratothoa trigonocephala (M. Edw.), from New Zealand, described; Thomson, Tr. N. Z. Inst. xi. p. 233.

Ceratothoa lineata (Miers); Miers, Crust. New Zeal. p. 105, pl. iii. fig. 1.

Ægathoa loliginea, sp. n., Harger, Am. J. Sc. (3) xv. p. 276, New Haven, Connecticut, on the mouth of a Squid.

Bopyridæ.

General remarks on the biology and development of the known genera, and list of the authors; P. Fraisse, Arb. Inst. Würzb. iv. pp. 404–437.

Entoniscus cavolinii, sp. n. (known to Cavolini in 1787), in the visceral cavity of *Grapsus marmoratus* (F.) and *Carcinus mænas* (L.), Naples. The first larval stage is provided with two pairs of antennæ (the posterior very long), six pairs of thoracic feet (the first prehensile), and five pairs of natatory abdominal feet; second larval stage unknown; adult animal wormlike, segmentation obsolete, four pairs of branchial appendages at the hinder half of the body, cavity of the head, trunk, and peculiar lateral lobes filled with eggs. Fraisse, *l. c.* pp. 382–403, pls. xx. & xxi.

Cryptoniscus (Buchholz). A monograph, with historical, anatomical, and morphological observations. The male is always free, and represents the typical form; the female fixes itself in all species but one on Cirripeds, chiefly *Peltogastridæ*, and becomes entirely deformed; copulation has been observed. In the second larval stage, the first two pairs are very short, prehensile, and the sixth and seventh are different from the preceding; abdominal feet two-branched; the rectum has a bottle-shaped, dark, pigmented dilatation, which exhales a penetrating smell. Eleven species are distinguished and described, including as new:—*C. paguri*, Mahon, on *Peltogaster rodriguezi*, *C. macrophthalmus*, Naples, on *P. curvatus* (Kossm.), and *C. curvatus*, Naples, on *Sacculina neglecta*. Fraisse, *l. c.* pp. 239–296, pls. xii.–xv.

PHYLLOPODA.

Branchipodidæ.

Branchipus found in a fossil state in the Eocene freshwater limestone of Gurnet Bay, Isle of Wight; P. Geol. Soc. 1878, abstract in Ann. N. H. (5) ii. p. 99.

Branchipus arcticus (Verrill), var. ? from Discovery Bay; Miers, in Nares's Narrative, &c., ii. p. 246, pl. iii. fig. 1.

Apodidæ.

Lepidurus couesi (Packard, 1875) and *bilobatus*, spp. nn., Verrill, Bull. U. S. Geol. Surv. iii. [1877] pp. 177 & 178, Montana and Colorado.

Lepidurus kirki and *compressus*, spp. nn., Thomson, Tr. N. Z. Inst. xi. p. 260, pl. xi. figs. E 4 & 5, New Zealand.

Limnadiidæ.

Limnadia hermanni (Brongn.) [*lenticularis*, L.]. Note on its occurrence in Mecklenburg; only specimens of the size of 8 mm. and with 22 pairs of feet have been found, but including females with well-developed egg-clusters, to the end of August; segmentation of the body, nervous system, and ovary described. No male has been found. F. Spangenberg, Z. wiss. Zool. xxx. suppl. pp. 474–492.

*Eulimnadia amplexima*na, sp. n., Packard, Bull. U. S. Geol. Surv. iii. [1877] p. 174, Kansas.

Lymnetis [*Limn-*] *brevifrons*, sp. n., *id. l. c.* p. 172, woodcut, Kansas, compared with some other species.

CLADOCERA.

A. Weismann discusses the highly-coloured spots found in some *Cladocera*, most striking in *Latona*, also in *Sida*, *Holopedium*, *Bythotrephes*, *Polyphemus*, and *Eurycercus*, and exceptionally in some specimens of *Daphnella brachyura* and *Daphnia pulex*. In *Eurycercus* (*lamellatus*) these coloured spots are limited to the female, in the others they occur in both sexes and in parthenogenetic females, but are generally most beautiful in the females during the sexual period. The author thinks that they are purely ornamental, and appeared originally on the females as an attraction for the males (in *Sida*, which rests in a reversed position, they are only on the ventral side), and afterwards passed by heredity to the males and parthenogenetic females. As in *Sida crystallina*, the spots are different in specimens from different captures; the author concludes that these ornamental colours were acquired after the ice-period of Middle Europe. The numerical relations of the sexes are also discussed, with the conclusion that generally at the beginning of the sexual period the males are fewer than the females, but afterwards, if not in equal numbers, at least in sufficient for fecundating all the females. As to the sexual differences, the antennæ and their olfactory filaments are generally more developed in the males, but are in *Bythotrephes* equally poor and in *Latona* equally richly developed. Z. wiss. Zool. xxx. suppl. pp. 123–165, pl. vii.; abstract in Nature, xviii. p. 226.

W. Kurz discusses the peculiarities of those *Cladocera* which live on muddy ground; they are generally clumsy, vaulted and broad, thick-skinned, with relatively short natatory organs, mobile feelers and reduced

eyes. The genera *Streblocerus*, *Acantholeberis*, *Ilyocryptus*, *Leydigia*, *Alona*, *Pleuroxus*, section *Rhypophilus*, and *Monospilus*, come within this description. Z. wiss. Zool. xxx. suppl. pp. 393–396.

Males and ephippia in the females are sometimes found during spring and summer in the genera *Daphnia*, *Ceriodaphnia*, and *Simocephalus*; Lutz, SB. Ges. Leipz. v. p. 40.

Observations on strange coloration in some *Cladocera*; id. *l. c.* pp. 39 & 40.

Sididæ.

Sida crystallina (Müll.). Specimens from Lake Constance have rose-coloured, others from a small lake, "Alpsee" (Bavaria), blue, spots on the ventral side; Weismann, *l. c.* p. 128, pl. vii. figs. 4 & 4 A.

Daphnella exspinosa, sp. n., Birge, Not. Cladoc. p. 3, pt. 2, figs. 1–4, Massachusetts.

Latona setifera (Müll.), richly coloured; Weismann, *l. c.* p. 125, pl. vii. figs. 3 A–D.

Holopedium gibberum (Zaddach), ornamental colours; *id. l. c.* p. 131.

Daphniidæ.

Daphnia lævis, sp. n., and *pulex* (Geer), var. n. *denticulata*; Birge, Not. Cladoc. pp. 12 & 11, pl. ii. figs. 5–7, & pl. i. fig. 11, Massachusetts and Wisconsin.

Daphnia brevicauda, sp. n., Chambers, Bull. U. S. Geol. Surv. iii. [1877] p. 154, Colorado.

Daphnia obtusata, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 261, pl. xi. fig. E 2, New Zealand.

Daphnia hyalina (Leydig), var. n. *muelleri*, = *pellucida* (P. E. Müller); Lutz, SB. Ges. Leipz. v. p. 37, Leipzic.

Simocephalus americanus, sp. n., Birge, Not. Cladoc. p. 6, pl. i. fig. 9, "everywhere common" (Massachusetts and Wisconsin).

Simocephalus intermedius, sp. n., Studer, Arch. f. Nat. xliv. p. 106, pl. iii. fig. 1, Kerguelen Island.

Ceriodaphnia dentata, *consors*, and *cristata*, spp. nn., Birge, *l. c.* pp. 4–6, pl. i. figs. 1–4, & pl. ii. figs. 8 & 9, Massachusetts and Wisconsin.

Scapholeberis mucuta, sp. n., and *mucronata* (Müll.) ?; *id. l. c.* pp. 9 & 8, pl. i. figs. 8–10 & 7, North America (Massachusetts or Wisconsin).

Macrothrix bergeni, sp. n., Studer, Arch. f. Nat. xliv. p. 108, pl. iii. fig. 2, Kerguelen Island.

Ilyocryptus. Accurate description of the genus generally and of the three known species: *sordidus* (Lievin), *agilis*, sp. n., Kuttenberg, in Bohemia, and *acutifrons* (G. O. Sars). Kurz, Z. wiss. Zool. xxx. suppl. pp. 396–410, pl. xviii.

Lyncеidæ.

Eurycercus lamellatus (Müll.). Female only ornamentally coloured; Weismann, *l. c.* p. 135.

Alona acanthocercoides (Fischer): male described; Lutz., SB. Ges. Leipz. v. p. 41.

Alona angulata, porrecta, and *glacialis*, spp. nn., Birge, Not. Cladoc. pp. 28–30, the two former pl. i. fig. 16, & pl. ii. fig. 16, Massachusetts.

Alona weinecki, sp. n., Studer, Arch. f. Nat. xliv. p. 108, pl. iv. figs. 3 & 4, Kerguelen Island.

Alonopsis media, sp. n., Birge, *l. c.* p. 32, pl. i. figs. 14 & 15, North America.

Graptoleberis inermis, sp. n., Birge, *l. c.* p. 26, pl. i. fig. 17, Wisconsin and Massachusetts.

Pleuroxus procurvus, straminius [*-eus*], *insculptus, unidens, hamatus*, and *acutirostris*, spp. nn., *id. l. c.* pp. 16–23, pl. i. figs. 19–22, & pl. ii. figs. 11–15, Massachusetts.

Pleuroxus wittsteini, sp. n., Studer, Arch. f. Nat. xliv. p. 109, pl. iv. figs. A & B, Kerguelen Island.

Chydorus minutus, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 262, pl. xi. fig. E 3, New Zealand.

Crepidocercus, g. n. Head immovable, rostrum sharp, short; antennæ bearing eight setæ and three spines; post-abdomen shoe-shaped, much compressed laterally, bearing numerous bristles scattered somewhat irregularly over its surface; ventral margin of the valves fringed with somewhat long plumose setæ. *C. setiger*, sp. n., Wisconsin: remarkable by the extreme suddenness of its movements; Birge, *l. c.* pp. 24–26, pl. i. fig. 18.

Copechæte, g. n. Shell oval-oblong, rounded behind, without large spines; no eye-spot before the eye; thoracic feet flat, armed with strong claws and long divergent bristles; in other respects allied to *Bosmina*. *C. elongata, affinis, fissa*, and *armoricana*, spp. nn., Brest, in the sea, found below stones and in the stomach of fishes. The author thinks that they will form a new family, "*Copechetiens*." Hesse, Ann. Sci. Nat. (6) vii. No. 15, 20 pp., pl. 12.

Polyphemidæ.

Polyphemus oculus (Müll.), ornamental colours; Weismann, *l. c.* p. 133, pl. vii. fig. 2.

Bythotrephes longimanus (Leydig), ornamental colours; *id. l. c.* p. 132, pl. vii. fig. 1.

OSTRACODA.

Brady's monograph of the *Ostracoda* of the Antwerp Crag, Tr. Z. S. x. pp. 379–409, pls lxii–lxix., may be mentioned here, as most of the genera and several species are still living.

Cypris grandis, altissima, and *mons*, spp. nn., Chambers, Bull. U. S. Geol. Surv. iii. [1877] p. 151–153, Colorado.

Cypris ciliata, viridis, littoralis, spp. nn., Thomson, Tr. N. Z. Inst. xi. p. 253, pl. xi. figs. A 1–3 & B 1, New Zealand, the two former in fresh, the last in brackish water.

Candona ahlefeldi, sp. n., Studer, Arch. f. Nat. xliv. p. 110, pl. iv. fig. 5, Kerguelen Island.

Cythere atra and *truncata*, spp. nn., Thomson, Tr. N. Z. Inst. xi. p. 254, pl. xi. figs. A 2 & C 1 & 2, Otago Harbour, New Zealand.

Loxoconcha punctata, sp. n., *id. l. c.* p. 255, pl. xi. figs. B 3, Otago Harbour, New Zealand.

Philomedes agilis, sp. n., *id. l. c.* p. 257, pl. xi. figs. C 3 & D 1, Taieri Beach, New Zealand, in rock pools.

Acanthopus, g. n. [name preoccupied], Vernet, Arch. Sci. Nat. lx. [1877] p. 334; abstract in Ann. N. H. (5) i. p. 352. Antennæ like those of *Cythere*. One pair of jaws; three pairs of feet armed by strong hooks at the basilar article; post-abdomen rudimentary, reduced to two lobes, each bearing two hairs. Lake of Geneva, in deep water. It does not swim, but burrows in the mud.

COPEPODA.

G. S. Brady has published the first part of a monograph of the British *Copepoda*, describing and figuring 49 species, belonging to 26 genera and 5 families: *Calanidæ*, *Misophriidæ*, *Cyclopidæ*, *Notodelphyidæ* (incl. *Ascidicolinæ*), and *Buproridæ* (gen. *Enterocola*). He also gives (p. 31) a list of 34 genera of *Harpactidæ*, 2 of *Corycæidæ*, 1 of *Sapphirinidæ* (*Lichomolgus*), and 4 of *Artotrogidæ*, living in the British seas. The introduction (pp. 1–31) treats of the general structure and habits of these animals, with hints for collecting and preserving them, a synoptical table of the names of the cephalothoracic members used by the principal authors (p. 14), tables for the classification and determination of the British genera, and a bibliographical list. As to habitat, the author mentions *Diaptomus castor*, *Canthocamptus*, and 12 species of *Cyclops* as living in fresh water; the brackish water of salt marshes and small estuaries sustains, according to him, a peculiar Entomostracan fauna, characterized by *Cyclops insignis* and the genera *Temora*, *Tachidius*, *Nannopus*, *Platychelipus*, *Mesochra*, and *Dalavalia*; pools of sea water above or at the extreme limit of high water mark are tenanted by *Harpacticus fulvus*. *Calanus finmarchicus* and *Anomalocera patersoni* occur on the surface of the sea in immense profusion; the former and *Metridia armata* are in the Arctic regions many times the bulk of those taken in our own latitude. The fronds of *Laminaria saccharina* are the favourite abode of many species, more especially of the flat-bodied *Porcellidiinæ*, and amongst the growth of smaller algæ in tidal rock-pools, *Copepoda* are always to be found in abundance. On sandy bottoms, the most abundant species are *Longipedia coronata* and *Ectinosoma spinipes*. The bed of the sea, down to the extreme depths attainable round the British Islands, is inhabited by numerous *Copepoda* (pp. 7–9). Only the new species or those not before figured will be mentioned *infrà*.

Cyclopidæ.

Cyclops helleri, sp. n., ? = *clausi* (Heller, 1872), *macrurus* (Sars, 1863),

affinis (Sars, 1863), and *kaufmanni* (Ulianin, 1875), British; Brady, Brit. Copep. pp. 115 & 111–113, pl. xxii. figs. 15–18, & pl. xxiv. figs. 1–15.

Cyclops novæ-zealandiæ, sp. n., Thomson, N. Z. Inst. xi. p. 258, pl. xi. fig. D 2, New Zealand, fresh and brackish water.

Cyclops hopsini and *krillei*, spp. nn., Studer, Arch. f. Nat. xliv. pp. 110 & 111, pl. iv. figs. 6 & 7, Kerguelen Island, freshwater.

Oithona spinifrons (Böck, 1864) = ? *helgolandica* (Claus); Brady, *l. c.* p. 90, pl. xiv. figs. 1–9, & pl. xxiv. figs. 1 & 2, British seas, on the surface.

Lophophorus, g. n. Resembling *Cyclopsinæ*, but the fifth pair of feet foliaceous. *L. insignis*, sp. n., Durham Coast, 27 fath. Brady, *l. c.* pp. 121 & 122, pl. xiii. figs. 1–10, & pl. xv. fig. 10. [Name preoccupied among Birds].

Thorellia brunnea (Böck, 1864) = *Cyclops nigricauda* (Norman, 1868); *id. l. c.* p. 95, pl. xvi. figs. 1–10, British seas, on *Laminaria*.

Harpactidæ.

[*H*]*arpacticus bairdi*, sp. n., Thomson, Tr. N. Z. Inst. xi. p. 259, pl. xi. figs. D 3 & E 1, Otago Harbour, New Zealand.

Idya palæocrystica, sp. n., Norman, in Nares's Narrative, &c., ii. p. 253, under ice-floes in mid-winter, 82° 27′ N. lat.

Misophriidæ.

Brady distinguishes this family from the *Calanidæ* by the anterior antennæ being composed only of 7–18 joints, and much shorter than the cephalothorax; the general build is decidedly cyclopoid. It contains the genera *Misophria* (Böck), *Pseudocyclops* (Brady), and *Cervinia*. Brit. Copep. pp. 18, 20 & 78.

Misophria pallida (Böck, 1864); *id. l. c.* p. 79, pl. xviii. figs. 11 & 12, Durham Coast, Ayrshire, and Donegal.

Cervinia (Norman, MS.), g. n. Near *Misophria*; anterior antennæ 7-jointed, secondary branch of posterior antennæ 4-jointed. *C. bradyi*, (Norman, MS.), sp. n., dredged at Oban. *Id. l. c.* pp. 85 & 86, pl. xxiv. figs. 3–13.

Calanidæ.

Calanus finmarchicus (Gunner) = *Cetochilus septentrionalis* (Goodsir), Baffin's Bay, 73° 33′ N. lat., much larger than British specimens; Norman, in Nares's Narrative, &c., ii. p. 252.

Pseudocalanus feildeni, sp. n. (not described), under ice-floes in mid-winter, 82° 27′ N. lat.; *id. l. c.* p. 253.

Pseudocalanus armatus (Böck, 1872) figured; Brady, *l. c.* p. 46, pl. iv. figs. 1–11, Ayrshire.

Dias ? mossi, sp. n., under ice-floes in mid-winter, 82° 27′ N. lat., Norman, *l. c.* p. 253.

Candace pectinata, sp. n., Brady, *l. c.* p. 49, pl. x. figs. 1–12, & pl. viii. figs. 14 & 15, Scilly Islands, 40 fath.

Candace athiopica (Dana): somewhat non-typical specimens from the Pacific, 21° N. lat., described; Streets, Bull. U. S. Nat. Mus. No. 7, [1877], p. 139.

Metridia proposed for *Metridium*, which is preoccupied in the *Cœlenterata*; *M. armata* (Böck) = *Paracalanus hibernicus* (Brady), and ? = *Pleuromma* (Claus). The curious globular stalked bodies observed to be attached to the maxillipeds, and probably taken for eyes by Claus, seem to be parasites. Specimens from Baffin's Bay, 70° 33′ N. lat., are six times the size of those from the Irish Coast. Norman, *l. c.* p. 251.

Isias clavipes (Böck, 1864), first figured; Brady, *l. c.* p. 62, pl. vii. figs. 3–13, British Seas generally, 3–35 fath.

Centropages typicus (Krøyer, 1849) = *Ichthyophorba denticornis* (Claus); *id. l. c.* p. 65, pl. viii. figs. 1–10, British Seas.

Diaptomus gracilis (G. O. Sars, 1862), Gruber, Süsswass. Cal. p. 11, pl. i. figs. 14–24, Lakes of Constance, Zurich, and Wallenstatt in Switzerland.

Heterocope robusta (G. O. Sars, 1832); *id. l. c.* p. 5, freshwater, pl. i. figs. 1–13, Lake Constance and Lago Maggiore.

Parapontella, g. n. Anterior antennæ dissimilar in both sexes; mandibular palpus composed of only one branch; inner branch of first pair of swimming feet 3-jointed, of second, third, and fourth pairs 2-jointed. *P. brevicornis* (Lubbock, as *Pontella*, 1857), British Seas, on the surface; Brady, *l. c.* p. 69, pl. ix. figs. 1–16.

Corycæidæ.

Copilia mirabilis (Dana), from the Pacific, 8° S. lat., described; Streets, Bull. U. S. Nat. Mus. No. 7 [1877] p. 141.

Notodelphyidæ.

Doropygus normani and *porcicauda*, spp. nn., Brady, *l. c.* pp. 136 & 138, pl. xxxii. figs. 1–14, pl. xxvii. figs. 1–9, and pl. xxxiii. figs. 14–16, Ireland, in the cavities of Ascidians.

Pachynesthus, g. n. Male unknown. Female: extremity of the abdomen terminated by two flat divergent plates; antennæ short, rounded; feet unguiculate, flat; no appendages for protecting the eggs ("ovitecteurs"). *P. violaceus*, sp. n., Brest, within a compound Ascidian. Hesse, Ann. Sci. Nat. (6) vii. No. 3, pp. 1 & 12, pl. v. figs. 1–11.

Polyoon, g. n. Male unknown. Female: extremity of the abdomen terminated by two sharp points. Other characters resembling those of the preceding genus. *P. luteum*, sp. n., Brest, within a compound Ascidian. *Id. l. c.* pp. 4 & 13, pl. v. figs. 12–20.

Notes on some allied genera, described before by the same author; *id. l. c.* pp. 11 & 12.

Chondracanthidæ.

G. M. R. Levinsen, Vid. Medd. 1878, pp. 351–380, enumerates the

Crustacea known to live parasitically on Annelids, and describes some new genera of them, but as only detailed specific descriptions, and no short generic characters are given, the Recorder is unable to summarize diagnostic generic characters.

Selioides bolbroei, g. & sp. nn., Levinsen, *l. c.* pp. 353–358, pl. vi. figs. 5–11, Greenland, on *Harmothoe imbricata* (L.). The ovisac of another allied species, 4-lobed, on *Nychia cirrosa* (Pall.), from Iceland; *id. l. c.* p. 359, with woodcut.

Rhodinicola elongata, g. & sp. nn., *id. l. c.* pp. 360–262, pl. vi. figs. 1–4, Samsö, Norway, on *Rhodine loveni* (Malmgr.).

Herpyllobius arcticus (Steenstrup, Lütken) = *Silenium polynoes* (Kröyer), Greenland, on *Harmothoe imbricata* (L.) and *Eunoe œrstedi* (Malmgr.), described, *id. l. c.* pp. 363–370. [Belongs to the *Lernæopodidæ*, according to Claus.]

Bradophila pygmæa, g. & sp. nn., *id. l. c.* pp. 371–373, with woodcut, on *Brada villosa*, locality not known.

Saccopsis terebellidis, g. & sp. nn., *id. l. c.* pp. 374 & 375, pl. vi. figs. 21–22, Greenland, on *Terebellides stræmi* (Sars).

Crypsodomus terebellæ, g. & sp. nn., *id. l. c.* pp. 375–378, pl. vi. figs. 19 & 20, Greenland, on *Terebella cirrata* (Müll.).

Dichelesthiidæ.

Lernanthropus gisleri and *krœyeri*, males described; Hesse, Rev. Montp. vi. [1877] and vii. pp. 1–12, pl.

Nemesis mediterranea (Risso), var. n. *sinuata*, Valle, Boll. Soc. Adr. iv. p. 89, figured, found on a shark, *Oxyrrhina spallanzanii* (Raf.), in the Adriatic.

Anthosoma smithi (Leach), found on the same shark; *id. l. c.* p. 89, pl. i.

Lernæidæ.

Lernæenicus gempyli, sp. n., Horst, Ned. Tijdschr. Dierk. iv. pp. 51–54, with plate, on a Trichiuroid fish, *Gempylus serpens* (C. V.), Atlantic.

Lernæopodidæ.

Lernæopoda arcturi, sp. n., Miers, in Nares's Narrative, &c. ii. p. 247, pl. iii. fig. 2, Floeberg Beach, 82° 27′ N. lat., on the gills of *Salmo arcturus* (Gthr.).

Herpyllobius: see *suprà*, in the *Chondracanthidæ*.

CIRRIPEDIA.

A. Lang describes and discusses the metamorphosis from the Nauplius stage to the *Cypris*-like larva in *Balanus* and *Scalpellum*. MT. Aarg. Ges. i. pp. 104–115, pl. i.

Balanidæ.

Note on *Balanidæ* fixed on sponges and overgrown by them, termed *Acasta*, by Leach; H. J. Carter, Ann. N. H. (5) ii. p. 158.

Balanus porcatus (Dacosta), Cape Napoleon, 50 fath., and 79° 38′ N. lat., and *balanoides* (L.), Port Foulke, Arctic America; Miers, in Nares's Narrative, &c., ii. pp. 247 & 248.

Balanus improvisus (Darwin), found on several points of the northern shore of Germany, the var. *gryphica* is a very slight variation: Metzger, Nachr. mal. Ges. 1878, pp. 7–9.

Elminius sinuatus and *rugosus*, spp. nn., Hutton, Tr. N. Z. Inst. xi. p. 328, New Zealand.

Lepadidæ.

Pollicipes darwini, sp. n., Hutton, Tr. N. Z. Inst. xi. p. 329, New Zealand.

Scalpellum strœmi (Sars); Heller, Denk. Ak. Wien, xxxv. p. 39, pl. iv. figs. 13 & 14, Arctic Sea.

Scalpellum striolatum, sp. n., G. O. Sars, Arch. Math. Naturv. 1876, p. 364, Northern Sea, 62–63° N. lat., 1° E.–1° W. long., 400–1000 fath.

Note on the formation of the stalk in *Lepas anatifera*; Lang, MT. Ges. Bern, 1877, pp. 103–105.

Conchoderma virgatum (Spengl.) fixed on an undetermined species of *Pennella*, taken from *Xiphias gladius* at Naples; P. Mayer, MT. zool. Stat. Neapel, i. p. 53.

Peltogastridæ.

Sacculina neglecta, sp. n., Fraisse, Arb. Inst. Würzburg. iv. p. 290, Naples, on *Stenorrhynchus phalangium* (Penn.).

Peltogaster rodriguezi, sp. n., *id. l. c.* p. 289, pl. xii. figs. 10 & 11, Mahon, on *Clibanarius misanthropus* (Risso).

XIPHOSURA.

A. Gerstäcker, in his general treatise on the *Crustacea*, continues the anatomical and physiological description of *Limulus* (order *Pœcilopoda*), and discusses at length its systematic place; he admits, with Owen, opposing Milne-Edwards, that the first pair of pincer-bearing feet is præoral, and rejects the suggested affinity with the Spiders, as founded only on the same number of oral and thoracic members, which may be accidental, and is contradicted by important anatomical characters, among which the want of Malpighian vessels may be mentioned. According to him, *Limulus* is doubtless a Crustacean, on account of the abdominal members, which functionally differ from the thoracic, and resemble those of the Copepods in general shape and order of development, bearing also respiratory organs; also on account of the situation of the genital orifices, the whole disposition of the female organs, the

existence of a bent-forward portion of the œsophagus and of a proventriculus, and the simultaneous presence of reticulated and frontal eyes. The most important differences from the rest of *Crustacea* are the existence of only one pair of præoral members, the want of special mandibles, and the homonomy and small number of the cephalo-thoracic members. Neither the knowledge of its development nor its palæontology yields any fact which could enable us to connect it more closely with other orders of the *Crustacea*, or with the *Arachnida*; the fossil *Eurypteridæ* have, indeed, some relations to *Limulus*, chiefly in the thoracic members, but no real near affinity can be maintained. Klassen und Ordnungen des Thierreichs, v. *Arthropoda*, pp. 1089–1136 (chiefly 1123–1130) pls. xxxvi.–xxxix.

H. Woodward, in the last part of his monograph of British fossil *Crustacea*, gives a general account of our knowledge of recent *Limulus*, containing Owen's paper on the anatomy of *L. polyphemus*, taken from Tr. L. S. xxviii. [1872] pp. 459–506, with 3 pls., pp. 186–210, pls. xxxiv.–xxxvi. He treats of its mouth and replacement of lost appendages, pp. 210–212; its spawning, the eggs being fecundated by the male after their deposition in the sand, from Lockwood's observations, p. 212; its embryology, chiefly from Packard [Zool. Rec. viii. p. 195] pp. 213–221; its zoological position, with special reference to the views of Dohrn and Owen, urging the relations with the *Crustacea*, and especially *Pterygotus*, pp. 221–232; and the geographical distribution of the recent species, from Milne-Edwards (1873) p. 233.

E. Ray Lankester states that the spermatozoids of *Limulus* are actively motile, and concludes that this genus ought to be placed among the *Arachnida*, forming there a special sub-class, *Branchiopulmonata*; Q. J. Micr. Sci. xviii. pp. 453 & 454.

A. Agassiz has observed that young specimens of *Limulus* swim, and rest very often on their backs. Am. J. Sc. (3) xv. p. 75, also in Ann. N. H. (5) i. p. 183.

MYRIOPODA.

BY

E. C. Rye, F.Z.S., M.E.S.

The General Subject.

Fanzago, F. Dei Caratteri specifici nei Myriapodi. Lettera al Professore G. Fedrrizzi [sic]. Ann. Soc. Mod. (2) xii. pp. 147–150.

Chiefly refers to the inconstancy of the number of the segments in species, and the importance of the position of the sexual organs as a family character.

Fedrizzi, Giacinto. I Litobi Italiani. Atti Soc. Pad. v. (fasc. 2), p. 184 *et seq.* [Not seen by the Recorder.]

Describes 35 species, of which 8 are new.

——, ——. I Cordeumidi Italiani. *Tom. cit.* p. 375 *et seq.* [Not seen by the Recorder.]

Describes 6 species, including 3 new, and 1 new genus, *Megalosoma* (with spp. nn. *M. canestrinii*, from the Non Valley, and *athesinum*, R. Adige and Levico).

—— ——. Miriapodi del Trentino raccolti e classificati. I. I Chilognati. Ann. Soc. Mod. (2) xi. [1877] pp. 80–110.

42 species are described (including *Glomeris bimaculata*, *Iulus colubrinus*, and *Craspedosoma levicanum*, previously described by the author, and apparently not mentioned as yet in Zool. Rec.), of which 4 are new.

—— ——. II. Chilopodi. *Op. cit.* xii. pp. 47–75.

Also describes 42 species, including 2 new. *Lithobius* (*L.*) *ardesiacus*, Non Valley (referred to as described by the author in Atti. Soc. Pad. v., and stated at p. 57 to be *L. piceus*, C. Koch), *parvolus*, Rovenna, *inequidens* and *marginatus*, Non Valley, and *fanzagoi*, Sfruzzo, *L.* (*Archilithobius*) *meridionalis*, Non Valley, *Geophilus canestrini* [*i*] and *anaunensis*, Non Valley, are species formerly described by the author and apparently hitherto omitted from Zool. Rec. The following synonymy occurs:—*Geophilus sanguineus*, Fanz., = *crassipes*, C. Koch ; *G. carpophagus*, Fanz.,

= *cavanna*, Fauv.; *G. palustris*, Fauv., = *proximus*, Koch; *G. maxillaris*, Fauv., = *ferrugineus*, Koch.

PORATH, C. O. VON. Om några exotiska Myriopoder. Sv. Ak. Handl., Bihang iv. 2, pp. 1–48.

[Not seen by the Recorder.]

Lombardy: Pavesi, Bull. Ent. Ital. x. (Resoc. delle Adun.), p. 21.

Rome: R. Pirotta, Ann. Mus. Genov. xii. pp. 568 & 569, enumerates 14 species. A few observations are made on *Scolopendra hispanica*.

The same author, Ann. Mus. Genov. xi. pp. 379–410, gives a Systematic Catalogue of the 27 Myriopods collected during the voyage of the Italian ship "Violante" from Genoa to Constantinople in 1876, with their localities. Three are described as new.

Algiers and Spain: F. P. Pascoe, Pr. E. Soc. 1878, p. xxxviii.

Russia: A. Sceliwanow, Troudy Ent. Ross. xi. p. 3 *et seq.*, contributes to the knowledge of Russian species, describing 9 as new. [Not seen by the Recorder.]

Japan: L. Koch, Verh. z.-b. Wien, xxvii. [for 1877, published in 1878], in "Japanesische Arachniden und Myriapoden," pp. 787–797, describes 9 new species of *Chilopoda* and 3 of *Chilognatha*.

Nova Scotia: S. H. Scudder, Mem. Bost. Soc. ii. pp. 561 & 562, woodcut, figures segments of the Carboniferous Myriopods described in his former paper, *l. c.* p. 211.

Martinique, Barbados, and Antigua: T. A. Marshall, Pr. E. Soc. 1878, pp. xxxvii. & xxxviii.

CHILOPODA.

MACLEOD, JULES. Recherches sur l'appareil vénimeux des Myriapodes Chilopodes. Description des véritables glandes vénéniques. Bull. Ac. Belg. (2) xlv. pp. 781–798, pl.

Describes the forceps in the *Chilopoda*, demonstrating the existence of a perforation in all of them, and describing and figuring the opening in *Scutigera*, *Lithobius*, *Scolopendra*, *Cryptops*, *Himantarium*, and *Geophilus*. The anterior glands, hitherto wrongly considered as poison-secreting, are probably salivary; true venomous glands have been found by the author in *Scolopendra horrida*, and also in *Lithobius forficatus*, in a cavity in the distal part of the basilar joint of the forcipular hook (which is always comparatively voluminous in size), with an excretory canal opening at the point. These glands are composed of a special homogeneous coating, enveloping numerous elongated secretory cells, all of which end in small chitinised tubes, which empty themselves by small mouths into a cylindrical chitinous excretory duct, strengthened by a spiraloid thickening which gives it the aspect of a trachea. There is therefore no special muscular coating, as in the veneniferous glands of the *Arachnida*; but, as the glands are embedded in the motor muscles of the forceps, a compressing and ejaculatory action probably takes place when the Chilopod bites.

F. von. Feiller refers with doubt to the New Zealand genus *Henicops* (? *impressus*, Hutton) some specimens found under unfixed substances in the river bed at Vienna, and remarks on the structure and distribution of that genus and of *Lamyctes*, Meinert ; SB. z.-b. Wien, xxvii. p. 41.

Geophilus from the nostrils of a child 6 years old; Am. Nat. xii. p. 705, quoting J. H. Packard, in "Medical and Surgical Reporter" (Philadelphia), Aug. 3, 1878, p. 100.

Arthronomalus similis, Newp. : two males recorded, on the authority of Dr. Büchner, as ejected from the nasal sinus of a youth, with notices of similar cases before recorded ; J. J. Le Roy, Tijdschr. Nederl. Dierk. Ver. iii. [1877] pp. 119–121.

New species :—

Scutigera caruleo-fasciata, p. 787, *truculenta*, p. 788, L. Koch, *l. c.*, Japan.

Lithobius asperatus, id. *l. c.* p. 788, Japan ; *L.* (*Neolithobius*) *finitimus*, p. 55, Saloro and Spormuore, *L.* (*Archilithobius*) *o. raceus* [sic], p. 62, Levico, G. Fedrezzi, Ann. Soc. Mod. (2) xii.

Scolopendra lopadusæ, p. 403, Lampedusa, *doriæ*, p. 405, Palermo, and *violantis*, p. 407, Pantellaria, R. Pirotta, Ann. Mus. Genov. xi. ; *S. damnosa*, p. 789, *japonica*, p. 790, *mutilans*, p. 791, Koch, *l. c.*, Japan.

Scolopocryptops rubiginosa, Koch, *l. c.* p. 792, Japan ; *S. antillarum*, T. A. Marshall, Pr. E. Soc. 1878, p. xxxvii., Martinique.

Geophilus procerus, p. 793, *tenuiculus*, p. 794, Koch, *l. c.*, Japan.

Chilognatha.

A. Stecker, Arch. mikr. Anat. xiv. p. 6 *et seq.*, pl. ii., discusses the structure and development of the germinal layers from experiments on *Julus*, *Craspedosoma*, *Polydesmus*, and *Strongylosoma*.

Voges, E. Beiträge zur Kenntniss der Juliden. Z. wiss. Zool. xxxi. pp. 127–194, pls. xi.–xiii.

Besides a general account of the segmental divisions, muscular, respiratory, and copulatory systems of the *Julidæ* (special attention being directed to the value of the organs of the latter system as generic and specific characters), and some observations on the hard parts, trachea, apertures, muscles, and gland-apparatus of *Spirobolus cupulifer*, the author enters at some length upon the comparative structure of the tracheæ in the *Myriopoda*, *Insecta*, &c. [see Insecta, p. 11, *postea*]. 35 new species are described ; the plates are all anatomical, and for the most part consist of details of *Julus londinensis* ; the copulatory organs of 18 new species are also figured.

J. Paszlavszky, in "Massenhaftes Erscheinen von Tausendfüsslern," Verh. z.-b. Wien, xxviii. [for 1878, published in 1879], pp. 545–552, describes accounts of incredibly enormous swarms of a Myriopod, identified as *Julus unilineatus*, Koch, between the stations Szajol, Török-Szent-Miklós, and Fegyvernek, on the Theiss Railroad ; the Myriopods were in such vast numbers that the earth was black with them ; the locomotives

destroyed them by thousands on the rails, and were absolutely impeded in their progress by the creatures, requiring sand to be strewed before their driving wheels could work [as in America, with *Doryphora 10-lineata*]. Observations are also made on the swarming of other species. See also another account in Ent. Nachr. iv. p. 315 (quoting MT. Ver. Pest for July, 1878).

Palæojulus dyadicus, Geinitz, is part of a fern, *Scolecopteris elegans*, Zenk.; Sterzel, Z. geol. Ges. xxx. p. 417, & JB. f. Mineral. 1878, pp. 729-731 (Geinitz disputes this, *l. c.* p. 731).

Polyxenus fasciculatus, Say, and *Pauropus* (? *huxleyi*, Lubbock), recorded from Fairmount Park, Philadelphia, with notes on habits; J. A. Ryder, Am. Nat. xii. p. 557. A prior notice of the latter species, probably *P. lubbocki*, Packard, and the common occurrence of the former, both near Salem, Mass., recorded by A. S. Packard, *l. c.* p. 558 (editorial note).

New species:—

Zephronia larvalis, p. 301, Torres Straits, *atrisparsa*, p. 302, A. G. Butler, Tr. E. Soc. 1878.

Spharotherium crassum, p. 299, *lamprinum*, p. 300, and *reticulatum*, p. 301, Madagascar, *angulatum*, p. 299, Queensland, *id. l. c.*

Polydesmus fanzagoi, Fedrezzi, *op. cit.* xi. p. 107 (= *edentulus*, Fanz., *nec* Koch); *P. cruentatus*, Koch, *l. c.* p. 795, Japan.

Ozyurus flavo-limbatus, Koch, *ibid.*, Japan.

Euryurus pallipes, id. *l. c.* p. 796, Japan.

Spirostreptus annulatus, p. 163, locality unknown, *cephalotes*, p. 164, *plumaceus*, p. 167, *semiglobosus*, p. 172, *fasciatus*, p. 173, Zanzibar, *setosus*, p. 165, *bi-nodifer*, p. 176, Natal, *intricatus*, p. 166, *cameroonensis*, p. 175, Cameroons, *sulcatus*, p. 168, St. Thomé, *costatus*, p. 169, *clavatus*, p. 170, *rutilans*, p. 171, *rugifer*, p. 172, and *lævis*, p. 174, Africa, *semi-cylindricus*, p. 176, ? Africa, *clathratus*, p. 177, Montevideo, *rostratus*, p. 178, Porto Cabello, *segmentatus*, p. 179, Philippine Islands, Voges, *l. c.*

Iulus octo-formis, p. 161, Hildesheim, *cornutus*, Hamburg, and *lividus*, Göttingen, p. 162, id. l. c.; *I. ciliatus*, p. 96, Rovereto, *roseus*, p. 98, Non Valley, Fedrezzi, Ann. Soc. Mod. (2) xi.; *I. telluster* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 776, Green River Shales, Wyoming.

Blaniulus pallidus, Fedrezzi, *l. c.* p. 101, St. Michele.

Spirobolus ligulatus, p. 180, Lagos, *rugosus*, p. 181, Rangoon, *falcatus*, p. 182, Zanzibar, *tegulatus*, p. 183, West Africa, *hamatus* and *holosericus*, p. 184, *unisulcatus*, p. 186, *flavo-punctatus* and *auratus*, p. 187, and *capulifer*, p. 188, Philippines, *obtuso-spinosus*, p. 189, Ceylon, *fasciculatus*, p. 190, Australia, *brevicollis*, p. 191, Mexico, Voges, *l. c.*

INSECTA.

THE GENERAL SUBJECT.

By E. C. Rye, F.Z.S., M.E.S.

Bellesme, J. de. [See Pérez, *infrà*.]

Bertkau, P. Bericht über die wissenschaftlichen Leistungen im Gebiete der Arthropoden während der Jahre 1877–78. Arch. f. Nat. xliv. 2, pp. 562.

Pp. 364–401 refer to *Insecta* generally, the remainder being devoted to *Coleoptera* (the only portion published in 1878).

Binzer, — von. Insecten-Kalender. Lebensphasen und Frassperioden der wichtigsten schädlichen Fortsinsecten. Berlin: 16mo, 2 pls. [Zool. Anz. i. p. 22.]

Bobretzky, N. [On the question of the development of blastoderm in Insects. In Russian; in the "Sapiski," or Memoirs, of the Kieff Naturalists' Society, v. pp. 18.]

——. Ueber die Bildung der Blastoderms und der Keimblätter bei den Insecten. Z. wiss. Zool. xxxi. pp. 195–215, pl. xiv.

The author's researches as to the earliest appearance of embryonal development in the eggs of *Lepidoptera*, based upon experiments on *Pieris crataegi* and *Porthesia chrysorrhœa*, result in the opinions:—(1) That before the appearance of blastoderm an increase of the formed elements in the yelk occurs, consisting of protoplasm with a nucleus, and having the morphological value of a true cell; (2) that one portion of these elements gradually leaves the yelk for the egg-surface, producing the blastoderm, in which no special germ-layer has any share; (3) that another portion of them remains for the formation of the blastoderm in the yelk, and causes the subsequent division of the latter into the so-called yelk-flakes or balls, which are to be considered as true cells. As to the first two of these conclusions, Bobretzky's observations accord in the main with those of Brandt; but in the 3rd he differs fundamentally from that author, who considers that the elementary substances leaving the yelk for the surface are of entirely similar formation to the primary germ-vesicles.

Brandt, Eduard. Ueber das Nervensystem der Laufkäfer (*Carabida*). Hor. Ent. Ross. xiv., Auszüge aus den Sitzungsberichten, pp. iv. & v.

——. Untersuchungen über das Nervensystem der Dipteren. *L. c.* pp. vii. & viii.

——. Ueber das Nervensystem der Wespen (*Vespa*). L. c. pp. ix.–xi.

——. Ueber das Nervensystem der Fächerflügler (*Strepsiptera*). L. c. pp. xiii. & xiv.

——. Ueber das Nervensystem der Blatthörner (*Lamellicornia*). L. c. pp. xv.–xvii.

——. Vergleichend-anatomische Untersuchungen über das Nervensystem der Hemipteren. Hor. Ent. Ross. xiv. pp. 496–505, pl. iv.

The sketch of the nerve-system in the *Carabidæ* is based upon 29 species of 11 genera, and also various larvæ. Five types are recognized: (1) *Carabus*, with seven, (2) *Cicindela*, with six, (3) *Broscus*, with five, (4) *Agonum*, *Omaseus*, and *Bradytus*, with three, and (5) *Harpalus* and *Pœcilus*, with only two, abdominal ganglions—all having two head- and three thoracic-knots. The sympathetic nerve-system consists of a vertex-knot, two posterior pharyngeal ganglions, and an abdominal knot. The larvæ (of *Carabus*, *Cicindela*, and *Omaseus*) have two head, three thoracic (always free), and eight abdominal ganglions, also a vertex-knot and four posterior pharyngeal sympathetic ganglions. Combinations of the abdominal knots with the last abdominal ganglion occur between the larval and perfect states of different genera, in different degrees; and the first two abdominal knots of the larvæ always fuse in the last thoracic knot, except in *Carabus*.

The notes on the system in *Diptera* are the result of observations on 275 species in the imago and 29 in the larval state, and include the metamorphoses of the nerve-system in 12 species. All *Diptera* have brain convolutions, hitherto only known to occur in *Musca vomitoria*, from Lowne's experiments; some show a difference in the position of the last abdominal knot in ♂ & ♀ (*Conops*, *Myopa*, and *Zodion*), in *Leptis* the last abdominal ganglion is duplicated in the ♂ and single in the ♀, and in the whole of the *Leptides* there is the special peculiarity that all the thoracic and abdominal knots are united by two distinct and widely separated commissures; the nerve-system of the *Phoridæ*, *Dolichopodidæ*, *Xylophagidæ*, *Gallicolæ* (only larvæ), and *Noctuiformes*, is stated for the first time, and many errors of Léon Dufour are pointed out; three formulated types of nerve-system are laid down; the relationship of the different families in this respect are briefly stated; and a table is given of the series of ganglions in the various families.

The observations on *Vespa* refer to 5 species which have two head (supra- and infra- œsophageal) ganglions, two thoracic knots, and five or six abdominal ganglions, all united by double ventral commissures. The abdominal ganglions vary in number both in species and sexes. The sympathetic nerve-system has three divisions, and the larvæ two head, three thoracic, and eight abdominal ganglions.

In the *Strepsiptera* (4 ♀ & 1 ♂ of *Stylops melittæ*, and 3 alcoholized ♀

of *Xenos vesparum* examined), the head portion of the nerve-system is peculiar, consisting merely of a supra-œsophageal ganglion, the infra-œsophageal being wanting, as in *Rhizotrogus solstitialis* and *Serica brunnea* in *Coleoptera*, and *Hydrometra lacustris* in *Hemiptera*. The thoracic part consists of one large complex ganglion divided into two portions, the anterior smaller, representing the infra-œsophageal ganglion and first thoracic knot of other insects, the posterior equivalent to the normal two other thoracic knots and the more or less numerous abdominal ganglions. The forward part supplies nerves to the mouth and first pair of legs—the posterior to the wings, remaining legs, thorax, and some abdominal segments. The abdomen has one nervous knot, supplying the fifth, sixth, and apical segments, and the rectum.

The "Lamellicorn" beetles observed include *Lucanidæ* as well as *Scarabæidæ* (30 species of 19 genera); and the results so far agree with those of former observers as to justify the two great type-forms of genuine Lamellicorns with no abdominal ganglion, and *Pectinicornia* with from five to six of them. No absolute connecting links are found, but the genuine Lamellicorns are divided into 7 typical groups, represented by *Rhizotrogus*, *Serica*, *Phyllopertha* and *Anomala*, *Cetonia* and *Melolontha* and their immediate allies, *Oxythyrea*, *Geotrupes* and *Copris* and allies, and *Glaphyrus*, in the last of which the last of six knots representing the abdominal ganglion is situated in the first abdominal segment, thus showing an approach to *Lucanus*. The nervous systems of the larvæ and pupæ of species of both groups are described, but apparently with no result differing especially from those obtained by former observers.

In the *Hemiptera*, Brandt has examined the systems of 170 species (including *Homoptera* and *Anoplura*), and he gives a list of the prior works on the subject. Only cephalic and thoracic ganglions are found; the supra-œsophageal is always strongly developed; and in every one of the species examined, the author found the brain convolution bearing stalked bodies hitherto only noticed in *Acanthia lectularia*. Several species have ocellar nerves; the infra-œsophageal gland exhibits greater variability than is shown in any other Order of Insects; the supra-œsophageal is wanting in very few species, and has special morphological value, &c. Five type-forms are recognized, represented by *Hydrometra*, *Nepa* and *Acanthia*, *Pentatoma*, *Lygæus*, and the *Anoplura* with the *Mallophaga*. The entire want of abdominal ganglions places the *Hemiptera* with the *Muscæ acalypteræ* and *Œstridæ*, but also associates the Order with such of the beetles (*Lucanidæ*, *Curculionidæ*, &c.) as are also deficient in that respect.

Brauer, F. Betrachtungen über die Verwandlung der Insecten im Sinne der Descendez-Theorie. ii. Verh. z.-b. Wien, xxviii. [for 1878, published in 1879], pp. 151–166.

A continuation of the author's former treatise [Zool. Rec. vi. p. 173] on the same subject, with corrections on some points.

Brischke, G. Resultate der Zuchten forstschädlicher Insecten. Schr. Ges. Danz. (4) ii. pp. 4.

Camerano, L. Di alcune variazioni avvenute nella fauna entomologica del contorno di Torino. Torino: 1878, 8vo, pp. 6 (Extract from Ann. R. Accad. Agricult. Tor. xxi., referring to beetles only).

Cornelius, C. Abnormitäten und Curiositäten bei Insecten. JB. Ver. Elberf. v. pp. 47–49.

Monstrosities or deformities in *Carabus auratus* and *cancellatus*, *Melolontha vulgaris*, *Polyphylla fullo*, *Lucanus cervus*, ♀, *Aromia moschata*, and *Chrysomela staphylea*; colour varieties of *Dynastes tityus*, *Trichius fasciatus*, *Strangalia 4-fasciata*, and *Chrysomela varians*; *Harpalus rufi-cornis* and an *Anoplognathus* with thread-worm parasites; *Musca domestica* (?) entirely covered with a small yellow Acarid; *Phyllobius rufi-cornis*, ♂, in *copulâ* with *Polydrosus micans*, ♀.

Dewitz, H. Beiträge zur postembryonalen Gliedmassenbildung bei den Insecten. Z. wiss. Zool. xxx. Suppl. pp. 78–105, pl. v.; Nachtrag, *op. cit.* xxxi. pp. 25–28 (SB. Nat. Fr. 1878, p. 122; Ent. Nachr. iv. p. 256 *et seq.*).

Studies on the formation of the legs and wings in the worker of *Formica rufa* in the larval state and during pupation, and of the wings in sexuated individuals; on the development of the wings in *Lepidoptera*; and on the formation of the spines on the pronotum in *Myrmica lævinodis*; with comparison of these researches with those of other observers, and remarks on the circumstances connected with want of wings in the workers of Ants and *Termites*.

The existence in the workers of ants of two very small wing-discs similar in all ways to those of the future winged individuals, and appearing with the first development of the creature, is proved. The thoracic segmental substances in ants appear first in the young larvæ as discoidal hypodermal thickenings, separating into a germ (whether of legs or wings) and an enveloping layer, which, however, exhibits an external aperture; and these substances throw off a chitinous covering at an early stage both in ants, bees, and humble-bees. The formation of the wings in *Lepidoptera*, and indeed of the limb-substances in all Insects, proceeds from the hypodermis, though the tracheæ, nerves, &c., that penetrate them probably always complete the inner construction of the appendages. The great difference between females and workers in ants is probably not caused by any variation in treatment of the eggs or larvæ by the perfect workers, as happens in the bees; the egg most likely receives the germ of its future development before exclusion from the mother. In the supplement, Schmidt discusses Ganin's views which have come to his knowledge subsequently to the publication of his own paper; he disagrees with that author's views as to the rupture and extrusion of the enveloping sac of the limbs.

Fettig, J. F. Essai d'Entomologie Générale appliquée. Les Insectes nuisibles de l'Alsace, avec un aperçu des Insectes utiles. Bull. Soc. Colm. xvi. & xvii. 1875–76 [1877], p. 89 *et seq.*

Flögel, J. H. L. Ueber den einheitlichen Bau des Gehirns in den

verschiedenen Insecten-Ordnungen. Z. wiss. Zool. xxx. Suppl. pp. 556–592, pls. xxiii. & xxiv. (reviewed in Am. Nat. xii. p. 616).

The wide hiatus between the complex structure of the brain in the social *Hymenoptera* and that of other insects with less developed instincts is now apparently bridged by a knowledge of the cerebral organs in the common cockroach, *Periplaneta orientalis*, the structure of which can be homologized without great difficulty with that of the bees. The term "brain" is restricted to the upper pharyngeal ganglion and its appendages. Its structure is described in detail in *P. orientalis* (based upon over 2000 microscopical dissections), more briefly in various *Hymenoptera*, *Orthoptera* (excluding *Blatta*), *Lepidoptera*, *Coleoptera*, *Neuroptera*, *Diptera*, and *Hemiptera*. A table (p. 581) shows the different degrees of development of the various component parts, the highest being *Vespa* and the lowest in the *Hemiptera*. The author considers that the single parts of the brain have their homologues in the different Orders, and is thus enabled to give an outline of the comparative brain anatomy in *Insecta*. The remarkable central body is always present in the imago state of all Orders, but almost absent in Lepidopterous larvæ. The antennæ are probably organs of smell. There is no connection of nerve-fibre with any part of the brain except the lobes and surrounding substance.

Forel, August. Beitrag zur Kenntniss der Sinnesempfindungen der Insekten. MT. Münch. ent. Ver. ii. pp. 1–21.

The commencement of a proposed series of articles on the sensitive faculties of insects, devoted (after some preliminary general deductions) to that of sight. The *Hymenoptera*, and especially the *Formicidæ*, furnish (as might be anticipated) the chief illustrations.

Girard, M. Catalogue raisonné des animaux utiles et nuisibles de la France. Paris: 1878, 8vo, two fasc.

Consists chiefly of insects. Noticed in Pet. Nouv. ii. p. 268, & Nouv. et faits (2) No. 21, p. 81; an abstract by the author himself in Bull. Soc. Ent. Fr. (5) viii. p. c.

Goss, H. Introductory papers on fossil Entomology. Ent. M. M. xv. pp. 1–5, 52–56, 124–127.

After a general discussion of the bearing of fossil Entomology on the question of evolution and antiquity of types, the author commences a proposed review of records on the subject by an analysis of species of the Devonian period.

——. The Insect Fauna of the Secondary or Mesozoic Period. London: 1878, 8vo, pp. 37.

The second of the three proposed papers on fossil Insects mentioned in Zool. Rec. xiv. *Ins.* p. 1, reprinted from the Proceedings of the Geologists' Association, vi. (No. 3).

Graber, V. Vorläufige Ergebnisse einer grosseren Arbeit über vergleichende Embryologie der Insecten. Arch. mikr. Anat. iv. pp. 630–640.

Gurlt, —. Neues Verzeichniss der Thiere, auf welchen Schmarotzer-Insecten leben. Mit Hinzufügungen von Schilling. Arch. f. Nat. xliv. 1, pp. 162–210.

595 Mammals and birds (Man to *Mergus*) enumerated, with their respective known Insect parasites.

Haller, G. Kleinere Bruchstücke zur vergleichenden Anatomie der Arthropoden. Arch. f. Nat. xliv. 1, pp. 91–101, pl. ii.

Contains (1) observations on the respiratory organ of the larva of *Culex*; (2) on the chitinous components of the dilated joints in the front tarsi of the male of *Dytiscus*; and on *Polyxenus lagurus*, Deg.

Joseph, G. Ueber Sitz und Bau der Geruchsorgane bei den Insekten. Ber. Vers. Naturf. 50 (München), pp. 174 & 176.

——. Zur Morphologie des Geschmacksorganes bei den Insekten. *Loc. cit.* p. 227 *et seq.*

These papers on the position and structure of the organs of smell and taste in Insects have not been seen by the Recorder.

Krüger, —. Ueber die Lautäusserungen und Tonapparate der Insekten. JB. Ver. Magdeburg, vii. p. 107 *et seq.*

Not seen by the Recorder.

Lomnicki, M. Sprawozdanie z wycieczki zoologicznéj odbytéj na Podolu w r. 1876, pomiedzy Seretem, Zbruczem a Dniestrem. Sprawozd. Kom. fizyogr. xi. [1877] pp. (128)–(151).

Refers to all Orders, the *Orthoptera*, however, receiving most attention.

Lowne, R. T. On the Modifications of the Simple and Compound Eyes of Insects. Phil. Tr. clxix. pp. 577–602, pls. lii.–liv., woodcut.

Observations with improved methods and instruments on the structure of the stemmata and compound eye in *Eristalis tenax*, of the compound eye in *Tipula*, *Formica rufa*, *Syrphus*, *Musca vomitoria*, *Stomoxys*, *Tabanus*, and *Vanessa atalanta*, and of the eye in *Agrion puella*, *Acridium*, *Sphingidæ*, and Noctuid moths. The highest development of the aggregate eye is in the so-called compound eye of the Nematocerous *Diptera*, and of the *Hymenoptera*. Grenacher's observations, made on immature insects, do not accord well with those of the author. The form of eye typical of the *Noctuæ* is the conic, which is termed proto-conic in its embryonic condition, and sclero-conic in these moths; this conic eye is the nearest approach to the primitive eye, but is remarkably modified into (1) hydro-conic (with the cone replaced by fluid, and the recipient structures reduced to their simplest condition), as in Brachycerous *Diptera* and *Odonata*, and (2) tetraphoric, with very complex tetrasome and tetraphore, as in some diurnal *Lepidoptera* examined and in *Acridium*. Müller's theory of mosaic vision is on the whole accepted. The number of species and genera as yet examined is, however, admitted to be far too small to found a correct opinion as to typical structures.

Marshall, T. A. Notes on the Entomology of the Windward Islands. Pr. E. Soc. 1878, pp. xxxvii. & xxxviii.

A general sketch, with notices of the recognized and more important

species, of insects of all orders (including *Arachnida* and *Myriopoda*, the latter with one sp. n.) observed in Barbados, Martinique, and Antigua. The fauna is very meagre. *Apis mellifica* is now wild in the latter island.

Meldola, R. Entomological Notes bearing on Evolution. Ann. N. H. (5) i. pp. 155–161.

Contains extracts from a letter by Fritz Müller, bearing on the sounds made by butterflies, the display of colours by *Lepidoptera*, Insects distinguishing colours, mimicry, and the correlation of habit with protective resemblance.

M'Lachlan, R. Report on the *Insecta* (including *Arachnida*), collected by Captain Feilden and Mr. Hart between the parallels of 78° and 83° North Latitude, during the recent Arctic Expedition. J. L. S. xiv. pp. 98–122, map.

About 45 spp. of *Insecta* (5 of *Hymenoptera*, 1 of *Coleoptera*, 13 of *Lepidoptera*, about 15 of *Diptera*, 1 of *Hemiptera*, 7 of *Mallophaga*, and 3 of *Collembola*), and about 15 of *Arachnida* are noticed. An affinity with the fauna of Lapland is suggested, and the occurrence of *Rhopalocera* so far north is emphasized. Three new species (*Hymenoptera* and *Lepidoptera*) are described, and three named varieties of known Lepidopterous species.

Mocsáry, S. Adatok Zólyom és Liptó Megyék Faunájához (Data ad Faunam Hungariæ septemtrionalis comitatuum ; Zólyom et Liptó). Term. Közl. xv. (1877–78), pp. 223–263.

Pp. 232–262 refer to *Insecta* : a mere list of names with localities. A new species of *Chrysis* and of *Hoplisus* are, however, described.

Müller, Hermann. Die Insecten als unbewusste Blumenzüchter. Zool. Anz. i. pp. 32 & 33 (abstract) ; Kosmos, ii. pp. 314–337, 403–426, 476–499, illustrations.

Pérez, J. Sur les causes du bourdonnement chez les Insectes. C. R. lxxxvii. pp. 378–380.

The author's experiments do not entirely corroborate those of Chabrier, Burmeister, Landois, &c. Gumming together the wings of *Sarcophaga carnaria* does not stop the buzzing sound ; but if the wings are held firmly together and stretched as tightly as possible from their base, all noise ceases. Removing the scaly parts round the stigmata has no effect whatever, if the fly is not physically and sensibly weakened by the operation. Lesions of the respiratory orifices, and the introduction of solid substances into them, neither stop the buzzing nor change its tone. Hermetically sealing the thoracic stigmata only weakens the sound produced in proportion to the weakening of the power of flight by the consequent asphyxia. The wings are the seat of the buzzing : in *Hymenoptera* and *Diptera* this noise is owing to two distinct causes, (1) the vibrations of which the wing articulation is the seat, and which constitutes the true buzzing, (2) the friction of the wings against the air, modifying the other sound more or less. In *Lepidoptera* and *Neuroptera*, the only sound produced is that of the friction of the air by the wings.

Jousset de Bellesme, *tom. cit.* pp. 535 & 536, referring to this Memoir, records his own observations, communicated to the Congress of Sciences, but not then published. Only the *Diptera* and *Hymenoptera* emit two sounds, one grave, the other acute and usually an octave higher; this is the essential of buzzing. The grave sound is produced by the wing, disappearing when that is cut off. The acute is not produced by the rush of air through the stigmata or by the vibration of the valvules round them, but by the vibration of the thoracic pieces to which the flight muscles are attached; and it is only in the *Diptera* and *Hymenoptera* that the displacement can occur on a sufficiently large surface to produce a perceptible noise.

Reiber, F. Des Régions Entomologiques de l'Alsace et de la Chaîne des Vosges. Bull. Soc. Colm. xviii. & xix. [1877–78]. p. 63 *et seq.*

The author divides Alsace into seven physical regions, of which he enumerates the special Insect-fauna. Three are in the plain country, and three in the mountains, separated by the Vosges sandstone district.

——. Promenade Entomologique à l'île du Rhin, près de Strasbourg. *Tom. cit.* p. 81 *et seq.*

These papers are also published separately, pp. 35. *Cf.* Nouv. et faits, 2, No. 12, p. 46.

Rondani, Camillo. Repertorio degli Insetti Parassiti e delle loro Vittime. Supplemento alla seconda parte: Vittime. Bull. Ent. Ital. x. pp. 9–33 (*Lepidoptera*), 91–112 (*Coleoptera* and *Hymenoptera*), 161–178 (*Diptera*, *Hemiptera*, and *Acaridea*).

This supplement to the insects attacked apparently concludes the work, commenced in 1871.

Schindler, E. Beiträge zur Kenntniss der Malpighi'schen Gefässe der Insecten. Z. wiss. Zool. xxx. pp. 587–660, pls. xxxviii.–xl., woodcut.

A purely histological discussion of the Malpighian vessels in Insects, defined in a general way (including *Myriopoda* and *Arachnida*) as supplementary glands of the intestinal canal, always situated in the equivalent to the rectum, though with different degrees of distance from the meatus. Three special constituents of this general structure are noted, (1) a fasciated, serous outer coating, enveloped in the peritoneum, and containing a gland-kernel; (2) a usually very soft homogeneous Tunica propria; and (3) a single layer of frequently very large excretion-cells (gland epithelium), forming a more or less wide central canal, next to the overlying stratum of the Tunica propria. The last is not the invariable structure, as frequently an accessory inner-lining, perforated by small pore-channels, is found. The author enters at some length upon the history of these vessels and the different theories as to their origin and functions; and then describes their formation in the different Orders, coming to the decided conclusion that they are special urinary-organs.

H. Simroth, Z. ges. Naturw. (3) iii. pp. 826–831, reviews Schindler's paper, comparing his own descriptive account of the intestinal canal and appendages in the larva of *Osmoderma eremita*, tom. cit. pp. 493–518, pls. xvi.–xviii., and Graber's on *Chalcophaga mariana* (Graz: 1874).

The Malpighian vessels can be demonstrated both in the pylorus and chyle-stomach.

SCHNEIDER, OSCAR. Naturwissenschaftliche Beiträge zur Kenntniss der Kaukasusländer, auf Grund seiner Sammelbeute. Dresden: 1878, 8vo, pp. 160, pls. i.–v.

The results of the author's collecting in the Caucasus during the summer of 1875 have been consigned to various specialists; and (as regards the *Insecta*) the present volume contains the descriptions of *Hymenoptera*, by Reinhard, Mayr, and Emery; the *Orthoptera*, by Brunner von Wattenwyl; and the *Hemiptera*, by Geyza von Horvath. The *Coleoptera*, which are by far the most numerous (18,000 specimens of 1700 species) have been separately treated by the author with Leder, Eppelsheim, &c., in Verh. Ver. Brünn, xvi. & xvii.

SCUDDER, S. H. An Account of some Insects of unusual Interest from the Tertiary Rocks of Colorado and Wyoming. Bull. U. S. Geol. Surv. iv. pp. 519–543.

Chiefly from the Florissant Beds, Colorado, the species found in which indicate a tropical relationship in a conspicuous degree. The following new genera and species are described:—LEPIDOPTERA, *Prodryas* (p. 520) *persephone* (p. 524), the first American fossil butterfly, diverging from living types, and showing scales on the wings; DIPTERA, *Palembolus* (p. 526) *florigerus* (p. 528); COLEOPTERA, *Parolamia* (p. 529) *rudis* (p. 530); HEMIPTERA, *Petrolystra* (p. 530) *gigantea* (p. 531) and *heros* (p. 532); ORTHOPTERA, *Lithymnetes* (p. 532) *guttatus* (p. 533); NEUROPTERA, *Dysagrion* (p. 534) *frederici* (p. 536), *Holcorpa* (p. 540) *maculosa* (p. 542). Some remarkable egg-masses, the first insect eggs found in a fossil state, are referred to an unknown insect named *Corydalites* (g. n.) *fecundum* (p. 537), and some caddice-fly cases to another named *Indusia calculosa* (p. 542), adopting Giebel's general generic name for cases of extinct *Phryganeidæ*.

——. The Fossil Insects of the Green River Shales. *Tom. cit.* pp. 747–776.

Found near the Green River Station on the Union Pacific Railroad in Wyoming. The following new forms are described and named:—HYMENOPTERA, *Lasius terreus*, p. 747, *Bracon laminarum*, p. 748, *Decatoma antiqua*, p. 749; DIPTERA, *Diadocidia ? terricola*, p. 750, *Stenocinclis* (g. n., *Asilidæ*) *anomala*, p. 751, *Milesia quadrata*, p. 752, *Chilosia ampla*, p. 753, *Polyomyia* (g. n., *Myopidæ*), p. 754, for *P. recta*, p. 755, *Sciomyza ? manca*, p. 756, *disjecta*, p. 758; COLEOPTERA, *Cychrus testeus*, p. 758, *Platynus senex*, p. 759, *Tropidosternus saxialis*, p. 759, *sculptilis*, p. 760, *Berosus tenuis* and *sex-striatus*, ibid., *Laccobius elongatus* and *Hydrobius decineratus*, p. 761, *Bledius adamus*, p. 762, *Anobium ? ovale*, ibid., and *deceptum*, p. 763, *A. lignitum*, p. 763, *Mycotretus binotata* [*-tus*], p. 763, *Cryptocephalus vetustus*, p. 764, *Eugnamptus decemsatus*, ibid., *Ophryastes compactus*, p. 765, *Otiorrhynchus dubius* and *Eudiagogus terrosus*, p. 766, *Gymnetron lecontii*, p. 767, *Dryocœtes carbonarius*, p. 768, *Cratoparis repertus* and *C. ? elusus*, ibid.; HEMIPTERA, *Cyrtomenus con-*

cinnus, p. 769, *Æthus punctulatus*, ibid., *Cydnus ? mamillanus*, p. 770, *Rhyparochromus ? terreus*, ibid., *Reduvius ? guttatus*, *Acocephalus adæ*, and *Fulgora ? granulosa*, p. 771, *Aphana rotundipennis*, *Lystra ? richardsoni*, and *Cixius ? hesperidum*, p. 772, *Mnemosyne terrentula*, p. 773, *Lithopsis* (g. n., *Tropiduchidæ*), ibid., for *L. fimbriata*, p. 774; ORTHOPTERA, *Nemobius tertiarius*, p. 774; NEUROPTERA, *Podagrion abortivum*, p. 775. Other known species and many fragments are described.

SIMROTH, H. See SCHINDLER, *suprà*.

SLATER, J. W. On the Secondary Sexual Characters of Insects. Pr. E. Soc. 1878, pp. xiv.–xvii.

Observations on the projections of head or thorax, development of antennæ or palpi, and modifications of legs, usually found in the male sex (in *Coleoptera*). No result is arrived at. See also Camerano, Atti Acc. Tor. xiii. p. 751.

SWINTON, A. H. On the Expression of the Emotions by Insects. Pr. E. Soc. 1878, pp. xviii.–xxi.

Observations on exhibitions of instinct for self-preservation, sexual attraction, anger, and maternal care.

TASCHENBERG, E. L. Praktische Insektenkunde. 1. Einführung in die Insektenkunde. Bremen: pp. 233, 46 cuts. [Not seen by the Recorder; quoted from Bertkau's Bericht, &c., 1877–78, in which no date for this work appears.]

WACHTL, F. A. Entomologisch-biologische Studien. Erste Serie. (Arbeiten aus dem entom. Laboratorium der k. k. Versuchsleitung in Wien.) Wien: 1878.

Refers to *Hymenoptera* and *Diptera*.

WEALE, J. P. M. Notes on South African Insects. Tr. E. Soc. 1878, pp. 183–188.

Discusses species found on *Acacia horrida*, and protected by resemblances to various parts of that tree, such as the leaves, thorns, excrescences, stems, bark, flowers, &c. Mimicry of ants by species of *Salticus* (*Arachnida*) is also referred to. *Cf.* also Pr. E. Soc. 1878, pp. xiii. & xiv.

Fossil Insects.

See GOSS & SCUDDER, *suprà*.

A. Assmann corrects some determinations of insects from the lithographic stone strata in Bavaria described by Germar, and in the Palæontological Museum at Munich; Ber. Vers. Naturf. 50 (München), pp. 191 & 192.

Oustalet's "Recherches sur les insectes fossiles des terrains tertiaires de la France," criticised by A. Giard, Bull. Sc. Nord. (2) i. p. 56 *et seq.*

Dalman's memoir on Copal-insects; H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. l.

Anatomy, Physiology, &c.

See also Bobretzky, Brandt, Dewitz, Flögel, Graber, Haller, Joseph, Krüger, Lowne, Pérez, Schindler, & Simroth, *suprà*.

Ovology. A. Brandt's work "Ueber das Ei und seine Bildungstätte" (Leipzig: 1878, pp. 200, pls. i.–iv.) contains an elaborate account of the insect ovary, egg-structure, and genital organs, with a special comparison of the component parts of the egg in Insects with those of other classes.

Tracheal-system as basis of Classification. Ernst Voges, Z. wiss. Zool. xxxi. pp. 143 & 144, in "Beiträge zur Kenntniss der Juliden" [*Myriopoda*, suprà], gives the following scheme for the Tracheata :—

A. Tracheal openings fasciculate, tracheæ non-branchiate, on a free upper surface, without metameric arrangement, principally situated on the ventral and lateral surfaces.

a. Tracheal openings irregularly distributed over the surface . . . . . *Peripatus capensis*.

b. Tracheal openings distributed so far with regularity that the majority are placed in two lateral rows, alternating with the 15 pairs of foot-stumps of the animal. *P. novæ-zealandiæ*.

B. Openings fasciculate, tracheæ non-branchiate, on a covered upper surface, with metameric arrangement, and situate on the ventral surface of the body.

c. Openings irregularly disposed over the upper surface of the integumentary covering . *Polydesmus complanatus* ?.

d. Openings regularly disposed over the upper surface of the integumentary covering . *Spirobolus cupulifer*, *Julus londinensis*.

C. Openings of dissimilarly formed tracheæ on a free upper-surface, in the majority with metameric arrangement, situate on the ventral or lateral surfaces, and becoming a more uniform organ-system by fusion of contiguous branches.

e. Tracheal openings not placed metamerically, with fasciculate, non-ramose tracheæ, having cribriform orifices ramose tracheal stems with simple orifice occurring in the same animal . . *Gibocellum* (*Arachnoidea*).

f. Tracheal openings arranged metamerically, cribrose and simple-mouthed tracheæ in the same genus, but occurring in different forms . . . *Scolopendra*.

g. Tracheal openings arranged metamerically, tracheæ with arborescent ramifications, anastomosing, joined before the opening to a rudimentary trachea . . *Insecta*.

Béla Deszö, in Zool. Anz. i. p. 275, discussing the connection between the circulatory and respiratory organs in the Arthropods remarks that in *Insecta*, *Arachnida*, and *Myriopoda* there are as many pairs of openings in the dorsal vessels as there are pairs of stigmata.

Respiration. Chemical experiments by R. Pott (Landwirthschaftliche Versuchsstationen, xviii. 1875, p. 81), with table showing the amount of

carbonic dioxide given off by various *Coleoptera*, *Lepidoptera*, and *Orthoptera*, noted by G. Dimmock, Psyche, ii. p. 125.

Nervous system. Cadiat, C. R. lxxxvi. p. 1422, in a note on the structure of the nerves of the *Invertebrata*, states that in *Crustacea*, *Insecta*, and *Annelida*, this differs from the vertebrate system in the complete absence of "myeline," a substance possessing great refracting power, and situated in the *Vertebrata* between the cylindrical axis and special coating of the nerve-tubes, except the grey threads of the great sympathetic nerve.

The Eyes of Insects. Grenacher's "Untersuchungen über das Arthropoden-Auge," published as a supplemental number of the Clinical Monatsblatt für Augenheilkunde of Rostock, xv. [May, 1877], is very fully abstracted in Bertkau's Bericht, &c., 1877–78, pp. 230–236, with observations on the same subject by Exner (SB. Ak. Wien, lxxii. Abth. 3, p. 156 *et seq.* pl.) and Schmidt (Z. wiss. Zool. xxx. suppl. p. 1 *et seq.* pl. i.). See also FOREL, *suprà*.

E. Berger's "Untersuchungen über den Bau des Gehirns und der Retina der Arthropoden," Arb. Zool. Inst. Wien, ii. pp. 173 *et seq.*, & iii. p. 437 *et seq.* 5 pls.; and Dietl's "Die Gewebselemente das Centralnervensystems bei wirbellosen Thieren" in Ber. Ver. Innsbr. 1878, may be noticed here as bearing on the discussion of hearing in Insects.

On the functions of the antennæ in Insects; Bull. Soc. Nîmes, vi. No. i.

On their physiological importance, &c.; SB. Ges. Isis, 1877, p. 133.

Smell acutely developed in Insects, hearing not considered to exist; W. M. Gabb, Nature, xvii. p. 282.

E. L. Layard, *op. cit.* xviii. p. 301, adduces further instances proving the existence of the smelling faculty, and also supports that of hearing: he quotes Montrouzier of New Caledonia, whose experiments on a weevil proved the perception of smell to be in the tip of the antennæ. A poisonous wasp called "cubo" on the Guaquaquil river is well known to appreciate sounds; A. Simpson, *tom. cit.* p. 540. This corroborated by W. L. Dudley, *l. c.* p. 568.

The antennæ considered not the seat of smell. J. W. Slater, Ent. xi. p. 233.

The development of auditory organs and eyes useful in classification; A. H. Swinton, Ent. xi. p. 255.

Cibarian organs. J. Muhr has published (Prague) five diagrams of highly magnified views of these in *Carabus*, *Apis*, *Pieris*, *Culex*, and *Pyrrhocoris*. The same author, according to Bertkau (Bericht, &c.: 1877–78), has given a descriptive account in Programm der deutschen Staats-Realgymnasiums, Prag, 1878.

Intestinal absorption. G. F. Tursini (Rend. Acc. Nap. xvi. 1877, p. 95 *et seq.*), in a treatise entitled "Un primo passo nella ricerca dell' assorbimento intestinale degli Artropodi," describes his experiments on *Pimelia*, *Scaurus*, *Cetonia*, and *Blatta*.

On the tegumentary colours of Insects; H. Hemmerling, Inaugural Dissertation, Bonn: 1878.

Causes of colour in Insects; Roelofs, CR. Ent. Belg. xxi. p. cclxvi.

Vitality in Insects; Helms, Ent. Nachr. iv. p. 312.

Stridulation in *Hemiptera*, *Hymenoptera*, and *Coleoptera*. Notes by A. H. Swinton, Ent. M. M. xv. p. 117. In *Coleoptera*; J. L. Le Conte, Psyche, ii. p. 126, and L. v. Heyden, Käf. v. Nassau, p. 112.

On the hybernation of various Insects; F. Rudow, Z. ges. Naturw. (3) iii. p. 244.

On secondary sexual characters (in *Cicindela campestris*, *hybrida*, *chloris*, and *germanica*, and *Carabus olympiæ*); L. Camerano, Atti Acc. Torr. xiii. pp. 751–764. [See also Slater, in General Subject, *suprà*.]

Monstrosities, &c.:—

See Cornelius, *suprà*.

Necrophorus humator and *vespillo*, *Silpha atrata* and *lævigata*, *Hoplocephalus bungaroides* and *calcaratus* and *pyri*, *Cetonia metallica* and *aurata*, *Telephorus* brown and black species, and *Rhagonycha melanura*, ♂, and *Agriotes lineatus*, ♀, *Chrysomela sanguinolenta* and *hæmoptera*, *Cryptocephalus sericeus* and *violaceus*, respectively observed *in copulâ*; F. Rudow, Z. ges. Naturw. (3) iii. pp. 243 & 244.

Hermaphrodite *Melolontha vulgaris*, the left side apparently ♀, the right ♂; on dissection, the specimen proved to be a true ♂, the left antennal clava being abnormal. Observations on instances of supposed hermaphroditism in bees, &c., noticed by Graber & Siebold are also discussed; H. Simroth, Z. ges. Naturw. (3) iii. pp. 347–350, figs. 1–3.

Deformities.—Gredler, CB. Ver. Regensb. xxxi. p. 139. *Abax ovalis* and *Geotrupes sylvaticus*; P. de Borre, CR. Ent. Belg. xxi. p. ccxlix. fig. *Dytiscus latissimus* and *marginalis*, and *Hydrous piceus*; C. A. Dohrn, S. E. Z. xxxix. p. 219. *Dytiscus marginalis* ♂ with three right-hand front legs, springing from one enlarged coxa, figs. 1 & 2; and *Saperda carcharias* with an aborted antennæ springing near the base of the left antennæ; J. Ritzema Bos, Tijdschr. Ent. xxii. pp. 206–209, pl. xi. *Lucanus cervus*, ♀, with toothed mandibles; G. de Rossi, Ent. Nachr. iv. p. 228. *Tentyria interrupta* with a 4-jointed supplementary right antenna; M. Blanc, Feuil. Nat. vii. p. 91. *Toxotus meridianus* with a triple right antenna; Jolicœur, Bull. Sc. Nord (2) i. p. 65. *Geotrupes stercorarius* simulating *typhæus*; Fröhlich, Ent. Nachr. iv. p. 118. *Rhamnusium salicis*, with deformed left antenna; Von Hahn, JB. schles. Ges. lv. [1878] p. 189. *Lytta vesicatoria* with both antennæ malformed; Penzig, *ibid.*

Fertilization of flowers by Insects; R. Vion, Bull. Soc. L. N. Fr. 1878, p. 151. *Utricularia* and *Pyxidanthera*; W. J. Beal, Am. Nat. xii. p. 552. *Lepidoptera* never visiting *Tecoma capense*, which is much frequented by small bees; M. S. Evans, Nature, xviii. p. 543. Honey-bees collecting pollen from chickweed (*Stellaria media*), hitherto not noticed as an insect-attractor and supposed to fertilize itself. *Salvia splendens* bored to get the honey, when other plants failed; T. Meehan, *l. c.* p. 334. [See also Müller, *suprà*.]

Selective discrimination. *Macroglossa stellatarum* mistaking pine-knots on a wall for holes; C. G. O'Brien, Nature, xvii. p. 402. *Bombus*

in turn taking the pollen, &c., of *Althæa*, *Trifolium*, *Cirsium*, and *Delphinium*; 'V. T. C.' *tom. cit.* p. 424.

Insectivorous plants: G. B. Corbin, Ent. xi. p. 197; G. C. Druce, *tom. cit.* p. 233.

On natural enemies to insects, both animals and plants (Saxifrage especially noted); W. V. Reichenau, Ent. Nachr. iv. p. 284. [See also Rondani, *suprà*.]

The existence of certain insects considered corroborative of the nativity of the plants to which they are elsewhere known to be attached; F. B. White, Nature, xviii. p. 278.

Biological notices on various Prussian species; Katter, Ent. Nachr. iv. pp. [illegible]4; H. Gradl, *tom. cit.* pp. 237 & 238.

Report of Committee of Am. Ass. 1877 on Biological Nomenclature; E. D. Cope, Am. Nat. xii. p. 517.

The Bulletin d'Insectologie Agricole, 1878, contains many small articles on economic entomology (V. Mayet, 'Les Insectes utiles'). See also Fettig, *suprà*.

The "Scientific American" and "Field and Forest" for 1878 also contain many scattered notes of economic and biological interest, mostly at second hand (contents given in Pysche, ii.).

Injurious Insects. Observations on 8 additions to the list; Schoch, MT. schw. ent. Ges. v. p. 387.

Bavarian and Bohemian forests: injurious insects and their parasites; Herlein, Ber. Ver. Passau, xi. pp. 88 & 95 *et seqq.* (See also Binzer and Brischke, *suprà*).

Economic Entomology: E. A. Ormerod, Tr. Watford Soc. ii. pp. 84–88.

Townend Glover's "Manuscript Notes from my Journal, or Entomological Index to Names, &c., in Agricultural Reports, with lists of vegetable and animal substances injured or destroyed by Insects," &c., 1877, and "Cotton, and the principal Insects, &c., frequenting or injuring the plant in the United States," 1878, lithographed at Washington, have not been published. Their contents are given in Psyche, ii. p. 158.

On the prevention of Insect injury by the use of phenol preparations; E. A. Ormerod, Tr. E. Soc. 1878, p. 333.

Local Faunæ.

(See also Camerano, Marshall, M'Lachlan, Reiber, Schneider, and Weale, *suprà*.)

Great Britain. Publication of old notes on rare or doubtful species; F. Smith, Ent. xi. pp. 171–178.

South of England. C. W. Dale, in "The History of Glanville's Wootton, in the County of Dorset" (London: 1878, sm. 8vo), devotes pp. 40–317 to lists of the various Insects observed in that parish, enumerating 3890 species, whereof a few are curtly diagnosed as new, and with occasional remarks as to habits, rarity of occurrence, &c.

Ireland. *Coleoptera* and *Hemiptera* recorded by J. A. Power, Ent. xi. pp. 2–8. Many of the most common English species did not occur. Additions by T. Brunton, *tom. cit.* p. 94.

Schelling. List of species collected by H. J. Veth ; Tijdschr. Ent. xxii. (Verslag), pp. xciii.–xcviii.

Belgium. Species new or rare to the fauna ; CR. Ent. Belg. xxi. p. cclxxix. *et seq.*

Dunes of Normandy ; M. Girard, Ann. Soc. Ent. Fr. (5) viii. p. 241.

Rhine district. Interesting forms noticed by P. Bertkau ; CB. Ver. Rheinl. 1877, p. 117.

Mecklenburg. Additions to the insect-fauna ; F. Rudow, Arch. Ver. Mecklenb. xxxi. [1877] pp. 113–119 [*Hymenoptera, Hemiptera, Neuroptera*].

Egerlande. The commencement of a list of the Insect fauna ; von Dalla Torre, Lotos, xxvii. [1877], p. 91 *et seq.*

Austro-Hungary. The periods of appearance of *Coleoptera* and *Hymenoptera* given by Fritsch in continuation of his work on this subject ; Denk. Ak. Wien, xxxvii. p. 1 *et seq.*, xxxviii. pp. 97–166, 6 pls.

Spain. V. L. Seoane, "Notas para la Fauna Gallega" (Ferrol : 1878, pp. 1–16) describes various new and little known insects.

Krasnovodsk and Derbend. List of *Lepidoptera* and *Coleoptera* collected in June ; A. Becker, Bull. Mosc. liii. (1) pp. 123–126.

Amur. The insects observed on the road to and from Moscow mentioned in letters by H. Christoph, S. E. Z. xxxix. pp. 201–219, 401–410.

Java. Mention of insects from Sindang-læeja ; C. O. Waterhouse, J. L. S. xiv. p. 134.

Africa. Oriental affinities in the Æthiopian Insect-fauna pointed out, especially in *Hemiptera-Heteroptera* ; W. L. Distant, Nature, xvii. p. 282.

C. J. S. Bethune, Canad. Ent. x. pp. 116, 137, 213, *et seqq.*, continues his compilation of "Insects of the Northern Parts of British America" (from Kirby's "Fauna Boreali-Americana"), discussing the *Hymenoptera* and *Hemiptera*.

United States. Characteristics of the central zoo-geographical province noted by A. S. Packard, Jun., Am. Nat. xii. p. 512.

Insects imported from Europe ; H. A. Hagen, Psyche, ii. p. 191.

Illinois. Cyrus Thomas's "Sixth Report of the State Entomologist on the noxious and beneficial insects of the State of Illinois. The first biennial Report" (Springfield, Ill. : 1877), is of the usual practical and local nature, from the notice in Psyche, ii. p. 165. The second part contains the commencement of a proposed Manual of economic Entomology, describing the beneficial and injurious *Coleoptera*.

Chilian and New Zealand faunæ. E. Birchall, Nature, xvii. p. 221, notices European genera of *Heterocera* occurring in New Zealand and Chili.

On means of destroying *Acari* in collections (benzine preferred) ; C. Royer, Pet. Nouv. ii. p. 218. A coating of mercury for the sides of the boxes or drawers is still better, and does not evaporate ; V. Pyot, *tom. cit.* p. 227. Recapitulation of various methods, and the preference given to creosote ; Lafaury, *tom. cit.* p. 245. Mercury no use ; De la Perraudière, *tom. cit.* p. 262. Percussion to displace parasitic larvæ ; Xambeu, *tom cit.* p. 271.

On preservation of insects for collections (except *Lepidoptera*) with a resinous medium, suggested by the perfect condition of amber-insects; F. Petzold, Ent. Nachr. iv. pp. 104–106.

The Linnæan collection and its types; Pr. E. Soc. 1878, pp. xlvi.–xlix.

Zinc wash for cabinet drawers; E. L. Graef, Canad. Ent. x. p. 97.

A compendious collecting apparatus; B. Haase, Ent. Nachr. iv. pp. 200, 217, 231.

Beating net; J. S. Bailey, Canad. Ent. x. p. 62, figs.

Dat[illegible]and localities on labels; F. Katter, Ent. Nachr. iv. pp. 8, 62.

[illegible]nological *v.* classical Latin; Ent. Nachr. iv. p. 47.

[illegible]he difficulties attending the student in getting to know recorded inf[illegible]ation, especially as regards separata; Kriechbaumer, Ent. Nachr. iv. p. 255, & K. W. v. Dalla Torre, *tom. cit.* pp. 281–284.

On the number of Entomologists and small practical results; F. Katter, Ent. Nachr. iv. pp. 1–5.

Hagen's 'Bibliotheca.' Additions and corrections by K. W. v. Dalla Torre, Ent. Nachr. iv. pp. 324–330.

Bulletin of the Brooklyn Entomological Society, 1878. An analysis of the contents of most of the years' publication in Ent. Nachr. v. pp. 274 & 275: apparently nothing new.

On the Recent progress of Entomology in North America; S. H. Scudder, Psyche, ii. pp. 97–116.

Stettin. ent. Zeit. M. Wahnschaffe, S. E. Z. xxxix. Beilage, has compiled a 'Repertorium' of the contents of the vols. for 1871 to 1878.

C. Stål. Notice of his life and works; V. Signoret, Ann. Soc. Ent. Fr. (5) viii. p. 177 *et seq.*

COLEOPTERA.

BY

E. C. Rye, F.Z.S., M.E.S.

The General Subject.

Ballion, E. Verzeichniss der im Kreise von Kuldsha gesammelten Käfer. Bull. Mosc. liii. (1) pp. 252–389.

293 species are enumerated, with dates and localities, and descriptions of several new ones.

Bedel, L. Notes pour servir à la Nomenclature générale des Coléoptères. Ann. Soc. Ent. Fr. (5) viii. pp. 245–260.

Corrections in references, dates, derivations, orthography, &c., in the Munich Catalogue, chiefly applicable to *Carabidæ*, *Dytiscidæ*, and *Hydrophilidæ*, and for the most part from the works of Linnæus, Fabricius, and Latreille. [The omission by Gemminger and von Harold of Dalman's copal species is noted by H. Lucas, *l. c.* Bull. p. l.; *cf.* also, generally, C. A. Dohrn, S. E. Z. xxxix. pp. 243 & 487.]

Bertkau, P. Bericht über die wissenschaftlichen Leistungen im Gebiete der Arthropoden während der Jahre 1877–78. Arch. f. Nat. xliv. 2, pp. 364–562. [*Insecta: Coleoptera.*]

Bertolini, S. de. Supplemento contenente le specie scoperte o descritte di recente od ommesse nel "Catalogo sinonimico e topografico dei Coleotteri d' Italia." [Published with Bull. Ent. Ital. x., and paged 237–252, in continuation of the Catalogue above referred to, commenced in 1872.]

Chaudoir, E. de. Énumération des Cicindélètes et des Carabiques recueillis par M. A. Raffray, dans les Iles de Zanzibar et de Pemba, ainsi qu'à Bagamoyo, Mombaze, et sur les montagnes de Schimba, avec la description des espèces nouvelles. R. Z. (3) vi. pp. 69–103, 145–161, 175–194.

117 species are enumerated and described, including some new genera. 26 species mentioned by Gerstäcker are also referred to; and, with others, the number is raised to 143 (6 *Cicindelidæ*, 137 *Carabidæ*). Some of the new species are described by Putzeys. Various species are identified as common to Natal, Angola, and other African localities, as well as Madagascar.

Deyrolle, H., & Fairmaire, L. Descriptions de Coléoptères recueillis par M. l'Abbé David dans la Chine Centrale. Ann. Soc. Ent. Fr. (5) viii. pp. 87–140, pls. iii. & iv.

No analysis, recapitulation, or comparison of fauna is made, the paper consisting of descriptions of many new genera and species throughout the *Coleoptera*. In some few instances, the initial identifying the author is omitted.

Faust, J. Beiträge zur Kenntniss der Käfer des europäischen und asiatischen Russlands, mit Einschluss der Küsten des Kaspischen Meeres. Hor. Ent. Ross. xiv. pp. 112–139.

Continues [Zool. Rec. xiii. *Ins.* p. 12] the descriptions and elucidations of obscure Russian species, solely referring to the *Cerambycidæ*. No new species are described.

Gandolphe, P. Révision des Coléoptères recueillis en Algérie. Bône: 1878, 8vo (extr. from Bull. Ac. d'Hippone).

Heyden, L. von. Die Käfer von Nassau und Frankfurt. JB. Nass. Ver. xxix. & xxx. pp. 55–413 [also separately, Wiesbaden: 1878, 8vo, pp. 358].

This very carefully prepared list contains localities with critical and biological notes on 3161 species. Reviewed in Ent. Nachr. ii. p. 91.

Król, Z. Fauna koleopterologiczna Janowa pod Lwowem. Sprawozd. Kom. fizyogr. xi. [1877] pp. (33)–(63).

A list of names and localities; some species are new to the fauna.

Lacker, K. Die Vielgestaltigkeit den Form und Lebensweise im Reiche der Käfer im Lichte der Descendenztheorie. JB. Ver. Gratz, iv. p. 45 *et seq.*

Apparently of little value, from the notice in Bertkau's "Bericht."

Le Conte, J. L. The *Coleoptera* of the Alpine Regions of the Rocky Mountains. Bull. U. S. Geol. Surv. iv. pp. 447–480.

The peculiar geological features of the elevated interior region of North America are considered to present particularly favourable opportunities for the study of geographical distribution. Of some 220 species enumerated (with localities and elevations) as collected by Mr. F. C. Bowditch at an elevation of 6000 feet and upwards, 30 are of wide distribution east and west, 9 or 10 are not found west, and 6 not east of the mountain mass; about 46 belong to the conterminous arid regions east and west, 10 being found only on the east, and 20 only on the western side; 43 species are hyperborean, 14 having only a north-western distribution, and 3 only an eastern range; and 30 are known from the mountains only. Various new species are described. Another list of species collected at Atlanta, Idaho (7,800 feet), by Mr. L. Allgewahr, is given; followed by an elaborate discussion of the North American species of *Nebria* (5 new). The author incidentally records a belief that when the beetles of the American Atlantic slopes are more thoroughly investigated, several genera of the Atlantic islands fauna will be found represented among them which do not occur in Africa.

LE CONTE, J. L. [See also SCHWARZ, *infrà*.]

MILLER, L. Eine coleopterologische Reise durch Krain, Kärnten und Steiermark im Sommer 1878. Verh. z.-b. Wien, xxviii. pp. 463–470.

Contains localities, &c., for the species observed in the Alps of Carinthia, Carniola, and Styria, with notes on varieties, &c.

RAGAZZI, VINCENZO. Contribuzione alla Fauna Entomologica Italiana. Catalogo Metodico dei Coleotteri raccolti nella provincia Modenese, nell' estate degli anni 1875–76. Bull. Ent. Ital. x. pp. 179–188.

Of purely local interest: a mere list of names. See also Ann. Soc. Mod. xii. p. 175 *et seq.*, for enumeration of 315 species.

SCHIÖDTE, J. C. De Metamorphosi Eleutheratorum Observationes: Bidrag til Insekternes Udviklingshistorie. Nat. Tids. (3) xi. pp. 479–598, pls. v.–xii. (lxxiii.–lxxviii. of the whole work).

This continuation refers solely to the *Tenebriònidæ*.

SCHNEIDER, O., & LEDER, H. Beiträge zur Kenntniss der kaukasischen Käferfauna. Verh. Ver. Brünn, xvi. p. 3 *et seq.*

Contains the commencement of the descriptions of the species collected by Schneider during his journey in the Caucasus in the summer of 1875. [See THE GENERAL SUBJECT, *suprà*.] Eppelsheim, De Saulcy, Weise, Reitter, &c., assist in this work.

SCHOCH, G. Practische Anleitung zum Bestimmen der Käfer Deutschlands und der Schweiz. Nach der analytischen Methode. Stuttgart: 1878, 8vo, pp. 183, pls. i.–x. (159 figs.).

Reviewed in Ent. Nachr. ii. p. 165.

SCHWARZ, E. A. The *Coleoptera* of Florida. P. Am. Phil. Soc. xvii. pp. 353–372. List of Species, pp. 434–469. Additional descriptions of new species by JOHN L. LE CONTE, M.D., pp. 373–434, and Remarks on Geographical Distribution, *id.* pp. 470 & 471.

1457 species (many new) are enumerated (not reckoning unexamined *Aleocharidæ*), of which 17 are also found in the Antilles, 8 in Mexico and Texas, 4 in Texas, Arizona, and S. California, and 7 occur in South America. Two species occur also in San Domingo, and some N.E. Asian, African, and European genera are represented. The formation of Florida by the gradual growth of coral reefs in comparatively modern times, and their subsequent conversion into land surface, added to the interruption effected by the Gulf Stream, explains the small number of Antillean species. No points at the north-west or extreme south are represented in the collections forming the material of these papers.

SEIDL, F. Die phylogenetischen Grundzüge der Coleopterensystems. JB. Ver. Gratz, iv. p. 60 *et seq.*

SHARP, D. List of Aquatic *Coleoptera* collected by M. Camille van Volxem in Portugal and Marocco. Ann. Ent. Belg. xx. pp. 112–115.

Enumerates 47 *Dytiscidæ* (2 new, 1 described), 2 *Haliplides*, 3 *Gyrinidæ*, and 25 *Hydrophilidæ* (1 new).

[Sharp, D.] Aquatic *Coleoptera* collected by M. Camille van Volxem in Brazil. *L. c.* pp. 116–119.

15 *Dytiscidæ* (2 new, not described), 6 *Gyrinidæ* (2 new), and 6 *Hydrophilidæ*.

——. Aquatic *Coleoptera* collected by M. J.-C. Purves in Antigoa, during the summer of 1872. *L. c.* pp. 120 & 121.

7 *Dytiscidæ*, 1 new *Haliplus*, 2 *Gyrinidæ*, and 3 *Hydrophilidæ*.

Thomson, James. Typi Cetonidarum, Suivis de Typi Monommidarum et de Typi Nilionidarum Musæ Thomsoniani. Paris: 1878, 8vo, pp. 44.

35 new species of *Cetoniidæ* are described in this work, 5 of *Monommatidæ*, and 2 of *Nilionidæ*. The same author's separate work, "Typi Buprestidarum," is noticed *infrà*, under *Buprestidæ*; and his "Typi Cerambycidarum," also published in R. Z., under *Cerambycidæ*.

Faunistic Notices.

See also Ballion, Bertolini, Chaudoir, Deyrolle, Faust, Gandolphe, Von Heyden, Król, Le Conte, Miller, Ragazzi, Schneider, Schwarz, and Sharp, *suprà*.

Scotland. D. Sharp, Scott. Nat. iv. pp. 223–228, 273–276, 322–324, 362–364, continues his Catalogue (*Trachys* to *Rhinosimus*).

A. B. Hepburn, *tom. cit.* p. 248, notes new species to the fauna, &c.

Shetlands. A hypothetical record of captures (including *Spondylis buprestoides*) by M. Nilis; CR. Ent. Belg. xxi. p. xii.

New species to the British fauna, 1872–77, collated by J. A. Power, Ent. xi. pp. 62–69. Notes on this list; G. C. Champion, *tom. cit.* p. 118.

Loire district. L. Favarcq (Ann. Soc. Agric., &c., dep. Loire, xxii., also separately, St. Étienne: 1878, 8vo, pp. 1–23) commences a Catalogue of the *Coleoptera* with *Cicindelidæ* and *Carabidæ*.

Reims. Lajoye, Bull. Soc. Reims, 1878, p. 72, commences a Catalogue of the *Coleoptera* of the environs (*Cicindelidæ* and *Carabidæ*); Bull. Sc. Nord, x. p. 331.

Rhine district. *Asida sabulosa* (*grisea*, F.), on the right bank of the Rhine, near Bonn, and *Otiorrhynchus scabripennis* near Bingen; F. C. Noll, JB. Frankf. Ver. Geogr. 1878, p. 46.

Mecklenburg. Brauns adds 213 species to the List of Mecklenburg beetles; Arch. Ver. Mecklenb. xxxii. pp. 58–74.

Oldenburg. F. Brüggemann gives names and localities of 596 species; Abh. Ver. Brem. v. pp. 579–596.

Bavaria. Kittel continues his systematic list of the species occurring in and near Bavaria; CB. Ver. Regensb. xxxii. Nos. 10 & 11 (to *Scarabeidæ*).

Silesia. K. Letzner, JB. schles. Ges. liv. [1877], pp. 208–211, records 49 species as new to the Silesian Coleopterous fauna. 27 more recorded, *op. cit.* lv. [1878], pp. 193–195, making 4232 in all.

Silesia, Moravia, &c. J. Gerhardt, J. Weise, and others; Deutsche E. Z. 1878, pp. 207–210.

Siebenbürgen. A list of species and varr. in Verh. siebenb. Ver. xxvii. p. 92 *et seq.*

Tyrol. V. Gredler, Z. Ferd. (3) xxii. pp. 102–119, gives a 5th Supplement to his enumeration of the beetles of Tyrol. On species near Trient; S. de Bertolini, Ent. Nachr. ii. p. 81.

Gallicia. Additions to the fauna; M. Lomnicki, Sprawozd. Kom. fizyogr. xi. [1877] p. (151).

Hungary. J. Frivaldszky, Term. Közl. xiii. p. 303 *et seq.*, gives a list of beetles observed in the counties of Temes and Krasso; A. Mocsáry, *op. cit.* xv. p. 232 *et seq.*, in like manner records those of Zólyom and Liptó.

Carpathians. Additions to the fauna by E. Reitter, with help of Eppelsheim, De Saulcy, and Weise (some new species described); Deutsche E. Z. 1878, pp. 33–64.

Upper Engadine. L. v. Heyden notes 7 new species for the local fauna; JB. Ges. Graub. xx. pp. 103 & 104.

Lebanon. E. Peyron, Pet. Nouv. ii. p. 270.

Caucasus. See SCHNEIDER, *suprà*.

Kashgar. Preliminary diagnoses of the new genera and species of *Geodephaga* and *Longicornia* taken by the late Dr. Stoliczka during the Forsyth Expedition, 1873–74, are given by H. W. Bates, P. Z. S. 1878, pp. 713–721. Of *Dytiscidæ*, *Staphylinidæ*, and *Scarabæidæ*, by D. Sharp, J. A. S. B. xlvii. 2, p. 169 *et seq.*; and of *Chrysomelidæ*, by J. S. Baly, Cist. Ent. ii. p. 369.

Cochin China; species collected by Morice (one new genus of *Cebrionidæ*) described by L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. pp. 269–274.

Japan. E. v. Harold publishes the fourth instalment of his Memoirs on the beetle-fauna, in Deutsche E. Z. 1878, p. 65 *et seq.* Many synonyms and indications of identification are suggested.

Abyssinia and Somali Land. R. Gestro describes 10 new species; Ann. Mus. Genov. xiii. pp. 318–322.

Tropical Africa. E. v. Harold, MT. Münch. ent. Ver. ii. pp. 38 & 99, describes new species.

East Africa. 43 new species described, mostly taken by Hildebrandt at Zanzibar; *id.* MB. Ak. Berl. 1878, pp. 210–222, pl.

Nyassa. A new genus of Longicorns, and various new species taken by Mr. H. B. Cotterill, described by H. W. Bates, Tr. E. Soc. 1878, pp. 189–192.

Madagascar. L. v. Heyden, Ber. senck. Ges. 1877–78, p. 97 *et seq.*; C. O. Waterhouse, Ent. M. M. xv. p. 84; Cist. Ent. ii. pp. 287 & 363.

Canada. Additions by Provancher to his "Faune Entomologique du Canada," vol. i.; Nat. Canad. x. pp. 369–385 (1 sp. n.).

Michigan. J. L. Le Conte, P. Am. Phil. Soc. xvii. pp. 593–626, describes new species referred to in (1) a Catalogue by H. G. Hubbard and E. A. Schwarz, *l. c.* pp. 627–643, of the *Coleoptera* found in the Lake Superior Region, and (2) Contribution to a List of the *Coleoptera* of the Lower Peninsula of Michigan, by the same authors, *l. c.* pp. 643–666. Species are also described from Le Conte's own collection, so that the list may be taken as complete, so far as is now known. A large proportion of the species is common to Alaska.

Myrmecophilous beetles in N. America; H. C. McCook, Am. Nat. xii. p. 441.

Central America. Diagnoses of new species of *Cicindelidæ* and *Carabidæ*, preparatory to full descriptions in Godman & Salvin's 'Biologia Americæ Centralis,' are given by H. W. Bates, P. Z. S. 1878, pp. 587–609.

Jamaica and West Indies; C. O. Waterhouse, Tr. E. Soc. 1878, pp. 303–311.

Colombia. Species described and noticed by J. Putzeys, E. Lefèvre, & M. Jacoby; MT. Münch. ent. Ver. ii. pp. 54, 112, & 134.

Tacna, Peru; L. Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lxxxv.

Sandwich Islands. D. Sharp, Tr. E. Soc. 1878, p. 15 *et seq.*, in describing new *Curculionidæ*, refers to the number of species (between 200 and 300) of *Coleoptera* collected in Oahu during two seasons, by Rev. T. Blackburn, who notes the small number of individuals. *Nitidulidæ* described; *id. l. c.* p. 127 et seq. *Cerambycidæ*, id. *l. c.* pp. 201–210.

Fiji, Samoa, &c.; species briefly described by L. Fairmaire in Pet. Nouv. ii. pp. 278, 282, 286 *et seqq.*

Malaysia and New Guinea. A. Raffray records 1,752 species taken by himself in the Austro-Malaysian region, and 640 in the Indo-Malaysian, with comparison of the great groups in each; the *Xylophaga* predominate in the former, and only tree-frequenters are found in the *Carabidæ*, the stone and earth-frequenters being practically absent. The coleopterous fauna of New Guinea is considered to be generically like that of the Moluccas, and more Indo-Malaysian than Australian, in spite of the other faunas. Individuals are more numerous than species, and there are many distinct species on the outlying islands. Bull. Soc. Ent. Fr. (5) viii. p. cxlvi.

Australia and Tasmania. Lamellicorns and *Heteromera* described by C. O. Waterhouse from the British Museum Collection; Tr. E. Soc. 1878, pp. 225–227.

Tasmania; H. W. Bates, Cist. Ent. ii. p. 317 (*Carabidæ*).

New Zealand. H. W. Bates, Ent. M. M. xiv. p. 191, xv. p. 57; D. Sharp, *op. cit.* xv. pp. 47 & 81, and Tr. E. Soc. 1878, p. 9 (*Cossonides*).

Larvæ of beetles. M. Rupertsberger, "Natur und Offenbarung," 1878, pp. 9 & 73 *et seqq.*, woodcuts, describes and figures the structure and segmental divisions.

Stridulation in *Passalus* and *Prionus* noted; J. L. Le Conte, Psyche, ii. p. 126. In *Polyphylla fullo*; L. v. Heyden, Käf. v. Nassau, p. 112.

Stein and Weise's Catalogue, 2nd edn. [Zool. Rec. xiv. *Ins.* p. 11]. Additions and corrections by L. v. Heyden, Eppelsheim, H. v. Kiesenwetter, G. Kraatz (criticising the synonymy of various *Quedii* accepted merely on Fauvel's authority), J. Weise, and E. v. Harold (with occasional observations quoted from other writers); Deutsche E. Z. 1878, pp. 160–196. C. A. Dohrn, S. E. Z. xxxix. p. 76 *et seq.*, & p. 244, criticises various discrepancies and mechanical errors. E. v. Harold, S. E. Z. xxxix. pp. 475–485, replies to Kiesenwetter's critique on the question of revivals of oldest names. E. Bergroth, Ent. Nachr. ii. pp. 17–20, gives

many corrections of errors in nomenclature, based on a misapprehension of older author's species and Crotch's List, adding also various species from Thomson's Opusc. Ent., &c. *Cf.* also J. Frivaldszky, Term. füzetek, ii. Heft i. (reproduced in Ent. Nachr. iv. p. 82; but see Kraatz, *ibid.* p. 91); Von Hopffgarten, Ent. Nachr. iv. p. 97 (*cf.* Kraatz, *ibid.* p. 120), and 149 (*cf.* Kraatz again, p. 182, and editorial note, p. 184). See also Bedel, *suprà*.

S. A. de Marseul, L'Ab. xvi. pp. 1–50, discusses beetles described in MT. schw. ent. Ges. vi., and, under the heading 'Archéologie Entomologique,' pp. 51–168, recapitulates the species of Schrenck's voyage in Eastern Siberia described by Motschulsky. In *op. cit.* xvii., commenced in 1878, he in like manner analyses Ann. Soc. Esp. i., with some few supplementary observations.

A. Fauvel's 'Annuaire entomologique' for 1878 (Caen) is of the usual character of that publication.

Synonymic notes, with fresh localities: E. Reitter, Deutsche E. Z. 1878, p. 96.

Injuries by beetles. To manufactured tobacco; Ent. Nachr. iv. p. 314 (quoting 'Natur,' No. 42). To silk; G. Schoch, MT. schw. ent. Ges. v. p. 425, refers to *Dermestes lardarius*, *Corynetes ruficollis* and *rufipes*, and *Anobium striatum*, collectively known in Italy as "Camola." To various species of oak in Italy; P. Bargagli, Bull. Ent. Ital. x. (Resoc. delle Adun.) pp. 5–9. To corn crops in South Russia by *Anisoplia austriaca* and *crucifera*, and *Cleonus punctiventris*, reported by the British Consul at Taganrog; Pr. E. Soc. 1878, pl. liii. Report of sub-committee appointed to consider these ravages; *l. c.* p. lvii.

Moss-collecting in winter; C. A. Dohrn, S. E. Z. xxxix. p. 284.

Sulphate of carbon recommended as an agent for killing beetles for collections; J. M. Eder, SB. z.-b. Wien, xxviii. p. 58.

Cicindelidæ.

Amblychila cylindriformis, p. 29, figs. 1–1 *g* (this is the *Pasimachus* larva of Le Conte, olim), *Omus dejeani*, p. 31, figs. 2–2 *e*, *Tetracha carolina*, p. 34, figs. 3–3 *e*, *Cicindela repanda*, p. 35, figs. 4–4 *d*; larvæ described and figured, with general and comparative observations, pp. 28 & 37; all have nine pairs of spiracles, the anterior pair under the margin of the prothorax, and much larger than the rest. G. H. Horn, Tr. Am. Ent. Soc. vii. pl. ii.

New species:—

Tetracha ignea, H. W. Bates, P. Z. S. 1878, p. 587, Chiriqui.

Cicindela belti, Nicaragua, and *flohri*, Mexico, p. 588, *stoliczkana*, p. 713, North of the Kuen Lun range, *id.* l. c.; *C. austromontana*, id. Ent. M. M. xv. p. 22, Canterbury, New Zealand; *C. millingeni*, Bushire, *phosphora*, Mexico, and *rutherfordi*, Cameroons, p. 329, *graphica*, Angola, *gabonica*, R. Ogowé, and *olivia*, Chamusari and Morabadad, India, p. 330, *monteiroi*, Delagoa Bay, *cabinda*, Landana, and *oras*, Madagascar, p. 331, *balucha*,

Beloochistan, *swinhoei*, Formosa, *filigera*, Borneo, and *oculata*, Tamatave, p. 332, *azureo-cincta*, p. 333, Bombay, *id.* Cist. Ent. ii.; *C. poggei* and *muata*, E. v. Harold, MT. Münch. ent. Ver. i. p. 99, Kábebe, W. Central Africa.

Eurycoda ano-signata, Bates, Cist. Ent. ii. p. 333, Old Calabar.

Dromica (*Cosmema*) *simplex*, id. *ibid.*, Mozambique, *D. albicinctella* (= *marginella*, Chaud., *nec* Boh.), *id. l. c.* p. 334, Transvaal.

Therates everetti, Mindanao, p. 334, *punctipennis* and *versicolor*, ibid., and *princeps*, p. 335, N. W. Borneo, *chennelli*, p. 335, Naga Hills, *id.* l. c.; *T. misoriensis*, A. Raffray, Bull. Soc. Ent. Fr. (5) viii. p. xcvi., Korido Island (Schouten group) and New Guinea.

Collyris andamana, Andaman Islands, and *rhodopus*, North Borneo, p. 335, *rubens*, p. 336, Assam, H. W. Bates, Cist. Ent. ii.

Ctenostoma (*Procephalus*) *sigma* and *læticolor*, id. P. Z. S. 1878, p. 588, Nicaragua.

Carabidæ.

T. Blackburn, Ent. M. M. xv. pp. 119 & 156, describes genera and species from the Hawaiian Isles.

H. W. Bates, Ent. M. M. xiv. p. 191, & xv. p. 57, describes species from New Zealand, and Cist. Ent. ii. pp. 317–326, from Tasmania.

J. Putzeys, MT. Münch. ent. Ver. ii. p. 54 *et seq.*, describes species from Colombia.

P. de Borre, CR. Ent. Belg. xxi. pp. c.–cxxvii., discusses at considerable length the Belgian species of *Panagæides*, *Loricerides*, *Licinides*, *Chlæniides*, and *Broscides*.

Elaphrides.

Elaphrus pallipes, p. 51, Oregon and British Columbia, *viridis*, p. 52, California, spp. nn., G. H. Horn, Tr. Am. Ent. Soc. vii.

Carabides.

Géhin, J. B. Quatrième lettre pour servir à l'histoire des insectes de la tribu des Carabides. Note sur les genres *Eupachys* et *Cathaicus*. Cinquième lettre, &c. Metz.: 1878, 8vo.

Elaborately criticised by Kraatz in Deutsche E. Z. 1878, *passim*; cf. also Nouv. et faits. (2) No. 13, p. 49, and L. Fairmaire, Pet. Nouv. ii. p. 232. Géhin's sectional names *Proteocarabus*, *Eurycarabus*, *Eutelocarabus*, *Trachycarabus*, *Pachycarabus*, and *Oreocarabus* criticised, especially with regard to Thomson's and Motschulsky's genera; Kraatz, Deutsche E. Z. 1878, pp. 254–256. On the synonymy of various species of some of these sections; *id. l. c.* pp. 264–266.

On excessive multiplication of genera in *Carabus*; C. A. Dohrn, S. E. Z. xxxix. p. 358. On Thomson's subgenera, in connection with Dohrn's criticisms; Kraatz, *l. c.* pp. 270–272.

Sphodristus. On the species of this genus, and the confusion in their synonymy, with *S. adamsi*, var. n. *subcyaneus*, p. 101, Sarijal Mts.; Kraatz, *l. c.* pp. 97–112.

Cathaicus, Bates. On its generic or subgeneric status; *id. l. c.* pp. 151–155.

Melancarabus, *Lamprocarabus*, and *Sphodristus*. On Géhin's reference of the first to *Pachystus*, the second to *Lipaster*, and the last to the genus of the same name, all by Motschulsky; *id. l. c.* pp. 159 & 160 (dissenting).

Carabus. The forceps-points of 36 species figured, with observations on the value of those organs as specific diagnostics; *id. l. c.* pp. 257–262, 435–439, pl. i., and MT. schw. ent. Ges. v. pp. 326–331, pl. i.

On the abdominal punctures; *id.* Deutsche E. Z. 1878, pp. 262 & 263.

On the elements of sculpture in *Carabus*, the primary foveolæ and their granulations, punctures and striæ, interstitial punctures, thoracic setiferous punctures and lateral setæ, supplementary and tertiary striæ, nomenclature, &c., *id. l. c.* pp. 272–291; on sculpture-changes, pp. 292–294.

Carabus tuerkheimi [script. *Fürckheimi*], Har., = *brandti*, Fald.; E. v. Harold, Pet. Nouv. ii. p. 206.

Carabus sylvestris, F. Kraatz, MT. schw. ent. Ges. v. pp. 310–326, discusses the allies of this species found in Switzerland and Upper Italy, including *C. alpinus*, Dej., varr. nn. *bernhardinus*, St. Bernard, and *mimethes*, Monte Rosa, p. 316, and *amplicollis* (Villa), p. 318, Lombard Alps. *C. castanopterus*, Villa, = *alpinus*, var.; *C. fairmairii*, Thoms., var. n. *baudii*, p. 320, Monte Viso; *C. putzeysi*, Thoms., = *putzeysianus*, Géhin, and is probably only a race of *maritimus*, Schaum; *C. concolor*, F., *nec* Panz. (which = *sylvestris*, F., var.), ex. typ., = *alpinus*, ♀.

Carabus granulatus. On its varieties in Germany, including *parvicollis*, *debilicostis*, *forticostis*, and *hæmatomerus*, apparently new names; Kraatz, Deutsche E. Z. 1878, pp. 128–134.

Carabus ullrichi (nec *ulrichi*). The like treatment, with varr. *viridilimbatus*, *cupreo-nitens*, and *superbus*; id. *l. c.* pp. 134–143.

Carabus mannerheimi, *auriculatus*, and *pyrenæus* (with var. *costatus*); id. *l. c.* pp. 156 & 157. *C. catenulatus*, var. *inflatus* (Deyr. MS.), S. France; *C. beauvoisi*, Dej., = *catenulatus*, with wrong locality; *C. bayardi*, Sol., is simply a ♀ of *lefebvrei*; *C. jenissoni* = *henningi*, colour var.: *id. l. c.* p. 158.

On species found by Cristoph in the Amur region, with others from Siberia, including *C. hummeli* var. n. *smaragdulus*, p. 248, *C. ochoticus*, Mann., var. n. *tristiculus*, p. 249; *id. l. c.* pp. 241–253.

Carabus creutzeri varr. nn. *pseudonothus*, Carniola, and *viridimicans*, Carinthia; *id. l. c.* p. 144.

Carabus scheidleri (*kollari*) var. n. *magnificus*, p. 144, Bazias, & var. n.? *parallelus*, p. 147, Plisevica Mts.; *id. l. c.*

Carabus auro-nitens, varr. from Puy-de-Dôme and La Lozère; A. Carret, Feuil. Nat. viii. p. 102.

Carabus auro-nitens, var. n. *opacus*, Transsylvania, *intricatus* var. n. *angustulus*, *ullrichi* var. n. *glaucus*, and *graniger* var. n. *nicanor*, Bazias, Danubian frontier, &c., p. 213, *purpurascens* var. n. *muelleri*, p. 214, Barcelona; Haury, Pet. Nouv. ii. On Haury's varr., see Kraatz, Deutsche E. Z. 1878, p. 149; *C. nicanor* = *mœstus*, Dej., *opacus* = *atratus*, Heer.

Carabus convexus var. n. *merkli*, Siebenbürgen, with other varr.; Von Hopffgarten, Ent. Nachr. iv. p. 128.

Carabus rothi. Discussion of its synonymy and varieties (*æquistriatus, varistriatus, 4-catenatus,* and *late-striatus,* apparently new, p. 299); Kraatz, *l. c.* pp. 295–302.

Carabus violaceus. On the species or forms (*exasperatus, purpurascens, picenus, obliquus, necsi, azurescens,* &c., including *purpurascens* var. n. *asperulus,* p. 306, Clausthal); *id. l. c.* pp. 303–317.

Carabus lapilayei, Cast., and *amœnus,* Chaud., the latter from Nikandr, Altai. Observations on specific peculiarities, &c., by C. A. Dohrn, S. E. Z. xxxix. pp. 362–364.

Carabus intricatus, with left front leg abnormal; A. Pelikan von Plauenwald, Verh. z.-b. Wien, xxviii. SB. p. 17.

Ceroglossus. On the genus in general, and *C. darwini,* Hope, and *gloriosus,* Gerst., in particular; Kraatz, Deutsche E. Z. 1878, pp. 318–326.

Nebria. The North American species discussed, and classified according to the number of ambulatorial setæ, rising from punctures on the ventral side of the abdomen. J. L. Le Conte, Bull. U. S. Geol. Surv. iv. pp. 473–480.

Damaster and *Coptolabrus.* On the question of the generic or subgeneric value of these groups; Kraatz, *l. c.* pp. 267–270.

Cychrus. G. H. Horn, Tr. Am. Ent. Soc. vii. p. 168 *et seq.*, gives a synopsis of the species inhabiting Boreal America.

Orinocarabus, g. n., Kraatz, Deutsche E. Z. 1878, p. 328. For *Carabus sylvestris* and allies (with three elytral striæ interrupted by primary foveolæ), mountain species, and mostly the same as *Oreocarabus,* Géhin. Various observations on species referred to this genus, *l. c.* pp. 327–336, and on the German species, pp. 417–434, including *O. alpestris,* Stm., var. n. *illyricus,* p. 425, *O. brevicornis,* Ktz., varr. nn. *puncticollis* and *tyrolensis,* p. 427, and *O. bertolinii,* sp. n., p. 432, Trientine Alps.

New species :—

Carabus cenisius, p. 322, Mt. Cenis, *lombardus,* p. 325, Lombardy, Kraatz, MT. schw. ent. Ges. v.; *C. tarbagataicus,* p. 215, Tarbagatai Mts., Siberia, and *cristophi,* p. 216, Amur region, *id.* Deutsche E. Z. 1878; *C. bogdanovi,* p. 254, *lindemanni,* p. 256, *subparallelus,* p. 257, *striatus,* p. 258, *angustatus,* p. 259, *variabilis,* p. 261, *kuldshaensis,* p. 262, *carbonarius,* p. 263, E. Ballion, Bull. Mosc. liii. (1), Kuldja; *C. davidis,* H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 87, pl. iii. fig. 4, Central China; *C. stoliczkanus,* H. W. Bates, P. Z. S. 1878, p. 713, Murree.

Cratocephalus solskyi, Ballion, *l. c.* p. 265, Kuldja.

Calosoma antinorii, R. Gestro, Ann. Mus. Genov. xiii. p. 318, Shoa.

Nebria ovipennis, p. 477, California, *purpurata,* ibid., and *longula,* p. 478, Colorado, *trifaria,* Utah, and *obtusa,* Wyoming, p. 478, Le Conte, Bull. U. S. Geol. Surv. iv.

Cychrus fulleri, p. 179, and *hemphilli,* p. 184, Horn, *l. c.*, United States.

Pamborides.

Tefflus muata, sp. n., E. v. Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa.

Trigonodactylides.

Hexagonia pallida, sp. n., E. de Chaudoir, R. Z. (3) vi. p. 192, Zanzibar.

Odontacanthides.

Casnonia seriepunctata, Chaudoir, *l. c.* p. 193, Mombas; *C. limbata*, C. O. Waterhouse, Tr. E. Soc. 1878, p. 304, Jamaica; *C. tubulifera*, H. W. Bates, P. Z. S. 1878, p. 604, Chontales: spp. nn.

Ctenodactylides.

Leptotrachelus puncticollis, Chontales, *panamensis*, Panama, spp. nn., Bates, *l. c.* p. 600.

Galeritides.

Zuphium exiguum, sp. n., J. Putzeys, MT. Münch. ent. Ver. ii. p. 55, Colombia.

Calophæna cruciata, Chontales, and *lævigata*, Panama, spp. nn., Bates, *l. c.* p. 605.

Helluonides.

Planetes quadricollis, sp. n., Chaudoir, *l. c.* p. 191, Pemba Island.

Brachynides.

Pheropsophus grandicornis, Fairm., = *kersteni*, Gerst.; *id. l. c.* p. 181.

Brachynus crepitans swarming on sugar used as moth-bait; F. G. Hopkins, Ent. xi. p. 256.

Pherosophus sansibaricus, E. v. Harold, MB. Ak. Berl. 1878, p. 210, Zanzibar; *P. raffrayi*, p. 180, Mombas, *nigriventris*, p. 181, Zanzibar, *stenopterus*, p. 183, Pemba Island, Chaudoir, *l. c.*: spp. nn.

Brachynus scriptus, sp. n., Chaudoir, *l. c.* p. 184, Pemba.

Crepidogaster bi-oculatus, sp. n., *id. l. c.* p. 185, Mombas.

Lebiides.

Lebia marginata, Putz., *nec* Fourc., if really distinct from *luteo-cincta*, Chaud., renamed *putzeysi*; L. Bedel, Ann. Soc. Ent. Fr. (5) viii. p. 247.

Lebia grandis devouring larvæ of *Doryphora*; W. Saunders, Canad. Ent. x. p. 185.

New genera and species:—

Diabaticus, H. W. Bates, Cist. Ent. ii. p. 324. Near *Pinacodera*, which it resembles, but with the tarsi of *Plochionus* and head of *Xanthophæa*. For *Plochionus australis*, Er.

Microus, E. de Chaudoir, R. Z. (3) vi. p. 146. Allied to *Masoreus* [script. "*Mazoreus*," apparently with the idea of suggesting a derivation from μαζός], but with a tooth in the emargination of mentum, and very short and moniliform antennæ; also allied to *Caphora*. *M. mocquerysi*, ibid., Zanzibar (scarcely like a Carabid at all).

Cylindrocranius, id. *l. c.* p. 152. Near *Demetrias*, though with cylindrical head, not narrowed at base; ligula not free, horny, narrow, with

foliaceous paraglossæ. *C. rufulus*, p. 154, Zanzibar, and ? also *Callida castanea*, Boh.

Polyaulacus, id. *l. c.* p. 156. Near *Glycia*: head thickly and strongly sulcate. *P. brunneus*, p. 157, Zanzibar and Mombas.

Demetridula, id. *l. c.* p. 160. Intermediate between *Demetrias* and *Aetophorus*, with pectinated tarsal hooks, and no tooth in the emargination of mentum. *D. pallida*, p. 161, Mombas.

Agra laticolor and *chrysopteryx*, Chontales, *panamensis*, Panama, Bates, P. Z. S. 1878, p. 609.

Callida semirubra, *latipennis*, and *jansoni*, id. *l. c.* p. 608, Chontales; *C. levistriata*, p. 150, Zanzibar, *præstans*, p. 151, Schimba, Chaudoir, *l. c.*

Crossoglossa [in error, *Ceroglossa*] *ferruginea*, p. 151, Zanzibar, *piceola*, p. 152, Amur, Chaudoir, *l. c.*

Endynomena huebneri, L. Fairmaire, Pet. Nouv. ii. p. 276, Tonga Islands.

Onota trivittata, J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 373, Florida.

Cymindis dubia, E. Ballion, Bull. Mosc. liii. (1) p. 266, Kuldja; *C. glabrella*, Bates, *l. c.* p. 719, Ladak.

Apenes angustata, E. A. Scharwz, P. Am. Phil. Soc. xvii. p. 354, Florida; *A. comis*, Bates, *l. c.* p. 606, Panama.

Pinacodera amblygona and *angulifera*, Bates, *l. c.* p. 606, Mexico.

Demetrida mœsta, D. Sharp, Ent. M. M. xv. p. 47, Otago.

Dromius trapezicollis, Chaudoir, *l. c.* p. 158, Zanzibar.

Metabletus tartarus, Bates, *l. c.* p. 719, Pamir.

Apristus latipennis, Chaudoir, *l. c.* p. 160, Zanzibar and Natal.

Eurycoleus belti, Bates, *l. c.* p. 606, Chontales.

Nematopera melanacra, p. 175, Mombas, *lividipennis* (? = *melanacra*, var.). no locality, and *fumata*, Mombas and Zanzibar, p. 176, Chaudoir, *l. c.*

Lebia zanzibarica, p. 176, Schimba, *albidipennis*, p. 177, Mombas, *id.* l. c.; *L. rhodopus*, Schwarz, *l. c.* p. 354, Florida; *L. atriceps*, J. Putzeys, MT. Münch. ent. Ver. ii. p. 55, Colombia; *L. callizona*, Guatemala, *corcula* and *charina*, Chontales, Bates, *l. c.* p. 607.

Lia quadri-annulata, Bates, *l. c.* p. 607, Chontales.

Otoglossa cœlestina, p. 607, and *obscurella*, p. 608, *id. l. c.* Chontales.

Lebistina ? bicolor, Chaudoir, *l. c.* p. 178, Zanzibar.

Singilis zonata, id. *l. c.* p. 179, Mombas.

Tetragonoderus subsulcatus, Pemba Island, and *insignicollis*, Natal and Mombas, *id. l. c.* p. 149.

Perigona columbiana, J. Putzeys, MT. Münch. ent. Ver. ii. p. 69, Colombia; *P. parallela*, p. 100, and *zanzibarica*, p. 101, Chaudoir, *l. c.* Zanzibar.

Pericalides.

Scopodes aterrimus, Bates, 1874, *nec* Chaud., 1872, renamed *edwardsi*; H. W. Bates, Ent. M. M. xv. p. 58.

Catascopus chontalensis and *angulicollis*, spp. nn., *id.* P. Z. S. 1878, p. 605, Chontales.

Coptodera scintillans, sp. n., *id. l. c.* p. 605, Chontales.

Ferus procerus, sp. n., J. Putzeys, MT. Münch. ent. Ver. ii. p. 55, Colombia.

Scopodes versicolor and *prasinus*, p. 57, *multipunctatus* and *lævigatus*, p. 58, Bates, Ent. M. M. xv., New Zealand; *S. tasmanicus*, id. Cist. Ent. ii. p. 324, Tasmania: spp. nn.

Graphipterides.

Graphipterus laticollis, sp. n., E. v. Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa.

Anthiides.

Eccoptoptera, g. n., E. de Chaudoir, R. Z. (3) vi. p. 189. Differs from *Polyhirma* in the elytra being very truncate and deeply emarginate at the apex, &c. For *Anthia mutilloides*, Bertol., *P. lagenula*, Gerst., and *E. cupricollis*, sp. n., p. 190, Schimba Mts., Zanzibar coast.

Anthia hildebrandti, E. v. Harold, MB. Ak. Berl. 1878, p. 210, Zanzibar; *A. calida* and *crudelis*, id. MT. Münch. ent. Ver. ii. p. 99, West Central Africa; *A. ampliata*, Chaudoir, *l. c.* p. 187, Bagamoyo and Caffirland; *A. vitticollis*, p. 189, *alternata*, p. 190, H. W. Bates, Tr. E. Soc. 1878, Nyassa: spp. nn.

Polyhirma perspicillaris, p. 187, *tenuicollis*, p. 188, spp. nn., Chaudoir, *l. c.*, Schimba Mts.

Morionides.

Morio polynesiæ, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 286, Fiji.

Scaritides.

Dyschirius interpunctatus, Putz., = *Phreoryctes debilis*, Schm. Goeb.; E. Putzeys, CR. Ent. Belg. xxi. p. clxxiv.

Clivina fossor myrmecophilous; H. Crowther, Ent. M. M. xv. p. 19.

Scarites (*Macrotelus*) *sulciceps*, sp. n., Chaudoir, R. Z. (3) vi. p. 72, Zanzibar.

Dyschirius lævifasciatus, G. H. Horn, Tr. Am. Ent. Soc. vii. p. 52, Oregon; *D. fusus* and *verticalis*, p. clxxii., *nitens*, *binodosus*, and *rugifer*, p. clxxiii., Putzeys, *l. c.*, Calcutta; *D. falciger*, p. 373, Florida, *brevispinus*, p. 593, Michigan, J. L. Le Conte, P. Am. Phil. Soc. xvii.; *D. zanzibaricus*, Chaudoir, R. Z. (3) vi. p. 75, Zanzibar: spp. nn.

Aspidoglossus brachyderus, sp. n., H. W. Bates, P. Z. S. 1878, p. 589, Panama.

Schizogenius riparius and *inter-striatus*, spp. nn., J. Putzeys, MT. Münch. ent. Ver. ii. p. 54, Colombia.

Panagæides.

E. de Chaudoir, Ann. Ent. Belg. xxi. pp. 83–186 [all but the first two pages published in Feb. 1879] monographs this group, in continuation of his essay in Bull. Mosc. 1861. *Tefflus* and *Eurysoma* are included in it, and the author uses various old names for the divisions which he introduces. *Craspedophorus westermanni*, Laf., = *Panagæus strachani*, Hope, *ex. typ.*, but the latter is deposed, as insufficiently described. *Geobius*, Dej., is characterized (p. 181); it constitutes a separate section, perhaps with some affinity to the *Lachnophorides*.

Panagæus crux-major, var. n. *putzeysi*, P. de Borre, CR. Ent. Belg. xxi. p. ciii., Belgium.

Dischissus, H. W. Bates. African individuals present the tarsal peculiarities of this Japanese genus, but with the palpi extremely securiform in the ♂; Chaudoir, R. Z. (3) vi. p. 86. *B. obscuricornis*, Laf.; var. from Zanzibar equivalent to var. *trimaculatus* of *Panagæus crux-major*; id. *l. c.* p. 85.

New genera and species :—

Brachyonychus [*Brachyonyx*, Schön., Agassiz, and *Brachyonycha*, Hübn., Agassiz], Chaudoir, Ann. Ent. Belg. xxi. p. 86. Allied to *Craspedophorus*, but with apical joint of tarsi short, and fourth joint deeply and angularly excised, not bilobed; elytra very wide and convex, and only slightly punctured. *B. lævipennis*, p. 87, Siam and Cochin China, also *Epicosmus sublævis* and *humeratus*, Chaud.

Tinognathus, id. *l. c.* p. 137. Allied to *Epicosmus*; for *T. parviceps*, p. 138, Moreton Bay.

Microsomus, id. *l. c.* p. 139. Smaller than *Epicosmus*, with various minute differential characters. For *Craspedophorus vicinus*, Murray, &c., and *M. angolensis*, p. 141, Angola, *lætiusculus* and *aurantiacus*, p. 143, N'gami, *villosulus*, p. 144, Senegambia, and *planicollis*, p. 146, Abyssinia.

Epigraphus, id. *l. c.* p. 147, for *Crasp. arcuaticollis*, Murr., and *Isotarsus amplicollis*, Schaum.

Tinoderus, id. *l. c.* p. 155. Dilated ♂ tarsi as in *Panagæus*, paraglossæ as in *Epicosmus*. For *P. singularis*, Bates.

Craspedophorus unicolor, p. 101, Zanzibar, *laticeps*, p. 103, Abyssinia, *id. l. c.*

Epicosmus mniszechi, p. 109, ? W. Africa, *castelnaui*, p. 112, Coromandel, *difficilis*, p. 118, Zambesi, *gratiosus*, p. 122, Natal, *corpulentus*, p. 131, Rockhampton, *longicollis* (sp. ?), p. 132, no locality given, *id. l. c.*

Eudema muata, E. v. Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa; *E. unicolor*, Chaudoir, R. Z. (3) vi. p. 85, Zanzibar.

Dischissus pradieri, Chaudoir, *l. c.* p. 86, and Ann. Ent. Belg. xxi. p. 153, Gaboon.

Coptia marginicollis, id. Ann. Ent. Belg. xxi. p. 168, Cayenne.

Chlæniides.

Chlænius nigricornis, var. n. *wesmaeli*, P. de Borre, CR. Ent. Belg. xxi. p. cxviii., Belgium.

Thryptocerus, g. n., E. de Chaudoir, Bull. Mosc. liii. (2) p. 74. Facies of a wide *Oodes*, to which it is allied; antennæ elbowed; highly polished. *T. politus*, sp. n., p. 76, Madagascar.

Trimerus [Green, *Crustacea*, 1833], g. n., *id.* R. Z. (3) vi. pp. 89-92. Founded on a single ♀ specimen, of the facies of *Calathus*, or of *Chlænius erythrocnemis*: it is thought to be intermediate between the *Chlæniides* and *Feroniides*, though differing from both in the exceptional form of its ligula. It can enter into no existing group, but should provisionally follow *Oodes* and allies, whereof, however, it lacks the chief characters. The maxillary palpi are apparently only 3-jointed, the penultimate joint

being entirely hidden in the excavation of the extremity of the second; the scutellum is wide, as in *Eucamptognathus*. For *T. raffrayi*, sp. n., p. 92, Schimba.

Chlænius scoanei, sp. n., L. Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. cxxxii., Ferrol.

Systolocranius impressicollis, sp. n., Chaudoir, R. Z. (3) vi. p. 88, Mombas.

Oodes vagabundus, sp. n., *id. ibid.* "l'île de Mombaze" [? "de Pemba"].

Stenous olivaceus, sp. n., H. W. Bates, P. Z. S. 1878, p. 589, Mexico.

Licinides.

Dicælus, sp. The larva described and figured; anterior pair of spiracles in the mesothorax. G. H. Horn, Tr. Am. Ent. Soc. vii. p. 37, pl. ii. figs. 5–5*c*.

Dicælus flohri, sp. n., H. W. Bates, P. Z. S. 1878, p. 589, Mexico.

Badister obtusus, sp. n., J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 594, Lake Superior.

Physolæsthus insularis, sp. n., H. W. Bates, Ent. M. M. xv. p. 22, Canterbury province, New Zealand.

Cnemacanthides.

Broscus asiaticus, Ball., probably = *cephalotes* var. *semistriatus*; *B. limbatus*, Ball., = *punctatus* [but no mention of types is made]; *B. illustris*, Putz., is a good species: E. de Chaudoir, Bull. Mosc. liii. (2) pp. 2 & 3.

Broscus anomalus, sp. n., *id. l. c.* p. 1, Himalayan region.

Percosoma sulcipenne, sp. n., H. W. Bates, Cist. Ent. ii. p. 317, N. Tasmania.

Lychnus strangulatus, p. 317, *striatulus*, p. 318, spp. nn., *id. l. c.*, Tasmania.

Cratocerides.

Amblygnathus ruficollis, sp. n., J. Putzeys, MT. Münch. ent. Ver. ii. p. 71, Colombia.

Anisodactylides.

Harpalus erichsoni, Castelnau, = *germari*, Cast.; *H. infelix*, Cast., ? = *iridipennis*, Cast.; *H. illawarensis*, *vandiemensis*, and *patrueloides*, C., = *amaroides*, C. (? also = *ignobilis*, Boh.); *H. plano-impressus*, C., = *femoralis*, C.; *H. coxi*, C., = *inornatus*, Germ., = *australis*, Dej.; *H. boisduvali*, C., = *æreus*, Dej.; *H. tasmanicus*, *yarræ*, and *rana*, C., = *mœstus*, Dej.; *H. versicolor*, C., = *dampieri*, C.; various other species of *Harpalus* described by Castelnau are referred to *Diaphoromerus*, and *H. krefti*, C., and *H. novæ-hollandiæ*, C., = *peroni*, C., with others, to *Hypharpax*; *H. interioris*, C., = *waterhousii*, C., is an *Anisodactylus*; *Selenophorus baladicus*, Fauvel, = *H. wilcoxi* and *thouzeti*, C., = *melanarius*, Dej.; *H. interstitialis*, McL., = *pulcher*, Dej.; *H. planipennis*, McL., = *punctiferus* and *montanus*, C.; *H. gayndahensis*, McL., ? = *picipes*, McL.; *H. æneo-nitens*, McL. (? = *melbournensis*), and *H. paroensis*, *marginicollis*, and *adelaidæ*, C., are referred to *Gnathaphanus*, McL. (recharacterized), from which *Pach*[*y*]

auchenius, W. McL., is not distinct. E. v. Chaudoir, Ann. Mus. Genov. xii. pp. 477–513.

Diachromus germanus in thousands in a restricted locality under stones and cow-dung, in West Prussia; C. A. Dohrn, S. E. Z. xxxix. p. 220.

Actenoncus atratus, Chaud., = *Lobia atra*, Cast., which must stand as *A. ater*; Chaudoir, Bull. Mosc. liii. (2) p. 7.

Gynandropus. J. Putzeys, S. E. Z. xxxix. p. 289 *et seq.*, discusses this genus, describing various new species. It is distinguished by the slightly dilated first joint of the tarsi in the ♀ being clothed beneath with two rows of squamulæ, as in the ♂. *Harpalus margine-punctatus*, Dej., is also referred to it (from Cayenne).

New genera and species :—

Microsaurus, H. W. Bates, Cist. Ent. ii. p. 319. Exactly resembling *Selenophorus*; mentum almost (sometimes entirely) edentate, male 4 anterior tarsi dilated (2–4 widely cordate), densely clothed with erect squamose setæ beneath. *M. insularis*, ibid., Tasmania.

Thenarotes, id. *l. c.* p. 320. Form and colour of *Acupalpus* and *Bradycellus*; closely allied to *Lecanomerus*, but with 4 anterior tarsi less dilated, and more elongate and flatter body. *T. tasmanicus*, p. 321, Tasmania.

Orthogonius davidi, p. 3, China, *ovatus*, p. 4, Macassar, *acutangulus*, p. 5, Ceylon, Chaudoir, Bull. Mosc. liii. (2).

Hexachætus lævissimus, id. *l. c.* p. 6, Malacca.

Diaphoromerus angustulus, p. 479, Rockhampton, *ovatus*, p. 481, Cape York, *planiusculus*, p. 483, Australia, *rectangulus*, S. Australia and Tasmania, and *quadricollis*, N. Australia, p. 486, *id.* Ann. Mus. Genov. xii.

Gnathaphanus rectangulus, id. *l. c.* p. 507, ? Rockhampton.

Anisodactylus opacipennis, id. *l. c.* p. 513, S.W. Australia; *A. mœstus*, p. 76, *picinus*, p. 77, *id.* R. Z. (3) vi., Zanzibar; *A. rotundangulus*, H. W. Bates, P. Z. S. 1878, p. 589.

Lecanomerus obesulus, Bates, Ent. M. M. xv. p. 23, South Island, New Zealand.

Notiobia disparilis, p. 589, *parilis* and *limbipennis*, p. 590, Nicaragua, *leirodes*, Mexico, and *cupreola*, Costa Rica, p. 590, *id.* P. Z. S. 1878; *N. præclara* and *jucunda*, p. 71, *concolor*, *similis*, and *transversicollis*, p. 72, *ancola*, *dubia*, and *longipennis*, p. 73, Putzeys, M'T. Münch. ent. Ver. ii. Colombia.

Hypharpax flavitarsis, p. 498, Gulf of Carpentaria, *latiusculus*, p. 499, Tasmania, *parvus*, S. Australia, and *rotundipennis*, Australia, p. 500, *celebensis*, Macassar, and *simplicipes*, Java, p. 502, Chaudoir, Ann. Mus. Genov. xii.; *H. abstrusus*, Bates, Ent. M. M. xv. p. 23, New Zealand.

Gynandropus brevis, Putzeys, *l. c.* p. 70, Colombia; *G. placidus*, p. 289, *acutangulus*, p. 292, Brazil, *mexicanus*, p. 291, *intermedius*, p. 293, *agonoides*, p. 294, Mexico, *subquadratus*, p. 293, Hayti, *cyclogonus*, p. 294, Venezuela, *id.* S. E. Z. xxxiv.

Dichirotrichus alticola, Bates, P. Z. S. 1878, p. 713, Pamir.

Harpalides.

Chaudoir, Ann. Mus. Genov. xii. pp. 475–517, discusses the Australian

species, from his own collection and that of Castelnau. The species described by the latter under *Harpalus* are, with 5 exceptions, *Anisodactylides*; of these 5, 3 are *Feroniides*, the 4th a *Stenolophus*, and the last doubtful. *H. promptus*, Er., is a *Bradycellus*.

Acinopus ammophilus. On its economy; J. Frivaldszky, Term. füzetek, ii. pp. 60 & 61.

Harpalus cephalotes, Fairm., is not a var. of *ruficornis*, but a true *Ophonus* and distinct; L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. ix.

Selenophorus. J. Putzeys, S. E. Z. xxxix. pp. 1–73, describes the American species, of which he recognizes 112 (many new). The majority of the characters are also found in other groups of the family, and no definite conclusion is arrived at as to the generic status or position. Synonymy is given, including the following: *S. lineato-punctatus*, Dej., = *alternans*, Dej.; *S. æneo-cupreus*, Dej., = *beauvoisi*, Dej.; *S. puberulus*, Putz., renamed *pubifer*, p. 69.

New genera and species:—

Haplaner, Chaudoir, *l. c.* p. 514. Tarsi of ♂ not dilated, not spongy or papillose beneath. For *Harpalus velox*, Castelnau.

Syllectus, Bates, Ent. M. M. xiv. p. 191. An anomalous antarctic form with no near northern allies; with small head and long slender mandibles, and possibly having its nearest affinities with *Lecanomerus* and *Trachysarus*. *S. anomalus*, p. 192, Auckland.

Arthrostictus, id. P. Z. S. 1878, p. 592. Allied to *Selenophorus*, having no tooth to the emargination of the mentum, but with the elytra densely and minutely punctured. For *S. speciosus*, Dej., *Pangus metallicus*, Reich., *Hypolithus puberulus* and *chlœnioides*, Dej., *Harpalus sulcatulus*, Dej., and *A. opalescens*, Panama, and *sericatus*, Mexico, *ibid.*

Hypsinephus, id. *l. c.* p. 715. Differs from *Selenophorus* in its elongate stout legs, and in the male tarsi being dilated and cordate, with the first joint slender at the base and suddenly widened at the apex, and the 4th joint slightly bilobed. *H. ellipticus*, p. 716, Pangong Valley.

Atrachycnemis, T. Blackburn, Ent. M. M. xv. p. 120. No affinities suggested. *A. sharpi*, ibid., Haleakala, Sandwich Isles.

Bradycellus lucidus, p. 592, *sub-obsoletus* and *circumdatus*, p. 593, Bates, *l. c.*, Mexico; *B. celeripes* and *suturiger*, p. 74, *apicalis*, p. 75, J. Putzeys, MT. Münch. ent. Ver. ii., Colombia.

Pangus parvulus, E. Ballion, Bull. Mosc. liii. (1) p. 268, Kuldja.

Ophonus cyaneus, id. *l. c.* p. 269, Kuldja.

Harpalus regeli, p. 270, *ellipticus*, p. 271, *atratus*, p. 272, *affinis*, p. 273, *id. l. c.*, Kuldja; *H. clandestinus*, J. L. Le Conte, Bull. U. S. Geol. Surv. iv. p. 450, Colorado; *H. alienus*, p. 591, Mexico, *cæruleatus*, Yangi Hissar, *melaneus* and *indicola*, Murree, &c., p. 714, *turculus*, ibid., and *liodes*, p. 715, ? Yarkand, *masoreoides*, p. 715, Pamir, Bates, P. Z. S. 1878; *H. vicarius*, E. v. Harold, Deutsche E. Z. 1878, p. 66, Japan.

Selenophorus distinctus, p. 12, *xantholomus* (also from Brazil), p. 37, *dilutipes*, p. 47 (do.), *modestus*, p. 58, *glabripennis*, p. 66, *liodiscus*, p. 67, *velutinus*, p. 68, Colombia, *circumfusus*, p. 69, ? Colombia, *apicalis* and *tessel[l]atus*, p. 14, *oparus*, p. 26, *satyrus*, p. 35, *vilis*, p. 39, *agilis*, p. 52,

batesi, p. 56, *pleuriticus*, p. 57, *rugulosus*, p. 68, *rugipennis*, p. 69, Amazons, *pusillus*, p. 17, *chalceus*, p. 19, *cordatus*, p. 32, *genuinus*, p. 34, Cayenne (the first also from Brazil), *sallei* [*-lavi*], p. 17, *seriatoporus*, p. 23, *subsinuatus*, p. 31, *flavipes*, p. 39, *assimilis*, p. 44, *tarsalis*, p. 49, *quadricollis*, p. 55, *crassiusculus*, p. 70, *arcuatus*, p. 71, Mexico, *curvipes*, p. 70, ? Mexico, *rodriguezi*, p. 22, Guatemala, *yucatanus*, p. 24, *punctatulus*, p. 65, Yucatan, *rufescens*, p. 24, *rufulus*, p. 40, Venezuela, *obscuricornis*, p. 26, ? E. Indies, *dubius*, p. 54, ? S. Spain, ?? Antilles, *mundus*, p. 29, *striato-punctatus*, p. 33, Mexico and Antilles, *emarginatus* and *cardionotus*, p. 30, *subcordatus*, p. 35, *mendicus*, p. 36, *punctipennis* and *illustris*, p. 50, *ventralis* and *fulvicornis*, p. 51, *misellus*, p. 53, *tibialis*, p. 54, *obscurus*, p. 58, *poeciloides*, p. 61, *faldermanni*, p. 63, Brazil, *foveatus*, p. 33, Cumana, *punctipennis*, p. 34, *cariniger*, p. 44, St. Domingo, *lugubris*, p. 38, Buenos Aires, *puellus*, p. 40, United States, *barysomoides*, p. 41, *pampicola*, p. 42 (? = *punctulatus*, var.), Pampas, *cinctus*, p. 45, Cuba, *pusio*, p. 53, Caracas, *thoracicus*, p. 59, Hayti, *excisus*, p. 59, Dominican Republic, and *splendidus*, p. 64, Guatemala, Mexico, Colombia, Putzeys, S. E. Z. xxxix. ; *S. cyaneus*, id. MT. Münch. ent. Ver. ii. p. 70, Colombia ; *S. amblyderus*, *tenuistriatus*, and *mitis*, Mexico, *callistichus*, Panama, Bates, P. Z. S. 1878, p. 591 ; *S. excisus*, J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 377, Florida.

Hypolithus mœstus, p. 77, *vulpeculus*, p. 78, and *lucens*, p. 79, Zanzibar, *quadraticollis*, p. 79, Pemba, Putzeys, R. Z. (3) vi.

Siopelus simplex and *vermiculatus*, id. *l. c.* p. 80, Zanzibar.

Platymetopus obscurus, p. 80, Pemba, *crenulatus*, Mombas, and *seriatus*, Bagamoyo, p. 81, Chaudoir, R. Z. (3) vi.

Hispalis tetrasemus, id. *l. c.* p. 82, Pemba.

Acupalpus flohri and *obesus*, Bates, *l. c.* p. 593, Mexico.

Stenolophus germanus, Chaudoir, *l. c.* p. 84, Zanzibar and Abyssinia.

Anoplogenius angustatus, id. *l. c.* p. 83, Zanzibar.

Trigonotomides.

Omaseus himalayicus, Redt., *ex. typ.*, is a *Triplogenius* ; *O. viridicollis*, McL., = *T. bicolor* ; *Delinius*, Westw., recharacterized : Chaudoir, Bull. Mosc. liii. (2) p. 33.

Pediomorphus, g. n., *id. l. c.* p. 28. Facies of *Pedius* or *Pediolus* ; very near *Holconotus*. Included in the *Abacetides* of Chaudoir. *P. planiusculus*, sp. n., p. 29, Melbourne.

Abacetus distinctus, p. 25, Angola, *haplosternus*, ibid., and *siamensis*, p. 26, Bangkok, *australasiæ*, p. 26, Cape York, *hæmorrhous*, Australia, and *picticornis*, Moupin, p. 27, *id.* l. c. ; *A. denticollis*, p. 94, Pemba Island and Zanzibar, *setulosus*, ibid., and *tibialis*, p. 96, Pemba Island, and *A.* ? *trisulcis*, p. 96, Zanzibar, *id.* R. Z. (3) vi. : spp. nn.

Drimostoma intermedium, p. 98, Zanzibar and Angola, and *zanzibaricum*, p. 99, Zanzibar, spp. nn., *id.* R. Z. (3) vi.

Stomonaxus quadricollis, sp. n., *id. l. c.* p. 99, Mombas.

Triplogenius putzeysi, p. 31, Java, *andamensis*, p. 32, Andaman Isles, spp. nn., *id.* Bull. Mosc. liii. (2).

Delinius castelnaui, sp. n., *id. l. c.* p. 34 (? Australia).

Feroniides.

Nurus, Mots., has only the first two joints of the anterior tarsi of the ♂ dilated and clothed beneath with the normal two rows of lamellæ. This most important character, which separates it from all the other *Feroniides*, is omitted by the author of the genus. *N. brevis* stands, and *Trichosternus curtus*, Chaud., is referred to the genus. Chaudoir, Bull. Mosc. liii. (2) p. 37.

Cratogaster, Blanch., *Pachidius*, Chaud., and *Tiribasus*, Cast., = *Cyphosoma*, Hope; *id. l. c.* p. 35.

Trichosternus dilaticeps, Chaud., is a *Mecynognathus*; id. *l. c.* p. 39. *Abax stierlini*, Des Cottes, is a *Haptoderus*, p. 73.

Strigia is not separable generically from *Rhathymus*, and various species of it are discussed; *id. l. c.* pp. 7–9.

Pterostichus cupreus var. *affinis*. Note on its occurrence in England with varieties; E. C. Rye, Ent. M. M. xiv. p. 233.

Zabrus contractus, Fairm., = *distinctus*, Luc., *ex.* typ.; *Feronia cantalica*, Chaud., = *femorata*, Dej., var.; L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. ix.

Amara continua, Thoms., considered to be either a form of *communis* or perhaps its type condition; K. Letzner, JB. schles. Ges. liv. [1877] p. 213.

New genera and species:—

Tropidocerus, Chaudoir, *l. c.* p. 9. Intermediate between *Poecilus* and *Cyrtonotus*; with a simple tooth in the emargination of the mentum. *Harpostomus*, Chaud., should be placed near it. For *Platysma flavicornis*, Dej., and *T. indicus*, p. 13, North Hindostan.

Abacomorphus, id. *l. c.* p. 14. Approaches *Pelecium* by its very long paraglossæ, pubescent on the inner side, and the deep emargination of its labrum; but differs from that genus in its flattened form and the structure of its tarsi. Intermediate between *Pelecium* and *Feronia*. For *Abax caledonicus*, Montr.

Setalidius, id. *l. c.* p. 18. Facies of *Setalis*, Cast., but really allied to *Abacomorphus* and *Selenochilus*. For *S. nigerrimus*, p. 19, New Caledonia.

Selenochilus, id. *l. c.* p. 21. Another transitional form between *Feronia* and *Pelecium*. For *Argutor erythropus* = *piceus*, Blanchard, New Zealand.

Hoplodactylus, id. *l. c.* p. 41. Facies of *Stenomorphus*; differs from *Feronia* in the form of the side lobes of the mentum, the structure of the anterior tarsi, and the un-margined base of the elytra. Near *Percus*. *H. persicus*, p. 44, Persia.

Eurystomis, id. *l. c.* p. 46. Labrum strongly emarginate, tooth of mentum simple, narrow, and long. *E. castelnaui*, p. 48, Queensland.

Nelidus, id. *l. c.* p. 49. Ligula of *Feronia*, palpi of *Platyderus*; near *Metarys* and *Cyrtomoscelis*. *N. australis*, p. 50, Parroo River, Australia.

Macroprotus, id. *l. c.* p. 51. Near *Orthomus* and *Platyderus*; mentum with a short small simple tooth; penultimate joint of maxillary palpi with a crown of four long setæ, &c. *M. tenuicornis*, p. 53, Ega.

Nurus niger, id. *l. c.* p. 37, Cape York.

Polpochila mexicana, Bates, P. Z. S. 1878, p. 589, Vera Cruz.

Trichosternus angulosus, Chaudoir, *l. c.* p. 39, Australia.

Pterostichus (*Trichosternus*) *difformipes*, Wellington, and *P. lobipes*, Southern New Zealand, Bates, Ent. M. M. xiv. p. 191 (& p. 196); *P.* (*T.*) *aucklandicus*, p. 25, Auckland, *temukensis*, Temuka, and *sylvius*, Peel Forest, South New Zealand, p. 26, (*P. Holcaspis*) *integratus*, p. 27, South Island, *id. op. cit.* xv.; *P.* (*Cryobius*) *surgens*, J. L. Le Conte, Bull. U.S. Geol. Surv. iv. p. 449, Colorado.

Feronia (*Simodontus*) *sexfoveata*, p. 53, and *F.* (*Ceneus*) *suspecta*, p. 54, Queensland, *F.* (*Blennidus*) *diminuta*, Peru, and *vancuverensis*, Vancouver, p. 55, *F.* (*Chlœnioideus*), Queensland, and *F.* (*Psegmatopterus*) *anchomenoides*, New Zealand, p. 57, *F.* (*Ophryogaster*) *anomala*, p. 59, Mexico, and *æquatoria*, p. 61, Ecuador, *F.* (*Pachymorphus*) *adelosioides*, p. 62, Montevideo, *F.* (?) *nimbatidia*, Japan, and *solskyi*, Amur, p. 63, *F. ophryodera*, p. 64, Mexico, *punctiventris*, p. 66, Texas, *F.* (*Sarticus*) *quadrisulcata*, p. 67, N. Australia, and *ischna*, p. 68, King George's Sound, *F.* (*Holcaspis*) *edax*, p. 69, New Zealand, *F.* (*Pterostichus*) *melanodes*, ibid., Manchuria, and *consanguinea*, p. 72, Trezibond, *F.* (*Hypherpes*) *brachyptera*, p. 70, Eastern slopes of Mexican Cordillera, *F.* (*Pristoscelis*) *serratipes*, p. 71, Mexico, *F.* (*Notonomus*) *parallelomorpha*, p. 73, Queensland, Chaudoir, Bull. Mosc. liii. (2).

Rhabdotus floridus, Bates, Cist. Ent. ii. p. 322, Tasmania.

Notonomus tubericauda, id. *l. c.* p. 323, Tasmania.

Loxandus ornatus, J. Putzeys, MT. Münch. ent. Ver. ii. p. 68, Colombia.

Feron[*i*]*omorpha sculptilis*, id. *l. c.* p. 69, Colombia.

Rhathymus (*Strigia*) *ater*, Chaudoir, *l. c.* p. 8, Coromandel.

Amara bambidunyæ, Pamir, *ambigena*, Pangong Valley, Bates, P. Z. S. 1878, p. 716.

Liocnemis himalaica, Ladak, and *tartariæ*, Pamir, p. 716, *frivola*, p. 717, ? Yarkand, *id. l. c.*

Amathitis kuenlunensis, id. *l. c.* p. 717, Sanju.

Bradytus compactus, id. *ibid.*, Murree.

Celia costaricensis, id. *l. c.* p. 600, Costa Rica; *C. quadrifoveolata*, E. Ballion, Bull. Mosc. liii. (1) p. 275, Kuldja.

Cyrtonotus putzeysi, p. 600, Mexico, *pamirensis*, p. 717, Pamir, Bates, *l. c.*; *Amara* (*C.*) *cylindrica*, J. L. Le Conte, Bull. U. S. Geol. Surv. iv. p. 450, Colorado, Winnipeg.

Anchomenides.

Onychopterygia, *Dicranoncus*, and *Colpodes* revised by Chaudoir, Ann. Soc. Ent. Fr. (5) viii. pp. 275–382. Much synonymy with other observations impossible to condense here is given, but the following may be noticed:—*O. fulgens* var., Mexico, p. 275; *Loxocrepis ruficeps*, Brullé, *nec* McL., is a *Dicranoncus*, and named *amabilis*, p. 277; a synoptical table of *Colpodes* is given, pp. 279–286; *Colpodes atramentarius*, Reiche., = *corvinus*, Dej.; *C. corvinus*, Chaud., *nec* Dej., renamed *afer*, p. 291; *C. brunnipennis* and *anchomenoides*, Chaud., = *lugens*, Dej.; *C. tristis*, Chaud., and *Feronia opaca* and *funesta*, Chaud., = *C. mœstus*,

Dej.; *C. cyclocerus*, Chaud., = *tenuicornis*, Chaud.; *C. chalcopterus*, Reiche., = *purpuratus*, Reiche.; *C. planicollis*, Chaud., = *nitidus*, Chaud.; *C. brevicollis*, Chaud., = *laticollis*, Reiche. [N.B. 168 new species of this genus are recorded *infrà*!]

Colpodes. On Japanese species; E. v. Harold, Deutsche E. Z. 1878, p. 212.

Læmosthenes; Bou., corrected to *Læmostenus*; L. Bedel, Ann. Soc. Ent. Fr. (5) viii. p. 250.

Zargus, Woll., ? = *Lestignathus*, Er.; H. W. Bates, Cist. Ent. ii. p. 324.

New genera and species :—

Glyptolenus, Bates, P. Z. S. 1878, p. 595. Near *Anchomenus*, with very narrow angulated thorax, and ample convex elytra. *G. rugicollis*, ibid., Chontales.

Blackburnia (g. n. ?), D. Sharp, Ent. M. M. xiv. p. 179. Closely allied to *Anchomenus*, but with the "after-body" greatly developed, feeble eyes, very deep ventral sutures (approaching *Cardiomera*), and apically elongated elytra, which are accurately fitted to the elongate apical ventral segment. For *B. insignis*, ibid., Oahu. Also *B. frigida*, Haleakala, and *blaptoides*, Oahu, T. Blackburn, *op. cit.* xv. p. 157.

Disenochus, T. Blackburn, *l. c.* p. 121. Facies of *Argutor*. For *D. anomalus*, ibid., Haleakala, Hawaiian Isles.

Lestignathus simsoni, Bates, Cist. Ent. ii. p. 323, Tasmania.

Diploharpus exstriatus, id. P. Z. S. 1878, p. 601, Chontales.

Platynus floridanus, Florida, and *texanus*, Texas, J. L. Le Conte. P. Am. Phil. Soc. xvii. p. 374; *P. jejunus*, id. Bull. U. S. Geol. Surv. iv. p. 449. California, Oregon, Nevada, Idaho; *Anchomenus* (*P.*) *otagoensis*, Bates, Ent. M. M. xv. p. 27, Otago.

Anchomenus montezumæ and *transpunctatus*, p. 593, *scutifer*, *vix-striatus*, *concisus*, *suffectus*, and *nugax*, p. 594, *simplicior*, p. 595, Mexico, *tadakensis*, p. 718, Pangong Valley and Pamir, *politissimus*, p. 719, Murree, Bates, P. Z. S. 1878; *A. inconsociabilis* and *erro*, p. 121, *sharpi* and *rupicola*, p. 122, Blackburn, *l. c.* Haleakala; *A. fallax*, p. 67, *pedestris*, p. 68, J. Putzeys, MT. Münch. ent. Ver. ii. Colombia.

Cyclothorax montivagus, *micans*, and *multipunctatus*, p. 122, *brevis*, *oahuensis*, *simiolus*, and *obscuricolor*, *scaritoides*, *cordaticollis*, *angusticollis*, *nubicola*, p. 156, *inæqualis*, p. 157, Blackburn, *l. c.* Hawaiian Isles.

Loxandrus (table, p. 375) *reflexus*, *calathinus*, and *floridanus*, p. 376, *rectangulus*, p. 377, Le Conte, *l. c.*, Florida.

Megalonychus quadridens, p. 101, and *obscurus*, p. 102, Chaudoir, R. Z. (3) vi. Schimba.

Stenocnemus (?) *nebrianus*, L. Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lxxxvi. Peru.

Onychopterygia æneipennis, *pallidipes*, and *pusilla*, p. 276, *cyanea*, p. 277, Chaudoir, Ann. Soc. Ent. Fr. (5) viii., Mexico.

Dicranoncus cinctipennis, id. *l. c.* p. 278, Hong Kong and Ceylon.

Colpodes strictocollis, p. 595, *lactipes* and *parviceps*, p. 597, *cyanostolus* and *chontalensis*, p. 598, *lebioides*, *princeps*, *superbus*, *viridi-auratus*, and

chrysopterus, p. 599, and *prolongatus*, p. 600, Chontales, *intergenens*, *gratus*, *duplex*, and *obscurellus*, p. 596, *prolixus*, p. 597, *auro-tinctus* and *prostomis*, p. 598, Costa Rica, *procephalus*, p. 597, Guatemala, *ovaliceps*, p. 719, Murree, Bates, P. Z. S. 1878 : *C. cephalotes*, p. 287, and *alpinus*, p. 303, Chimborazo ; *oopteroides*, p. 287, *orthomus*, p. 289, *æquatorius*, p. 349, *buckleyi*, p. 354, Ecuador ; *striatulus*, p. 287, *obesulus* and *despiciendus*, p. 288, *ciliatus*, p. 290, *agonoides*, p. 291, *morosus*, *sub-iridescens*, and *physopterus*, p. 292, *inconspicuus* and *sub-reflexus*, p. 293, *alpæoides* and *piceolus*, p. 299, *dyschromus*, p. 303, *chalconotus*, p. 307, *interruptus*, p. 308, *elegantulus*, p. 309, *sulcitarsis*, p. 310, *eurypterus*, p. 314, *consanguineus*, p. 315, *clarus*, *sub-angulatus*, and *bispinosus*, p. 318, *platynoides*, p. 325, *asphaltinus* and *sinuosus*, p. 336, *punctato-striatus* and *leptomorphus*, p. 337, *sub-inflatus*, p. 340, *difficilis* and *ahenonotus*, p. 352, *lucidus*, p. 353, *politus* (Dej. Cat.) and *hexacælus*, p. 356, *convexiusculus*, p. 359, *phæocnemis*, p. 362, *cyclothorax* and *sulcipennis*, p. 377, Colombia ; *robustus*, p. 296, *transfuga*, p. 297, *neglectus*, p. 298, *angulosus*, p. 299, *ebeninus*, p. 310, *lyrophorus*, p. 319, *amplicollis*, p. 320, *teter*, *severus*, and *pristonychoides*, p. 321, *bi-ovatus* and *semi-opacus*, p. 322, *delicatulus*, p. 323, *porrectus*, p. 326, *brachyderus*, p. 327, *macrous* and *olivaceus*, p. 328, *rubidus*, *lætiusculus*, and *fragilis*, p. 329, *agilis*, p. 330, *columbinus* and *sex-foveolatus*, p. 332, *longipes*, p. 333, *deyrollii*, p. 336, *sub-cyaneus*, p. 339, *femoralis*, p. 341, *incommodus* and *lyratus*, p. 347, *picicornis*, p. 350, *bicolor*, p. 351, *pectoralis*, p. 353, *phæolomus*, p. 357, *fratellus*, p. 358, *conicicollis*, p. 362, *inops* and *limbicollis*, p. 363, *approximatus*, p. 370, *purpuripennis*, p. 377, Mexico ; *guatemalensis*, p. 298, *crossomerus*, p. 331, Guatemala ; *cayennensis*, p. 380, Cayenne ; *brevitarsis*, p. 348, *ruficollis*, p. 379, *rivalis*, p. 380, Brazil ; *frigidus*, p. 300, *chalybicolor*, p. 338, *plebeius*, p. 342, *lævipennis*, p. 357, *consentaneus*, p. 358, *conicus*, p. 360, *trapezicollis*, p. 361, *affinis*, p. 379, Venezuela ; *melanocnemis*, p. 335, Costa Rica ; *insignis*, p. 355, Panama ; *ellipticus*, p. 312, Martinique ; *elongatus*, p. 344, and *alternans*, p. 348, Guadelupe ; *macroderus*, p. 346, and *nigrita*, p. 380, S. America ; *nilgherriensis*, p. 301, and *rotundatus*, p. 302, Nilgherries ; *baconi*, p. 311, and *bengalensis*, p. 312, N. Bengal ; *saphyripennis* [*sapphiripennis* !], p 334, E. Indies ; *hirmocælus* and *semi-striatus*, p. 365, N. Hindostan ; *incertus*, p. 369 (? = *Colpodes buchanani*, Hope), p. 369, and *plagioderus*, p. 374, E. Indies ; *cruralis*, p. 376, Malabar ; *cælopterus*, p. 368, Shanghai ; *obscuritarsis*, p. 375, Rangoon ; *saphyrinus* [*sapphirinus*], p. 366, Pulo Pinang and Tonda, *chloropterus*, p. 339, *phæoderus*, p. 364, *maculicollis*, p. 376, Celebes, [*h*]*abropoides*, p. 361, *luzonicus*, p. 366, *apicalis*, p. 367, Philippine Islands ; *neo-zelandicus*, p. 294, *bidens*, p. 303, *crenatus*, p. 304, *cardiophorus*, p. 305, *macropterus*, p. 370, New Zealand ; *callidoides*, p. 373, Bogos country ; *anescens*, p. 368, locality doubtful ; Chaudoir, Ann. Soc. Ent Fr. (5) viii. : *C. protensus* and *melas*, p. 58, *anthracinus* and *carbonarius*, p. 59, *cyano-cupreus*, p. 60, *beryllinus*, p. 61, *ovatus*, p. 62, *interruptus* and *atro-æneus*, p. 63, *trapezicollis*, p. 64, *micans*, *ahenonotus*, and *acutus*, p. 65, *politus* and *punctato-striatus*, p. 66, *brevis* and *landolti*, p. 67, J. Putzeys, MT. Münch. ent. Ver. ii., Colombia : *C. hakonus*, p. 213, and *speculator*, p. 214, E. v. Harold, Deutsche E. Z. 1878, Japan.

Pogonides.

Platidiolus, g. n., Chaudoir, Bull. Mosc. liii. (2) p. 77. *Deltomerides*: mentum almost divided into three parts by two deep basal excavations, 2nd joint of antennæ almost globular, eyes very small, &c. *P. rufus*, sp. n., p. 79, Baikal.

Pogonus australis, sp. n., *id. l. c.* p. 76, Melbourne.

Deltomerus raddei and *triseriatus*, spp. nn., J. Putzeys, Verh. Ver. Brünn, xvi. p. 67, Kevsur District, Central Caucasus.

Anchonoderides.

Anchonoderus quadrinotatus, G. H. Horn, Tr. Am. Ent. Soc. vii. p. 53, Texas; *A. reichei, erosus*, and *femoratus*, J. Putzeys, MT. Münch. ent. Ver. ii. p. 57, Colombia: spp. nn.

Lachnophorus semirufus, leucoscelis, and *longulus*, p. 603, Chontales, *sculptifrons*, p. 604, Guatemala and Chontales, Bates, P. Z. S. 1878; *L. angusticollis*, p. 55, *cyanescens*, p. 56, Putzeys, *l. c.*, Colombia: spp. nn.

Chalybe belti, sp. n., Bates, *l. c.* p. 604, Chontales.

Trechides.

"*Aëpus.*" C. A. Dohrn, S. E. Z. xxxix. p. 412, remarks that all Catalogues wrongly give the diæresis mark to the second vowel, and that the Munich Catalogue wrongly states the name to be of doubtful etymology, whereas it is derived from ἄπυς; he also protests against the stigma of malformation implied by the large star prefixed by Erichson and Agassiz. [The Recorder as long ago as 1866 anticipated this derivation in the Catalogue to his "British Beetles"; but if Dr. Dohrn had consulted the large "Nomenclator Zoologicus" instead of the small Index, he would have found "a priv.; ἔπος verbum" (= "a deed without a name") suggested as the derivation.]

Anophthalmus. J. Frivaldszky, Term. füzetek, ii. Heft 1, gives a synopsis of the 5 species as yet found in Hungary.

Anophthalmus parœcus, sp. n., *id. l. c.* p. 13, Hungary.

Trechus diemenensis, H. W. Bates, Cist. Ent. ii. p. 322, Tasmania; *T. lederi*, J. Putzeys, Verh. Ver. Brünn, xvi. p. 82, Kasbeg, Caucasus: spp. nn.

Bembidiides.

Cillenum albescens, sp. n., Bates, Ent. M. M. xiv. p. 193, Tairua, near Auckland.

Anillus mayeti, sp. n., C. Brisout, Bull. Soc. Ent. Fr. (5) viii. p. lxii. Agde (Hérault).

Pericompsus longulus, sp. n., Bates, P. Z. S. 1878, p. 601, Mexico.

Xysostomus belti and *olivaceus*, spp. nn., *id. ibid.*, Chontales.

Tachys diploharpinus, id. *l. c.* p. 602, Chontales; *T. oahuensis, arcanicola*, and *atomus*, Oahu, *mucescens*, Honolulu, T. Blackburn, Ent. M. M. xv. p. 158: spp. nn.

Tachyta subvirens, sp. n., Chaudoir, R. Z. (3) vi. p. 193, Zanzibar.

Peryphus angulicollis, sp. n., Putzeys, MT. Münch. ent. Ver. ii. p. 76, Colombia.

Notaphus basiplagiatus, sp. n., *id. l. c.* p. 75, Colombia.

Bembidium (*Notaphus*) *arcuatum* and *versutum*, J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 594, Lake Superior; *B.* (*N.*) *flohri* and *placitum*, p. 602, Mexico, *B.* (*Peryphus*) *rogersi*, ibid., Costa Rica, *submaculatum*, p. 603, Mexico, *pamirense*, Pamir, and *punctulipenne*, Pamir or Yarkand, Bates, l. c.; *B.* (*Lopha*) *pacificum*, Blackburn, *l. c.* p. 157, Oahu; *B. ovatum*, Putzeys, *l. c.* p. 76, Colombia; *B. tairuense*, p. 193, *parviceps*, p. 194, *anchonoderum* and *custictum*, p. 195, Tairua, *callipeplum*, p. 195, Wellington, Bates, Ent. M. M. xiv.; *B. orbiferum* and *chalceipes*, p. 24, *hokitikense*, p. 25, South Island, New Zealand, *id. op. cit.* xv.; *B. bowditchi*, Wyoming, *scudderi*, Salt Lake Valley, Le Conte, Bull. U. S. Geol. Surv. iv. p. 451 : spp. nn.

Dytiscidæ.

Régimbart, M. Étude sur la Classification des *Dytiscidæ*. Ann. Soc. Ent. Fr. (5) viii. pp. 447–466, pl. x.

After deprecating the value usually attached to mere sexual differences, and especially the formation of the tarsi in the ♂ in this group, the author describes and figures the pieces of the meso- and meta-sternum, on which he is disposed to place greater reliance for purposes of classification, as being common to both sexes. He characterizes 5 sub-families or tribes, (1) *Haliplinæ*, with hind coxæ covering the first abdominal segments, and antennæ 10-jointed; (2) *Hygrobiinæ* (= *Pelobiides*), with head not received in the pronotum, of which the front margin is ciliated; (3) *Dytiscinæ* (including *Colymbetides*), which, with No. 4, have triangular meso-thoracic epimera, the meta-thoracic episterna reaching the intermediate coxæ by their inner angle, and the posterior coxal projections small, not lamellated, and more or less dilated at the apex, but which have 5 joints visible to all the tarsi; (4) *Hydroporinæ*, with only 4 joints visible in the front and middle tarsi; and (5) *Noterinæ*, with linear meso-thoracic epimera, the meta-thoracic episterna not reaching the middle coxæ, and the posterior coxal projections wide, lamellar, and triangular. [Supposing these sternal characters to be admitted as dominant, the apparent difference in the tarsi should logically sink the *Hydroporinæ* as a sub-tribe of the *Dytiscinæ*, of which they possess the major attributes.] *Cnemidotus*, Er., *nec* Ill., which is simply *Haliplus*, is renamed *Peltodytes* (pp. 450 & 457); *Eretes*, Cast., is adopted for the preoccupied *Eunectes*, Er., and *Metadema*, Cast., for the undescribed *Scutopterus*, Esch.; *Agabus ? gaudichaudi*, Cast., is near *Agabetes*, Crotch; *Ilybiosoma*, Crotch, evidently = *Eriglenus*, Thoms.

Secretions of water-beetles; E. C. Rye (quoting T. T. Cooper), Ent. M. M. xiv. p. 232.

Water-beetles imprisoned in frog-spawn; F. Katter, Ent. Nachr. iv. p. 132.

Schøyen, N. Mag. Naturv. 1878, pp. 200 & 201, records various North European species from Norway.

Haliplus. J. Gerhardt on the *ruficollis* group; Z. E. Ver. Schles. 1878, p. 34 *et seq.*

Hydroporus hispanicus, Ros., = *opatrinus*, *H. depressicollis*, Ros., probably = *carinatus*, Aubé, var.; C. E. Leprieur, Bull. Soc. Ent. Fr. (5) viii. p. xvii.

Laccophilus. The faculty of skipping possessed by species of this genus indicated as not before recorded; *id. l. c.* p. cxxxvii. [*Cf.* Régimbart, Ann. *l. c.* p. 458.]

Dytiscus (? *circumcinctus*) met with half-way between Russia and England in the North Sea; B. Haase, Ent. Nachr. iv. p. 25.

Dytiscus marginalis and *Cybister* dying soon after food when kept some time without it; J. & P. Passy, Feuil. Nat. viii. p. 61.

Dytiscus marginalis. The crystalline lens of the eye figured in O. Schmidt's paper, "Die Form der Krystallkegel im Arthropodenauge," Z. wiss. Zool. xxx. suppl. (pp. 1–13) pl. i. fig. 16.

New genera and species:—

Homœodytes, Régimbart, *l. c.* pp. 451 & 458. Differs from *Cybister* in its free posterior claws, the outer one being smaller and moveable. For *C. scutellaris*, Germ.

Platynectes, id. *l. c.* pp. 454 & 462. Allied to *Platambus*, Thoms., with epipleura very narrow after the middle of the elytra, body depressed, and pronotum very short. For *Agabus* 10-*notatus*, Aubé, *sub-maculatus*, Cast., *spilopterus*, Germ., *tasmaniæ* and *bakewelli*, Clarke, with others from America and Australasia.

Peltodytes, vide suprà.

Haliplus robustus, D. Sharp, Ann. Ent. Belg. xx. p. 120, Antigua; *H. immaculatus*, J. Gerhardt, Z. E. Ver. Schles. 1877, p. 38, Leignitz.

Hydroporus decipiens, Sharp, *l. c.* p. 113, Portugal; *H. strigosulus*, Fairmaire, Pet. Nouv. ii. p. 278, Fiji; *H. congruus*, Le Conte, Bull. U. S. Geol. Surv. iv. p. 452, Colorado; *H. seminulum*, p. 377, Florida, *laccophilinus*, p. 595, Detroit, *id.* P. Am. Phil. Soc. xvii.

Suphis semipunctatus, Le Conte, *l. c.* p. 595, Michigan.

Laccophilus pumilio, id. *l. c.* p. 596, Florida.

Gaurodytes leptaspis and *longulus*, id. *l. c.* p. 596, Lake Superior; *G. nanus*, id. Bull. U. S. Geol. Surv. iv. p. 452, Colorado.

Agabus dichrous, Sharp, J. A. S. B. xlvii. 2, p. 169, Pamir.

Ilybius cinctus, id. *ibid.*, Yangihissar.

Cybister semirugosus, E. v. Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa.

Gyrinidæ.

Gyrinus apicalis, p. 117, Santa Cruz, and *derasus*, p. 118, Barbacena, spp. nn., Sharp, Ann. Ent. Belg. xx.

Dineutes angustus, Le Conte, P. Am. Phil. Soc. xvii. p. 378, Florida; *D. quadrispina*, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 88, Central China: spp. nn.

Hydrophilidæ.

Laccobius. J. Gerhardt, Z. E. Ver. Schles. 1877. p. 7 *et seq.*, discusses

Rottenberg's treatment of *L. nigriceps* and *viridiceps*, considering that that author's varieties *maculiceps* and *obscurus* of the former are good species.

Ochthebius. Table of N. American species, p. 378; *O. fossatus*, Lec., = *nitidus*, Lec., p. 380. Le Conte, P. Am. Phil. Soc. xvii.

Hydrocassis, g. n., [presumably] L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 88. Very near *Hydrobius*, but less oblong and convex, with epistoma and labrum widely sinuated, and mesosternum forming a narrow keel between the middle coxæ, &c. *H. scapulata*, sp. n., *id. l. c.* p. 89, Central China.

Hydrobius feminalis, Detroit, *castaneus* and *cuspidatus*, California, spp. nn., Le Conte, *l. c.* p. 597.

Philhydrus halophilus, sp. n., L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. clxix., brackish water, British Channel to Mediterranean and Asia.

Laccobius biguttatus, sp. n, J. Gerhardt, *l. c.* Leignitz, Berlin.

Berosus punctipennis, sp. n., E. v. Harold, Deutsche E. Z. 1878, p. 67, Japan.

Ochthebius discretus, California and Canada, p. 379, *rectus*, ibid., *laevipennis*, p. 381, California, *sculptus*, p. 381, California and Arizona, *tuberculatus*, p. 380, New Mexico, *benefossus*, p. 381, New Jersey, *attritus* and *simplex*, p. 380, *foveicollis*, p. 381, Florida, Le Conte, l. c.; *O. volxemi*, Sharp, Ann. Ent. Belg. xx. p. 115, Portugal: spp. nn.

Cyclonotum (tabulated) *palmarum*, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 355, Florida.

Sphaeridium sharpi, sp. n., E. v. Harold, MB. Ak. Berl. 1878, p. 210, Zanzibar.

Cercyon sharpi, sp. n., *id.* Deutsche E. Z. 1878, p. 68, Tokio.

Staphylinidæ.

A. Fauvel, Ann. Mus. Genov. xii. pp. 171–315, pls. i. & ii., describes the known *Staphylinidæ* of the Moluccas and New Guinea, 139 in all, of which only 19 extend beyond the geographical limits mentioned. The *Piestides* and *Staphylinides* predominate. The distribution of the various species is noted on tables, and various deductions are made on apparently quite insufficient material.

The same author, *op. cit.* xiii. pp. 465–598, publishes a second memoir on the *Staphylinidæ* of Australia and Polynesia (chiefly New Caledonia). Nine cosmopolitan species are added to the former list; and the number of known species is raised to 351, in 76 genera (including 7 new). The *Staphylinides* predominate, and *Quedius* is the genus with most species. Revised tables of distribution are given.

Eppelsheim, Deutsche E. Z. 1878, pp. 385–404, redescribes various known species recently recorded from Germany.

E. Mulsant & C. Rey's "Tribu des Brévipennes, Pédériens, et Evæsthétiens," in Ann. Soc. L. Lyon, xxiv. [for 1877, published in 1878], 6 pls., has not been seen by the Recorder.

Aleocharides.

Oxalea latipennis, Sharp, = *rivularis*, Mill., ex. typ.; *Aleochara alu-*

tacea, Muls., = *villosa*, Mann.; Eppelsheim, Deutsche E. Z. 1878, p. 386.

Aleochara japonica, Shp., = *asiatica*, Ktz., occurs also in the Aru Islands and Celebes; Fauvel, Ann. Mus. Genov. xii. p. 306.

New genera and species:—

Polypea, Fauvel, *l. c.* p. 301. Near *Pronomæa* and *Diglossa*, but front and middle tarsi 4-jointed, and the coxæ of those legs separated, &c. *P. coralli*, p. 302, pl. ii. fig. 37, Aru Islands.

Correa ("nom géographique"), *id. op. cit.* xiii. p. 592. Near *Aleochara*, but with basal joint of posterior tarsi only as long as second joint. *C. oxytelina*, ibid., Adelaide.

Falagria basalis, id. *op. cit.* xii. p. 310, Aru Islands and New Guinea.

Ophioglossa novæ-guineæ, id. *l. c.* p. 308, pl. ii. fig. 39, New Guinea.

Myrmecopora insignicornis, id. *l. c.* p. 303, pl. ii. fig. 38, New Guinea (the genus is probably not at all myrmecophilous, but maritime); *M. senilis*, id. *op. cit.* xiii. p. 582, Victoria.

Bolitochara spinosa, id. *op. cit.* xii. p. 307, New Guinea; *B. discicollis*, id. *op. cit.* xiii. p. 595, S. and W. Australia.

Silusa melanogastra, Melbourne, and *pallens*, W. Australia and Sydney, *id. l. c.* xiii. p. 590.

Ocalea alutacea, p. 90, *minor*, p. 91, Eppelsheim, Verh. Ver. Brünn, xvi., Caucasus.

Ischnoglossa cæca, id. *l. c.* p. 92, Caucasus.

Leptusa caucasica, p. 93, *bituberculata*, p. 94, *carinicollis*, p. 95, pl. i. fig. 3, *cingulata*, p. 97, *id. l. c.*, Caucasus; *L. simoni*, id. Deutsche E. Z. 1878, p. 211, Schwarzwald.

Sipalia (?) *caledonica*, Fauvel, *op. cit.* xiii. p. 591, New Caledonia.

Microglossa conviva, Eppelsheim, Verh. Ver. Brünn, xvi. p. 98, Caucasus.

Aleochara ternatensis, Fauvel, *op. cit.* xii. p. 305, Ternate; *A. punctum*, p. 593, New South Wales, *rhopalocera*, p. 594, Tonga Tabu, *id. op. cit.*, xiii.

Myrmedonia hildebrandti, E. v. Harold, MB. Ak. Berl. 1878, p. 211, Zanzibar, Taita; *M. clavigera*, p. 588, Sydney, *insignicornis*, p. 589, Australia, Fauvel, *op. cit.* xiii.

Calodera abdominalis, p. 580, Australia, *macilenta*, Victoria, and *ruficollis*, Sydney, p. 581, *id. l. c.*

Chilopora antennata, Eppelsheim, Verh. Ver. Brünn, xvi. p. 100, Caucasus.

Tachyusa flavo-limbata, p. 100, Caucasus, *impressa*, p. 101, Borshorn, *id. l. c.*

Gnypeta fulgida, Fauvel, *op. cit.* xiii. p. 583, Victoria.

Polylobus insecatus, p. 585, Queensland, *parvicornis*, Victoria, and *aterrimus*, W. Australia, p. 586, *id. l. c.*

Oxypoda variegata and *vincta*, id. *l. c.* p. 584, New South Wales.

Pelioptera specularis, id. *l. c.* p. 579, Sydney.

Homalota serricauda, p. 417, Derbent, *armata*, p. 418, Greece, Eppelsheim, S. E. Z. xxxix.; *H. hydrocephalica*, id. Verh. Ver. Brünn, xvi.

p. 102, Kasbek; *H. basalis*, New Guinea and Ternate, and *hatamensis*, Hatam, p. 295, *aruensis*, p. 296, Aru Isles, Fauvel, *op. cit.* xii.; *H. robusticornis*, p. 576, *piceicollis*, p. 577, Sydney, *politula*, p. 577, Adelaide, *gentilis*, p. 578, Southern Australia, *id. op. cit.* xiii.; *H. infirma*, p. 38, Carpathians, and *padana*, ibid., note, Monte Viso, J. Weise, Deutsche E. Z. 1878.

Thamiarea insigniventris, p. 299, pl. ii. fig. 36, New Guinea and Celebes, *cavicola*, p. 300, Amboina, Fauvel, *op. cit.* xii.

Thectura cribrum, p. 297, *pectinalis*, p. 298, New Guinea and Ternate, *id. l. c.*

Placusa tridens, p. 574, Sydney, *tenuicornis*, p. 575, Australia, *id. op. cit.* xiii.

Phlœopora lœviuscula, Victoria, and *gratiosa*, W. Australia, *id. l. c.* p. 587.

Oligota asperiventris, id. *l. c.* p. 573, Victoria.

Brachida suturalis, p. 570, Adelaide, *atriceps*, p. 571, Victoria, *basiventris*, ibid., and *annulata*, p. 572, Sydney, *id. l. c.*

Gyrophæna clavicornis, Eppelsheim, Deutsche E. Z. 1878, p. 40, Carpathians; *G. ebenina*, p. 290, Aru Isles, *quadra*, ibid., and *microcephala*, p 293, New Guinea, *moluccensis*, p. 291, Amboina, *variolosa*, Hatam and Key Islands, and *basicornis*, Key Islands, p. 292, Fauvel, *op. cit.* xii.; *G. discoidalis*, p. 568, Fiji Islands, *cribrosa*, p. 569, Sydney, *id. op. cit.* xiii.

Diglossa celebensis, id. *op. cit.* xii. p. 301, Celebes.

Myllana papuana, id. *l. c.* p. 288, New Guinea.

Dinopsis australis, id. *op. cit.* xiii. p. 567, Victoria.

Tachyporides.

Amblyopinus, Solsky [see *Staphylinides*, infrà].

Habrocerus (?) *magnus*, sp. n., J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 598, Lake Superior.

Cilea rugosella, p. 279, *basicornis*, p. 280, *curticornis* and *angusta*, p. 281, *dimidiata*, p. 282, *speculum* and *clavicornis*, p. 283, *antennaria* and *glabra*, p. 285, New Guinea, *lœviuscula*, p. 280, and *alutacea*, p. 284, also in the Aru Isles, Fauvel, *op. cit.* xii.; *C. discipennis*, id. *op. cit.* xiii. p. 563, Sydney: spp. nn.

Tachinoderus alutaceus, sp. n., *id. l. c.* xii. p. 277, New Guinea and Aru Isles.

Tachinus stoliczkæ, sp. n., Sharp, J. A. S. B. xlvii. 2, p. 170, Pamîr.

Conurus circumflexus, Fauvel, *op. cit.* xii. p. 286, Ternate; *C. impennis*, p. 564, W. Australia, *triangulum*, p. 565, S. & W. Australia, *discus*, ibid., Victoria, *personatus*, p. 566, Sydney, *id. op. cit.* xiii.: spp. nn.

Mycetoporus lævicollis, sp. n., Eppelsheim, Verh. Ver. Brünn, xvi. p. 107 Caucasus.

Quediides.

G. H. Horn, Tr. Am. Ent. Soc. vii. p. 149, *et seq.*, gives a "Synopsis of the *Quediini* of the United States."

Acylophorus. N. American spp. tabulated; *A. pratensis*, Lec., is apparently not *glabricollis*, as Fauvel avers. Le Conte, P. Am. Phil. Soc. xvii. p. 388.

Velleius dilatatus. J. Erné, MT. schw. ent. Ges. v. p. 369, adds to his former account of the habits of this species, associated with hornets.

Antimerus, g. n., Fauvel, Ann. Mus. Genov. xiii. p. 550. Facies of *Ocypus* and *Quedius*, near *Algon*, with very dilated tarsi. *A. smaragdinus*, sp. n., *ibid.*, Victoria.

Quediopsis, g. n., *id. l. c.* p. 560. Between *Quedius* and *Tanygnathus*, with sub-geniculate antennæ and five-jointed tarsi. *Q. lugubris*, ibid., and *abdominalis*, p. 561, Victoria, spp. nn.

Tanygnathus australasiæ, sp. n., *id. op. cit.* xiii. p. 562, Victoria (stated also to be a race of *terminalis*).

Heterothops semicuprea, p. 557, and *laticeps*, p. 558, Queensland, *bimaculata*, p. 557, and *flavicollis*, p. 559, Sydney, *tibialis*, p. 559, Victoria, spp. nn., *id. l. c.*

Acylophorus densus and *flavipes*, Le Conte, *l. c.* p. 387, Florida; *A. asperatus*, Fauvel, *op. cit.* xiii. p. 561, Victoria: spp. nn.

Quedius abdominalis, Eppelsheim, S. E. Z. xxxix. p. 419, Caucasus; *Q. ferox*, p. 388, Canada to Florida, *vernix*, p. 389, Canada, Massachusetts, Le Conte, l. c.; *Q. splendidus*, p. 273, fig. 34, and *chalceiventris*, p. 275, New Guinea, *cyaneo-rufus*, fig. 35, Aru Isles, and *cyanellus*, Moluccas, p. 274, Fauvel, *op. cit.* xii. pl. ii.; *Q. dichrous*, p. 553, *rubricollis* and *piceolus*, p. 554, Victoria, *diversipennis*, p. 554, Swan River, *viridescens*, p. 555, E. & W. Australia, *metallicus*, Queensland, and *semiviolaceus*, W. & S. Australia, p. 556, *id. op. cit.* xiii.; *Q. desertus*, p. 161, *limbifer*, p. 162, *debilis* and *prostans*, p. 165, *puncticeps* and *seriatus*, p. 166, Horn, *l. c.*, various parts of the United States.

Staphylinides.

Amblyopinus, Solsky (1875). A. Mathews (Cist. Ent. ii. pp. 275–279, pl. vi.) describes and figures his dissections of a second species, referred from description alone to this genus, and found in Tasmania on the fur of a live rat. Solsky's original species, from field-mice in South America, was referred by him with some hesitation to the *Tachyporides*; but, supposing this Tasmanian exponent to be congeneric with it, *Amblyopinus* should be placed in the "*Staphylini genuini*," close to *Philonthus*, of which the Tasmanian insect has the form and outline, differing only in the prolongation of the frontal plate, the peculiarly placed and almost rudimentary eye, and the deflexed angles of the pronotum. It forms a good connecting link between *Quedius* and *Philonthus*.

G. H. Horn, Tr. Am. Ent. Soc. vii. p. 185 *et seq.*, gives a "Synopsis of the species of *Staphylinus* and the more closely allied genera inhabiting the United States."

Staphylinus cæsareus occurring at Detroit; Le Conte, P. Am. Phil. Soc. xvii. p. 598.

Ocypus olens. On the habits of the perfect insect, ♂ & ♀; H. Steinike, Ent. Nachr. iv. p. 270.

Actinus, g. n., Fauvel, Ann. Mus. Genov. xii. p. 250. Allied to *Philonthus*, but with different antennæ and tarsi. *A. imperialis*, sp. n., *ibid.*, pl. ii. fig. 27, South New Guinea.

Leucitus, g. n., *id. l. c.* p. 253. Differs from *Cafius* in the tarsi and the non-securiform fourth joint of the maxillary palpi. *L. argyreus*, sp. n., p. 254, pl. ii. fig. 28, New Guinea, Aru Islands, &c., also *Philonthus stenoides*, Gr.

Mysolius, g. n., *id. l. c.* p. 255. Differs from *Philonthus* in the palpi and prosternum, and the frontal furrow. *M. aurichalceus*, sp. n., p. 256, pl. ii. fig. 29, New Guinea, Aru Isles, &c.

Amblyopinus jansoni, sp. n., Matthews, *l. c.* p. 278, pl. vi. figs. 1–8, Tasmania.

Emus violaceus, sp. n., Fauvel, *l. c.* p. 248, Moluccas.

Leistotrophus moluccarum, sp. n., *id. l. c.* p. 249, Moluccas.

Staphylinus nigrellus, p. 188, *rutilicauda* and *viridanus*, p. 196, Horn, *l. c.*, United States; *S. gracilipalpis*, p. 109, *hochhuthi*, p. 110, pl. i. fig. 4, Eppelsheim, Verh. Ver. Brünn, xvi. Caucasus: spp. nn.

Ocypus simulator, sp. n., Eppelsheim, S. E. Z. xxxix. p. 420, Acarnania and Asia Minor.

Philonthus stoliczkæ, Yarkand, and *pamirensis*, Pamir, D. Sharp, J. A. S. B. xlvii. 2, p. 170; *P. cingulatus*, p. 259, fig. 30, *albertisi*, p. 260, fig. 31, *auro-scutatus*, p. 261, *doriæ*, p. 262, fig. 33, *gestroi*, p. 263, *rufithorax*, p. 264, *tetramerus*, p. 265, *sericeicollis*, p. 266, *specularis* and *humeralis*, p. 267, New Guinea, &c., *beccarii*, pl. 262, fig. 32, *inclitus*, p. 264, Aru Islands, *violaceus*, p. 265, Moluccas, Fauvel, *l. c.* pl. ii.; *P. chalcipennis*, p. 547, New Caledonia, *hebridensis*, p. 549, New Hebrides, *id. op. cit.* xiii.: spp. nn.

Hesperus semirufus, p. 543, Northern Australia, *indigaceus*, p. 544, New Caledonia, spp. nn., Fauvel, *op. cit.* xiii.

Belonuchus æneiventris and *fuscipes*, p. 270, *lividipes* and *limbatus*, p. 271, spp. nn., *id. op. cit.* xii., New Guinea, Moluccas, Aru Isles.

Xantholinides.

Leptomicrus, g. n., Fauvel, *op. cit.* xii. p. 240. Differs from *Leptacinus* in its non-imbricated elytral suture, and from *Pachycorynus* in its palpi and un-spined middle tibiæ: facies of *Leptolinus*. *L. teredo*, sp. n., p. 241, New Guinea.

Pachycorynus analis, id. *l. c.* p. 240, New Guinea; *P. tabuensis*, Tonga Tabu, *caledonicus*, New Caledonia, *id. op. cit.* xiii. p. 536: spp. nn.

Leptacinus papuensis, sp. n., *id. op. cit.* xii. p. 242, New Guinea.

Xantholinus auriceps, id. *op. cit.* xii. p. 244, New Guinea; *X. hæmorrhous*, p. 538, Queensland, *sideralis*, p. 539, W. Australia, *cælestis* and *cribratus*, Victoria, p. 540, *id. op cit.* xiii.: spp. nn.

Pæderides.

Cryptobium. The North American species tabulated; Le Conte, P. Am. Phil. Soc. xvii. pp. 390–392.

Paderus. The like treatment; *id. l. c.* p. 395. *P. nevadensis*, Aust., = *compotens*, Lec.

Dicax, g. n., Fauvel, Ann. Mus. Genov. xiii. p. 518. Facies of *Cryptobium*, but without geniculate antennæ. For *Lathrobium longiceps*, Fauv.,

and *D. cephalotes*, p. 519, "Australie orientale, King George's Sound," *rubripennis*, ibid., and *arculus*, p. 520, Victoria, spp. nn.

Suniopsis, g. n., *id. l. c.* p. 530. Facies of *Sunius*, tarsi of *Scimbalium*. For *S. singularis*, sp. n., p. 531, W. Australia.

Hyperomma, g. n., *id. l. c.* p. 531. Facies of *Lathrobium*, but near *Scimbalium* in tarsal structure, and with the eyes almost on the top of the head, as in *Suniopsis*, from which it differs in the palpi, front tarsi, and untoothed mandibles. *H. lacertinum*, sp. n., p. 532, W. Australia.

Cryptobium floridanum, p. 389, *lugubre*, p. 393, *obliquum*, and *parcum*, p. 394, Florida, *texanum*, p. 392, *prospiciens*, p. 393, and *lepidum*, p. 395, Texas, *californicum*, p. 392, and *tumidum*, p. 393, California, *flavicorne*, p. 392, Massachusetts and Lake Superior, Le Conte, l. c.; *C. piceum*, p. 533, Queensland, *fractum*, p. 534, Victoria, Fauvel, *l. c.*: spp. nn.

Dolicaon paricolor, sp. n., *id. l. c.* p. 517, N. and E. Australia.

Scimbalium ferrugineum, p. 526, and *opaculum*, p. 530, Queensland, *duplo-punctatum*, p. 527, *simplarium* and *sparsicolle*, p. 528, *arcuatum*, p. 529, Southern Australia, *rufum*, p. 529, Australia, spp. nn., *id. l. c.*

Lathrobium breviceps, p. 521, *pennatum* and *angusticeps*, p. 522, *micros*, p. 523, *limbatum*, p. 524, Queensland, *cribrum*, p. 523, no locality given, *mutator*, Victoria, and *bipartitum*, N. S. Wales and Queensland, p. 525, spp. nn., *id. l. c.*

Lithocharis gigantea, p. 230, Aru Islands, *hirta* and *lanigera*, p. 231, *parvicollis*, p. 232, *sunioides* and *parvistria*, p. 233, New Guinea, *id. op. cit.* xii., spp. nn.

Thinocharis nigrella, p. 227, *brevicornis*, p. 228, spp. nn., *id. l. c.*, New Guinea.

Scopæus digitalis, sp. n., *id. op. cit.* xiii. p. 515, Victoria.

Sunius pectinatus, sp. n., *id. l. c.* p. 513, Sydney.

Domene australiæ, id. *l. c.* p. 514, Queensland; *D. aciculata*, M. v. Hopffgarten, Ent. Nachr. iv. p. 269, Croatia: spp. nn.

Paderus obliteratus, Le Conte, *l. c.* p. 395, Florida and Massachusetts; *P. albertisi*, p. 236, fig. 21, *politus*, fig. 22, and *gestroi*, fig. 23, p. 237, Fauvel, *op. cit.* xii. pl. i., New Guinea; *P. sparsus*, p. 516, S. Australia, *vitiensis* (= *samoensis*, F., olim), p. 517, Fiji, *id. op. cit.* xiii.: spp. nn.

Pinophilides.

Palaminus. The North American species tabulated; Le Conte, P. Am. Phil. Soc. xvii. p. 396.

Palaminus flavipennis, p. 396, *contortus* and *cribratus*, p. 397, and *pumilus*, p. 398, Florida, *normalis*, p. 397, Georgia and S. Carolina, Le Conte, *l. c.*; *P. novæ-guineæ*, Fauvel, *op. cit.* xii. p. 225, Hatam; *P. vitiensis*, p. 507, Ovalau, *australiæ*, p. 508, Queensland, *id. op. cit.* xiii.: spp. nn.

Œdichirus rubricollis, sp. n., *id. op. cit.* xiii. p. 508, Australia.

Procirrus victoriæ and *castelnaui*, spp. nn., *id. l. c.* p. 509, Australia.

Pinophilus trapezus, p. 510, *marginellus* and *rubripennis*, p. 511, spp. nn., *id. l. c.*, S. Australia.

Stenides.

Edaphellus, g. n., Fauvel, *op. cit.* xii. p. 220. *Evæsthetini*: general

characters of *Edaphus*, but differing in the palpi, antennal club, margined abdomen, &c. *E. novæ-guineæ*, sp. n., *ibid.*, pl. i. fig. 18, New Guinea.

Stenus prismalis, p. 222, fig. 19, *cœlestis*, p. 224, fig. 20, *id. l. c.* pl. i., New Guinea; *S. atro-virens*, p. 503, *obesulus*, p. 506, Queensland, *macellus*, p. 504, W. Australia, *pustulifer*, p. 505, N. S. Wales, *id. op. cit.* xiii.; *S. capitatus*, Eppelsheim, S. E. Z. xxxix. p. 421, Oran: spp. nn.

Megalops denticollis, sp. n., Fauvel, *op. cit.* xiii. p. 500, Australia.

Oxytelides.

Corallis, g. n., Fauvel. *op. cit.* xii. p. 212. Facies of *Trogophlœus* and slightly of *Phytosus*; near *Actocharis*, but with different maxillary palpi and intermediate coxæ rather widely separated. Of submarine habits. *C. polyporum*, sp. n., *id. l. c.* p. 213, pl. i. fig. 17, Aru and Key Islands.

Sharpia, g. n., *id. op. cit.* xiii. p. 488. Near *Planeustomus*, having 4-jointed tarsi, but with front tibiæ rather ciliated than spined, and different ligula and labial and maxillary palpi. Facies of *Ancyrophorus*. *S. banksi*, sp. n., *ibid.*, Victoria.

Osorius striola, p. 210, *carinellus*, *hatamensis*, and *hirtus*, p. 211, *pilosus*, p. 212, spp. nn., *id. op. cit.* xii., New Guinea, &c.

Bledius convexifrons, p. 498, and *hamifer*, p. 499, W. Australia, *phytosinus*, p. 499, Australia, spp. nn., *id. op. cit.* xiii.

Oxytelus fallax, p. 215, and *scabripennis*, p. 216, Ternate, *spinifer*, p. 216, *opacicollis*, p. 217, *dentifer* and *plumbeus*, p. 218, *clavicornis*, p. 219, New Guinea, *id. op. cit.* xii.; *O. rufinodis*, p. 493, *flavipes*, *apicalis*, and *obscurifrons*, p. 494, *scabrellus*, p. 496, *rubeculus*, p. 497, W. Australia, *piceicollis*, p. 495, S. Australia, Sydney, *cribriceps*, p. 496, Melbourne, *striatellus*, p. 497, Victoria, *id. op. cit.* xiii.: spp. nn.

Trogophlœus carbonarius, id. *op. cit.* xiii. p. 490, Victoria; *T. rufipennis*, Eppelsheim, S. E. Z. xxxix. p. 422, Greece: spp. nn.

Piestides.

Leptochirus minutus, Cast., pl. i. fig. 1, *samoensis*, Blanch., pl. ii. fig. 10; Fauvel, *op. cit.* xii. *Chasolium ernestinii*, Cast., = *Isomalus complanatus*, Er., ex. typ., and is referred to *Eleusis*.

Leptochirus parcus, fig. 2, and *antennarius*, fig. 3, p. 187, *albertisi*, p. 188, fig. 4, *conicicollis* and *extensus*, fig. 5, p. 189, *spinosulus*, p. 190, fig. 7, *alternus*, fig. 8, and *beccarii*, fig. 9, p. 191 (pl. i.), *opacicollis*, fig. 12, and *monilicornis*, fig. 11, p. 193, *vitulus*, p. 195, fig. 15 (pl. ii.), New Guinea, &c., *lorquini*, p. 190, pl. i. fig. 6, and *quadrifidus*, p. 194, pl. ii. fig. 13, Amboina, *cavifrons*, p. 194, pl. ii. fig. 14, Key Islands, spp. nn., Fauvel, *l. c.*

Lispinus unistriatus and *lineipennis*, p. 202, *nitidus* and *lævior*, p. 203, *foveatus*, p. 204, *alutaceus* and *æqualis*, p. 205, *castaneus*, p. 206, New Guinea, &c., *corticollis*, p. 204, Key Islands, *id.* l. c.; *L. sidne* [*y*] *ensis*, New South Wales, and *caledonicus*, New Caledonia, *id. op. cit.* xiii. p. 481: spp. nn.

Eleusis ruficollis, p. 207, *punctigera* and *longiceps*, p. 208, *id. op. cit.* xii., New Guinea; *E. australis*, id. *op. cit.* xiii. p. 482, Queensland: spp. nn.

Thoracophorus crenicollis, p. 196, pl. i. fig. 16, Key Islands, *duplicatus*, p. 197, Aru Isles, Borneo, Burma, spp. nn., *id. op. cit.* xii.

Holosus substriatus, Aru Isles, and *politulus*, New Guinea, spp. nn., *id. l. c.* p. 199.

Ancæus aruensis, sp. n., *id. l. c.* p. 200, Aru Isles.

Phlœocharides.

Phlœocharis antipodum, sp. n., Fauvel, *op. cit.* xiii. p. 483, W. & S. Australia.

Homaliides.

Orobanus, g. n., J. L. Le Conte, Bull. U. S. Geol. Surv. iv. p. 453. Facies of *Lesteva*: allied to *Micræus*, with the last joint of the maxillary palpi much smaller and acicular, the thorax scarcely wider than the head, with oblique sides, and deep lateral impression. *O. simulator*, sp. n., *ibid.*, Colorado, Vancouver, and California.

Geodromicus ovipennis, sp. n., *id. l. c.* p. 452, Colorado.

Homalium conicum, p. 484, New Zealand, *philor* [*rh*] *inoides*, p. 485, Victoria, spp. nn., Fauvel, Ann. Mus. Genov. xiii.

Amphichroum cribriceps, p. 486, S. Australia, "Nouvelle-Galles," *spinipes*, p. 487, W. Australia, spp. nn., *id. l. c.*

Anthobium (*Eusphalerum*) *sareptanum*, sp. n., Eppelsheim, S. E. Z. xxxix. p. 423, Sarepta.

PSELAPHIDÆ.

Claviger lederi, Reitt., figured; Verh. Ver. Brünn, xvi. p. 138, pl. ii. fig. 19.

Fustiger is scarcely, if at all, distinct generically from *Articerus*; D. Sharp, Nouv. et faits, (2) No. 16, p. 63.

Rhinoscepsis, g. n., Le Conte, P. Am. Phil. Soc. xvii. p. 382. Differs from *Rhexius* and *Trichonyx* (which it resembles in facies) in the approximated antennæ being situate under a long frontal protuberance. Apparently resembles *Panaphantus*, Kies. For *Rhin. bistriatus*, sp. n., *ibid.*, Florida.

Chennium prometheus, sp. n., F. de Saulcy, Verh. Ver. Brünn, xvi. p. 131, pl. ii. fig. 11, Caucasus.

Pselaphus pentagonus, *lederi* (fig. 16), and *armeniacus* (fig. 17), p. 136, *caucasicus*, p. 137, fig. 18, spp. nn., *id. l. c.* pl. ii., Caucasus.

Batrisus simplex, sp. n., Le Conte, *l. c.* p. 598, Detroit.

Amaurops saulcyi, sp. n., E. Reitter, Verh. Ver. Brünn, xvi. p. 132, pl. ii. fig. 12, Suram.

Rhexius substriatus, sp. n., Le Conte, *l. c.* p. 383, Florida.

Bryaxis balcanica, De Saulcy, Deutsche E. Z. 1878, p. 41, Balkans; *B. colchica*, id. Verh. Ver. Brünn, xvi. p. 132, Caucasus: spp. nn.

Macharites lucantii, sp. n., *id.* Pet. Nouv. ii. p. 277, Cave in Basses-Pyrénées.

Bythinus acutangulus, p. 42, Reitter, Deutsche E. Z. 1878, p. 42, and *B. specialis* and *attila*, De Saulcy, *l. c.* p. 43 (with names and indications

of *B. stussineri* and *subvalidus*), Carpathians, *anatolicus*, id. *l. c.* p. 44, note, Asia Minor; *B. ammon*, p. 133, fig. 13, *schamylanus*, fig. 14, and *murida*, fig. 15, p. 134, *jaso*[*n*], p. 135, *id.* Verh. Ver. Brünn, xvi., Caucasus; *B. extremitalis*, E. Reitter, *l. c.* p. 135, Caucasus: spp. nn.

Euplectus debilis and *tenuis*, p. 386, *cavicollis*, p. 387, Florida, *integer*, p. 386, Michigan, Le Conte, l. c.; *E. frivaldszkii*, De Saulcy, Deutsche E. Z. 1878, p. 44, Carpathians: spp. nn.

Trimium (American spp. tabulated, p. 385) *convexulum*, p. 383, and *simplex*, p. 384, Florida, *californicum*, p. 383, California, *puncticolle*, Arizona, *discolor*, Louisiana, and *foveicolle*, Massachusetts, Le Conte, l. c.; *T. planiceps*, Reitter, Deutsche E. Z. 1878, p. 384, Greece: spp. nn.

Articerus ponticus, sp. n., Sharp, *l. c.* p. 62, Mesopotamia (myrmecophilous).

Scydmænidæ.

Cephennium turgidum, Reitt., figured; Verh. Ver. Brünn, xvi. pl. ii. fig. 20.

Conoderus [|| Eschscholtz, *Elateridæ*, 1829], g. n., De Saulcy, Pet. Nouv. ii. p. 221. Differs from *Scydmænus* in the very short, conical, very obtuse last joint of the maxillary palpi, strongly keeled mesosternum, and truncate elytra. Apparently closely allied to *Euthia*. For *S. conicicollis*, Fairm., and *C. tschapecki*, sp. n., *ibid.*, Vienna. The genus again referred to as new, with *C. parallelocollis*, sp. n., by the author, Deutsche E. Z. 1878, p. 45, Carpathians, this latter species being nevertheless in the original diagnosis of the genus referred to as "récemment décrit."

Scydmænus divisus, E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 357, Florida; *S. latitans*, De Saulcy, Deutsche E. Z. 1878, p. 46, Carpathians: spp. nn.

Euconnus reitteri, sp. n., De Saulcy, Verh. Ver. Brünn, xvi. p. 141, pl. iii. fig. 27, Suram Mts., Caucasus.

Cephennium carpathicum, id. Deutsche E. Z. 1878, p. 45, Carpathians; *C. caucasicum* and *ditomum* (pl. ii. fig. 21), *id.* Verh. Ver. Brünn, xvi. p. 139, Suram: spp. nn.

Silphidæ.

Necrophorus. On the fossorial habits and astonishing instincts of this genus; W. Eichhoff, S. E. Z. xxxix. p. 411.

Necrophorus japanus, Har., from Central China, figured and redescribed; [? L. Fairmaire: unsigned] Ann. Soc. Ent. Fr. (5) viii. p. 89, pl. iii. fig. 5.

Camirus, Sharp, preoccupied, is renamed *Camiarus*; D. Sharp, Ent. M. M. xv. p. 36.

Necrophorus ocellatus, sp. n. [? L. Fairmaire: unsigned], Ann. Soc. Ent. Fr. (5) viii. p. 90, Central China.

Ptomascopus davidis, sp. n. [? *id.*], *l. c.* p. 91, Central China [? = *4-maculatus*, Ktz., var.].

Ptomaphagus ventricola, sp. n., J. Weise, indicated from the Trans-

sylvanian Alps and Caucasus; Deutsche E. Z. 1878, p. 47, also Verh. Ver. Brünn. xvi. p. 145.

Silpha (Oiceoptoma) cyaneo-cincta, sp. n., L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 92, Central China.

Choleva lederi, sp. n., J. Weise, Verh. Ver. Brünn, xvi. p. 144, Caucasus, (myrmecophilous).

Catopomorphus georgicus, sp. n., *id. l. c.* p. 142, Caucasus (myrmecophilous).

Adelops hungarica, E. Reitter, Deutsche E. Z. 1878, p. 63, Carpathians; *A. tarissani*, L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. lxxiv., Drôme: spp. nn.

Anisotomidæ.

Anisotoma fusco-cincta, sp. n., L. Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lv., Corsica.

Agathidium globatile and *parvulum*, J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 598, Lake Superior; *A. rubicundum*, p. 47, Carpathians, *punctato-seriatum*, p. 88, Japan, E. Reitter, Deutsche E. Z. 1878; *A. suturale*, id., Verh. Ver. Brünn, xvi. p. 147, Caucasus: spp. nn.

Corylophidæ.

Orthoperus. The European species described and tabulated; E. Reitter, Deutsche E. Z. 1878, pp. 199–202.

Sericoderus revelierei, id. *l. c.* p. 125, Corsica; *S. ferrugatus*, id. Verh. Ver. Brünn. xvi. p. 150, Tifflis: spp. nn.

Sacium latum, id. Verh. Ver. Brünn, xvi. p. 149, pl. iii. fig. 28, Caucasus; *S. mollinum*, p. 356, *splendens*, p. 357, E. A. Schwarz, P. Am. Phil. Soc. xvii., Florida: spp. nn.

Orthoperus scutellaris, Lake Superior, Illinois, and British Columbia, *suturalis* and *elongatus*, Florida, spp. nn., J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 599.

Trichopterygidæ.

Matthews, A. Synopse des Espèces des Trichopterygiens qui habitent l'Europe et les contrées limitrophes. L'Ab. xvi. [sep. pag.] pp. 1–68.

Trichopteryx volans, Mots., in Britain; *id.* Ent. M. M. xv. p. 64.

Trichopteryx championis [*-ni*], p. 64, *fratercula*, p. 65, spp. nn., *id. l. c.*, England.

Ptilium simsoni, sp. n., *id.* Cist. Ent. ii. p. 327, Tasmania.

Ptinella bi-impressa, sp. n., E. Reitter, Deutsche E. Z. 1878, p. 48, North Hungary.

Histeridæ.

Hister. G. H. Horn, Tr. Am. Ent. Soc. vii. p. 1, tabulates the N. American species by the striation of the prosternum.

Acritus. Table of European species; E. Reitter, Deutsche E. Z. 1878, p. 50.

Tinotarsus poggei, sp. n., E. v. Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa.

Hetærius blanchardi, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 609, Massachusetts.

Paromalus teres, sp. n., *id. l. c.* p. 699, Lake Superior.

Saprinus permixtus, sp. n., *id. l. c.* p. 401, Florida.

Acritus salinus, id. *l. c.* p. 402, Florida; *A. hopffgarteni*, p. 49, Hungary, Germany, and France, and *tataricus*, p. 51, in table (also in Verh. Ver. Brünn, xvi. p. 154, Caucasus), E. Reitter, Deutsche E. Z. 1878: spp. nn.

Phalacridæ.

Olibrus princeps, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 361, Florida.

Nitidulidæ.

D. Sharp, Tr. E. Soc. 1878, pp. 127–140, characterizes a new genus and various new species of *Carpophilides* taken by the Rev. T. Blackburn in the Hawaiian Islands, thinking it probable that their nearest allies will be found in Wallace's Indo-Malayan and Austro-Malayan sub-regions. The small supplementary segment at apex of abdomen is not invariably characteristic of the male.

Gonioryctus (Blackburn, MS.), g. n., Sharp, *l. c.* pp. 128 & 131. With coarsely facetted eyes, abbreviated elytra, and greatly developed tarsi. Near *Brachypeplus* and *Campysopyga* in Murray's scheme, but probably more nearly allied to *Epuræa*. For *G. latus*, p. 129, *blackburni* and *monticola*, p. 130, spp. nn., Honolulu.

Cychramptodes, g. n., E. Reitter, Deutsche E. Z. 1878, p. 383. Allied to *Cychramus* and *Camptodes*, but more ovate and strongly convex in front, with 9-jointed antennæ (club as in *Thalycra*), bidenticulate mandibles, approximated posterior coxæ, &c. *C. murrayi*, sp. n., *ibid.*, Adelaide.

Brachypeplus discedens and *puncticeps*, p. 133, *robustus* and *reitteri*, p. 134, *infimus* and *impressus*, p. 135, *inæqualis* and *[h]omalioides*, p. 136, *brevis* and *aper*, p. 137, Sharp, *l. c.*, Hawaiian Isles; *B.* (*Tasmus*) *brevicornis*, id. Ent. M. M. xv. p. 47, Tairua; *B. glaber*, J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 398, Florida (belongs to subg. *Liopeplus*, hitherto W. African only): spp. nn.

Epuræa zealandica, Sharp, Ent. M. M. xv. p. 48, Tairua; *E. carpathica*, Reitter, *l. c.* p. 51, Carpathians: spp. nn.

Soronia optata, sp. n., Sharp, *l. c.* p. 48, New Zealand.

Amphotis martini, sp. n., C. Brisout, Bull. Soc. Ent. Fr. (5) viii. p. lxiii., Sierra Nevada, with a small yellow *Myrmica*.

Meligethes schneideri, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 157, Caucasus.

Strongylus literatus, sp. n., *id.* Deutsche E. Z. 1878, p. 88, Japan.

Camptodes biformis, sp. n., *id. l. c.* p. 32, Bolivia.

Cybocephalus syriacus, sp. n., *id. l. c.* p. 91, Syria and Cyprus.

Ips davidis and *nankineus*, spp. nn., L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 93, Central China.

Rhizophagus brunneus, sp. n., G. H. Horn, P. Am. Phil. Soc. xvii. p. 608, Lake Superior.

Trogositidæ.

Phanodesta angulata, Reitt., = *Trogosita cribrata*, Germain, which, with *T. variegata* and *picea*, Gmn., are referred to *Phanodesta*; but *Leperina argentea*, Montr., has nothing to do with that genus. A. Léveillé, Bull. Soc. Ent. Fr. (5) viii. pp. lxxx. & lxxxi.

Gaurambopsis, g. n., G. Kraatz, Deutsche E. Z. 1878, p. 238. Allied to *Peltis*; anterior thoracic angles scarcely, the posterior not at all, produced; elytra as in *Gaurambe*, but with six slightly elevated sub-equal ridges; margin of thorax and elytra ciliated. *G. maculipennis*, sp. n., p. 239. Bawankitzi, S. Africa.

Trogosita sennevillii, sp. n., Léveillé, *l. c.* p. lxxix., Colombia.

Tenebrio[no]ides mathani, sp. n., *id. ibid.*, Para.

Leperina spercheoides, sp. n., *id. l. c.* p. lxxx., New Caledonia.

Xenoglena tetrastigma, sp. n., *id. ibid.*, Malacca.

Colydiidæ.

G. H. Horn, P. Am. Phil. Soc. xvii. p. 555 *et seq.*, gives a synopsis of the species known to occur in the United States. A new family, *Discolomidæ*, is erected for the reception of *Discoloma fryi* and an unnamed species of *Hyberis* from the Cape of Good Hope, in which the tarsi are 3-jointed, and the posterior coxæ are exceptionally small and completely surrounded, the metasternal side-pieces being distant from their outer edge. New tribes, *Rhagoderini*, for the genera without retractile antennæ, and *Deretaphrini*, for those with the anterior coxæ contiguous or very nearly so, are also proposed. *Nematidium filiforme*, Lec., = *mustela*, Pascoe. *Aglenus* has open anterior coxæ, and *Anommatus* must not be dissociated from it. *Myrmidius* rejected from the family, and its characteristics discussed.

Machlotes, Pasc. (1863) = *Erotylathris*, Mots. (1861); E. Reitter, Deutsche E. Z. 1878, p. 96.

Mecedanops, g. n., *id. l. c.* p. 120. Very near *Aprostoma*, but with basal joints of tarsi not so long, and anterior coxæ approximated. *M. ornamentalis*, sp. n., p. 121, Ceylon.

Endophlœus nosoderm[at]oides, sp. n., Horn, *l. c.* p. 567, California.

Coxelus pacificus, sp. n., *id. l. c.* p. 569, Vancouver.

Diplotoma erichsoni, p. 113, *colorata*, p. 114, spp. nn., Reitter, *l. c.*, Madagascar.

Cicones lineaticollis, sp. n., Horn, *l. c.* p. 564, S. Carolina and Florida.

Lasconotus (recharacterized) *borealis*, sp. n., Horn, *l. c.* p. 570, Michigan.

Sosylus dentiger, sp. n., *id. l. c.* p. 582, Lower California and Santo Domingo.

Phlæonemus catenulatus, id. *l. c.* p. 568, California; *P. haroldi*, Reitter, *l. c.* p. 114, Cuba: spp. nn.

Colydium unistriatum, p. 116, Guiana, *corpulentum*, p. 117, ? S. America, *mexicanum*, p. 118, Mexico, *longicolla*, ibid., and *acuticolle*, p. 119, Aragua, *brevicorne*, p. 119, Antilles or Colombia, *ferrugineum*, p. 120, Brazil, spp. nn., Reitter, *l. c.*

Prolyctus angulosus, sp. n., *id. l. c.* p. 122, Aragua.

Penthelispa aquicolle, Porto Rico, and *conferta*, Madagascar, p. 123, *acutangulum*, New Zealand, and *simplex*, Colombia, p. 124, spp. nn., *id. l. c.*

Philothermus puberulus, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 361, Florida.

Discoloma thymaloides, sp. n., Reitter, *l. c.* p. 125, Aquapim, Guinea.

Cucujidæ.

Platamus buqueti, p. 67, fig. 1, *Telephanus agilis*, fig. 2, and *pubescens*, fig. 3, p. 68, *acuminatus*, p. 69, fig. 4, *Læmophlœus albo-fasciatus*, p. 70, fig. 5, *tuberculatus*, fig. 6, and *perrisi*, fig. 7, p. 71, and *Æraphilus corsicus*, p. 76, fig. 14, now fully described and figured by A. Grouvelle, Ann. Soc. Ent. Fr. (5) viii. pl. ii. *Passandra blanchardi*, Grouv., fig. 1, *marginata*, Grouv., fig. 2, p. 261, *Hectathrum murrayi*, Grouv., p. 262, fig. 3, *Scalidia* (referred to *Catogenus*) *cylindricollis*, Dej., p. 262, fig. 4, *S. linearis*, Lec., p. 263, fig. 5 (described as a *Catogenus*, but referred to *Scalidia*, with *Ancistria semi-castanea*, *filum*, and *tenuissima*, Reitt.), *Læmophlœus contaminatus*, Grouv., p. 265, fig. 7, *Silvanus atratulus*, Grouv., p. 266, fig. 9, *Æraphilus syriacus*, Grouv., p. 267, fig. 10, described and figured, pl. viii. *id. l. c.*

Diochares depressus, Reitt., = *Xenoscelis* (*Pristoscelis* olim) *deplanatus*, Woll., = *Pediacus costipennis*, Fairm.,—*Xenoscelis* to stand; L. Reiche, Bull. Soc. Ent. Fr. (5) viii. p. cxxxiv.

Passandrina, g. n., E. Reitter, Verh. z.-b. Wien, xxviii. [for 1878, not published until 1879], p. 186. Near *Hectarthrum*, but with eleven-jointed antennæ, of which the basal joint is incrassate, joints four to ten are very transverse, incrassate, the intermediate very wide, excavated and densely tomentose beneath, &c. For *P. egregia*, sp. n., p. 187, Madagascar.

Apytho, g. n., *id.* S. E. Z. xxxix. p. 318. Facies and texture of *Pytho*. *A. æneipennis*, sp. n., p. 319, Abyssinia.

Tristaria, g. n., *id. l. c.* p. 320. Facies and head-structure of the *Cucujidæ*, in which it is placed, near *Hypocoprus* and *Amydropa*, though with four-jointed tarsi, and longer first abdominal segment: tarsi simple. *T. grouvellii*, p. 321, Rockhampton, *fulvipes*, p. 322, Australia.

Hectarthrum bilineatum, sp. n., *id.* Verh. z.-b. Wien, xxviii. p. 186, Madagascar.

Catogenus acutangulus, sp. n., *id. l. c.* p. 185, Aragua.

Platisus integricollis, p. 188, and *angusticollis*, p. 189, spp. nn., *id. l. c.* Australia.

Hemipeplus gundlachi, sp. n., Grouvelle, Bull. Soc. Ent. Fr. (5) viii. p. xliv., & Ann. *l. c.* p. 267, pl. viii. fig. 11, Cuba.

Nemicelus microphthalmus, sp. n., Schwarz, P. Am. Phil. Soc. xvii. p. 360 (and *marginipennis*, Lec., ♀), Florida.

Ino elongatula, Ceylon, and *flavidorsis*, Colombia, p. 190, *inamunda*, p. 191, Tennessee, Reitter, *l. c.*; *I. subvirescens*, id. S. E. Z. xxxix. p. 314, Fiji: spp. nn.

Pseudino fritschi, sp. n., *id.* S. E. Z. xxxix. p. 315, Cape of Good Hope.

Uliota puberula, sp. n., *id. l. c.* p. 316, E. India.

Platamus richteri, sp. n., *id.* Verh. z.-b. Wien, xxviii. p. 189, New Valentia.

Telephanus pulchellus, sp. n., *id. l. c.* p. 190, New Valentia.

Narthecius haroldi, Madagascar, and *truncatipennis*, Ceylon, *id. l. c.* p. 193; *N. claviceps*, id. S. E. Z. xxxix. p. 317, E. India: spp. nn.

Læmophlæus chamæropis, Schwarz, *l. c.* p. 359, Florida; *L. bistriatus*, p. 72, pl. ii. fig. 8, Tasmania, *chevrolati*, p. 264, pl. viii. fig. 6, Cuba, Grouvelle, l. c.; *L. albipennis*, p. 191, Colombia, *concavus*, Cuba, and *carinatus*, Aragua, p. 192, Reitter, Verh. z.-b. Wien, xxviii.; *L. bituberculatus*, id. S. E. Z. xxxix. p. 316, Porto Rico: spp. nn.

Æraphilus serricollis, sp. n., *id.* S. E. Z. xxxix. p. 319, E. India.

Lathropus pictus, Schwarz, *l. c.* p. 358, Florida; *L. parculus*, Grouvelle, *l. c.* p. 73, pl. ii. fig 9, Mexico: spp. nn.

Psammæcus pradieri, p. 74, pl. ii. fig. 18, Otaheite, *longulus*, p. 265, pl. viii. fig. 8, Port Natal, spp. nn., Grouvelle, *l. c.*

Silvanus vulgaris, p. 74, fig. 11, Mexico, *communis*, fig. 12, and *trivialis*, fig. 13, p. 75, Brazil, Grouvelle, *l. c.* pl. ii.; *S. lateritius*, Reitter, Verh. z.-b. Wien, xxviii. p. 194, Ceylon: spp. nn.

Cathartus angulicollis, p. 194, and *cryptophagoides*, p. 195, spp. nn., Reitter, *l. c.*, Colombia.

Cryptophagidæ.

Henoticonus, g. n., Reitter, Deutsche E. Z. 1878, p. 127. Near *Henoticus*, but with the thorax not denticulate at the sides, no sutural stria, &c. For *H. triphylloides*, sp. n., *ibid.*, Japan.

Micrambina, g. n., *id. l. c.* p. 128. Near *Loberus* and *Micrambe*, differing from the former in the thorax, hardly lobate third tarsal joint, &c., and from the latter by its long robust build, punctate-striate elytra, &c. For *M. amitta*, sp. n., *ibid.*, Colombia.

Antherophagus caucasicus, sp. n., *id.* Verh. Ver. Brünn, xvi. p. 169, Caucasus.

Cryptophagus inæqualis, p. 53, Carpathians, *sylvanoides*, p. 91, Sarepta, *durus*, p. 93, Algeria, *id.* Deutsche E. Z. 1878, spp. nn.

Atomaria attila, sp. n., *id. l. c.* p. 53, Carpathians.

Leucohimatium brevicolle, p. 93, Caucasus, Astracan, *puberulum*, p. 94, Cape of Good Hope, spp. nn., *id. l. c.*

Tomarus hirtellus, sp. n., Schwarz, P. Am. Phil. Soc. xvii. p. 358, Florida.

Monotomidæ.

Monotoma. Reitter, Z. E. Ver. Schles. (n.f.) vi. [1877] pp. 1-7, restricts

the known European species to twelve, on account of their variability in size, colour, and structure of thorax.

Smicrips, g. n., J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 399. A miniature *Ips*, with quadrangular epistoma, deep frontal suture, and maxillæ unusually large and flat at the base. *S. palmicola*, sp. n., *id. ibid.*, Florida and Georgia (on *Chamærops palmetto*).

Monotoma diecki, sp. n., Reitter, *l. c.* p. 6, Corsica.

Lathridiidæ.

Merophysia has a tooth followed by an emargination on the postero-internal face of the front tibiæ in the ♂; and many species have also a little tubercle near the base of the metasternum and a depression on the fifth abdominal segment. No *Cholovocera* exhibits sexual characters. Belon, Bull. Soc. Ent. Fr. (5) viii. p. cxv.

Stephostethus, g. n., Le Conte, P. Am. Phil. Soc. xvii. p. 601. Prosternum extending only a short distance behind the coxæ, and enclosed by the epimera, which coalesce on the median line as in the *Rhynchophora*; first coxæ conical, prominent, and contiguous. For *Lathridius liratus*, Lec.

Lobogestoria, g. n., Reitter, Deutsche E. Z. 1878, p. 31. Near *Langelandia* and *Anommatus*; apparently also allied to *Pycnomerus* (*Colydiidæ*). *L. gibbicollis*, sp. n., p. 32, Cuba.

Lathridius opaculus, *maculatus*, and *duplicatus*, p. 600, Detroit, Illinois, &c., *tenuicornis*, California, and *laticollis*, Detroit, p. 601, spp. nn., Le Conte, *l. c.*

Corticaria corsica, sp. n., H. Brisout, Bull. Soc. Ent. Fr. (5) viii. p. xcvi., Corsica.

Mycetophagidæ.

G. H. Horn, P. Am. Phil. Soc. xvii. p. 603 *et seq.*, gives a synopsis of the N. American species. *Mycetophagus obscurus*, Lec., = *melsheimeri*, Lec., var.; *M. pini*, Ziegl., ? = *pluripunctatus*, Lec., var.; *Marginus* = *Diplocælus*.

Triphyllina, g. n., Reitter, Verh. Ver. Brünn, xvi. p. 167. Between *Triphyllus* and *Litargus*. For *T. lederi*, sp. n., *ibid.* pl. iv. fig. 32, Suram.

Mycetophagus californicus, California, and *tenuifasciatus*, Northern States, p. 604, *confusus*, p. 605, Colorado, spp. nn., Horn, *l. c.*

Diplocælus angusticollis, sp. n., *id. l. c.* p. 605, Michigan.

Dermestidæ.

Dermestes destroyed by tallow, of which it seems unable to withstand the smell; tallow also keeps off moth and cabinet pests; C. E. Heustis, Canad. Ent. x. p. 141.

Dermestes bicolor and its larvæ causing the death of young pigeons; Taschenberg, Z. ges. Naturw. (3) iii. p. 393.

Anthrenus scrophulariæ. Description and figures of this beetle, which

destroys carpets in N. America; *H. lepidus*, Lec., is only a colour var. of it. J. A. Lintner, Am. Nat. xii. p. 536. *Cf.* also H. Hagen, Canad. Ent. x. p. 161 (with notes on imported European insect pests), & S. W. Williston, Psyche, ii. p. 126.

Attagenus orientalis, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 178, Caucasus.

Hadrotoma quadriguttata, id. Deutsche E. Z. 1878, p. 95, and *H. breviclavis*, id. Verh. Ver. Brünn, xvi. p. 179, Caucasus, spp. nn.

Trogoderma variabilis[*-le*], sp. n., E. Ballion, Bull. Mosc. liii. (1) p. 277, Kuldja, &c.

Byrrhidæ.

Cytilus auricomus specifically differentiated from *C. varius*; G. Czwalina, Deutsche E. Z. 1878, p. 205.

Pedilophorus subcanus, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 609, Lake Superior.

Limnichus auricomus, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 180, Caucasus.

Parnidæ.

Elmis, of which the derivation is given by Latreille, should be written *Helmis*; the types from Dejean's collection, received by him from Latreille, are identical with the subsequently described *æneus*, Müller, and their specific name, variously written *maugeti* or *maugetii*, is named after Maugé, and should be written *maugei* [*maugœi*]; *E. maugeti*, Er., *nec* Latr., is therefore re-named *latreillii*. L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. lxxv.

Dryops dicksoni, sp. n., C. O. Waterhouse, Ann. N. H. (5) i. p. 491, Formosa.

Lucanidæ.

Lucanus cervus. On its economy, especially its development early in the season (April 9), and a ♀ with large toothed mandibles; G. de Rossi, Ent. Nachr. iv. p. 227; C. Schreiber, *tom. cit.* p. 259.

Nicagus obscurus, Lec.: J. O. Westwood, Pr. E. Soc. 1878, pp. 34–37, figs. 3, 3 *a–k*, figures this species with details, and repeats his association of it with the *Trogides* [Zool. Rec. vii. p. 281].

Pseudolucanus davidis, sp. n., H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 93, pl. iv. figs. 1 & 2, Central China.

Prismognathus davidis, sp. n., *id. l. c.* p. 94, Central China.

Nigidius perforatus and *lævigatus*, spp. nn., Harold, MT. Münch. ent. Ver. ii. p. 100, W. Central Africa.

Passalus duplicatus, sp. n., *id. l. c.* p. 101, W. Central Africa.

Scarabæidæ.

Adaptability of structure in the higher forms of Lamellicorns for exclusion of the parasites which abound on some of them, eminently shown

in a new species of *Heliocopris*; and the theory suggested that *Geotrupes*, which is much infested by Acari, holds its place in temperate latitudes because the more highly developed *Coprophaga* are only adapted for existence in a warm climate. Nevertheless, *Acari* penetrate into the buccal cavity and prothoracic stigmata of the *Helicopris*. D. Sharp, Ent. M. M. xv. p. 154.

A dissertation as to the physiological value of the horned mandibles and similar developments in the Lamellicorns, with the opinion that they are not for sexual attraction, but for defensive purposes by causing intimidation; W. v. Reichenau, Kosmos, ii. pp. 56 & 57.

Coprides.

Parapinotus, g. n., E. v. Harold, MT. Münch. ent. Ver. ii. p. 43. Near *Copris*, *Pinotus*, &c., but with subcylindrical labial palpi; differs from *Canthidium* and allies in the conical projecting coxæ of the front legs. *P. dewitzi*, sp. n., p. 44, Cape of Good Hope.

Scarabæus paganus, sp. n., id. *l. c.* p. 101, W. Central Africa.

Copris mesacanthus, sp. n., *id. l. c.* p. 45, Nyassa.

Heliocopris hamifer, p. 39, *jupiter*, p. 40, Nyassa, *samson*, p. 101, W. Central Africa, *id.* l. c.; *H. meneliki*, R. Gestro, Ann. Mus. Genov. xiii. p. 318, fig., Somali Land; *H. mouhotus*, Sharp, *l. c.* p. 155, Laos: spp. nn.

Catharsius nubiensis, p. 41, Kordofan, *pollicatus*, p. 42, Zanzibar, *dux* and *peregrinus*, p. 101, W. Central Africa, Harold, l. c.; *C. davidis*, H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 95, Central China: spp. nn.

Synapsis davidis, sp. n., Deyrolle, *l. c.* p. 96, pl. iv. fig. 5, Central China.

Onitis ærarius, sp. n., Harold, *l. c.* p. 46, Nyassa.

Onthophagus hildebrandti, *sansibaricus*, and *nanus*, Harold, MB. Ak. Berl. 1878, p. 211, Zanzibar, interior; *O. extensus*, id. MT. Münch. ent. Ver. ii. p. 101, W. Central Africa; *O. capreolus*, E. Ballion, Bull. Mosc. liii. (1), p. 279, Kuldja; *O. rectinicornis* [sic], L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 96, pl. iv. fig. 6, Central China; *O. concolor*, D. Sharp, J. A. S. B. xlvii. 2, p. 170, Sind Valley and Murree: spp. nn.

Aphodiides.

Aphodius incertus, p. 282, and *subsericeus*, p. 283, Ballion, Bull. Mosc. liii. (1), Kuldja; *A. ager*, p. 170, Yangihissar, *kashmirensis*, Ladak, *tenuimanus*, Central Asia, p. 171, Sharp, l. c.; *A. vagus*, p. 56, and *terminatus*, p. 57, "M.," Nouv. et faits, (2) No. 14, Algeria, and *A. hilaris*, "Harold," *l. c.* p. 56, Palestine; *A. bidens*, p. 453, *duplex* and *obtusus*, p. 454, *subtruncatus*, *scabriceps*, and *explanatus*, p. 457, *rudis*, p. 458, Colorado, *cribratus*, Oregon, *anthracinus*, Utah, and *brevicollis*, Nebraska, p. 455, *marginatus*, Nevada, *pharopterus*, Idaho, and *cruentatus*, N. New Mexico, p. 456, *sparsus*, p. 458, California, *humeralis*, p. 459, Michigan, J. L. Le Conte, Bull. U.S. Geol. Surv. iv.: spp. nn.

Rhyssemus berytensis, Beyrut, p. 57, *exaratus*, ibid., and *gemmifer*, p. 58, Egypt, spp. nn., "M.," *l. c.*

Psammodius multipunctatus, sp. n., *id. l. c.* p. 58, Batum.

Psammobius japonicus, sp. n., Harold, Deutsche E. Z. 1878, p. 69, Hagi.

Ægialia rufa [‖ Fab.!], p. 610, and *spissipes*, p. 611, Lake Superior, *latispina*, p. 611, Mojave Desert, spp. nn., Le Conte, P. Am. Phil. Soc. xvii.

Orphnides.

Orphnus cribratellus, sp. n., L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 269, Cochin China.

Ochodæus gigas, sp. n., "M.," *l. c.* p. 58, Algeria.

Hybalus biretusus, sp. n., *id. l. c.* p. 59, Delly.

Geotrupides.

Geotrupes kashmirensis, Sharp, J. A. S. B. xlvii. 2, p. 171, Kashmir; *G. chalybeus*, Le Conte, P. Am. Phil. Soc. xvii. p. 402, Florida (? also S. Carolina and Maryland); *G.* (*Phelotrupes*) *davidis*, H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 97, Central China: spp. nn.

Thorectes distinctus, sp. n., "M.," *l. c.* p. 59, Algeria.

Glaphyrides.

Amphicoma regeli, p. 286, and *violaceopennis*[*-cei-*], p. 288, spp. nn., E. Ballion, Bull. Mosc. liii. (1), Kuldja.

Melolonthides.

Listrochelus. Revision of the species found in the United States; G. H. Horn, Tr. Am. Ent. Soc. vii. p. 137 *et seq.*

Anoxia villosa swarming in a restricted area at Wiesbaden; Herber, Ent. Nachr. iv. p. 310.

Melolontha hippocastani. On its limited range, replacing *M. vulgaris*, and the supposed periodicity of the latter; Möllinger (and quoting L. v. Heyden), Ent. Nachr. iv. p. 103.

Melolontha vulgaris alive in September in a box into which a larva of it had been placed during the preceding April; F. Smith, Pr. E. Soc. 1878, p. xlv.

Melolontha umbraculata, Burm.; colour variation, &c., C. A. Dohrn, S. E. Z. xxxix. p. 456.

New genera and species:—

Diphycerus, [presumably] L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 100. *Chasmopterides*; remarkable for its large antennæ in the ♂, and the large elongate tarsal hooks. *D. davidis*, Fairmaire, *l. c.* p. 101, Central China.

Toxospathius, [do.] *l. c.* p. 102. Apparently near *Pegylis* [script. *-lio*], with somewhat the facies of *Leucothyreus*. *T. inconstans*, id. *l. c.* p. 103, pl. iii. fig. 1, Central China.

Hyperius [*-ris*, Dej., *Col.* 1833; *-ria*, Latr., *Crust.* 1829], [do.] *l. c.* p. 104. Near *Clavipalpus*, but with equal abdominal segments, strongly emarginate labrum, fourth joint of antennæ as long as third, &c. *H. davidis*, ibid. pl. iii. fig. 2, *sparsutus* and *densiventris*, p. 105, *id. l. c.*, Central China.

Hoplia aurantiaca, C. O. Waterhouse, J. L. S. xiv. p. 135, Java; *H. concolor*, D. Sharp, J. A. S. B. xlvii. 2, p. 171, Kugiar.

Serica lœticula, Sharp, *l. c.* p. 172, Central Asia.

Camenta westermanni, Harold, MT. Münch. ent. Ver. ii. p. 101, W. Central Africa.

Pachydema foveiceps, "M.," Nouv. et faits, (2) No. 14, p. 60, Algeria.

Diplotaxis languida, Le Conte, P. Am. Phil. Soc. xvii. p. 403, Florida.

Europtron confusum, "M.," *l. c.* p. 60, Algeria.

Geotrogus laticeps, p. 63, *nubicollis*, *humericavus*, and *translucens*, p. 64. *biskrensis*, p. 65, *id. l. c.*, Algeria.

Apterogyna cilipes and *vorax*, p. 65, *curta*, p. 66, *id. l. c.*, Algeria.

Rhizotrogus bilobus, Sharp, *l. c.* p. 173, Eastern Turkestan; *R. sternalis*, "Fairm.," Nouv. et faits, *l. c.* p. 66, Tangiers; *R. warioni*, ibid., *humilis*, p. 67, *similis* and *gracilis*, p. 68, Algeria, *plagiatus*, p. 67, Tangiers, "M.," *l. c.*

Lachnosterna stridulans and *stoliczkæ*, p. 172, Murree, *pulvinosa* (Reiche, MS.), *ibid.* note, Northern India, Sharp, *l. c.*

Listrochelus disparilis, p. 141, *opacicollis*, p. 145, *sociatus* and *timidus*, p. 146, *senex*, p. 148, Horn, *l. c.*, various parts of the United States.

Schizonycha obscurata, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 99, Central China.

Melolontha (*Hoplosternus*) *davidis*, p. 97, *M. albo-pruinosa* and *mandarina* (? = *incana*, Mots.), p. 98, *id. l. c.*, Central China.

Granida edentula, Harold, Deutsche E. Z. 1878, p. 71, Himalaya.

Rhopœa pruinosa, id. MT. Münch. ent. Ver. ii. p. 101, W. Central Africa.

Enthora polita, C. O. Waterhouse, Cist. Ent. ii. p. 364, Madagascar.

Cyclomera rugipennis, Harold, *l. c.* p. 102, W. Central Africa.

Elaphocera rhodana, (Anon.) Nouv. et faits, (2) No. 14, p. 59, Rhodes.

Pachycoleus clypeatus, Waterhouse, *l. c.* p. 364, Madagascar.

Rutelides.

Anisoplia austriaca. On its ravages at Taganrog; Pr. E. Soc. 1878, pp. liii. & lvii.

Plusiotis. A. Boucard, P. Z. S. 1878, p. 293 *et seq.* pl. xvi., describes and figures 3 new species from Central America, with observations on known species, and figure of *P. mnizechi* (fig. 4). Twenty species are now recognized, and the excessive rarity of them is indicated; they appear to be peculiar to the oak region at great elevations, and not to occur south of Colombia. An instance of great vitality in *C. batesi* is recorded (p. 293); a var. of *P. chrysargyrea*, Sallé, is described, from the Candelaria Mts. (p. 294); *P. læta*, Stm., = *psittacina*, and is from Mexico, not Valparaiso. *P. boucardi*, Sallé, figured, fig. 3.

New genera and species:—

Didrepanephorus, J. Wood-Mason, Ann. N. H. (5) ii. p. 423. Allied to *Peperonota* and *Parastasia*, but with the apical one of the two teeth into which the extremity of the mandibles is externally divided, enormously produced and curved forwards far in front of the head in the male. *D. bifalcifer*, ibid., fig., Wakidgaon, S.E. of Sadia, in the valley of the Noa Dehing, a feeder of the Brahmaputra.

Saulostomus, C. O. Waterhouse, Tr. E. Soc. 1878, p. 225. Closely allied to *Schizognathus*, but without the mesial production to mentum and labrum; differs from *Amblyterus* in its short tarsi with simple claws. For *S. villosus*, ibid., Tasmania and Melbourne.

Homotropus, id. *l. c.* p. 226. Characters of *Schizognathus*, but with the clypeus concave, deflexed, and entirely rounded on the three free sides; mentum emarginate in the middle; no membranous border to the elytra, but placed at the end of the *Brachysterninæ*. *H. luridipennis*, p. 217, Australia.

Mesystæchus, id. *l. c.* p. 227. Closely allied to *Amblyterus*, but with mentum more regularly narrowed in front and not truncate, and only the larger claw of the anterior tarsi split. *M. ciliatus*, p. 228, Moreton Bay.

Anisoplia pumila, "M.," Nouv. et faits, (2) No. 16, p. 68, Egypt.

Phyllopertha nazarena, id. *l. c.* No. 18, p. 71, Nazareth; *P. conspurcata*, Harold, Deutsche E. Z. 1878, p. 71, Japan.

Anomala interna, Harold, MT. Münch. ent. Ver. ii. p. 102, W. Central Africa; *A. picticollis*, E. Ballion, Bull. Mosc. liii. (1) p. 289, Kuldja; *A. acutisterna*, L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 106, Central China; *A.* (*Rhombonyx*) *semilivida*, Le Conte, P. Am. Phil. Soc. xvii. p. 403, Florida; *A.* (*Callistethus*) *stoliczkæ*, D. Sharp, J. A. S. B. xlvii. 2, p. 173, Murree.

Callistethus davidis, Fairmaire, *l. c.* p. 101, Central China.

Aprosterna iridiventris, id. *l. c.* p. 102, Central China.

Popilia princeps and *serena*, Harold, MT.' Münch. ent. Ver. ii. p. 102, W. Central Africa.

Strigoderma exigua [*-guum*]. E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 362, Florida.

Plusiotis badeni, p. 294, fig. 2, and *prasina*, p. 295, fig. 5, Mexico, *rodriguezi*, p. 295, fig. 1, Guatemala, Boucard, *l. c.*; *P. boucardi*, Sallé, Bull. Soc. Ent. Fr. (5) viii. p. xvii., Costa Rica, and Boucard, P. Z. S. 1878, pl. xvi. fig. 3.

Cotalpa flavida, G. H. Horn, Tr. Am. Ent. Soc. vii. p. 53, Utah.

Adoretus nudiusculus and *simplex*, Sharp, *l. c.* p. 173, Jhelum Valley; *A. quadridens*, p. 71, Egypt, *evanescens*, p. 72, Algeria, "M.," Nouv. et faits, (2) No. 18; *A. strigatus* and *vittatus*, p. 287, *albo-setosus*, p. 288, C. O. Waterhouse, Cist. Ent. ii., Antananarivo.

Dynastides.

Oryctes grypus and *nasicornis*; intermediate forms described. Camerano, Bull. Ent. Ital. x. (Resoc. delle Adun.) pp. 21–24.

Mixigenius leander, Thoms., = *Podischnus tersander*, Burm., = *Scarabæus barbicornis*, Latr., for which Thomson's genus should stand; L. Fairmaire, R. Z. (3) vi. p. 266.

Pantodinus klugi, Burm., figured with details, and Candèze's reference of it to the *Trichiides* mentioned; J. O. Westwood, Pr. E. Soc. 1878, p. 33.

Amblyodus, g. n., Westwood, *l. c.* p. 32. Nearest *Phileurus*, allied to *Leptognathus* and *Actinibolus*, but with horned head, and mandibles obtusely toothed externally. *Am. taurus*, sp. n., p. 33, pl. ii. fig. 1, Chon-

tales. The author vainly endeavours to avoid the double employment of his *Leptognathus* in zoology, by a footnote, *l. c.*

Anomacaulus, g. n., Fairmaire, Pet. Nouv. ii. p. 278. Near *Phyllognathus*, but with the pro-pygidium not strigulose. *A. fulvo-vestitus*, sp. n., *ibid.*, Fiji.

Orizabus, g. n., *id.* R. Z. (3) vi. p. 260. Very near the Australian *Chiroplatys*, which it represents in Mexico [with apparently nothing but the locality to warrant the separation of the two]. *O. cultripes*, p. 261, *sallei*[*-lævi*] and *marginatus*, p. 262, *isodon*[*t*]*oides*, p. 263, spp. nn., Mexico.

Pentodon truncatus, p. 173, *pumilus*, p. 174, spp. nn., Sharp, J. A. S. B. xlvii. 2, Kugiar, E. Turkestan.

Scaptophilus fabius, ? La Plata, and *striatellus*, Buenos Aires, p. 264, *quadratus*, p. 265, Bolivia, and *cribrarius*, p. 266, Brazil, spp. nn., Fairmaire, R. Z. (3) vi.

Pericoptus stupidus, sp. n., Sharp, Ent. M M. xv. p. 50, Otago.

Xylotrupes davidis, sp. n., Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 106, pl. iv. figs. 3 & 4, Central China.

Phileurus poggei, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 102, W. Central Africa.

Cetoniides.

J. Thomson, "Typi Cetonidarum," &c. (Paris: 1878, 8vo), pp. 1–37, describes the types in his collection, including 8 new genera and 35 new species. *Tamisoria*, Thoms., = *Asthenorrhella*, Westw., and *T. deyrollii*, T., = *A. leonina*, W.; *Hemipharis emilia*, Thoms., *nec* White, renamed *whitii*, p. 17; *Eupœcila*, Burm., is sunk in *Diaphonia*, Newm.

"Further contributions to the knowledge of the *Cetoniidæ* of Madagascar"; C. O. Waterhouse, Ent. M. M. xv. p. 84.

Lomaptera amberbakiana, Thoms., = *papua*, Guér., *ex. typ.*, teste H. Deyrolle; J. Thomson, Bull. Soc. Ent. Fr. (5) viii. p. xi.

Lomaptera. Notes on its range and generic value; H. Deyrolle, Bull. Soc. Ent. Fr. (5) viii. p. ci. The species are found at sap, and never on flowers; A. Raffray, ibid. *L. amberbakiana*, Thoms., = *chloris*, Gestro, = *papua*, Guér.; *L. pulchripes*, Thoms., is an *Ischiopsopha*; *Digenethle ramulosipennis*, Thoms., = (*Schizorrhina*) *celata*, Gestro; R. Gestro, Ann. Mus. Genov. xii. pp. 27–31.

Cetonia inda supposed to injure corn in Massachusetts; C. B. Smith, Am. Nat. xii. p. 752. *C. marmorata* ♂ observed *in copulâ* with *C. aurata* and *metallica*, ♀; L. v. Heyden, Käf. Nass., p. 399.

Narycius (*Cyphonocephalus*) *smaragdulus*, Westw., ♂ fig. 3, ♀ fig. 4; *Cyclidius velutinus*, Westw., fig. 5; *Cremastochilus crassipes*, Westw., fig. 6; figured, with explanatory notes by J. O. Westwood, Pr. E. Soc. 1878, pl. i. pp. 29–32.

New genera and species:—

Amithao, J. Thomson, Typi Cetonid. p. 10. *Gymnetis* of elongate form, with lunate and tuberculate head, elongate and obtuse mesosternal projection, and comparatively slender legs. For *Cotinis lafertei*, Thoms., and *Gymnetis cavifrons* and *erythropus*, Burm.

Argyripa, id. *l. c.* p. 11. For *Allorrhina lansbergii*, Sallé.

Desicasta, id. *l. c.* p. 14. Allied to *Stethodesma*, with simple mesosternal appendage, not claviform. For *D. sculptilis*, p. 15, Guiana, and various species of *Stethodesma*.

Neophonia, id. *l. c.* p. 17. For *australasiæ*, Don., and others with long slender, unequal legs, and the front tibiæ only tridentate in ♀.

Dilochrosis, id. *l. c.* p. 18. For *flammula*, Blanch., &c., and *D. flamma*, id. *l. c.* p. 21, Ceram, and *D. sub-foveata* and *trapezifera*, id. Bull. Soc. Ent. Fr. (5) viii. p. xxxi. Australia.

Neorrhina, id. Typi Cetonid. p. 18. For *Eupœcila ochracea*, Westw.

Apocnosis, id. *l. c.* p. 30. Near *Charadronota*, Burm., with elongate and rather narrow mesosternal projection, which is flat and obtuse at apex. *A. brunneo-nigra*, ibid., Zambesi.

Golinca [!], id. *l. c.* p. 31. Differs from *Inca* in male characters of head and produced mesosternum. For *I. bifrons*, Ol.

Goniochilus, Harold, MT. Münch. ent. Ver. ii. p. 104. Near *Hoplostomus*. For *S. rufiventris* and *bicolor*, ibid., W. Central Africa.

Hypselogenia bilbergi, p. 7, S. Africa, *goryi*, p. 8, Caffraria, Thomson, Typi Cetonid.

Dicranorrhina carnifex, Harold, MB. Ak. Berl. 1878, p. 212, Zanzibar interior.

Rhomborrhina microcephala, p. 8, India, *glauca* and *squamuligera*, p. 9, Japan, Thomson, *l. c.*

Tmesorrhina barthi, Harold, MT. Münch. ent. Ver. ii. p. 102, W. Central Africa.

Fornasinius peregrinus, id. *ibid.*, W. Central Africa.

Heterorrhina mutica, *picturata*, and *subænea*, id. *l. c.* p. 103, W. Central Africa.

Ischnostoma rostrata [*-tum*], O. E. Janson, Cist. Ent. ii. p. 299, Caffraria.

Heteroclita (?) *scitula*, id. *l. c.* p. 300, Natal.

Gymnetis albo-scripta, id. *l. c.* p. 301, Oaxaca; *G. inquinata*, p. 11, Cordova, *pygidialis*, p. 12, and *prothoracica*, p. 13, Brazil, *meticulosa*, p. 12, Amazons, *lugubris*, p. 13, Cayenne, *lucidiventris* and *submaculosa*, Venezuela, *sculptiventris*, Chiquitos, p. 14, Thomson, *l. c.*

Desicasta thomsoni, Janson, *l. c.* p. 302, Panama.

Lomaptera gloriosa, A. Raffray, Bull. Soc. Ent. Fr. (5) viii. p. lxxxvii., New Guinea; *L. cinnamomea*, p. cii., *duboulayi*, p. cxxxviii., Thomson, *tom. cit.*, Australia; *L. doriæ*, Gestro, *l. c.* p. 27, Northern New Guinea (= *papua*, Gestro, *nec* Guér.).

Ischiopsopha deyrollii, Thomson, Bull. Soc. Ent. Fr. (5) viii. p. cii. Australia.

Macronota sulpticollis, p. 15, Ceylon, *domina*, p. 16, Philippine Isles, *id.*, Typi Cetonid.

Stenotarsia discoidalis, Waterhouse, Ent. M. M. xv. p. 84, Madagascar.

Liostraca bella, id. *ibid.*, Madagascar.

Euchilia puncticollis, id. Cist. Ent. ii. p. 291, Madagascar.

Anochilia fascicularis, id. *l. c.* p. 292, Madagascar.

Pygora costifer, id. *ibid.*, and *P. pulchripes* and *cowani*, id. Ent. M. M. xv. p. 85, Madagascar.

Pantolia polita, id. Cist. Ent. ii. p. 293, Madagascar.

Coptomia nigriceps, p. 85, *quadrimaculata*, *propinqua*, and *apicalis*, p. 86, *id.* Ent. M. M. xv., Madagascar; *C. mutabilis*, id. Ann. N. H. (5) ii. p. 139, Madagascar.

Eupœcila deyrollii, Thomson, Bull. Soc. Ent. Fr. (5) viii. p. xi., Australia.

Schizorrhina trichopyga, id. *l. c.* p. x., Australia (descr. amended, *id.* Typi Cetonid. p. 22); *S. kirbyi*, p. 22, *schreibersi* and *donovani*, p. 23, *id.* Typi Cetonid., Australia (different types of *S. philippsi*, Schr.).

Euryomia amourensis, Amur, and *andamana*, Andaman Isles, p. 24, *infima* and *maculatella*, N. New Guinea, and *moluccana*, Moluccas, p. 25, *id.* Typi Cetonid.

Euphoria steinheili, p. 303, Panama, *abreona*, p. 304, Bogota, Janson, Cist. Ent. ii.; *E. xanthomelas*, p. 26, *histrionica* and *mystica*, p. 27, Thomson, *l. c.*, Mexico.

Glycyphana bi-argentata, Thomson, *l. c.* p. 26, India; *G. luctifera*, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 107, pl. iii. fig. 7, Central China; *G. incongrua*, Janson, *l. c.* p. 388, Formosa.

Discopeltis aberrans, Janson, *l. c.* p. 387, Angola.

Stephanucha discicollis, Thomson, *l. c.* p. 28, N. America.

Oxythyrea cognata, Harold, MT. Münch. ent. Ver. ii. p. 103, W. Central Africa; *O. collaris*, id. MB. Ak. Berl. 1878, p. 214, Zanzibar, Taita; *O. subcalva*, "M.", Nouv. et faits, (2) No. 18, p. 72, Biskra.

Tephræa stellata, Guinea, Aquapim, and *hildebrandti*, Zanzibar, Harold. MB. Ak. Berl. 1878, p. 213.

Cetonia frontalis and *poggei*, id. MT. Münch. ent. Ver. ii. p. 103, W. Central Africa; *C. confuciusana* [!], Thomson, Typi Cetonid., p. 28, China; *C. bicostula*, "M." *l. c.* No. 19, p. 74, Cairo.

Pachnoda petersi, p. 212, fig. 2, Zanzibar interior, *calceata*, p. 213, fig. 3, S.W. Africa, Herero, Harold, MB. Ak. Berl. 1878; *P. circumscripta*, N'Gami, and *dubocagii*, Angola, Thomson, *l. c.* p. 29.

Cænochilus tomicoides, Harold, MB. Ak. Berl. 1878, p. 214, fig. 4, Interior of Zanzibar.

Callinomes davidis, p. 107, pl. iii. fig. 6, *obsoletus* (? = *Cremastochila scabrosa*, Mots.), p. 108, Fairmaire, Ann. Soc. Ent. Fr. (5) viii., Central China.

Agenius nobilis, Thomson, *l. c.* p. 31, ? India. ? ? Africa.

Calometopus nyassæ, J. O. Westwood, Pr. E. Soc. 1878, p. 27, pl. i. fig. 1, Nyassa.

Valgus furcifer, id. *l. c.* p. 28, pl. i. fig. 2, Sumatra.

Buprestidæ.

Thomson, James. Typi Buprestidarum Musæi Thomsoniani. Paris: 1878, 8vo, pp. 103.

The author's collection, comprising upwards of 1800 species and 7000 specimens, was entirely named by H. Deyrolle in 1876–77 from that of Count Mniszech, which contained the types of Castelnau & Gory. It is therefore a "sub-typical" one, as the author says. In this publication,

he characterizes many new genera, sub-genera and species (nearly all with MS. names of Deyrolle's). 237 type-species are contained in it altogether. *Chrysochroa scabra*, C. & G., varr. *a* & *b* are referred to *Steraspis* and named *nigripennis* (p. 12) and *luctuosa* (p. 13). *Buprestis* proper: types differentiated, p. 17. A few general observations are made.

The same author, under the heading "*Buprestides Polybothroïdes*," R. Z. (3) vi. pp. 313–349, classifies the species of the Madagascar genus *Polybothris* known to him, 90 in number, including many new, and some new sub-genera.

Dicerca mœsta at Stettin in April; C. A. Dohrn, S. E. Z. xxxix. p. 415.

Acmæodera. The United States species revised, with bibliography, synonymy, and figures of elytra of most of them; *A. pulchella*, Hbst., varr. nn., *arizonæ* (fig. 25) and *immaculata*, p. 19. G. H. Horn, Tr. Am. Ent. Soc. vii. pp. 2–27, pl. i.

Corœbus bifasciatus, Ol.; its transformations described, bred from West Colmar, out of oak. W. Eichhoff, S. E. Z. xxxix. p. 197.

Agrilus angustulus attacking and feeding on the wood of vines in great quantity; J. Chaffanjon, Feuil. Nat. viii. p. 91, & Bull. Soc. Ent. Fr. (5) viii. p. xii.

Agrilis viridis var. n. *salicis*, Frivaldszky, Term. Közl. xiii. p. 319, Hungary.

New genera, subgenera, and species :—

The following are characterized by J. Thomson in his "Typi Buprestidarum" :—

Amblysterna (Laferté MS., Saunders Cat.), p. 8. Retained on account of its "fascies" being different from that of *Julodes*. *A. transvalensis*, Transvaal, and *submarmorea*, Zanzibar, p. 9.

Diadoxus, p. 15. Near *Cyria*, Sol.; for *Anthaxia erichsoni*, Hope, = *Buprestis scalaris*, C. & G., and *A. pistacina*, Hope, = *B. erythrurus*, White.

Phospheres (Saund., Cat.), p. 16. For *Buprestis aurantio-picta*, C. & G.

Chalcophoropsis (id.), p. 18 (= *Scaptelytra*, Saund., ined.). For *B. 4-foveata*, C. & G.

Cyalithus, p. 23, = *Aprosopus*, Deyr., 1864, *nec* Guérin, 1830.

Evides (Dej. Cat.), *ibid.* Triangular, with short thorax, and prosternal projection wide, trilobate. For *E. pubiventris*, Gory, and *E. cupriventris*, ibid., and *triangularis*, p. 24, Zanzibar.

Pasiphae (Laf. MS., Saund. Cat.), p. 27. Near *Halecia*; for *B. modesta*, F.

Carcinias, p. 28 (this and the following seven are subgenera of *Psiloptera*). Differs from *Lampetis* in its produced and rounded shoulders. For *B. scapularis*, Guér.

Amphisbeta, p. 29. Prosternum armed in front. For *B. quadraticollis*, Gory.

Phobetodes, p. 29. In this and the two following, the front sides of the thorax are entirely margined in both sexes: thorax much dilated in front. For *B. dilatata*, Ol.

Damarsila, p. 29. Prosternum tuberculate on each side in front. For *B. bisulcata*, Gory.

Monosacra, p. 29. Prosternum strongly uni-dentate in the middle in front. For *B. lalandii*, Gory (*nec* Guér.).

Cassidabothris [!], p. 34. Body abbreviated, more or less Cassidiform. For *B. colliciata*, Guér., &c.

Icaria (Saund. Cat.), p. 35. For *B. alata*, Gory.

Coccinellopsis, p. 35. Body orbicular. For *B. cupreo-notata*, Gory, &c.

Chalcopœcila (Saund. Cat.), p. 37. For *B. ornata*, Gory.

Blepharum, p. 39. Near *Dicercomorpha*; for *B. nigrum*, ibid., New Hebrides.

Hilarotes, ibid. Facies of *Ancylochira*, approaching *Astræus* in general form and apex of elytra. For *B. mannerheimi*, Mann., and *chalcoptera*, Duv.

Torresita (Saund. Cat.), p. 41. Near *Melobasis*; for *M. dilatata*, Redt.

Aglaostola (Saund. Cat.), p. 42. Very near *Cinyra*; for *B. tereticollis*, Pall.

Merimna (Saund. Cat.), *ibid.* A gigantic *Melanophila*, with very long scape, triangular scutellum, &c. For *Chrysobothris atrata*, Gory.

Iulodimorpha, p. 51. Next before *Stigmodera*; for *I. saundersi*, ibid., Swan River, and *bakewelli*, White.

Ocypetes, p. 55. Near *Tyndaris*, but with elongate, globular, convex, and posteriorly strongly lobed thorax. For *B. crassicollis*, Gory, and ? *T. guttulata*, Fairm.

Xyroscelis, p. 56. Facies of *Ptosima* and *Polyctesis*. For *Amorphosoma crocatum*, Gory.

Nothomorpha, p. 57. Intermediate between the preceding and *Acmœodera*. For *Amorph. verrucosum*, Gory, and *N. plicatipennis* and *pauperata*, p. 58, Cape of Good Hope.

Amyia (Saund. Cat.), p. 83 (= *Eumerophilus*, Deyr., ined.). Very near *Eumerus*; for *E. violaceus*, Gory, and *A. coræboides*, ibid., Brazil.

Paracephala, p. 91. Differs from *Agrilus* in its short, cylindrical form, simple head and femora, &c. *Aphanisticus pistacinus*, Hope, and *P. murina*, ibid., Sydney.

Sternocera bertolonii, p. 7, Mozambique, *auro-signata*, p. 8, India.

Iulodis rugosa, p. 9, Diarbekr, *interpunctata* and *indica*, p. 10, India, *kampii*, p. 11, Turkey.

Steraspis cyanipes, p. 11, Natal (and var. *zanzibarica*, p. 12, Zanzibar), *delegorguei*, p. 12, Natal, *tamariscicola*, p. 13, Syria.

Philocteanus buphthalmus, p. 13, India.

Agelia proxima, p. 14, Lake "Gnamy" (? N'Gami).

Chrysochroa mirabilis, p. 14, Himalaya, *declivis*, p. 15, India.

Paracupta rutilans, p. 18, New Hebrides, *montrouzieri*, p. 19, New Caledonia.

Chalcotænia australis, p. 19, Australia.

Chrysodema obsoleta[*-tum*], p. 20, Celebes.

Iridotænia chrysomarmorea, ibid., and *lateralis*, p. 21, Andaman Isles, *fulgida*, p. 21, Silhet.

Cyphogastra lansbergii, Timor, *tuberculata*, New Hebrides, p. 22.
Chrysesthes steinheili, p. 24, Peru.
Pelecopselaphus elongatus, p. 24, Brazil, *curtus*, p. 25, Mexico.
Halæcia lacordairii, p. 25, *cognata* and *puncticollis*, p. 26, Brazil, *quadri-impressa*, p. 26, Colombia.
Lampetis rosco-carinata, Brazil, and *desmaresti*, Cordova, p. 30, *dilecta*, Brazil, and *nigro-violacea*, Caracas, p. 31, *costata*, Andaman Islands, *henrici*, Zanzibar, p. 32, *marginipennis*, Cape of Good Hope, and *coquereli*, Madagascar, p. 33.
Dicercomorpha grosse-guttata, p. 37, Northern New Guinea, *caruleipennis*, Fiji, and *margine-fossa*, New Hebrides, p. 38.
Pœcilonota leopardina, p. 40, Borneo.
Ancylochira salomoni, ibid., Persia.
Polycesta chevrolati, Cuba, and *æquinoxialis*[*-nocti-*], Colombia, p. 43, *solieri*, Colombia, and *cribrata*, Caracas, p. 44, *cortezi*, Mexico, *resplendens*, ? Surinam, and *goryi*, Madagascar, p. 45.
Castalia cyanipennis, Celebes, *unicolor*, Philippine Islands, and *globithorax*, Australia, p. 46.
Conognatha bi-ocularis, p. 47, Para, *paradisea* and *princeps*, p. 48, *proserpina* and *chabrillaci*, p. 49, Brazil, *comitessa*, p. 49, Colombia, *acuminata*, p. 50, no locality given.
Stigmodera chalcodera, *addenda*, and *adelpha*, p. 52, *brucki* and *castelnaudi*, p. 53, *vario-picta* and *alterno-zona*, p. 54, *flava*, p. 55, Australia.
Acherusia tristis, p. 55, Colombia.
Acmæodera kaupi, Guatemala, and *corrosa*, Mexico, p. 58, *lemoinii*, Colombia, p. 59, *triangulum*, ibid., *semi-marmorea*, p. 60, *punctatissima*, p. 61, and *lacustris*, p. 62, Lake N'Gami, *capicola*, p. 59, *alcmeone* and *xanthoptera*, p. 60, *sub-alveolata* and *chrysoloma*, p. 61, Cape of Good Hope, *gabonensis*, p. 62, Gaboon.
Sphenoptera mannerheimi, p. 63, Caucasus, *adelphina*, ibid., *natalensis*, p. 65, *bohemani*, p. 72, and *delegorguei*, p. 68, Natal (the last queried), *luctuosa*, p. 63, and *capicola*, p. 68, Cape of Good Hope, *pisciformis* and *nigrescens*, p. 64, *lafertæi*, p. 65, and *angustata*, p. 72, India, *cheloukensis*, p. 66, White Nile, *obesa*, *deyrollii*, and *curvipes*, p. 67, *frontalis*, *submutica*, and *chalceolata*, p. 71, Senegal, *fellah*, p. 68, Sudan, *zanzibarica*, Zanzibar mainland, and *cupreotoma*, Andaman Isles, p. 69, *abyssinica* and *raffrayi*, p. 70, Abyssinia.
Actenodes longitarsis, p. 73, Guinea, *sallæi*, ibid., and *reichii*, p. 74, Mexico, *ænea*, p. 74, Natal.
Colobogaster 4-impressa, p. 74, and *decorata*, p. 75, Cayenne.
Chrysobothris cupricentris, p. 75, *maculicollis*, p. 76, Brazil, *collaris*, p. 76, Caracas, *inæqualicollis*, p. 77, Colombia, *phœbe*, p. 77, *austini*, p. 78, *inca* and *cupreo-signata*, p. 80, Mexico, *chlorosticta*, p. 78, St. Domingo, *roseicentris*, Guinea, and *iri*[*di*]*color*, Senegal, p. 79, *guatimalensis*, p. 80, Guatemala.
Corœbus conspicuus, p. 81, India.
Melibœus dermestoides, ibid., Cape of Good Hope.
Sambus deyrollii, p. 82, India.
Pseudagrilus auripes, ibid., Natal.

Discoderes govdoti, ibid., Madagascar.

Agrilus pyropygus, p. 84, *immaculicollis* and *antepodex*, p. 85, *bi-fenestratus*, *soricellus*, and *æneellus*, p. 86, *obscurellus*, *ignicaudatellus*, and *fasciatellus*, p. 87, and *sub-europeellus* [!], p. 88, Brazil, *divergens*, p. 84, *squaliformis*, p. 85, and *correctus*, p. 90, Guatemala, *scabiosus*, p. 88, *splendidipodex*, *sub-carinellus*, and *rufo-centralis*, p. 89, *pilosellus* and *bi-colorellus*, p. 90, Mexico, *dominicanus*, p. 88, St. Domingo.

Mastogenius solieri, p. 91, Brazil.

Trachys senegalensis, p. 92, Senegal.

Brachys regularis, ibid., Brazil.

Lius lafertæi, ibid., Brazil.

Liopleura concinna, ibid., and *ana*, p. 93, Brazil.

Pachyscelis viridana, p. 93, Brazil.

Callimicra goryi, ibid., Brazil.

The following are characterized by J. Thomson in his "Buprestides Polybothroïdes":—

Hemisobothris, p. 315, for *H. infra-splendens*, p. 323, and *cæruleifinis* [sic], p. 324, also *P. quadricollis*, Gory.

Pseudophthalma, p. 315, for *P. videns*, p. 325.

Palæobothris, p. 316, for *P. ochreata*, Ol.

Laconides, p. 316, for *P. lelieuri*, Buq., and *L. chalybeo-ventralis*, p. 326.

Enharpya, p. 316, for *P. amorpha*, Gory, and *E. chaotica*, p. 328.

Erebodes, p. 317, for *E. jansoni*, p. 330, *deyrollii* and *squalus*, p. 331.

Alampetis, p. 317, for *P. zivetta*, Klug, and *A. granulosissima*, and *dissimilis*, p. 332, *incongrua* and *quadriplicata*, p. 333, *extrema*, p. 334, *soror* and *pisciformis*, p. 335, *simulatrix*, p. 336, *ambigua*, p. 337.

Aplax, p. 317, for *A. obscura*, p. 337.

Cornelia, p. 317, for *P. pyropyga*, Coq., and *analis*, Chevr.

Pycnobothris, p. 318, for *P. mucronata*, Gory, and *Pycn. ruficauda* and *viridi-chalybea*, p. 338, *molesta*, p. 339, *silphoides*, p. 340, *sub-silphoides* and *obscurella*, p. 341, *sub-elongata*, *adelpha*, and *ovularis*, p. 342.

Polybothris gloriosa, p. 321, and *superba* (? = *morosa*, Gory), p. 322.

Amphisbeta spinolæ, p. 325.

Phobetodes vespertilio, p. 327.

Carcinias spectralis, p. 329.

Coccinellopsis puncticollis and *orbicularis*, p. 343, *ænea*, p. 344, *circulum*, p. 345, *caudalis* and *cordiformis*, p. 346, *mystica*, p. 347, *mœsta* and *obsoleta*, p. 348, *decolor*, p. 349 (this and the three preceding genera being described as new in the 'Typi' above mentioned).

Sternocera hildebrandti, Harold, MB. Ak. Berl. 1878, p. 214, fig. 1, Zanzibar interior; *S. iris* and *morio*, id. MT. Münch. ent. Ver. ii. p. 104, W. Central Africa.

Steraspis calida, id. *l. c.* p. 104, W. Central Africa; *S. colossa*, id. MB. Ak. Berl. 1878, p. 214, Zanzibar interior.

Philocteanus moricii, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 270, Cochin China.

Paracupta late-impressa, *dilutipes*, and *kleinschmidti*, id. Pet. Nouv. ii. p. 278, Fiji.

Amblysterna enyassica, Harold, MB. Ak. Berl. 1878, p. 215, Nyassa.

Chrysaspis cuneata, id. MT. Münch. ent. Ver. ii. p. 104, W. Central Africa.

Psiloptera cylindrica, p. 104, *erosa* and *muata*, p. 105, *id. l. c.*, W. Central Africa; *P. confluens*, Herero, *vigilans*, Zanzibar, p. 215, *impressa*, Zanzibar interior, and *abyssinica*, Abyssinia, p. 216, *id.* MB. Ak. Berl. 1878.

Chrysodema fugax, id. MT. Münch. ent. Ver. ii. p. 105, W. Central Africa.

Melobasis cupreo-aenea, Fairmaire, Pet. Nouv. ii. p. 286, Fiji.

Blepharum cæruleipes, id. *ibid.*, Fiji.

Anthazia deleta, Le Conte, Bull. U. S. Geol. Surv. iv. p. 459, Utah.

Acmæodera fossicollis, p. 216, *sculptilis* and *ancilla*, p. 217, Harold, MB. Ak. Berl. 1878, Zanzibar interior; *A. amabilis*, p. 7, fig. 3, Arizona, *macra*, p. 8, fig. 5, *miliaris*, p. 10, fig. 9, *obtusa*, p. 19, fig. 29, and *consors*, p. 20, fig. 30, Texas, *robusta*, fig. 6, and *pubiventris*, fig. 7, *plagiaticauda* (Mniszech, MS.), p. 10, *flavo-sticta*, fig. 16, and *dohrni*, fig. 21, p. 15, *versuta*, p. 21, fig. 33, *mariposa* [*na*], p. 22, fig. 35, *gemina*, p. 23, fig. 37, and *alacris*, p. 25, fig. 40, California, *sparsa*, p. 11, fig. 10, Colorado, *tuta*, p. 11, fig. 11, Utah, Horn, *l. c.* pl. i.

Sphenoptera recticollis, p. 217, Zanzibar, Mombas, *zanzibarica* and *collaris*, p. 218, Zanzibar interior, Harold, l. c.; *S. cuprea*, E. Ballion, Bull. Mosc. liii. (1) p. 291, Kuldja.

Belionota vitticollis, Harold, MT. Münch. ent. Ver. ii. p. 105, W. Central Africa.

Chrysobothris fatalis, id. *ibid.*, W. Central Africa; *C. æraria*, id. MB. Ak. Berl. 1878, p. 217, Zanzibar interior; *C. carinipennis*, Le Conte, Bull. U. S. Geol. Surv. iv. p. 459, Utah.

Pseudagrilus inornatus, Harold, MB. Ak. Berl. 1878, p. 218, Zanzibar interior.

Agrilus hildebrandti, *vulgaris*, and *costulatus*, id. *l. c.* p. 219, Zanzibar interior.

Taphrocerus puncticollis, E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 363, and *T. lævicollis*, Le Conte, *tom. cit.* p. 403, Florida.

Brachys fascifera, Schwarz, *l. c.*, Florida.

Pachyscelus cæruleus, id. *l. c.* p. 364, Florida.

Eucnemidæ.

Cryptostoma dohrni, sp. n., G. H. Horn, Tr. Am. Ent. Soc. vii. p. 54, California.

Nematodes punctatus, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 404, Florida and Texas.

[? Family.]

Brounia, g. n., D. Sharp, Ent. M. M. xv. p. 49. Undoubtedly allied to *Chelonarium*, but with the aspect of a Eucnemid; structure of antennæ

similar to that in *Ceratophytum elateroides*, except that the basal joint is smaller. An isolated anomaly. For *B. thoracica*, sp. n., *ibid.*, New Zealand.

Elateridæ.

Corymbites cylindriformis. A larva observed crushing the elytron of a living *Harpalus pennsylvanicus*; W. L. Devereux, Canad. Ent. x. p. 143.

E. Candèze, CR. Ent. Belg. xxi. p. li. *et seq.*, contributes five memoirs in continuation of the Revision of his Monograph, and mostly consisting of diagnoses of species from Castelnau's collection. He records an *Athous* from Chili, and now refers *Monocrepidius ophthalmicus*, Germ., with the genus *Ischius*, to the *Pyrophorites*, suppressing the group *Melanactites*. *Melantho*, *Tibionema*, and *Anaissus* are placed in the *Crepidomenites*.

The following new genera and species are described :—

Hemi [*a*] *rrhaphes*, p. cxli. *Cryptohypnites*: near *Arrhapes*, but with the third and fourth joints of the tarsi lobed, the latter dilated and cordiform. *H. notabilis*, ibid., Burma or Silhet.

Chrostus, p. clxix. *Corymbitites*: close to *Corymbites*, though of different facies, having the prosternal sutures slightly channelled at the apex. *Aphileus* and *Melanactes* are to follow this genus, having natural affinities to the group. *Ch. quadrifoveolatus*, p. clxx., Paroo River, Australia.

Parallotrius, p. clxxxix. *Allotriites*, hitherto only represented in India: facies of *Crepidomenus*. *P. pallipes* (Philippi, MS.), p. cxc., Chili.

Paranilicus, p. cxci. *Ludiites*: near *Anilicus*, but of quite different facies, with a convex frons, which is pointed in front, and different hinder coxæ. *P. macleayi*, p. cxcii., Victoria, and *Ophidius brevicornis*, Mcl.

Comps [*o*] *helus*, p. cxcii. *Ludiites*: somewhat of the facies of *Simodactylus*; tarsi enlarged, hairy beneath. *C. flavus*, ibid., Fiji Isles.

Par [*a*] *hemiops*, p. cxcviii. *Campylites*: near *Aplastus*, *Hemiops*, and *Pleonomus*, most resembling the latter in facies, and differing from its closest ally, *Hemiops*, in the cylindrical third joint of its palpi. *Par. palliatus*, ibid., Siam.

Adelocera mixta, Mexico, *cincta*, Sumatra, p. lii.

Dilobotarsus minutus, Bahia, *raffrayi*, Zanzibar, *ibid.*

Lacon pictus, *badeni*, *fictus*, and *latiusculus*, p. liii., Madagascar, *tumidipennis*, Zanzibar, *reductus*, Sumatra, and *plagiatus*, Australia, p. liv.

Tilotarsus marmoratus, p. liv., Zanzibar.

Alaus macer, p. lv., Gaboon.

Chalcolepidius haroldi, Peru, *villei*, Ecuador, and *albertisi*, Honolulu, *ibid.*

Semiotus borrei, p. lvi., Ecuador.

Campsosternus mammon, ibid., Burma.

Pectocera brevicollis, ibid., Canton.

Tetralobus corrosus, p. lvii., Australia.

Psephus cyaneus, Himalaya, *geminatus*, Abyssinia, and *granulatus*, Zanzibar, *ibid.*

Elius alveolarius and *dilatatus*, p. lviii., Malacca.

Ischiodontus collaris, p. lviii., Bahia, *erythroderus*, ibid., and *quadraticollis*, p. lix., Guatemala, *niliacus*, Kordofan, and *ineptus*, Zanzibar, p. lix.

Atractodes flavipes and *luteipennis*, p. lx., Brazil.

Eudactylus dimidiatus and *discoidalis*, ibid., Colombia.

Pachyderes niger, p. lxi., Juthia and Burma.

Melanthoides gestroi, Zanzibar, and *ligneus*, Malacca, *ibid.*

Glyphochilus bicolor, p. lxxv., Sydney.

Monocrepidius fulvus, p. lxxv., Brazil, *pertusus*, Mendoza, *ferrugosus*, Malacca, *longus* (= *candezii*, Kirsch, 1875, *nec* Macleay, 1872), and *longicollis*, Calcutta, p. lxxvi., *elegans*, North India, *dohrni*, Himalayas, and *discoidalis*, Malaysia, p. lxxvii., *sulcatus*, *aurulentus*, *ventralis*, *socius*, and *rufifrons*, p. lxxviii., *seniculus*, *striatus*, *planiusculus*, *compactus*, *planus*, and *nigripennis*, p. lxxix., *nitidulus*, *macer*, *squalidus*, and *flavidus*, p. lxxx., Australia, *truncatus*, Montevideo, *castelnaui*, *serotinus*, and *reductus*, Bahia, p. lxxxi.

Æolus suillus, Melbourne, *tæniatus*, Guatemala, *nobilis*, Brazil, *variolatus*, Cayenne, p. lxxxii.

Heteroderes minusculus, Philippine Islands, *albicans*, Siam, p. lxxxiii.

Anchastus baltcatus, Brazil, *œoloides*, Amazons, p. lxxxiii., *davidi*, Kiansi, *castelnaui* and *vulneratus*, Siam, and *flavus*, Ceylon, p. lxxxiv., *nitidus*, Borneo, *australis*, Victoria, *tongaensis*, Tonga-tabu, *nigriceps*, Java, and *major*, Fiji, p. lxxxv.

Drasterius prosternalis, p. cxxxv., Himalayas.

Elaterpusillus, ibid., Adelaide.

Megapenthes volxemi, Caucasus, and *pauper*, Transgangetic Hindostan, ibid., *hirtus* and *curtus*, Siam, *flavescens* and *biplagiatus*, Madagascar, p. cxxxvi.

Melanoxanthus melanurus, ibid., and *rufo-tactus*, p. cxxxvii., Siam, *variolosus*, Burma, *fractus* and *decimus*, Penang, p. cxxxvii., *flavidus*, Bintang, *rubiginosus*, Darjeeling, *dimidiatus* and *brunneus*, Australia, p. cxxxviii.

Deromecus inops, ibid., *brevicollis*, *sanguinicollis*, *scapularis*, *debilis*, and *agriotes*, p. cxxxix., *curtus*, *grisescens*, and *adrastus*, p. cxl., Chili.

Medonia fairmairii, p. cxl., Chili.

Pomachilius ocellatus, p. cxli., Brazil.

Arrhaphes minusculus and *opacus*, p. cxlii., Himalayas.

Cryptohypnus perpusillus, Himalayas, and *fulvus*, Abyssinia, p. cxlii., *atomus*, p. cxliii., Chili.

Coptostethus sex-punctatus, p. clxi., Cape of Good Hope.

Cardiophorus scapulatus, ibid., Tunis, *octo-notatus*, *submaculatus*, *depressus* and *velatus*, p. clxii., and *castaneus*, p. clxiii., Zanzibar, *insignis* and *æthiopicus*, Abyssinia, and *stali*, Damara Land, p. clxiii., *fulvo-signatus*, ibid., *bicolor*, *hamatus*, *pallidipennis*, *consputus*, and *octavus*, p. clxiv., *flavipennis* and *minimus*, p. clxv., Australia, *nitidus*, N. India, and *melanopterus*, Cambodia, ibid., *bengalensis*, Calcutta, and *ligneus*, Madagascar, p. clxvi.

Horistonotus bitactus, Chili, and *distigma*, Cayenne, *ibid.*

Ethesopus morio, ibid., Ecuador.

Diploconus dorsalis, Borneo, *pilosus* and *ineptus*, Celebes, p. clxvii.

Melanotus fortnumi, Japan, *rodriguezi*, Guatemala, *ibid.*

Athous brucki, Taygetus, *campyloides* [|| Newman], Chili, p. clxviii.

Pyrophorus sirius, ibid., Costa Rica, *sanguinicollis*, Para and Guiana, and *ruber*, Bahia, p. clxix.

Crepidomenus æneus, *georgei*, and *pulsi*, p. clxx., *sulcatus*, *cordifer*, *subopacus*, *rotundicollis*, and *minimus*, p. clxxi., Australia.

Ophidius serricornis, p. clxxi., N. S. Wales.

Asaphes elegans, p. clxxxix., Chili.

Probotrium crinitum, Quito, and *pilosum*, Bahia, p. cxc.

Ludius variegatus, Aru Islands, ibid., *erubescens*, New Guinea, and *brevis*, ? Brazil, p. cxci.

Aphanobius æqualis, ibid., Siam.

Anilicus flavipennis, p. cxcii., Australia.

Agriotes ligatus, Guatemala, *lateralis*, Costa Rica, *curtus*, Morocco, and *sericeus*, North Japan, p. cxciii., *fusiformis*, p. cxciv., North China.

Agonischius cinctus, North Bengal, *chalcopterus* and *cyanopterus*, Madras, and *gemmula*, Hong Kong, p. cxciv., *dorsalis*, Canton, *lansbergii*, Billiton, *salicollis*, Bangkok, *frenatus*, S. India, Ceylon, and *unicolor*, Cambodia, p. cxcv., *monachus*, Canton, *lineatus* and *australis*, Australia, p. cxcvi.

Glyphonyx nigritus [*-ta*], Mexico, and *brunneus*, Burma, p. cxcvi.

Silesis sericeus, Sikkim, and *modestus*, Hong Kong, p. cxcvii.

Octinodes plumosus, p. cxcvii., Upper Amazons.

Hemiops semperi, ibid., Luzon.

Pleonomus wahlbergi and *niger*, p. cxcviii., Caffraria.

Cylindroderus chilensis, p. cxcix., Chili.

E. Candèze, Ann. Mus. Genov. xii. pp. 99–143, also enumerates 119 species collected in the Malaysian Archipelago, New Guinea, and North Australia, by Doria, Beccari, and D'Albertis, including one new genus and many new species. The African *Tetralobus* is recorded from Australia.

The following new genus and species are described :—

Sephilus, p. 108. *Dicrepidiites* : apparently very close to *Psephus* or *Elius*, but with prothoracic channels straight, large, and deep, almost as marked as in the *Agrypnites*, the frons excessively developed, and the nasal plate very large. For *S. frontalis*, p. 109, Borneo and Malayan Peninsula.

Lacon pauper, p. 100, Java, *discedens*, p. 101, Ternate, *subsericeus* and *impressus*, p. 102, New Guinea, *asperulatus* and *cinerascens*, p. 103, Yule Island.

Alaus albertisi, p. 104, New Guinea, *acontias*, p. 107, Yule Island.

Tetralobus albertisi, p. 108, Somerset.

Monocrepidius mucronatus, p. 110, *similis*, p. 111, *yulensis* and *horistonotus*, p. 112, *pauperatus* and *corniculatus*, p. 113, *contiguus*, p. 114, New

Guinea, *guttatus*, p. 110, Ternate, *aruensis*, p. 112, Aru Islands, *regularis*, p. 115, *basilaris* and *flavicans*, p. 116, *simulans*, p. 117, Somerset.

Heteroderes beccarii, p. 117, *multilineatus*, p. 118, Celebes.

Anchastus pisciculus and *nitidulus*, p. 119, New Guinea.

Drasterius apicalis, p. 120, Celebes.

Megapenthes marginatus, p. 120, Borneo and Singapore, *niger*, p. 121, Celebes, *suturalis* and *punctatus*, New Guinea, *carinatus*, Sarawak, and *dorsalis*, Java, New Guinea, p. 123.

Melanoxanthus ligatus, p. 124, *doriæ*, p. 125, *nigricornis*, p. 127, *brunneus* and *bicittatus*, p. 128, Borneo, *partitus*, p. 125, Ternate, *proximus* and *decem-notatus*, p. 126, Java, *ruficollis*, p. 127, *angulatus*, p. 129, New Guinea, *morio*, p. 128, *taniatus*, p. 129, Celebes.

Cryptohypnus javanus, p. 130, Java, *suturalis*, p. 131, New Guinea.

Arrhaphes gestroi, p. 131, Java.

Cardiophorus elegans, Celebes, *papuensis*, Yule Island, p. 132.

Horistonotus longicornis and *consobrinus*, p. 133, Somerset.

Melanotus albertisi, p. 135, *æqualis*, p. 136, New Guinea, *ruficaudis*, p. 135, Celebes, *porcellus*, p. 136, Java.

Corymbites coaretatus, p. 137, Java.

Ludius variegatus, p. 138, Aru Islands.

Glyphonyx dorsalis, p. 139, Java, *zonatus*, ibid., and *quadrimaculatus*, p. 140, Java.

Lacon davidis and *acuminipennis*, spp. nn., L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 109, Central China.

Lycoreus ebenaui, L. v. Heyden, JB. senck. Ges. 1877–78, p. 104, Madagascar; *L. figuratus*, E. v. Harold, MT. Münch. ent. Ver. ii. p. 105, West Central Africa: spp. nn.

Alaus [? ; script. "*Olaüs*"] *costulicollis*, sp. n., Fairmaire, Pet. Nouv. ii. p. 279, Fiji.

Campsosternus moricii, sp. n., *id.* Ann. Soc. Ent. Fr. (5) viii. p. 270, Cochin China.

Anchastus longulus (also from Louisiana), *fuscus*, and *asper*, spp. nn., Le Conte, P. Am. Phil. Soc. xvii. p. 404, Florida.

Athous debilis, id. *l. c.* p. 405, Florida; *A. acutidens*, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 110, Central China: spp. nn.

Corymbites planulus, Le Conte, Bull. U. S. Geol. Surv. iv. p. 460, Colorado, N. New Mexico; *C. atratus*, E. Ballion, Bull. Mosc. liii. (1) p. 293, Kuldja; *C. lederi*, L. v. Heyden, Verh. Ver. Brünn, xvi., p. 204, Caucasus: spp. nn.

Pantolamprus rufipes, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 105, W. Central Africa.

Dicronychus tibialis, sp. n., *id. l. c.* p. 106, W. Central Africa.

Hemiops alternata, sp. n., Fairmaire, *l. c.* p. 110, Central China.

Cebrionidæ.

Toxognathus, g. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 271. Very near *Physodactylus*, but with last joint of palpi slender, not securiform,

antennæ not perfoliate, tarsi not lamellate, &c. *T. costulatus*, sp. n., *ibid.*, Cochin China.

Rhipidoceridæ.

Callirrhipis marmoreus[*-rea*], sp. n., Fairmaire, *l.* c. p. 272, Cochin China.

Dascillidæ.

Sharp, D. On the *Dascillidæ* of New Zealand. Ann. N. H. (5) ii. pp. 40–59.

Twenty-eight species are described, all new. They form a natural group, between the 'Dascilliens' and the 'Cyphoniens' of Mulsant, marked by the presence of a deep fossa from the base of the antennæ to the base of the stipes of the maxilla. A provisional table of the genera is given.

New genera and species:—

Byrrhodes, Sharp, *l. c.* p. 43. Antennæ elongate, prosternal process large. *B. gravidus*, p. 42, New Zealand (as in the five following genera).

Cyprobius, id. *l. c.* p. 43. Antennæ not so elongate, and prosternal process small. *C. nitidus*, p. 44.

Cyphanus, id. *l. c.* p. 43. Elongate, narrow, labial palpi furcate. *C. laticeps*, *punctatus*, and *mollis*, p. 45, *debilis*, p. 46.

Veronatus, id. *l. c.* p. 43. Allied to *Cyphanus*, but more elongate, the labial palpi not furcate, and the junction of the prosternal process with the middle of the prosternum concealed between the tips of the front coxæ. *V. longicornis*, p. 48, and *longipalpis*, p. 49.

Mesocyphon, id. *l. c.* p. 43. Differs from *Cyphon* in the maxillary palpi, the less-reduced front band of the prosternum, and the acuminate prolongation of the prosternal process. *M. marmoratus* and *setiger*, p. 50, *wakefieldi* and *divergens*, p. 51.

Cyphotelus, id. *l. c.* p. 43. With no mesosternal cavity, and the front band of the prosternum quite distinct, and less reduced than in its allies. *C. angustifrons*, p. 58.

Pseudochilus, [presumably] Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 111. Near *Dascillus*, with wide lamellated tarsi, last joint of palpi oblong and truncate, and rounded prosternal projection. *P. sulcifrons*, id. *l. c.* p. 112, Central China.

Hæmatoides, [do.] *l. c.* p. 116. Near *Dascillus* and *Therius*, but with claviform antennæ, and tri-lamellate tarsi, the second joint being simple. *H. davidis*, id. *l. c.* p. 117, Central China.

Sinocaulus, [do.] *l. c.* p. 117. Very near the preceding genus, but narrower and less convex, with continuous front and middle coxæ, less wide antennæ, and labial palpi rather securiform. *S. rubro-relutinus*, id. *ibid.*, Central China.

Lichas davidis, Fairmaire, *l. c.* p. 111, Central China.

Therius jaspideus, id. *l. c.* p. 115, Central China.

Atopida lawsoni, *brouni*, and *proba*, Sharp, *l. c.* p. 47, New Zealand.

Cyphon huttoni and *parviceps*, p. 52, *pumilio* and *arduus*, p. 53, *oscillans*, *æqualis* and *graniger*, p. 54, *pictulus*, *zealandicus*, and *suffusus*, p. 55, *laticeps* and *genalis*, id. *l. c.* p. 56, New Zealand; *C. impressus*, Le Conte, P. Am. Phil. Soc. xvii. p. 405, Florida.

TELEPHORIDÆ.

Lycides.

C. O. WATERHOUSE, Tr. E. Soc. 1878, pp. 95–118, discusses the different forms occurring in this family, describing new genera and species. Great difficulty is experienced in discovering stable diagnostic characters for the groups, some of which are on that account not named [the species referred to these being given as (*Lycus*) infrà], 44 in all being recognized. *Dictyoptera*, Latr., 1829 (*nec* Leach, *Orthoptera*, 1818) is suppressed; *Digrapha* = *Calopteron*; *Anarrhynchus*, Guér., had no species assigned to it by its author, and the first described species, *A. scutellaris*, Er., is a *Calochromus* (1833); *Coptorrhinus*, *Temnostoma*, and *Odontocerus*, Guér., being preoccupied, and having no species assigned to them, must be dropped.

Lycus apicalis, J. Thoms., ♂ from W. African coast; J. Bourgeois, Ann. Soc. Ent. Fr. (5) viii. p. 165.

New genera and species :—

The following are characterized by Waterhouse, *l. c.* :—

Macrolycus, p. 96. With claws split at the apex. *M. bowringi*, p. 105, Allahabad.

Lyponia, p. 99. No rostrum, elytra unusually delicate, antennæ with long stout branches. *L. debilis*, p. 107, China.

Taphes, p. 102. Short, velvety, antennæ scarcely dentate, with long pubescence in the ♂. *T. brevicollis*, Sarawak, and *frontalis*, Sumatra, p. 111.

Atelius, p. 104, for *L. expansicornis*, Walk.

Scarelus, ibid., with antennæ much longer than the whole body, nearly filiform. *S. longicornis*, p. 116, Java, *orbatus*, p. 117, Singapore.

Libnetus, p. 104. Pubescent, elytra woolly. *L. pumilio*, p. 117, Ceylon.

Lyropæus, p. 104, for *L. fallax*, Walk.

Dexoris, p. 105. Antennæ woolly, thickest at base; elytra with no costæ, but thickly studded with minute obtuse tubercles. *D. insignis*, p. 117, Sierra Leone.

Calopteron ? notatus, p. 106, New Hebrides.
Calopteron ? pfeifferi, ibid., Celebes.
(*Lycus*) *tristis*, ibid., Ecuador.
,, *gracilis*, p. 107, S. India.
,, *punctipennis*, p. 108, Java.
,, *alternans*, Sarawak, and *misellus*, Penang, p. 108.
,, *deplanatus*, p. 109, New Guinea.
,, *obsoletus*, ibid., Java.
,, *excellens*, p. 110, Sarawak.
,, *velutinus*, Sikkim, and *festivus*, Sumatra, *ibid.*

Pyropterus sculpturatus, p. 112, Sarawak.
Cladophorus aberrans, ibid., Aru Isles, *restrictus*, p. 113, Waigiou.
(*Lycus*) *luteolus*, p. 113, Aru Isles.
Trichalus acutangulus, New Guinea, *æmulus*, Aru Isles, *anceps*, Batchian, p. 114.
(*Lycus*) *dispar*, Malacca, *conformis*, Sarawak, p. 115.
„ *exilis*, p. 116, Sarawak.

Lycus haagi, Bourgeois, *l. c.* p. 166, Cape of Good Hope.
Porrostoma davidis, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 118, Central China.
Metriorrhynchus moricii, id. *l. c.* p. 272, Cochin China.
Calopteron dives, p. 166, *segmentatum*, p. 167, *steinheili* and *poweri*, p. 168, *fenestratum* and *lebasi*, p. 169, *sub-cruciatum*, p. 170, *elongatum* and *acuminatum*, p. 171, and *flavo-cinctum*, p. 172, Bourgeois, *l. c.*, Colombia.
Cœnia loculata, id. *l. c.* p. 173, Colombia.
Eros longicornis, p. xxvii., Batum, and *abdominalis*, p. xxviii., L. Reiche, Bull. Soc. Ent. Fr. (5) viii., and *E. schneideri*, Kiesenwetter, Verh. Ver. Brünn, xvi. p. 206, pl. iv. fig. 35, Caucasus.

Lampyrides.

The Lampyrids considered as having certain powers of adaptation, and traced in their supposed evolution from an apterous to an aerial state, and back again as a purely terrestrial and degraded form: (Mrs.) V. O. King, Am. Nat. xii. pp. 354–358. Their phosphorescence discussed, and believed to be due to the actual presence of phosphorus; *ead. l. c.* p. 662.

Stenocladius, g. n., [presumably] L. Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 112. Near *Megalophthalmus*, but with antennæ almost as long as the body, the second joint small but distinct, no strong lateral abdominal lobes, and with no trace of phosphorescent apparatus, &c. *S. davidis*, sp. n., *id. l. c.* p. 113, Central China.
Lucernuta nigro-flava, p. 113, and *flaviventris*, p. 114, spp. nn., Fairmaire, *l. c.* Central China.
Vesta davidis, sp. n., *id. l. c.* p. 114, Central China.
Lucidota luteicollis, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 405, Florida.
Phausis inaccensa, sp. n., *id. l. c.* p. 611, Lake Superior.
Photinus (*Pyractomena*) *ecostatus*, p. 406, *P.* (*Pyractosoma*) *nitidiventris*, ibid., *collustrans*, and *umbratus*, p. 407, Florida, *punctiventris*, p. 407, Texas, *id. l. c.*, spp. nn.

Drilides.

Drilus pulchellus, sp. n., R. Gestro, Ann. Mus. Genov. xiii. p. 319, Shoa.

Telephorides.

C. O. Waterhouse, Tr. E. Soc. 1878, pp. 325 *et seq.*, describes a new genus and some new species from Central and South America: *Chaulio-*

gnathus heros, Guér., var., p. 326, Ecuador; *tripartitus*, Chevr., var., p. 327, Guatemala; *Telephorus* (*Chaul.*) *axillaris*, Fisch., = *Cantharis flavipes*, Fab., var., ex. typ., p. 329.

Telephorus. Sexual differences in the claws noted in two Japanese species, the ♀ having a tooth at the base of the inner claw of the front tarsi and the outer of the middle tarsi; the antennæ in the ♂ have a fine longitudinal line on the upper side of the intermediate joints, and this occurs in some European species. E. v. Harold, Deutsche E. Z. 1878, p. 74.

Telephori supposed to be aphidivorous; J. W. Slater, Ent. xi. p. 255.

Xenismus, g. n., Waterhouse, *l. c.* p. 331. Characters of *Telephorus*, but with the head evenly convex above and with a distinct labrum (or clypeus ?), separated from the epistoma by a curved line. *X. nigroplagiatus*, sp. n., *ibid.*, Ecuador.

Chauliognathus haversi, p. 325, Uruguay, *sodalis* and *togatus*, p. 326, Oaxaca, *excellens*, p. 327, Medellin, *distinguendus*, p. 328, Guatemala (and var. ?, described but not named, from Oaxaca), *expansus*, Brazil, and *janus*, Ecuador, p. 329, *dimidiatus* and *pallidus*, p. 330, Mexico, *sulphureus*, p. 331, Nauta, Amazons, spp. nn., Waterhouse, *l. c.*

Podabrus brevipennis, Le Conte, Bull. U. S. Geol. Surv. iv. p. 460, Colorado; *P. temporalis*, Harold, Deutsche E. Z. 1878, p. 73, Japan; *P. mocquerysi*, L. Reiche, Ann. Soc. Ent. Fr. (5) viii. p. 383, Rouen.

Telephorus melanopus, p. 74, *hilgendorfi*, p. 75, *insulsus*, p. 76, Harold, *l. c.* Japan; *T. hispanicus*, p. 383, Avila, *ocreatus*, p. 384, Corsica, Reiche, *l. c.*: spp. nn.

Rhagonycha sanguinolenta, sp. n., Reiche, *l. c.* p. 384, Syria.

Malthinides.

S. A. de Marseul, L'Ab. xvi. [for 1877, published in 1878], publishes a monograph of the Old World species.

Malthinus trigibber, p. 16, Jericho, *scapularis*, p. 23, Malta, *sulcicollis*, p. 24, *nigribuccis*, p. 34, *inflavus*, p. 36, *lacteifrons*, p. 43, Algeria, spp. nn., *id. l. c.*

Malachiides.

Hapolochrus apicalis, E. Ballion, Bull. Mosc. liii. (1) p. 294, Kuldja; *H. abyssinicus*, p. 219, Abyssinia, *floralis*, *cognatus*, and *amplipennis*, p. 220, Zanzibar, E. v. Harold, MB. Ak. Berl. 1878: spp. nn.

Temnopsophus impressus, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 364, Florida.

Malachius macer, p. 208, *cavifrons*, p. 209, *opacus* and *monticola*, p. 210, *debilis*, p. 211, spp. nn., H. v. Kiesenwetter, Verh. Ver. Brünn, xvi., Caucasus.

Troglops pluri-armatus, sp. n., P. Belon, Bull. Soc. Ent. Fr. (5) viii. pp. xxviii. & cxv., Mesopotamia.

Melyrides.

Dolichosoma æneum, Mshm., *cyaneum*, Ol., *viride*, Rossi, *nobile*, Ill., should be called "*viridicæruleum*," Geoffr.; L. Reiche, Bull. Soc. Ent.

Fr. (5) viii. p. clx. L. Bedel, *tom. cit.* p. clxix., observes that Geoffroy used no Latin names in nomenclature, the term "*viridi-carulea*" employed by him being the entire diagnosis of his "Cicindèle-verdâtre," subsequently latinized by Fourcroy.

Dazytiscus plumbeus, p. 214, Caucasus, *armeniacus*, p. 215, Armenia, spp. nn., Kiesenwetter, Verh. Ver. Brünn, xvi.

Danacæa calida, L. v. Heyden, Verh. Ver. Brünn, xvi. p. 215, Caucasus; *D. championi*, "M.," Nouv. et faits, (2) No. 14, p. 55, Piræus; *D. hæmorrhoidalis*, Ballion, Bull. Mosc. liii. (1) p. 296, Kuldja: spp. nn.

Chalcas sallei[*-læi*], p. 267, *abnormis*, p. 268, spp. nn., Fairmaire, R. Z. (3) vi., Venezuela.

Melyris apicalis, Harold, MT. Münch. ent. Ver. ii. p. 106, W. Central Africa; *M. atra*, Colorado, and *flavipes*, California, Le Conte, Bull. U. S. Geol. Surv. iv. p. 461: spp. nn.

Idgia deusta, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 118, Central China.

Cleridæ.

Chevrolat, A. Mémoire sur la famille des Clérites. Paris (March 15, 1876): 8vo, pp. 51.

This pamphlet, originally intended for Ann. Soc. Ent. Fr., but withdrawn and published separately by the author under the above date, has hitherto escaped notice in Zool. Rec. It is a supplement to the same author's former memoir in R. Z. 1874; and contains the following synonymical and other observations:—*Cymatodera ovipennis*, Lec., = *angustata*, Spin.; *Priocera modesta*, Spin., has nothing to do with *C. prolixa*, Kl., being an *Opilo*; *O. præustus*, Chev., = *apicalis*, Chev.; *O. cribripennis*, Boisd., is a *Natalis*; *Serriger coffini*, White, is a *Sallea*; *Clerus faber*, Chev., = *artifex*, Spin.; *C. scapularis*, Chev., = *Corynetes pectoralis*, Kl.; *Tarsostenus univittatus* from Colombia; *Zenithicola fulgens*, Chev., = *Chalciclerus pulcher*, Newm., and the genus should stand; *Trichodes affinis*, *alvearius*, and *apiarius*, and *Pelonium apicale*, varr., described; *Lemidia accinsus*, Newm., = *inanis*, Germ., and *xanthozona*, Chev., is probably a sex of it; *Pelonium fulvicolle*, Luc., = *fugax*; *Othnius mexicanus*, Chev., was described before by Horn. Some of Horn's identifications are given, with a few locality notices, corrections of Catalogue references, &c.

The following new genera and species are characterized:—

Pœcilochroa, p. 5. No differential characters suggested. For *Clerus cyanipennis*, Kl., *dasytoides*, White, and *thoracicus*, Ol.; also *P. haagi*, p. 12, N. America.

Tarandocerus, p. 7. The author employs this name for the males of *Platynoptera lycoides*, Spin., *Chariassa pilosa*, Först., and *Pelonium seminigrum*, Chev., of which the antennal club is very long, flattened, composed of three narrow, elongate, imbricated joints. Possibly, from the context, intended as a sub-genus of *Pelonium*.

Dereutes, p. 29. New name for *Eurymetopum*, Bld., nec *-pus*, Schön., *Curculionidæ*, nec *-pon*, Esch., *Tenebrionidæ*. For many known Chilian

species of *Trichodes* and *Thanasimus*, and *D. dimidiatipennis*, p. 30, *seminiger*, *semi-fuscus*, *centurio*, and *brevis*, p. 31, *brachialis*, *virens*, and *cinctipennis*, p. 32, *ornatipennis*, *implicatus*, and *4-fasciolatus*, p. 33, *rubidus* and *dimidiatus*, p. 34, *maculipennis*, *semi-prasinus*, and *frigidus*, p. 35, and *nodicollis*, p. 36, *frontalis* and *tri-nodosus*, p. 46, *infuscatus* and *luridipennis*, p. 47, all from Chili.

Tillus mouffleti, p. 8, no locality given.

Cymatodera emarginata and *striato-punctata*, Mexico, *megacephala*, Colombia, *ibid.*

Priocera bifasciata, *villosa*, and *rufierus*, p. 9, *proxima*, p. 10, S. Brazil.

Opilo calceatus, Benguela, *foveicollis*, Chili, p. 10, *depressus*, Chili, *brasilianus*, Brazil, *fallax*, Diarbekr, p. 11, *tilloides*, p. 12, Syria, *chloropterus*, p. 45, Gaboon.

Derestenus collaris, p. 12, Mexico.

Clerus boucardi, p. 13, Mexico, *hybrida*, *sahlbergi*, and *meridionalis*, ibid., S. Brazil, *subfasciatus* and *steinheili*, p. 14, *auro-notatus* and *cyaneus*, p. 15, Colombia.

Aulicus splendidus, p. 15, *multicolor*, *varicolor*, *lætus*, *ochrurus*, and *mellinipes*, p. 16, Australia, *rutilicornis*, p. 17, New Caledonia.

Trichodes theophili, Asia Minor, *podagricus*, Algeria, p. 18, *hispanus*, Spain and Algeria, p. 19, *rubro-limbatus*, p. 20, Syria.

Eleale basicornis, p. 20, *chloris*, *venustula*, and *smaragdina*, p. 21, Australia, *E.* ? *advena*, p. 22, Chili (with note on the great analogy between the *Coleoptera* of that country and Australia).

Stigmatium serie-granosum, p. 22, *costicolle*, p. 23, Gaboon, *bifasciatum*, S. Africa, *impressicolle*, Boru, p. 23, *nitescens*, p. 24, Siam, *longipalpe* and *leuco-cælum*, ibid., *filicorne*, p. 25, Malaysia, *albifrons* (? = *speculare*, White, var.), and *quadricostatum*, p. 25, *varipes*, p. 26, Australia, *gaboni-cum* (Thomson), p. 45, Gaboon.

Omadius ? *barbipennis*, p. 26, Malacca, *omoplatarum*, p. 27, Malaysia, *O. palliditarsis*, ibid., New Caledonia, *planicollis*, p. 45, ? East Indies.

Epiphlœus quatuordecim-maculatus, p. 27, Brazil, *nebulosus*, p. 28, Cuba.

Hydnocera calleidiformis [*-lid-*] and *lividipes*, p. 28, E. Colombia, *femoralis* and *ischion*, p. 29, Brazil.

Ichnea sutura-alba, p. 37, Colombia.

Tenerus (in which *Stenocylidrus*, Spin., sinks) *philippinarum*, p. 37, Philippine Isles, *virgaticollis*, p. 46, Gaboon.

Pelonium semivittatum, p. 37, *apicicorne*, *nigrum*, and *nigro-punctatum*, p. 38, *decem-punctatum*, *dilatatum*, and *togatum*, p. 39, *xanthurum*, *marginipenne*, *centro-maculatum*, and *conforme*, p. 40, S. Brazil, *guyanense*, p. 38, Cayenne, *angulicolle*, *ampliatum*, and *xanthochile*, p. 41, *tetraspilotum*, p. 47, Colombia.

Orthopleura photinoides, p. 42, Petropolis.

Pylus ? *quadrimaculatus*, ibid., S. Africa.

Lebasiella limbipennis and *sub-anchoralis*, p. 43, Chili.

Corynetes unicolor, ibid., Australia.

Necrobia subterranea, ibid., Syria.

H. E. Gorham, Tr. E. Soc. 1878, pp. 153-167, continues his descriptions of new genera and species, with notes on the genera and corrections of synonymy, referring to the *Corynetides*, but with a general appendix, and another enumerating the species found by Semper in the Philippine Islands. Various synonymical suggestions are made. *Thanasimus rufimanus*, Gorh., = *Aulicus chrysurus*, Chev.; *A. ochrurus*, Chev., = *albofasciatus*, Gorh., which has priority; *Clerus vulpinus*, Gorh., *silbermanni*, *assimilis*, *semi-ochraceus*, and *boucardi*, Chev., = *mexicanus*, Cast.

Dolichopsis, g. n., Gorham, *l. c.* p. 154. Allied to *Notostenus* (for which the correction of *Stenonotum* is dubiously put forward), but of narrow and subcylindrical form, less laxly jointed club to the antennæ, and subrostrate head. For *D. haplocnemo* [*i*] *des* and *cyanella*, spp. nn., p. 155, Cape of Good Hope.

Thriocera, g. n., *id. l. c.* p. 156. More nearly allied to *Corynetes* than to *Necrobia*, but of different facies and antennal structure (especially as regards the apical joint). For *Corynetes pectoralis*, Klug (with which the author is inclined to join *Pylus 4-maculatus*, Chev., = *anthicoides*, Newm., of which *Clerus scapularis*, Chev., is a colour var.).

Paratillus, g. n., *id. l. c.* p. 157. With tarsi indicating affinity to the *Enopliides*, antennæ and palpi to the *Corynetides*. For *Clerus carus*, Newm., and *P. basalis*, Moreton Bay, and *analis*, New Caledonia, spp. nn., p. 158.

Cylidrus sansibaricus, sp. n., Harold, MB. Ak. Berl. 1878, p. 220, Zanzibar.

Opilo eburneo-cinctus, sp. n., Gorham, *l. c.* p. 160, N. S. Wales.

Colyphus limbatus, p. 161, Venezuela, *marginatus* and *flammeus*, p. 162, Mexico, spp. nn., *id. l. c.*

Thanasimus pallipes, p. 162, Philippines, *pilosellus* (Kies., MS.), p. 163, Nagasaki, *id. l. c.*

Clerus cylindricus, p. 164, *concinnus*, p. 165, spp. nn., *id. l. c.*, Guatemala.

Trichodes davidis, sp. n., H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 119, Central China.

Stigmatium cinereum, New Guinea, Andaman Isles, and *ustulatum*, Sarawak, spp. nn., Gorham, *l. c.* p. 165.

Lymexylidæ.

Hylecœtus dermestoides not xylophagous, but predaceous on wood-feeding beetles; A. Puton, quoting Mathieu's notes from Catalogue of objects exhibited by the Administration of Forests at the Paris Exposition; Bull. Soc. Ent. Fr. (5) viii. pp. cxxvii.-cxxix.

Micromalthus, g. n., J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 613. Referred here, somewhat dubiously, on account of the resemblance to *Hylecœtus* in the antennæ and coxæ. Facies of a miniature narrow *Hydnocera*. *M. debilis*, sp. n., *ibid.*, pl. xv., Detroit. The larva described by H. G. Hubbard, *tom. cit.* pp. 666-668.

PTINIDÆ.

An increase in the number of joints of the antennæ from nine to eleven, by a power of segmentation in the fourth joint, noted in *Hadrobregmus linearis*, Lec., with the resulting opinion that nominal species may have been unduly multiplied from antennal characters alone; Le Conte, P. Am. Phil. Soc. xvii. p. 612.

Ptinomorphus imperialis: transformations noticed and figured; H. du Buysson, Feuil. Nat. viii. p. 126, pl. ii.

Anobium tessellatum. Evidence of serious damage to woodwork of houses in Paris by this insect; M. Girard, Bull. Soc. Ent. Fr. (5) viii. p. lvi.

Anobium paniceum feeding and breeding freely in orris-root powder; E. C. Rye, Ent. M. M. xv. p. 36.

Byrrhodes, g. n., Le Conte, *l. c.* p. 412. *Anobiini*: allied to *Dorcatoma* and *Cænocara*, but with striated elytra, larger second joint of antennæ, and broad, square, metasternal process. *B. setosus*, sp. n., *id. l. c.* p. 413, Florida.

Ptinus (? *Heteroplus*) *forticornis*, sp. n., E. Reitter, Deutsche E. Z. 1878, p. 94, Acarnania.

Eurostus kutzchenbachi, sp. n., *id.* Verh. Ver. Brünn, xvi. p. 217, pl. iv. fig. 36, Mamudly.

Gibbium schmidti, sp. n., Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lxxxvi., Tacna.

Ozognathus floridanus, sp. n., Le Conte, *l. c.* p. 408, Florida.

Xestobium subincanum, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 219, Mikwena.

Nicobium schneideri, sp. n., *id. l. c.* p. 218, pl. iv. fig. 37, Aksu.

Eupactus viticola, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 365, Florida.

Xyletinus lugubris, p. 612, Lake Superior, Massachusetts, Nebraska, *pubescens*, p. 613, Texas, spp. nn., Le Conte, *l. c.*

Dorcatoma granum, Florida, *tristriatum*, Texas, spp. nn., *l. c.* p. 411.

Cænocara lateralis, Florida, and *intermedia*, N. Carolina, p. 411, *californica*, p. 412, California, *id.* l. c.; *C. rufitarsis*, Reitter, Deutsche E. Z. 1878, p. 90, Japan: spp. nn.

Catorama punctulata, *holosericea*, and *minuta*, p. 409, Florida, *frontalis* and *obsoleta*, California, and *sectans*, Texas, p. 410, spp. nn., Le Conte, *l. c.*

Hemiptychus debilis, *similis*, and *abbreviatus*, p. 408, *auctus*, p. 409, spp. nn., *id. l. c.*, Florida.

BOSTRYCHIDÆ.

G. H. Horn, P. Am. Phil. Soc. xvii. p. 540 *et seq.*, revises the species found in the United States. *Exopioides* is united with *Polycaon*, and *Acrepis* with *Psoa*. *Poly. ocicollis*, Lec., = *stouti*, Lec., ♀.

Psoa. On the German species; G. Kraatz, Deutsche E. Z. 1878, p. 197.

Apate sexdentata injurious to oaks in Italy; P. Gargagli, Bull. Ent. Ital. x. (Resoc. delle Adun.) p. 6.

Tetraprio[no]cera, g. n., Horn, *l. c.* p. 544. Differs from *Sinoxylum* in its eleven-jointed antennæ, which have four dilated terminal joints. *T. schwarzi*, sp. n., p. 545, Florida and Santo Domingo.

Bostrychus californicus, sp. n., Horn, *l. c.* p. 546, California.

Amphicerus (dubiously distinct from *Bostrychus*) *teres*, sp. n., Horn, *l. c.* p. 548, California.

Sinoxylum texanum, S. W. Texas, and *dinoderoides*, Arizona, p. 543, *bidentatum*, Nebraska, and *suturale*, California, p. 544, spp. nn., *id. l. c.*

Dinoderus truncatus, California, and *brevis*, New Orleans, *id. l. c.* p. 550; *D. 4-collis*, "Fairm.," Nouv. et faits, (2) No. 21, p. 83, Algeria: spp. nn.

Lyctidæ.

E. Reitter, Verh. z.-b. Wien, xxviii. [for 1878, published in 1879], pp. 195–199, tabulates the genera. *Trogoxylum*, Lec., has the front tibiæ produced into a tooth at the apex, except in the N. American species. *Lyctus deyrollii*, Tourn., probably = *suturalis*, Fald.; *L. caucasicus*, Tourn., = *pubescens*, Panz., *L. lævipennis*, Fald., = *impressus*, Com., is a *Trogoxylum*. The following new genera and species are described: —

Lyctoxylon [*-lum*], p. 196. Form of *Trogoxylum*; both joints of antennal club very elongate, cylindrical; thorax as in *Lyctus*, but laterally set with bristles. *L. japonum*, p. 199, Hindostan and Japan.

Lyctopholis, p. 196. Thorax and general form of *Lyctus*; second joint of club elongate, sides of thorax toothed. *L. fovicollis*, St. Domingo, and *stichothorax*, Bogota, p. 199.

Lyctus nitidicollis, Chili, Bogota, and *longicornis*, Bogota, p. 197, *simplex*, Colombia, and *tomentosus*, Mexico, p. 198.

Trogoxylum recticolle, p. 199, La Plata.

Cioidæ.

Reitter, Deutsche E. Z. 1878, pp. 21–30, gives some corrections and additions to H. v. Kiesenwetter's work in Naturg. Ins. Deutschl. v. [Zool. Rec. xiv. *Ins.* p. 9]. *Octotemnus*, considered by that author as a subgenus of *Orophius*, the type of a group *Orophiidæ*, is really the older name, and must stand. *Ennearthrum* should stand generically. Many synonymical observations are made: *Cis micans*, Kies., *nec* Hbst., = *hispidus*, Payk.; *C. caucasicus*, Mots., = *rugulosus*, Mell., = *boleti*, var.; *C. oblongus*, Kies., *nec* Mell., = *coluber*, Ab.; *C. laricinus*, Mell., and *pruinosulus*, Perris (the latter fully described, *tom. cit.* p. 56), are referred to *Ennearthrum*; *Eridaulus jacquemarti*, Thoms., *nec* Mell., = *glabratus*, Mell.; Thomson is wrong in referring *C. lineato-cribratus*, Mell., to *Orophius*; *C. fronticornis*, Kies., *nec* Panz., = *Enn. affine*, Gyl., Abeille de Perrin's table of genera is published, and a dichotomous table given of all the European species.

Cera[to]cis militaris, Mell., having nine-jointed antennæ, is an *Ennearthrum*, and is wrongly placed by Crotch in his "Check List" as a

synonym of *C. sallei*, Mell., which has eight-jointed antennæ; *id.* MT. Münch. ent. Ver. ii. p. 37.

Macrocis, g. n., *id. l. c.* p. 34. Differs from *Cis* in its short form, deep antennal furrows, very short tarsi, and male clypeal armature. For *M. taurus*, ibid., Mexico, *diabolicus*, p. 35, and *bison*, p. 36, Colombia: spp. nn.

Rhopalodontus populi, C. Brisout, Bull. Soc. Ent. Fr. (5) viii. p. lxiii. St. Germain-en-Laye; *R. perrini*, Reitter, Verh. Ver. Brünn, xvi. p. 221, Tschattag: spp. nn.

Cis bubalus, p. 32, and *bilimeki*, p. 33, Mexico, *stsiuheili*, p. 33, and *nasicornis*, p. 34, Colombia, spp. nn., Reitter, MT. Münch. ent. Ver. ii.

Enneartbrum japonum, id. *l. c.* p. 36, Japan; *E.* (*Entypus*) *opaculum*, id. Deutsche E. Z. 1878, pp. 25 & 57, Vienna and Hungary: spp. nn.

Cera [*to*] *cis bison*, sp. n., *id.* MT. Münch. ent. Ver. ii. p. 37, Cuba.

Sphindidæ.

Le Conte, P. Am. Phil. Soc. xvii. p. 602, disputes the assignment of *Sphindus* to the end of the *Ptinidæ* on account of the small and not prominent coxæ being distinctly separated by the prosternum, the form of the antennæ and tarsi, and the way in which the antennæ are flexed in repose. The club is really two-jointed. He characterizes the following two new genera, of which the first seems to indicate a relationship to the *Derodontidæ*:—

Odontosphindus, p. 601. Differs from *Sphindus* in its elongate, glabrous body, laterally toothed thorax, strongly punctured, but not impressed striæ, and prothoracic flanks not concave for reception of antennæ. *O. denticollis*, sp. n., *ibid.*, Detroit, Canada, California.

Eurysphindus, p. 602. Broad, hairy, with feebly impressed striæ, and prothoracic flanks deeply and widely concave beneath. *E. hirtus*, sp. n., *ibid.*, Detroit.

Reitter, Verh. z.-b. Wien, xxviii. p. 200, associates *Sphindus* and *Aspidophorus* in a special family, agreeing with Crotch in placing it near the *Cioidæ* and *Cryptophagidæ*. He describes as new:—

Sphindus major and *kiesenwetteri*, p. 201, Mendoza, *castaneipennis*, ibid., and *brevis*, p. 202, Japan, *amplithorax*, Texas, and *cubensis*, Cuba, p. 202.

Aspidophorus japonicus, p. 202, Japan.

Tenebrionidæ.

J. C. Schiödte, Nat. Tids. (3) xi. pp. 479–598, pls. v.–xii., continues his descriptions and figures of the earlier stages of *Coleoptera*, the present (9th) part solely referring to *Tenebrionidæ*. He describes and figures with details the larvæ (and also the pupæ, when marked *), of the following species:—*Pimelia inflata*, pp. 479 & 523, pl. v. figs. 1–11; *Scaurus atratus*, pp. 480 & 526, pl. v. figs. 14–20; *Acis reflexa*, pp. 480 & 529, pl. v. figs. 12–21; *Blaps similis*, pp. 481 & 532, pl. vi. figs. 1–13; *Cryptieus quisquilius* *, pp. 481, 535, & 586, pl. vii. figs. 1–6; *Heliopates gibbus*,

pp. 432 & 538, pl. vii. figs. 7–14; *Opatrum sabulosum* *, pp. 482, 541, & 585, pl. vii. figs. 15–21; *Bolitophagus reticulatus* *, pp. 483, 544, & 584, pl. viii. figs. 1–11; *B. armatus* *, pp. 483, 546, & 585, pl. ix. figs. 1–9; *B. agricola* (pupa only), pp. 484, 547, & 585, pl. viii. figs. 12 & 13; *Diaperis boleti* *, pp. 484, 547, & 585, pl. viii. figs. 14–24; *Platydema violaceum*, pp. 484 & 550, pl. viii. figs. 25–29; *Scaphodema æneum*, pp. 485 & 552, pl. ix. figs. 10–16; *Phylethus quadripustulatus* *, pp. 485, 555, & 586, pl. ix. figs. 17–27; *Pentaphyllus testaceus* *, pp. 486, 557, & 586, pl. x. figs. 1–7; *Hypophlœus bicolor*, pp. 486 & 559, pl. x. figs. 8–11; *Palorus depressus* *, pp. 487, 561, & 587, pl. x. figs. 12–17; *Tribolium ferrugineum* *, pp. 487, 563, & 587, pl. x. figs. 18–22; *Alphitobius diaperinus*, pp. 487 & 565, pl. xi. figs. 1–3; *A. piceus* *, pp. 488, 568, & 587, pl. xi. figs. 4 & 5; *Tenebrio molitor* *, pp. 488, 568, & 587, pl. xi. figs. 6–14 (with note on *T. opacus*, p. 571); *Helops cæruleus*, pp. 488 & 571, pl. xi. figs. 15–22; *Allecula morio* *, pp. 489, 575, & 588, pl. xii. figs. 1–9; *A. rhenana* *, pp. 489, 578, & 588, pl. xii. figs. 10–13; *Mycetocharis barbata* *, pp. 490, 578, & 588, pls. xii. figs. 14–18, & xi. figs. 23 & 24; *Cistela atra* *, pp. 490, 581, & 589, pl. xii. figs. 19–27.

An elaborate "Conspectus morphologicus" of the entire group is given, pp. 491–505, followed by a "Conspectus systematicus," pp. 505–522; and the whole work is marked by the same completeness and perspicuity that characterize its predecessors (the execution of the plates again calling for express praise).

Haag-Rutenberg, Verh. Ver. Hamb. iii. [for 1876, published in and dated 1878], pp. 97–105, gives diagnoses of new species (with names of new genera) from the Museum Godeffroy, of which the full descriptions and figures are stated as intended to be published in J. Mus. Godeffr. [in vol. xiv.].

Adesmiides.

Adesmia physosternoides, p. 87, Cape of Good Hope, *A.* (*Macropoda*) *foveicollis*, p. 88, Zanzibar, spp. nn., Haag-Rutenberg, MT. Münch. ent. Ver. ii.

Stenocara albicollis, p. 89, N'Gami, *brevicollis*, p. 90, Orlog river, S. Africa, spp. nn., *id. l. c.*

Tentyriides.

Colposcelis quadricollis, sp. n., E. Ballion, Bull. Mosc. liii. (1) p. 297, Kuldja.

Scythis gracilis, p. 298, *affinis*, p. 299, and *intermedius*, p. 300, spp. nn., *id. l. c.*, Kuldja.

Rhytidonota cecchii, p. 319, *martinii*, p. 320, spp. nn., R. Gestro, Ann. Mus. Genov. xiii., Shoa.

Eeaniosomus piceo-fuscus, sp. n., Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lxxxvii., Pisco, Peru.

Epitragides.

Himatismus quadraticollis, p. 77, and *haroldi*, p. 78, Chinchoxo, *maxil-*

losus, p. 79, River Orlog, spp. nn., Haag-Rutenberg, MT. Münch. ent. Ver. ii.

Cryptochilides.

Cryptochile inflata, sp. n., *id. l. c.* p. 82, Cape of Good Hope.
Horatoma irregularis, sp. n., *id. l. c.* p. 84, Cape of Good Hope.
Pachynotelus lineatus, sp. n., *id. l. c.* p. 85, ? Interior of S. Africa.
Epipagus luridus, sp. n., *id. l. c.* p. 86, Benguela.

Zopherides.

Zopherus sp., worn alive as a personal decoration, fastened by a light gold chain, by ladies in Central America; Ent. M. M. xv. p. 116 (quoting "The Queen," of Aug. 24, 1878). Exhibited alive in London as *Z. bremei*; Pr. E. Soc. 1878, p. liii.

Zopherus jourdani. Sallé, from Guatemala, exhibited alive at Paris, and its sluggish habits described; H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. lxxviii.

Noserus emarginatus, sp. n., G. H. Horn, Tr. Am. Ent. Soc. vii. p. 55, Texas.

Adelostomatides.

Eurychora haagi, sp. n., Harold, MB. Ak. Berl. 1878, p. 221, Zanzibar interior.

Peristeptus scutellaris, sp. n., Haag-Rutenberg, MT. Münch. ent. Ver. ii. p. 80, ? East India (probably S. Africa).

Acestus similis, sp. n., *id. l. c.* p. 81, Orlog river.

Adelostoma curtum, sp. n., *id. l. c.* p. 82, ? Central or S.E. Africa.

Scaurides.

Dolichoderus dimidiatus, sp. n., C. O. Waterhouse, Cist. Ent. ii. p. 365, Madagascar.

Blaptides.

Blaps davidis, H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 119, Central China; *B. transversim-sulcata*, p. 301, *multistriata*, p. 302, *quadricollis*, p. 304, E. Ballion, Bull. Mosc. liii. (1), Kuldja: spp. nn.

Prosodes granulosa, p. 307, *similis*, p. 309, *costipennis*, p. 312, *deplanata*, p. 314, *dubia* and *lucida*, p. 316, spp. nn., *id. l. c.*, Kuldja.

Asidides.

Microschatia morata, sp. n., G. H. Horn, Tr. Am. Ent. Soc. vii. p. 56, New Mexico.

Asida mancipata, New Mexico, and *acerba*, Utah, spp. nn., *id. l. c.* p. 56.

Nycteliides.

Cerostena crassicosta, sp. n., Fairmaire, R. Z. (3) vi. p. 269, Chili.

Pilobalia haagi [script. "*Filobalia haag*"], sp. n., *id. ibid.*, Peru.

Pimeliides.

Platyope regeli, sp. n., E. Ballion, Bull. Mosc. liii. (1) p. 318, Kuldja.

Gedeon borrei, sp. n., Haag-Rutenberg, MT. Münch. ent. Ver. ii. p. 91, Mesopotamia.

Pimelia hildebrandti, sp. n., Harold, MB. Ak. Berl. 1878, p. 221, Zanzibar.

Molyrides.

Psammodes steinheili, Haag-Rutenberg, MT. Münch. ent. Ver. ii. p. 91, Blomfontein; *P. infernalis*, *punctipennis*, *rufipes*, *glabratus*, *muata*, and *subæneus*, Harold, MT. Münch. ent. Ver. ii. p. 106, W. Central Africa: spp. nn.

Trachynotus intermedius, p. 92, and *variegatus*, p. 94, Natal, *hoffmanni*, p. 93, Cape of Good Hope, spp. nn., Haag-Rutenberg, *l. c.*

Sepidium crassicaudatum, sp. n., R. Gestro, Ann. Mus. Genov. xiii. p. 320, Somali Land.

Coniontides.

Crypticus ovalis, sp. n., Ballion, Bull. Mosc. liii. (1) p. 321, Kuldja.

Pedinides.

Platyscelis sulcata, p. 322, *ovata*, p. 324, *regeli*, p. 326, *oblonga*, p. 327, *ovalis*, p. 329, *tibialis*, p. 331, spp. nn., Ballion, *l. c.*, Kuldja.

Blapstinus fortis, *opacus*, and *estriatus*, spp. nn., Le Conte, P. Am. Phil. Soc. xvii. p. 420, Florida.

Opatrides.

Opatrum japanum, Mots., redescribed; Harold, Deutsche E. Z. 1878, p. 77.

Anomalipus asperulatus, sp. n., *id.* MT. Münch. ent. Ver. ii. p. 107, W. Central Africa.

Opatrum asperidorsum, sp. n., Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. lvi., Corsica.

Microzoum dentipes, sp. n., Ballion, *l. c.* p. 332, Kuldja and Chodshent.

Trachyscelides.

Charodes concolor, sp. n., Sharp, Ent. M. M. xv. p. 81, Otago.

Phaleria hilgendorfi, Harold, Deutsche E. Z. 1878, p. 76, Japan; *P. fimbriata* (Dej. Cat.), p. ccxlvii., Cape of Good Hope, *senegalensis*, Senegal, *phalerata*, Mozambique, *subparallela*, Peru, *angustata*, San Domingo, p. ccxlviii., *pilatei*, p. ccxlix., Yucatan, A. Chevrolat, CR. Ent. Belg. xxi.; *P. punctipes*, Le Conte, P. Am. Phil. Soc. xvii. p. 421, Florida: spp. nn.

Bolitophagides.

Bradymerus sublævicollis and *cancellatus*, spp. nn., Fairmaire, Pet. Nouv. ii. p. 286, Fiji.

Diaperides.

Platydema tuberculatum, ♂ described; *Hoplocephala bi-tuberculata* is not European, but was bred from an exotic boletus, p. 210. *Scaphisoma proximum*, Chev., = *Liodema obidense*, Bates; *S. tergo-cinctum*, Chev., = *L. kirschi*, Bates; *S. cruciatum*, Chev., is also a *Liodema*, as

are *Platydema nigro-fasciatum* and *tenuicorne*, Chev., and 4-*notatum* Cast., Br.; *Hoplocephala flavicorne*, Chev., = *P. virens*, Cast., and is a *Histeropsis*; *H. janthina*, Chev., is a *Ceropria*, p. 243. A. Chevrolat, Pet. Nouv. ii.

Ceropria. Descriptions of the known and some new species by Harold, S. E. Z. xxxix. p. 345 *et seq.* Only three joints of the tarsi of the front legs are dilated in ♂.

New genera and species :—

Histeropsis, Chevrolat, *l. c.* p. 221. For a large number of *Diaperides*, distinguished by being more or less black, smooth, punctulate, granulose, elongate, slightly convex, with nine entire striæ and a short scutellar stria to each elytron. Four divisions of species are given, with the head of the ♂ either unarmed or with long slender horns. *Platydema picicorne*, F., *P. fronticorne*, Kl., &c.; also *H. dermestoides*, Fiji, *rubromarginatus*, Sumatra, *seminitens*, Celebes, *pugnax*, Zanzibar, p. 242, and *Hoplocephala capreola*, Chev., of which the ♂ is described, p. 243. Also *Histeropsis quadrispilotus*, Singapore (? = *H. rubro-marginatus* ♂), and *hydroporoides*, Ega, p. cxlix., (*H.* ?) *calliope*, p. cl., Gilolo, *id.* CR. Ent. Belg. xxi.

Basanus (Dej. Cat.), *id.* CR. Ent. Belg. xxi. p. cli. *B. javanus*, id. *ibid.*, Java.

Tetragonomenes [*-mecus*, from the author's own derivation], *id. l. c.* p. clii. Near *Ceropria*. *T. semiviridis*, id. *ibid.*, Moluccas.

Ennebœus, C. O. Waterhouse, Tr. E. Soc. 1878, p. 228. Allied to *Platydema*, but with the antennæ more like those of *Heterophyllus*, before which it is to be placed. *E. ovalis*, p. 229, Tasmania.

Hoplocephala cavifrons, p. 209, Brazil, *ephippiata*, Colombia, *H.* (?) *vitula*, S. Brazil, Chevrolat, Pet. Nouv. ii. p. 214; *H. oblonga*, Brazil, and *lutea*, Venezuela, *id.* CR. Ent. Belg. xxi. p. xcvii.

Platydema sex-maculatum, *sex-notatum*, *fasciato-colle*, and *undatum*, p. 194, *P.* (?) *dimidiatum*, ibid., *versicolor*, and *elegans*, p. 195, Mexico, *apicicorne*, *ornatum* (renamed *erotyloides*, p. 243), *marginale*, Brazil, *rubropictum*, Cayenne, *illegitimum*, locality unknown, and *melanocephalum*, Madagascar, p. 209, *setipes*, Cape of Good Hope, *tarsale*, Ceylon, *fraternum*, St. Domingo, p. 210, *piciventre*, p. 214, Colombia, *bi-impressum*, ibid., and *nigro-fasciatum*, p. 215, Mexico, *unicolor*, Ceylon, *fuscicorne* and *reflexum*, Malacca, and *P.* (?) *filicorne*, Jamaica, *bi-fasciatum*, Dorey, p. 222, *convexifrons*, p. 243, Zanzibar, Chevrolat, Pet. Nouv. ii.; *P. pygionatum*, *flavipalpe*, and *erythropum*, p. xcviii., *rufipes*, *obliquemacula*, *pallidicorne*, and *submaculatum* (var. *anguliferum*, p. c.), p. xcix., *hamatiferum* and *ramulosum*, p. c., Brazil, *minarum*, p. cxlvii., Minas Geraes, *zona*, *tibiale*, *octo-punctatum*, *nigrifrons*, and *multimaculatum*, p. cxlviii., and 16-*maculatum*, p. cxlix., Amazon region, 15-*maculatum*, p. cxlix., Nicaragua, *id.* CR. Ent. Belg. xxi.; *P. crenatum*, Le Conte, P. Am. Phil. Soc. xvii. p. 422, Florida; *P. musiva* [*-cum*], Harold, Deutsche E. Z. 1878, p. 78, Nagasaki.

Liodema inscriptum, Chevrolat, Pet. Nouv. ii. p. 222, Mexico.

Cosmonota corallipes, p. xcvii., and *C.* (?) *melanocera*, p. xcviii., S. Brazil, *id.* CR. Ent. Belg. xxi.

Ceropria tristis, p. 349, Timor, *sulcifrons*, p. 353, Japan, *intermedia*, New Guinea, *opulenta*, Sumatra, p. 354, *humeralis*, p. 355, Amboina, Harold, S. E. Z. xxxix.; *C. bifasciata*, Bombay, *metallica*, New Guinea, p. cl., *axillaris* and *insignis*, ibid., and *C.* ? *iris*, p. cli., Moluccas, Chevrolat, *l. c.*

Ischnodactylus batesi, id. Bull. Soc. Ent. Fr. (5) viii. p. lxxxviii., Sumatra.

Ecoplus quadricornis, id. *l. c.* p. xxxviii., Batum (genus hitherto American only).

Ulomides.

Lyphia tetraphylla bred from a gall of *Cynips kollari*; F. Rudow, Z. ges. Naturw. (3) iii. p. 242.

Corticeus hopffgarteni, Reitt., ? = *C. versipellis*, Baudi; Reitter, Verh. Ver. Brünn, xvi. p. 96.

Eutochia amaroides, sp. n., R. Gestro, Ann. Mus. Genov. xiii. p. 321, Shoa.

Uloma multicornis, sp. n., Fairmaire, Pet. Nouv. ii. p. 279, Fiji.

Peltoides politus, Old Calabar, *reflexus*, Isabal, *gyrinoides*, S. Brazil, and *elongatus*, Venezuela, spp. nn., Chevrolat, Pet. Nouv. ii. p. 237.

Hypophlœus glaber, Florida, and *piliger*, Florida, Georgia, and S. Carolina, p. 422, *substriatus*, Oregon, and *opaculus*, S. California, p. 423, *tenuis*, p. 424, Massachusetts, spp. nn., Le Conte, P. Am. Phil. Soc. xvii.

Helœides.

Adelodemus, g. n. (name only), Haag-Rutenberg, Verh. Ver. Hamb. iii. p. 100, for *A. asperulus*, sp. n., *ibid.*, Rockhampton [= *Cestrinus squalidus*, McL.; *id.* J. Mus. Godeffr. xiv. pl. vi. fig 7].

Pter[*oh*]*elœus ovulum*, sp. n., Haag-Rutenberg, Verh. Ver. Hamb. iii. p. 97, Gayndah.

Saragus luridus, ibid., N. S. Wales and Queensland, *reticulatus*, p. 98, Endeavour River, spp. nn., *id. l. c.*

Nyctozoilus domeli, sp. n., *id. l. c.* p. 98, Peak Downs.

Saragodinus batesi, sp. n., *id. ibid.*, Pt. Denison.

Hypocilibe impunctata, sp. n., *id. ibid.*, Peak Downs.

Onosterrhus vage-punctatus and *batesi*, p. 99, *lævipennis*, p. 100, Australia, spp. nn., *id. l. c.*

Cilibe huttoni, sp. n., Sharp, Ent. M. M. xv. p. 51, Otago.

Tenebrionides.

Nyctobates davidis, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 119, Central China.

Menephilus corulescens, sp. n., Haag-Rutenberg, *l. c.* p. 100, Cape York and N. S. Wales.

Heterotarsides.

Dignamptus, g. n., Le Conte, P. Am. Phil. Soc. xvii. p. 421. Facies of *Stenochia*. *D. stenochinus* and *langurinus*, spp. nn., *ibid.*, Florida.

Pycnocerides.

Odontopus regalis, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 107, W. Central Africa.

Pycnocerus exaratus, sp. n., *id. ibid.*, W. Central Africa.

Cyphaleides.

Laonicus, g. n. (name only), Haag-Rutenberg, *l. c.* p. 100; for *L. pilosus*, ibid., no locality, and *dæmeli*, p. 101, Cape York, spp. nn.

Trisilus, g. n. (name only), *id. l. c.* p. 101; for *T. femoralis*, sp. n., ibid., Gayndah.

Platyphanes (?) *godeffroyi*, sp. n., *id. l. c.* p. 100, Gayndah.

Laonicus dæmeli, sp. n., *id. l. c.* p. 101, Cape York.

Cyphaleus schmeltzi, sp. n., *id. ibid.*, Rockhampton.

Prophanes tricolor, sp. n., *id. ibid.*, Gayndah.

Cnodalonides.

Ischyomius, g. n., Chevrolat, MT. Münch. ent. Ver. ii. p. 98. Near *Acropteron*. *I. singularis*, sp. n., *ibid.*, Colombia.

Cyrtosoma denticolle, Guatemala, *melanarium* (Dej. Cat.), *cupripenne*, and *bogotanum*, Colombia, *cruentatum* and *columbinum* (Dej. Cat.), Cayenne, p. 273, *cupripenne* [again!; altered to *picipenne*, p. 281], Brazil, *rufipes*, Cayenne, p. 274, spp. nn., *id.* Pet. Nouv. ii.

Camaria violaceipennis, sp. n., C. O. Waterhouse, Cist. Ent. ii. p. 365 Madagascar.

Titæna varicolor, sp. n., Haag-Rutenberg, *l. c.* p. 102, Brisbane.

Helopides.

Thesilea, g. n. (name only), Haag-Rutenberg, *l. c.* p. 103; for *T. impressipennis* and *versicolor*, spp. nn., *ibid.*, Ovalau, and *Neomida viridi-pennis*, Montr., and *Olisthæna cuprina*, Fairm.

Menandris, g. n. (name only: *Misolampides*), id. *ibid.*, for *M. ænea*, sp. n., *ibid.*, Ovalau.

Asopis, g. n. (name only: *Misolampides*), id. *l. c.* p. 104; for *A. suavis*, sp. n., *ibid.*, Ovalau.

Læna lederi, p. 229, *quadricollis*, p. 232, *angustus*, p. 233, *piligera*, p. 235, *baudii*, p. 239, Caucasus, *hopffgarteni* (also indicated in Deutsche E. Z. 1878, p. 59), p. 230, Banat, *græca*, p. 231, *kraatzi*, p. 236, *weisii*, p. 238, Greece, *longicollis*, p. 237, and *deplanata*, p. 240, Smyrna, spp. nn., J. Weise, Verh. Ver. Brünn. xvi.

Cardiothorax connexus, Cape York, and *simulans*, Rockhampton, spp. nn., Haag-Rutenberg, *l. c.* p. 102.

Adelium (*Sirotrana*) *integricolle*, sp. n., *id. ibid.*, Gayndah.

Dædrosis pygmæa, sp. n., *id. l. c.* p. 103, Sidney.

Helops mutabilis, p. 304, *propinquus*, p. 305, C. O. Waterhouse, Tr. E. Soc. 1878, Jamaica; *H. viridimicans*, Florida, and *difficilis*, Colorado, G. H. Horn, Tr. Am. Ent. Soc. vii. p. 57: spp. nn.

Apolites angustus, sp. n., "M.," Nouv. et faits, (2) No. 19, p. 75, Asia Minor.

Helopinides.

Micrantereus rugulosus, sp. n., R. Gestro, Ann. Mus. Genov. xiii. p. 321, Shoa.

Megacanthides.

Hoplonyx uniformis, sp. n., Waterhouse, Tr. E. Soc. 1878, p. 306, Jamaica.

Amarygmides.

Eupezus brevicollis, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 107, W. Central Africa.

Amarygmus triangularis, Cape York, and *samoensis*, Samoa, spp. nn., Haag-Rutenberg, Verh. Ver. Hamb. iii. p. 104.

Plesiophthalmus lævicollis, Harold, Deutsche E. Z. 1878, p. 79, Japan; *P. arciferens*, p. 120, and *davidis*, p. 121, Fairmaire, Ann. Soc. Ent. Fr. (5) viii., Central China: spp. nn.

Strongyliides.

Strongylium anthrax, E. A. Schwarz, p. 369, and *S. simpli[ci]colle*, Le Conte, p. 424, P. Am. Phil. Soc. xvii., Florida; *S. poggei*, *muata*, *internum* and *luridipenne*, Harold, MT. Münch. ent. Ver. ii. p. 108, W. Central Africa: spp. nn.

Prœugena abyssinica, R. Gestro, Ann. Mus. Genov. xiii. p. 321, Shoa, &c.; *P. procera*, Harold, *l. c.* p. 107, W. Central Africa: spp. nn.

Aspidosternum antiquum and *sumptuosum*, spp. nn., Harold, *l. c.* p. 107, W. Central Africa.

CISTELIDÆ.

Homophlus dilatatus, Fald., is a good species; *H. kuesteri*, Kirsch, = *ochraceipennis*, Fald.; *H. volgensis*, Kirsch, = *pilicollis*, Mén.; T. Kirsch, Deutsche E. Z. 1878, p. 240.

Ismarus, g. n. (name only), Haag-Rutenberg, Verh. Ver. Hamb. iii. p. 104; for *I. godeffroyi*, sp. n., *ibid.*, Peak Downs.

Anaxo (?) *rufo-janthinus*, sp. n., Fairmaire, Pet. Nouv. ii. p. 279, Fiji.

Hymenorus dorsalis, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 370, Florida.

Homotrysis (?) *debilicornis* and *curticornis*, spp. nn., Haag, *l. c.* p. 105, Peak Downs.

Allecula costata, id. *ibid.*, Gayndah; *A. æneipennis*, Harold, Deutsche E. Z. 1878, p. 80, Japan: spp. nn.

Pseudocistela haagi, sp. n., *id. ibid.*, Japan.

Cistela maculicornis, p. 121, *ustiventris*, p. 122, *davidis*, p. 123, spp. nn., Fairmaire, Ann. Soc. Ent. Fr. (5) viii., Central China.

Hymenalia beckeri, sp. n., Kiesenwetter, Verh. Ver. Brünn, xvi. p. 245, pl. iv. fig. 39, Aksu.

Isomira valida, Schwarz, *l. c.* p. 370, Florida; *I. granifera*, Kiesenwetter, *l. c.* p. 245, Borshom: spp. nn.

Mycetochares gracilis, p. 615, *marginata*, p. 618, Lake Superior, *pubi-*

pennis, California, and *laticollis*, Pennsylvania, p. 617, *analis*, *lugubris*, and *longula*, p. 618, Detroit, spp. nn., Le Conte, P. Am. Phil. Soc. xvii.

Homophlus curtulus, p. 246, and *tumidipes*, p. 247, spp. nn., T. Kirsch, Verh. Ver. Brünn, xvi., Caucasus.

Monommatidæ.

J. Thomson, "Typi Monommidarum Musæi Thomsoniani" (pp. 39–42 of his "Typi Cetonidarum, &c.," *suprà*), mentions the types in his collection, describing as new :—

Monomma gnamyum [!], Lake N'Gami, *raffrayi*, Java, and *australe*, Australia, p. 40.

Hyporrhagus opacus and *laeviusculus*, p. 41, Brazil.

Nilionidæ.

The same author, "Typi Nilionidarum Musæi Thomsoniani" (pp. 43 & 44 of his "Typi Cetonidarum," *suprà*), refers to the types in his own collection, and describes as new :—

Hades raffrayi and *marginellus*, p. 43, Java.

The genus is not rightly placed here, and is closely allied to *Crypsis*, Wat., in the *Cyphaleides*; C. O. Waterhouse, Ann. N. H. (5) i. p. 494.

Melandryidæ.

Canifa pallipennis, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 619, Lake Superior.

Orchesia transsylvanica, p. 59, Transsylvanian Alps, and *carpathica*, p. 60, Carpathians, Reitter, Deutsche E. Z. 1878, spp. nn. (with table of the unicolorous species).

Hallomenus serricornis, sp. n., Le Conte, *l. c.* p. 619, Lake Superior.

Dircæa prona, p. 426, Florida, *fusca*, p. 619, Lake Superior, Virginia, N. Carolina, spp. nn., *id. l. c.*

F. Baudi di Selve, Deutsche E. Z. 1878, pp. 1–20, 337–376, continues his examination (Pars quinta) of the European species of *Heteromera* in Dejean's Catalogue, on the same scheme as before [Zool. Rec. xiv. *Ins.* p. 64], discussing the *Pedilidæ*, *Anthicidæ*, *Pyrochroidæ*, *Mordellidæ*, *Rhipidophoridæ*, and *Meloidæ*. As before, species not in this Catalogue are also discussed and described. This portion is also practically repeated (without the first three groups) by the same author, as before, in Atti Acc. Tor. xiii. pp. 765–866, 1027–1183, the new species being (as before) unnecessarily published in duplicate.

The species of *Pedilidæ*, *Cistelidæ*, and *Lagriidæ* found by the late C. van Volxem in Portugal and Morocco enumerated; S. A. de Marseul, CR. Ent. Belg. xxi. p. xii.

Pedilidæ.

Xylophilus minor, Baudi, Deutsche E. Z. 1878, p. 1, note, Piedmont;

X. quercicola and *ptinoides*, E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 371, Florida; *X. nubifer*, Le Conte, *tom. cit.* p. 425, Florida; spp. nn.

Anthicidæ.

Anthicus minutus, Laf., var. *blandulus*; Baudi, Deutsche E. Z. 1878, p. 12, Sicily and Spain.

Formicomus rubidus, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 249, Elisabetthal.

Tomoderus ventralis, sp. n., "M.," Nouv. et faits, (2) No. 13, p. 50, Algeria.

Monocerus macularis, sp. n., Baudi, *l. c.* p. 3, note, Jaffa.

Mecynotarsus mellyi, sp. n., "M." *l. c.*, Egypt.

Anthicus volxemi, sp. n., S. A. de Marseul, CR. Ent. Belg. xxi. p. xliii., Portugal; *A. honestus* ("Schm."), p. 50, Egypt, *moka* and *capilliger*, Jeddah, *violaris*, Oran, p. 51, *cinctutus*, p. 54, and *erythroderus*, p. 55, Algeria, *digitalis* and *bis-pilifasciatus*, p. 55, Spain, "M.", l. c.; *A. callimus*, p. 13, South Spain, *baudueri*, p. 14, *dolichocephalus*, p. 15, *pumilus*, p. 16, *oberthueri*, p. 17, *taeniatus*, p. 18, Algeria, Baudi, *l. c.*: spp. nn.

Pyrochroidæ.

Pyrochroa coccinea rejected by poultry; J. W. Slater, Ent. xi. p. 191.

Hemidendroides, Ferr., should not be sunk as a sub-genus; it differs from *Dendroides* by its distant eyes and the cordate bilobed last joint of its tarsi, of which the claws are simple. *Pogonocerus*, Fisch., is also generically distinct, having extremely small second and third joints to the antennæ, with extremely long filiform prolongations to joints four to eleven. L. Reiche, Bull. Soc. Ent. Fr. (5) viii. p. lxxiii.

Pyrochroa davidis, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 121, Central China.

Hemidendroides peyroni, sp. n., Reiche, *l. c.* p. lxxiii., Lebanon.

Criolis mulsanti, sp. n., *id. ibid.*, Caramania.

Mordellidæ.

Mordella aterrima, McL., is probably a *Tomoxia*; *M. mellissiana*, Woll., is a *Mordellistena*; *M. abdominalis*, Blessig, and *octo-maculata*, McL., = *leucosticta*, Germ.; C. O. Waterhouse, Tr. E. Soc. 1878, pp. 230 & 231.

Anaspis and *Silaria*. On the Silesian species; J. Gerhardt, Z. e. Ver. Schles (n.f.) vi. [1877], p. 28 *et seq.*

Stenalia brunneipennis, Muls., var. n. *gracilicornis*, F. Baudi, Deutsche E. Z. 1878, p. 348, and Atti Acc. Tor. xiii. p. 815, Cyprus.

Tomoxia flavicans, sp. n., Waterhouse, *l. c.* p. 229, Clarence River, E. Australia.

Glipa hieroglyphica, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 372, Florida.

Mordella fascifera and *angulata*, p. 427, Florida, *jovialis*, Texas, and

obliqua (? = *lunulata*, Heymuth), Maryland & Michigan, p. 428, J. L. Le Conte, P. Am. Phil. Soc. xvii. (elytra figured); *M. multiguttata*, p. 230, Moreton Bay, *communis*, p. 231, N.W. Coast of Australia and Tasmania, *elegans*, ibid., *trivialis*, p. 232, *bella*, p. 233, *obliqua*, p. 236, S. Australia, *ornata*, p. 233, N.W. Coast of Australia, *ruficollis*, p. 234, Tasmania, *limbata*, Sydney, and *humeralis*, Australia, p. 235, Waterhouse, *l. c.*: spp. nn.

Anaspis cypria, p. 339, Cyprus, *A.* (*Silaria*) *versicolor*, p. 341, Central Italy, *truquii*, p. 344, Cyprus, spp. nn., Baudi, Deutsche E. Z. 1878 (also Atti Acc. Tor. xiii. pp. 785, 799, & 796).

Rhipidophoridæ.

Rhipistena, g. n., Sharp, Ent. M. M. xv. p. 81. *Evaniocerides*, but connecting that group with *Mordellistena*. *R. lugubris*, sp. n., *ibid.*, New Zealand.

Pelecotomoides fulvo-sericans, sp. n., Fairmaire, Pet. Nouv. ii. p. 279, Fiji.

Emenadia gerstæckeri, sp. n., Harold, Deutsche E. Z. 1878, p. 82, Japan.

Myodites davidis, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 124, Central China.

Cantharidæ.

Mexican species described by E. Dugès, Naturaleza, iv. p. 57 *et seq.*, pl. ii.

Meloe. Synoptical table of Old World species; Nouv. et faits, (2) No. 20, pp. 78–80. Baudi, Deutsche E. Z. 1878, p. 356.

Meloe maialis. Deposit of ova and the newly-hatched larvæ observed; they resemble those of *Cantharis* more than any known *Meloe*; probably parasitic on *Anthophora personata* (Aragon); Gorriz, Bull. Soc. Ent. Fr. (5) viii. p. cxxxviii.

C. V. Riley, P. Am. Ass. St. Louis, 1878, Entomological Papers, pp. 18 & 19, gives an abstract of his researches into the life-history of the blister-beetles, and the structure and development of *Hornia* [Zool. Rec. xiv. *Ins.* p. 68], which he has made out since describing that genus. It is parasitic on *Anthophora abrupta*, Say, and its triungulin is very similar to that of *Sitaris*.

Riley's paper in Tr. Ac. St. Louis practically reproduced in Am. Nat. xii. pp. 213 & 282; also in Ent. M. M. xiv. pp. 169–175.

Lytta vesicatoria. Triungulins bred to pseudo-nymph stage; J. Lichtenstein, Ent. M. M. xv. p. 116. Pseudo-nymph obtained after four larval forms; *id.* Bull. Soc. Ent. Fr. (5) viii. p. lxxxix. An invasion of olive trees in Sicily by it; J. P. Marrot, Feuil. Nat. ix. pp. 12 & 23.

Sitaris apicalis ?, larvæ on *Colletes fodiens*: Lichtenstein, Nouv. et faits, (2) No. 21, p. 84.

Cerocoma septem-punctata, sp. n., F. Baudi, Deutsche E. Z. 1878, p. 361, & Atti Ac. Tor. xiii. p. 1059, Biskra.

Mylabris brevicollis, Baudi, *l. c.* p. 373 (& Atti, &c., p. 1111), Oran;

M. marseuli, p. 336, and *unifasciata*, p. 343, Kuldja, *chodshentica*, p. 337, Chodshent, Kuldja, &c., *sairamensis*, p. 342, Sairam, E. Ballion, Bull. Mosc. liii. (1); *M.* [as *Bruchus*] *muata* and *internus*, Harold, MT. Münch. ent. Ver. ii. p. 108, West Central Africa: spp. nn.

Macrobasis gissleri, sp. n., G. H. Horn, Tr. Am. Ent. Soc. vii. p. 58, New Mexico.

Cantharis flavo-vittata, p. 344, and *flavicentris*, p. 346, Ballion, *l. c.*, Kuldja; *C. protarsalis*, Dugès, *l. c.* p. 62, pl. ii. figs. 7 & 8, Mexico; *C. albo-vittata*, R. Gestro, Ann. Mus. Genov. xiii. p. 322, Shoa: spp. nn.

Lytta atro-cærulea and *episcopalis*, spp. nn., Harold, *l. c.* p. 108, W. Central Africa.

Eletica colorata, sp. n., *id. ibid.*, W. Central Africa.

Calospasta mœsta and *falleri*, spp. nn., Horn, *l. c.* p. 59, California.

Œdemeridæ.

Œdemera subulata, var. n. *vittata*, J. Frivaldszky, Term. Közlem. xiii. p. 235, Hungary.

Ananca japonica, Har., = *Sessinia cinereipennis*, Mots.; Harold, Deutsche E. Z. 1878, p. 82.

Xanthochroa hilleri, sp. n., *id. l. c.* p. 81, Japan.

Copidita læta, p. 306, *elegans*, p. 307, St. Domingo, *lateralis*, p. 307, St. Domingo and Jamaica, *tenella*, ibid., and *rubricollis*, p. 309, St. Thomas, *simplex*, St. Bartholomew, and *lineata*, Jamaica, spp. nn., C. O. Waterhouse, Tr. E. Soc. 1878.

Ananca lagenicollis and *incrassata*, Fairmaire, Pet. Nouv. ii. p. 286, Fiji.

Chrysanthia planiceps, sp. n., Kiesenwetter, Verh. Ver. Brünn, xvi. p. 256, Borshom.

Chitona sieversi, sp. n., *id. l. c.* p. 257, Armenia.

Curculionidæ.

Tournier, H. Curculionides (Coléoptères) récoltés au Portugal, en Espagne et au Maroc, par feu C. Van Volxem. CR. Ent. Belg. xx. pp. lxxii.–lxxvi.

One new species is described (*Brachyderides*).

Roelofs, CR. Ent. Belg. xx. pp. lxxvii.–lxxxii., analyses and discusses Le Conte and Horn's "Rhynchophora of America North of Mexico."

P. Gandolphe, [extr. Bull. Ac. Hipp.] Nouv. et faits, (2) No. 19, p. 73, enumerates all the *Curculionidæ* found during his residence in Algeria, with localities, &c. 290 species are given, whereof 10 are new, and described, one only being named.

["Aglycyderidæ."]

D. Sharp, Tr. E. Soc. 1878, p. 21, retracts his former suggestion that *Aglycyderes* might be an aberrant member of the *Colydiidæ*, and is inclined to agree with Wollaston's opinion that a separate family should be formed

for its reception. He now thinks it should be considered as an entirely isolated group at the head of the *Rhynchophora*, as defined by Le Conte, widely distinguished from the *Haplogastra* by the minute imbedded and globose front coxæ, more rudimentary trophi, and sub-tetramerous tarsi. A proximity to the *Rhinomacerida* is suggested by the ♂ of the following new genus, associated with *Aglycyderes* :—

Prote[*r*] *rhinus*, pp. 16 & 20, differing chiefly in the narrow head, which is distinctly rostrate in the male, and the largely developed lobes of the second tarsal joint. For *P. vestitus*, p. 16, *blackburni* and *simplex*, p. 17, *obscurus* and *oscillans*, p. 18, *debilis*, p. 19, spp. nn., Oahu.

Brachyderides.

Sciaphilus alternans and *fasciolatus*, Fairm., referred to *Elytrodon*; *Sitones audax*, All., = *ovipennis*, Hoch. (Hochhuth's species being ignored by Allard) ; L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. clxx.

New genera and species :—

Eusomostrophus, H. Tournier, CR. Ent. Relg. xxi. p. xviii. Head of *Eusomus*, with scrobes of *Foucartia*, posterior tibiæ as in *Neliocarus*: to be placed very near *Eusomus*. *E. viridis*, id. *ibid.*, Turkey.

Pleurodirus, A. Chevrolat, Pet. Nouv. ii. p. 281. Near *Metallites*, with rounded shoulders. Suggested for *Sciaphilus* (?) *lineola*, id. *ibid.*, Spain, and *Metallites ovipennis*, C. Bris.

Ischionoplus, id. Bull. Soc. Ent. Fr. (5) viii. p. ix. Near *Lachnopus*. *I. viridi-guttatus*, St. Domingo, and *niveo-guttatus*, Cuba, *id. l. c.* p. x.

Rhinospathe, id. *l. c.* p. xix. Near *Epicærus*, with spatuliform, truncate, and margined rostrum, which is three-keeled on the upper side. For *Hypsonotus albo-marginatus*, Mots.

Leptoscapus, id. *l. c.* p. xlvii. For *Siderodactylus denticollis*, J. Thoms., noted by Lacordaire as the type of a new genus from the length of its antennæ, especially the scape.

Temnoscapus, id. *l. c.* p. lv. Allied to *Megalostylus*; scape clavate and emarginate beneath. *T. fissirostris*, ibid., Bogota.

Decophthalmus, id. *l. c.* p. lxv. Very near *Stigmotrachelus*; eyes lateral, round, projecting, with their base surrounded by a corneous substance. *D. albiventris*, p. lxvi., Old Calabar.

Catapionus argentatus, p. 348, and *chrysochloris*, p. 349, E. Ballion, Bull. Mosc. liii. (1), Kuldja.

Eusomus chloris, Chevrolat, Pet. Nouv. ii. p. 281, Constantine.

Polydrosus vanvolxemi, Tournier, *l. c.* p. lxxiii., Portugal ; *P.* (*Eustolus*) *rubrivittis*, Chevrolat, *l. c.* p. 245, Algeria.

Apotomoderes albicans (Lac.), Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. liv. California.

Tanymecus bonnairii, Oran, *insipidus* (Sch.), Syria, *id.* Pet. Nouv. ii., p. 245.

Polyclæis curvispinis, N'Gami, and *mellii*, Africa, *id.* CR. Ent. Belg. xxi. p. xli.

Siderodactylus curtus, p. xlv., and *trisulcatus*, p. xlvi., *albilatera* [*-ralis*],

and *puberulus* (queried as forming only one species), N'Gami, p. xlvi., *id.* Bull. Soc. Ent Fr. (5) viii.

Stigmotrachelus alternans and *humeralis*, C. O. Waterhouse, Cist. Ent. ii. p. 366, Madagascar.

Megalostylus villosus, p. liv., *splendidus*, p. lv., *farinosus*, p. lxvi, Chevrolat, *l. c.*, Mexico.

Prepodes amabilis, Waterhouse, Tr. E. Soc. 1878, p. 309 (with notes on varr. of *P. vittatus*, one dubiously described), Jamaica.

Psalidium dshungaricum, p. 351, *tomentosum*, p. 352, *squamulosum*, p. 353, Ballion, *l. c.*, Kuldja.

Otiorrhynchides.

Otiorrhynchus ligustici. On its habits; Poulain, Bull. Soc. Reims, 1878, p. 37. Injurious to lucern in Magdeburg, &c.; Taschenberg, Z. ges. Naturw. (3) iii. p. 364.

Otiorrhynchus aterrimus and *alpicola*, Boh., are not specifically separable; L. Miller, Verh. z.-b. Wien, xxviii. p. 465.

Troglorrhynchus baldensis, Czwalina; description of ♀ by author, Deutsche E. Z. 1878, p. 206.

Cyrtolepus, Desbr., = *Cyclopterus*, Seidl., and *C. lethierrii*, Desbr., = (*Holcorrhinus*) *seidlitzi*, Tourn.; L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. clxx.

Phyllobius ruficornis, Redt., ♂, *in cop.* with *Polydrosus micans*, F., ♀; C. Cornelius, JB. Ver. Elberf. 1878, p. 48.

Otiorrhynchus arrogans, J. Frivaldszky, Term. füzetek, ii. p. 111, Fünfkirchen; *O. cantabricus*, V. L. Seoane, "Notas para la Fauna Galleca" (Ferrol: 1878), Gallicia; *O. lagenaria* [sic], p. 75, *clavicrus*, p. 76, "M.," Nouv. et faits, (2) No. 19, Trebizond; *O. manderstjernæ*, Ballion, Bull. Mosc. liii. (1) p. 354, Kuldja: spp. nn.

Troglorrhynchus mayeti, sp. n., Fairmaire, Bull. Soc. Ent. Fr. (5) viii. p. cxxxii., Cave at Arles-sur-Tech.

Peritelus albidus, p. 355, *sulcirostris*, p. 356, spp. nn., Ballion, *l. c.*, Kuldja.

Mylloceras trapezicollis, sp. n., *id. l. c.* p. 357, Kuldja.

Leptopides.

Polyteles guerini, Sch., is from Bolivia; var. from Buenos Ayres described. Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. xx.

Polyteles orbignyi [? *dorbignii*], sp. n., *id. ibid.*, Patagonia (? = *P. cœlestinus*, Perty, local var.).

Rhyparasomatides.

Dichotrachelus revised and considered (with Seidlitz) to be best placed in the *Rhytidorrhinides* (*Byrsopides*); G. Stierlin, MT. schw. ent. Ges. v. pp. 392–425.

Dichotrachelus freyi, p. 400, *bischoffi*, p. 402, and *tenuirostris*, p. 404, Coll della Nuova, Piedmont, *bernhardinus*, p. 405, Gt. St. Bernard, *pedemontanus*, p. 407, Mt. Cenis, *valesiacus*, p. 416, Valais, *alpestris*, p. 419, Jura, *tournieri*, p 423, Geneva, spp. nn., *id. l. c.*

Molytides.

Barynotus caucasicus, Desbr., is a *Meleus*, very near the very variable *M. fallax*, Fald.; L. Bedel, Bull. Soc. Ent. Fr. (5) viii. p. clxx.

Tanyrrhynchides.

Ita, g. n., H. Tournier, CR. Ent. Belg. xxi. p. xviii. Facies of *Auletes*. *I. crassirostris*, Sicily, and *gracilis*, Blidah, spp. nn., *id. l. c.* p. xix.

Hyperides.

Liophlœus maroccanus, Fairm., provisionally placed in *Alophus*; Bedel, *l. c.* p. clxx.

Alophus subcostatus, p. 358, *sulcirostris*, p. 360, *cinereus*, p. 361, spp. nn., E. Ballion, Bull. Mosc. liii. (1), Kuldja.

Cleonides.

Larinus sanctæ-balmæ, Ab., = *brevis*, Hbst.; *L. albo-marginatus*, Cap., = *albo-cinctus*, Chev.; Bedel, *l. c.* p. clxx.

Lixus iridis, Ol., var. n. *sibiricus*, Ballion, Bull. Mosc. liii. (1) p. 367, Kuldja.

Stephanocleonus nasutus, sp. n., *id. l. c.* p. 362, Kuldja.

Bothynoderes crispicollis, sp. n., *id. l. c.* p. 364, Kuldja.

Rhinocyllus carinirostris, sp. n., *id. l. c.* p. 366, Kuldja.

Hylobiides.

Hylobius abietis. Japanese specimens possibly represent a definite form; Deutsche E. Z. 1878, p. 83.

Curculio japonicus, p. 83, *rœlofsi*, p. 84, spp. nn., *id. l. c.*, Japan.

Aclees davidis, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 125, Central China.

Orthorrhinus grano-sparsus, sp. n., *id.* Pet. Nouv. ii. p. 286, Fiji.

Erirrhinides.

Smicronyx cuscutæ, sp. n., C. Brisout, Bull. Soc. Ent. Fr. (5) viii. p. lxiv., Vésinet, near Paris.

Oxycorynides.

Rhopalotria, g. n., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. xcvii. Differs from *Oxycorynus* in its slender, cylindrical, arched rostrum, and its large, elongate, 3-jointed club. *R. dimidiata*, sp. n., *ibid.*, Cuba.

Apionides.

Everts, E. Bidrage tot de Kennis der Apioniden. Tijdschr. Ent. xxii. pp. 133–185, pl. v.

Descriptions of 87 Netherlands species, with general introduction, bibliographical references, table, wood-cuts of limbs, and figures of parts useful for diagnosis.

Apion rœlofsi, p. 58, fig. *a*, Valkenburg, Netherland's Limburg, *ragusæ*, ibid., fig. *b*, and *viridi-cæruleum*, p. 59, fig. *c*, Palermo, *algiricum*, p. 59, fig. *d*, Algeria, *carbonarium*, p. 60, fig. *e*, Geneva, Everts, *l. c.* pl. v.: spp. nn.

Attelabides.

Apoderus tuberculatus, E. v. Harold, Deutsche E. Z. 1878, p. 85, Japan ; *A. nigro-flavus* and *melanostictus*, L. Fairmaire, Ann. Ent. Soc. Fr. (5) viii. p. 129, Central China : spp. nn.

Attelabus rubripennis, Chevrolat, CR. Ent. Belg. xxi. p. xxxi., Japan ; *A. hypomelas*, Fairmaire, *l. c.* p. 130, Central China : spp. nn.

Rhinomacerides.

Rhynchites davidis, sp. n., Fairmaire, *l. c.* p. 130, Central China.

Otidocephalides.

Otidocephalus ruficollis, Sta. Catharina, and *seniculus*, Cordova, Mexico, spp. nn., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. ciii.

Magdalinides.

Magdalinus violaceus, Gyl., very injurious to *Abies excelsa* at Remiremont ; Puton, Bull. Soc. Ent. Fr. (5) viii. p. clxix.

Magdalis olyra. A new species of *Calyptus* parasitic on it in Massachusetts ; E. T. Cresson, Psyche, ii. p. 189.

Magdalis alutacea, sp. n., Le Conte, Bull. U. S. Geol. Surv. iv. p. 463, Colorado and Lake Superior.

Balaninides.

Balaninus tessellatus, Fourcr., in quantity on the stone parapet of the jetty at St. Malo, in August ; H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. xxi.

Balaninus chinensis, p. xxxi., *leucaspis*, *interruptus*, and *scutellaris*, p. xxxii., Chevrolat, CR. Ent. Belg. xxi., China ; *B. hilgendorfi*, Harold, Deutsche E. Z. 1878, p. 86, Tokio ; *B. davidis*, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 126, Central China : spp. nn.

Anthonomides.

Atractomerus, (Dej. Cat.) Duponchel & Chevrolat, characterized in D'Orbigny's 'Dictionnaire,' ii. p. 312, with species (*nigro-calcaratus*) from Cayenne, in addition to *A. dromedarius*, has never been cited by any author [it is given in Agassiz's 'Nomenclator'] ; Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. xxxi.

Orchestes parvicollis, Lec., = *niger* ; G. H. Horn, P. Am. Phil. Soc. xvii. p. 621.

Orchestes quercûs. Fliche, Bull. Soc. Nancy (2) iv. pp. 19 & 44–46, describes its ravages in the forests of the Jura, causing the appearance of severe frost. The insect never seems to occur beyond an elevation of 500 metres, and almost exclusively attacks *Quercus pedunculata*, not touching *Q. robur*.

Omogonus, g. n., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. xxix. Near *Lonchophorus*, with very sharp humeral angles to the elytra. *O. gibbus*, sp. n., p. xxx., Cayenne.

Rhinolius, g. n., *id. l. c.* p. xxx. Near *Omogonus*, but of oblong convex build, and with unspined femora. *R. nigrirostris*, sp. n., *ibid.*, Brazil.

Orchestes canus, Michigan, Colorado, and *minutus*, California, spp. nn., Horn, *l. c.* p. 620.

Tychiides.

Encalus, Lec., = *Proctorus*, Lec., ♀ [Zool. Rec. xiii. *Ins.* p. 91], p. 620; *Alyca*, Lec., = *Elleschus*, and *E. bipunctatus* occurs at Lake Superior, *Acalyptus carpini* being also found in Michigan and Massachusetts: Le Conte, P. Am. Phil. Soc. xvii.

Prolobodontus [generic name not previously recorded] *ahenus*, Desbr., 1875, = *Jekelia ephippiata*, Fairm. (as *Tychius*); *Sibynia perrisi*, Tourn., = *sub-elliptica*, Desbr.; L. Bedel (quoting Puton), Bull. Soc. Ent. Fr. (5) viii. p. clxxi.

Menemachides.

Acicnemis, Fairm., *Berethia* and *Semelima*, Pasc. Notes on the generic distinctions and species; Chevrolat, Pet. Nouv. ii. p. 269.

Acicnemis albo-guttatus and *apicalis*, Otaheite, *maculicollis*, [New] Hebrides, *arcuferus* [*arcifer*], Ceylon, p. 257 ("par A. Chevrolat" at top of paper; "L. Fairmaire" signed at end), *dorso-notatus*, Ceylon, *neelgheriensis*, Western Hindostan, p. 261, *javanus* and *moniliferus*, p. 262, Java, *biconifer*, Fiji, and *crassiusculus*, Tonga and Fiji, p. 286, Chevrolat, Pet. Nouv. ii.; *A. lateralis*, id. Bull. Soc. Ent. Fr. (5) viii. p. ciii., Sarawak: spp. nn.

Cholides.

Kangoropus [after the Kangaroo], g. n., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. cxxvi. For *Sclerosomus granulosus*, Sch., and *K. verrucosus* and *albo-sparsus*, spp. nn., p. cxxvii., Brazil.

Thoracus, g. n., *id. l. c.* p. cxxxiii. For *Amerrhinus fahræi*, Sch., *pavo*, Gr., *pardus*, Germ., and *figuratus*, Boh.; also *T. quadrispilotus* and *luteo-fasciatus*, spp. nn., *ibid.*, Brazil.

Erethistes carbonarius and *bifasciatus*, p. cxvi., *uterinus* and *basalis*, p. cxvii., Brazil, *duponti*, p. cxvii., Goyas, spp. nn., *id. l. c.*

Callinotus geminatus, sp. n., *id. l. c.* p. cxl., Brazil.

Solenopus nitidicollis, sp. n., *id. l. c.* p. cxli., Chili.

Homalonotus lherminieri, ibid., Guadalupe, *distinctus*, Brazil, *nodipennis*, Moyabamba, and *complanatus*, Cayenne, p. clxi., spp. nn., *id. l. c.*

Polyderces luctuosus, sp. n., *id. l. c.* p. clxi., Venezuela.

Physarchus conspicillatus, sp. n., Fairmaire, Pet. Nouv. ii. p. 286, Polynesia.

Cryptorrhynchides.

Macromerus monographed; Chevrolat, Bull. Ent. Belg. xx. pp. 102–111.

Cryptorrhynchus stigma, L., in the fruit of the locust-tree (*Hymenea coubaril*) from British Guiana; F. Smith, Pr. E. Soc. 1878, p. xlv.

Molicorynes, g. n., C. O. Waterhouse, Tr. E. Soc. 1878, p. 310. *Sophrorrhinides*: in form between *Balaninus* and *Macromerus*. For *Mol. longimanus*, sp. n., p. 311, Jamaica.

Trichogonus, g. n., Fairmaire, Pet. Nouv. ii. p. 282. Near *Hemideres*. For *T. unipenicillus*, sp. n., *ibid.*, Fiji.

Conotrachelus ventralis, p. 428, *cognatus* and *pusillus*, p. 429, *coronatus*, p. 430, spp. nn., Le Conte, P. Am. Phil. Soc. xvii., Florida.

Gyioperus niveiventris, sp. n., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. cvii., Amazons.

Mecistocerus ocello-lineatus, sp. n., Fairmaire, *l. c.* p. 282, Fiji.

Acalles ventrosus, p. 430, *sub-hispidus*, p. 431, spp. nn., Le Conte, *l. c.* Florida.

Cyamobolus atomo-sparsus, sp. n., Fairmaire, *l. c.* p. 282, Fiji.

Cryptorrhynchus helvus, sp. n., Le Conte, *l. c.* p. 431, Florida.

Macromerus succinctus, p. 104, Mexico, *discicollis* and *gehini*, Cayenne, and *similis*, locality unknown, p. 106, *pupillatus*, French Guiana, *angustatus*, Para, and *amazonus*, Amazon region, p. 107, *collaris*, p. 108, Brazil, *bisignatus* and (*M.* ?) *insignis*, p. 109, Bogota, *bifasciatus*, Venezuela, and *sub-auratus*, S. America, p. 110, *bolivianus*, p. 111, Bolivia, spp. nn., Chevrolat, Bull. Ent. Belg. xx.

Zygopides.

Mecopus brevispina, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 125, Central China.

Antliarrhinides.

Hoplo[*r*]*rhinus*, g. n., Chevrolat, Bull. Soc. Ent. Fr. (5) viii. p. cviii. Near *Platymerus*; rostrum horizontal, long, slender, with small elongated asperities on the upper side. *H. melanocephalus* and *geniculatus*, spp. nn., *ibid.*, Brazil.

Ulomascides.

Euryscapus, g. n., *id. l. c.* p. cix. Follows *Ulomascus*; scape flat, triangular, truncate at apex. *E. feisthameli*, sp. n., *ibid.*, Cayenne.

Ceuthorrhynchides.

Mononychus algerinus, sp. n., P. Gandolphe, Nouv. et faits, (2), No. 19, p. 74 (extr. Bull. Ac. Hipp.), Algeria.

Scleropterus (*Rhytidosomus*) *reitteri*, sp. n., J. Weise, Deutsche E. Z. 1878, p. 61, Carpathians.

Ceuthorrhynchus albo-lineatus, sp. n., J. Frivaldszky, Term. füzetek, ii. p. 112, Pesth.

Baridiides.

Baridius davidis, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 127, Central China.

Barilepton bivitattum, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 431, Georgia and N. Florida.

Zygobaris subcalva, sp. n., *id. l. c.* p. 622, Detroit, Pennsylvania.

Diorymerus (?) *punctatellus*, sp. n., Fairmaire, Pet. Nouv. ii. p. 282, Fiji.

Pseudocholus holocyanus, sp. n., *id. ibid.*, Fiji.

Calandrides.

Rhynchophorus cruentatus. The larva has only one pair of spiracles, which are on the prothoracic segment. G. H. Horn, Tr. Am. Ent. Soc. vii. p. 39.

Sitophilus granarius attacking chestnuts; Baillot, Feuil. Nat. viii. p. 160.

Dichthorrhinus [*Dichorrhinus* vel *Dichthadiorrhinus*], g. n., C. O. Waterhouse, Cist. Ent. ii. p. 293. Very close to *Eugnoristus*, but with rostrum channelled above, only six joints to funiculus, &c. *D. bicornis*, sp. n., p. 294, Madagascar.

Cyrtotrachelus davidis, p. 127, Central China, *elegans* (Dohrn, MS.), p. 128, note, Manila, *dickrous*, p. 273, Cochin China, spp. nn., Fairmaire, Ann. Soc. Ent. Fr. (5) viii.

Otidognathus nigro-pictus, sp. n., *id. l. c.* p. 128, Central China.

Sphenophorus apicalis, Le Conte, P. Am. Phil. Soc. xvii. p. 432, Florida; *S. caviscutatus* and *asperipennis*, Fairmaire, Pet. Nouv. ii. p. 282, Pelew Islands: spp. nn.

Cossonides.

Oodemas. Observations on the known species and their distribution and habits; T. Blackburn, Ann. Ent. Belg. xxi. p. 73.

Entium, g. n., D. Sharp. Tr. E. Soc. 1878, pp. 9 & 13. Probably near *Pentarthrum* and *Sericotrogus*, but with approximate anterior coxæ, and feeble tibial hooks. *E. aberrans*, sp. n., p. 12, New Zealand.

Pentarthrum wollastonianum, p. 9, *debile*, p. 10, *parvicorne* and *remotum*, p. 11, *brevirostre*, p. 12, New Zealand, *prolixum* and *obscurum*, p. 25, *blackburni*, p. 26, Oahu, *id. l. c.*, spp. nn.

Sericotrogus simulans and *setiger*, spp. nn., *id. l. c.* p. 13, New Zealand.

Dryophthorus squalidus and *gravidus*, p. 22, *crassus*, *declivis*, and *modestus*, p. 23, *pusillus* and *insignis*, p. 24, spp. nn., *id. l. c.*, Oahu.

Oodemas nivicola, *sculpturatum*, and *insulare*, p. 74, *robustum*, *obscurum*, *angustum*, *mauiense*, and *borrei*, p. 75, spp. nn., Blackburn, *l. c.*, Oahu and Maui, Sandwich Isles.

Mesites rufipennis, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 432, Florida.

Scolytidæ.

Eichhoff, W. Ratio, Descriptio, Emendatio eorum Tomicinorum qui sunt in Dr. medic. Chapuisii et autoris ipsius Collectionibus et quos præterea recognovit Scriptor W. Eichhoff, &c. Mém. Liége (2) viii. pp. iv. & 1–531, pls. i.–v.

This comprises the author's portion (*Tomicides*) of the work commenced by Chapuis in his 'Monographie des Scolytides.' The *Scolytidæ* as a whole are retained as a group separate from and equivalent to the *Curculionidæ*, chiefly on account of the habit possessed by them both as larvæ and perfect insects, of eroding conspicuous galleries in their food

plants, a habit believed to be not shared by any *Curculio*, beetle, or (indeed) insect. The author repeats his arguments in favour of separating *Platypus* as another equivalent group, and assigns the name *Coleoptera pædognathica* (Imhoff) to the three divisions collectively, on account of the similarity of the cibarian organs in the larva and imago.

After a general description of the structure of the *Tomicides*, the author endorses the opinions of Chapuis, Perris, and Thomson, as opposed to Ratzeburg, in his definition of the sexes. The male is smaller, with no teeth (or lesser armature) at the declivous apex of the elytra, longer pubescence, and impressed forehead (a confusion being suggested in this respect as regards Lindemann's observations). The great rarity of the male in some species is explained by the fact of most of them copulating in the furrows in which they are developed, before taking to the wing—the male never leaving the burrow, but dying in it. The different kinds of galleries are specified. In discussing the question as to the beetles attacking sound or diseased trees, it is pointed out that the juice is more essential to them than the wood; and that preliminary tappings (as it were) are very frequently made by them with the view of testing the existence of the sap in sound trees, which thus become to a certain extent diseased, and are then finally attacked.

Dichotomous tables of genera and species are given. *Aphanarthrum pusillum*, Woll., referred to *Crypturgus*, is renamed *wollastoni* (nec *pusillus*, Gyll.); *Cryphalus piceæ* var. n. *numidicus*, p. 124, Attica; *C. tiliæ*, Thoms., = *abietis*, Ratz.; *Hypothenemus eruditus*, Westw., and *Bostrychus boildieui*, Perroud, ? = *Stephanoderes arecceæ*, Horn [if so, *eruditus* stands, being eight years older than *arecceæ*]; *Bostrychus tachygraphus*, Sahlb., and *ratzeburgi*, Kol., = *Xyleborus dispar*, F., ♀; *X. carinipennis*, Eich., = *oblique-cauda*, Mots., ex. typ.; *X. affinis*, Eich., is of very wide distribution; *X. kraatzi*, Eich., var. n. *philippinensis*, p. 374, Philippine Islands. The plates contain figures of the mouth organs, antennæ, and legs of various species.

Blastophagus, Eich., is wrongly suppressed as a synonym of *Hylurgus* by Weise, having a different mentum and prosternum; the name being preoccupied in the *Chalcididæ*, is altered to *Myelophilus*; Eichhoff, S. E. Z. xxxix. pp. 399 & 400.

Xyleborus plagiatus and *sparsus*, Lec., referred to *Pityophthorus*; *X. hamatus*, Lec., = *carinulatus*, Lec., ♀; *Bostrychus concinnus*, Mann., is a *Xylocleptes*; *Scolytus rugulosus* in New York. Le Conte, P. Am. Phil. Soc. xvii. pp. 623–626.

Xyleborus dispar and *saxeseni*. G. Schoch, MT. schw. ent. Ges. v. p. 367, remarks upon the biological relations of these two species, which according to him are always associated, the latter being also the only known Scolytid found both in deciduous and coniferous trees. [In England, at all events, *X. saxeseni* is found by itself, *X. dispar* being of the greatest rarity.]

Dryocœtes villosus, F.: the ♂ attributed to this species by Ratzeburg,

is, from his collection, that sex of *D. cryptographus*; Eichhoff (quoting Weise), S. E. Z. xxxix. p. 165.

Tomicus typographus. On the distribution, increase, and treatment of this (and other) injurious species in the Bavarian and Bohemian forests; Herlein, Ber. Ver. Pass. xi. [for 1875–77; 1878] pp. 93–98.

New genera and species :—

Eichhoff, Mém. Liége (3), viii., characterizes the following :—

Pycnarthrum, pp. 41–104. Allied to *Dolurgus* and *Aphanarthrum*, but with six-jointed funiculus, oval sub-acuminate three-jointed club, with oblique sutures, and squamulato-setose. For *P. gracile*, p. 104, Cuba (? = *Hypoborus ? hispidus*, Ferrari), and *quadraticolle*, p 106, Mexico.

Triarmocerus, pp. 42 & 119. With three-jointed funiculus, and orbicular club. *T. cryphaloides*, p. 119, Madagascar, *birmanus*, p. 486, Burmah.

Glyptoderes, p. 44 [*-rus*, p. 137]. Between *Cryphalus* and *Stephanoderes*; with oblong acuminate four-jointed club, five-jointed funiculus, and mentum wide, rather narrowed towards the apex. For *Cryphalus granulatus*, Ratz., *binodulus*, Ratz., and *alni*, Lind.

Problechilus, pp. 46 & 167. (*Gymnochilus*, Eich., olim., *nec -la*, Klug.) With a slight rostrum, seven-jointed funiculus, ovate imbricate club, and widely distant anterior coxæ. For *G. zonatus*, Eich., &c., and *P. reitteri*, p. 169, Mexico.

Cosmoderes, pp. 475 & 495. Next after *Stephanoderes*, but with two-jointed funiculus and flattened tibiæ. *C. monilicollis*, p. 496, Hindostan.

Scolytogenes, pp. 475 & 497. Follows *Xyloctonus* (with facies of *Scolytus*), but with four-jointed funiculus, imbricated club, and simple eyes, emarginate in the middle. *S. darwini*, p. 497, "Hindostan (Birma)."

Taphrorychus, pp. 49 & 204. Antennæ with five-jointed funiculus and orbicular club, mentum subquadrate, with the ligula small and inserted almost at its apex. For *Bostrychus bicolor*, Hbst., and *bulmerincqui*, Kol., *Dryocœtes* (?) *apatoides*, Eich., and *T. hirtellus*, p. 208, Anatolia.

Lepicerus [rectius *Lepidocerus*; *-ra*, Stephens, *Lepidoptera*, 1829], pp. 476 & 501. Follows *Dryocœtes*, with very short four-jointed funiculus and large imbricated club, tibiæ flat, serrated, receiving the tarsi. *L. aspericollis*, p. 501, "Hindostan, Asiæ (Birma)."

Coccotrypes, pp. 57 & 308. Near *Xyleborus*; with straight tibiæ, obliquely truncate at apex, and thorax equally punctured all over. For *Bostrychus dactyliperda*, Fab., and *C. pygmæus*, p. 310, Madagascar, St. Domingo, Manila, and Senegal, *integer*, p. 311, Siam, *tropicus*, p. 312, Peru, *robustus* (Chev., MS.), p. 313, Cuba, *graniceps*, p. 314, Japan.

Premnobius, pp. 65 & 404. Between *Xyleborus* and *Gnathotrichus*; with solid club, and front tibiæ compressed and roughened externally with elevated lines. *P. cavipennis*, p. 404, Cape of Good Hope and Colombia.

Anchonocerus, pp. 67 & 431. Antennæ inserted in furrows, scape twisted, funiculus two-jointed, club elongate. *A. rufipes*, p. 431, Colombia.

Phthorius, pp. 67 & 433. Allied to preceding; scape straight, no furrows. For *Pterocyclum ingens*, Eich.

Trypocranus, pp. 67 & 435. Near *Pterocyclum*; maxillary palpi subfiliform, at base of fulcrum, club sub-quadrate, frons cirrate. *T. cincinnatus*, p. 435, "America septentrionalis (Bogota)."

Steganocranus, pp. 70 & 460. Next to *Amphicranus*; club triangular, head nearly free. *S. dohrni*, p. 461, ? S. America.

Liparthrum corsicum, p. 110, S. France.

Cryphalus paganus (Dohrn, MS.), p. 129, Guinea, *numidicus* (Kies., MS.), p. 487, Greece, *horridus*, p. 488, *submuricatus*, p. 492, East Indies, *indicus*, p. 489, *dilutus* and *discretus*, p. 490, "Hindostan (Birma)," *scabricollis*, p. 491, Hindostan.

Stephanoderes rotundicollis, p. 145, and *sculpturatus*, p. 146, N. America, *fuscicollis*, p. 148, *myrmedon*, p. 160, Colombia, *cassiæ*, p. 152, ? Asia (= *asperulus*, Eich., *nec* Lec.), *depressus*, p. 155, Antilles (= *obscurus*, Eich., *nec* Ferr.), *arundinis*, p. 157, Piedmont (? introduced), *germari*, p. 159, Mexico, *ehlersi*, p. 493, Andalusia, *S.* (?) *coriaceus*, p. 494, Siam.

Pityophthorus glabratus, p. 179, Berlin, Corsica, *languidus*, p. 186, Venezuela, *concentralis*, p. 188, Cuba, *peregrinus*, p. 193, Brazil, *pruinosus*, p. 198, Carolina, *tomentosus*, p. 201, N. America, *tuberculatus*, p. 498, California.

Thamnurgus varipes, p. 212, S. France, *characiæ* (Rosenb., MS.), p. 513, "Europa."

Tomicus interpunctus, p. 241, Sitka (= *tridens*, Eich., *nec* Mann.), *infucatus*, p. 247, Styria, *spinifer*, p. 499, California.

Dryocœtes pumilio, p. 295, Venezuela.

Hylocurus discifer, p. 300, Venezuela, *alienus*, p. 301, Cuba.

Micracis acutipennis, p. 302, Bahia.

Xyleborus brevis, p. 319, *semi-opacus*, p. 334, and *pelliculosus*, p. 336, Nipon, *riehli*, p. 346, Celebes, *coronatus*, p. 348, Brazil, *indicus*, p. 354, Java, *principalis*, p. 357, Guinea, *interstitialis*, p. 375, Mexico, *cuneatus*, p. 389, *procer*, p. 402, Colombia, *glabratus*, p. 381, Japan, *viduus*, p. 391, "America," *dilatatus*, p. 393, Mauritius, *vicinus*, p. 394, Venezuela, *quadrispinosus*, p. 396, S. Africa, *granifer*, p. 502, *fallax*, p. 508, and *emarginatus*, p. 510, "Hindostan (Birma)," *muriceus*, p. 506, *arte-striatus*, p. 507 East India.

Gnathotrichus consobrinus, p. 409, and *nanus*, p. 410, Chili.

Pterocyclum gracile, p. 444, United States, *pumilio*, p. 445, Venezuela, *exile*, p. 451, *penicillatum*, p. 457, *scrobiceps*, p. 458, Colombia.

Amphicranus (?) *bipunctatus*, p. 469, Colombia.

Eichhoff, S. E. Z. xxxix (after recharacterizing as new *Pycnarthrum* and *Triarmocerus*, p. 383, *Cosmoderes* and *Scolytogenes*, p. 387, *Lepicerus*, p. 388, and *Coccotrypes*, p. 391, described in Mém. Liége, *suprà*), describes the following as new species (those marked * being also described as new, *l. c.* suprà):—

*Liparthrum corsicum**, p. 383, Corsica.

*Cryphalus horridus**, *indicus**, and *dilutus**, p. 384, *submuricatus** and *discretus**, p. 385, Hindostan, *numidicus**, p. 385, Greece.

Stephanoderes rotundicollis * and *sculpturatus* *, p. 385, N. America, *costatus*, Venezuela, *fuscicollis* * and *myrmidon* *, Colombia, *arundinis* *, Italy, and *germari* *, Mexico, p. 386, *chlersi* *, p. 387, no locality given.

Gymnochilus reitteri, p. 388, Mexico.

Pityophthorus tuberculatus *, p. 388, California, *languidus* *, Venezuela, *concentralis* *, Cuba, and *peregrinus* *, Brazil, p. 389, *pruinosus* *, Carolina, *tomentosus* *, no locality given, p. 390.

Thamnurgus varipes *, p. 390, S. France.

Tomicus interpunctus * and *spinifer* *, ? N. America, p. 390.

Xyleborus granifer *, p. 391, *fallax* * and *emarginatus* * (both much resembling *Pterocyclum*) p. 392, Burmah, *pelliculosus* *, Japan, *indicus* *, Java, and *muriceus* *, E. India.

Xyleborus punctipennis, Lake Superior, *decipiens*, Detroit, Le Conte, *l. c.* p. 624.

Tomicus (*Orthotomicus*) *balsameus*, id. *l. c.* p. 625, Central New York.

Micracis opaci[*c*]*ollis*, p. 625, *asperulus*, p. 626, Detroit, *id. l. c.*

Pityophthorus obliquus, p. 432, *seriatus*, p. 433, *annectens*, p. 622, Florida, *consimilis*, p. 622; *hirticeps*, *pusio*, and *opaculus*, p. 623, Lake Superior; *id. l. c.*

Cryphalus miles, id. *l. c.* p. 433, Florida.

Thamnurgus characiæ, Rosenhauer, CB. Ver. Regensb. xxxii. p. 162, Barcelona [also described by Eichhoff, Mém. Liége, *supra*].

Brenthidæ.

G. Power, Ann. Soc. Ent. Fr. (5) viii. p. 477, notes that the discovery of an *Amorphocephalus* in Senegal with very projecting mandibles, disturbs the arrangement proposed by Lacordaire, according to which that genus was placed in the *Trachelizides*; he therefore erects a group, *Amorphocephalides*, for its reception, together with *Cordus* and *Symmorphocerus*, out of Lacordaire's *Trachelizides*, *Eupsalis* out of the same author's *Arrhenodides*, and some species from the Gaboon described by J. Thomson under *Arrhenodes*. Besides a general analogy, these insects have in common lateral apophyses at the base of the rostrum; but the author admits a great structural discrepancy between the simple front femora and approximated front coxæ of some of them, and the dentate front femora and distant front coxæ of others; he has, however, two species with unarmed femora and distant front coxæ, thus connecting the two forms. Some species described under *Orychodes* will probably have to be placed here. *Symmorphocerus frontalis*, Ol., is from Guinea and Natal, not Surinam.

Debora, g. n., *id. l. c.* p. 490. Allied to *Eupsalis*, but with simple front femora and front coxæ distant. *D. bocandii*, ibid., and *thomsoni*, p. 491, spp. nn., Guinea.

Spathe[*r*]*rhinus*, g. n., *id. l. c.* p. 491. Also allied to *Eupsalis*, having the front femora toothed and the front coxæ distant, but with the front

tibiæ strongly curved inwardly. For *Eupsalis medioximus*, *opacus*, and *gabonicus*, Thoms.

Agriorrhynchus, g. n., *id.* Pet. Nouv. ii. p. 241. Near *Arrhenodes*, but with rostrum very elevated at apex and antennæ widened in the middle. *Ag. borrei*, Java, and *undulatus*, Malacca, spp. nn., *ibid.*

Episphales lacordairii, sp. n., *id. ibid.*, Mexico.

Cordus acutipennis and *schœnherri*, p. 483, and *pascoei*, p. 484, Australia, *puncticollis*, Natal, *elongatus* and *latirostris*, Senegal, p. 484, spp. nn., *id.* Ann. Soc. Ent. Fr. (5) viii.

Amorphocephalus variolosus, p. 485, Malacca, *calvei* (Dej. Cat.), ibid., *senegalensis* (Dej. Cat.), and *diadematus*, p. 486, Senegal, *lævis*, ibid., India, *mniszechi*, p. 487, Cape York, spp. nn., *id. l. c.*

Symmorphocerus minutus, Nubia, and *beloni*, Mossul, spp. nn., *id. l. c.* p. 488.

Eupsalis sallei [*-læi*] and *lecontii*, spp. nn., *id. l. c.* p. 494, N. America.

Prophthalmus delesserti, p. xxxvii., East Indies, *tricolor*, Moluccas, and *bourgeoisi*, Ceylon, p. xxxviii., *pugnator*, p. xliv., Java, *obscurus*, East Indies, and *brevis*, Malacca, p. xlv., *id. l. c.* Bull., spp. nn.

Bolbogaster hebridarum, sp. n., Fairmaire, Pet. Nouv. ii. p. 282, New Hebrides.

Anthribidæ.

Phænotherion, g. n., J. Frivaldszky, Term. közlem. xiii. p. 331. No visible scutellum. *P. pulszkyi*, sp. n., *ibid.*, pl. i., Hungary.

Euxenus piceus, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 434, Florida.

Choragus harrisi, sp. n., *id. l. c.* p. 626, Detroit.

Bruchidæ.

Bruchus adustus, Mots., = *chinensis*, L.; Harold, Deutsche E. Z. 1878, p. 86.

Bruchus (*Caryoborus*) *serripes*, Boh. Transformations described, bred from Tagua nuts (*Elephantusia macrocarpa*) from Bahia; K. Letzner, JB. schles. Ges. lv. pp. 195–198.

Bruchus [as *Mylabris*] *muata*, Harold, MT. Münch. ent. Ver. ii. p. 109, W. Central Africa; *B.* [*M.*] *japonica*, id., Deutsche E. Z. 1878, p. 87, Japan: spp. nn.

Cerambycidæ.

D. Sharp, Tr. E. Soc. 1878, pp. 201–210, describes new genera and species from the Hawaiian Islands, taken by the Rev. T. Blackburn. So far as known, these forms are very peculiar, but are associated with others from excessively distant lands, in spite of the isolation of the islands. Their nearest relatives appear to be in the distant islands to the south-west. *Ceresium simplex*, Gyll., also found in Ecuador. *Oopsis nutator*, Fab., and *Lagochirus araneiformis*, L., (of very reduced size) occur in the Hawaiian group.

THOMSON, JAMES. Typi Cerambycidarium. 2e Mémoire, R. Z. (3) vi. pp. 1–33 ; 3e Mémoire, *l. c.* pp. 45–68.

Refer to *Cerambycides* and *Lamiides* [Zool. Rec. xiv. *Ins.* p. 77.]

Prionides.

Prionus laticollis. 332 and 597 well-formed eggs found in the abdomen of two females respectively ; E. P. Mann, Psyche, ii. p. 189.

Paranœcus olivieri, J. Thoms., = *Apotrophus simplicicollis*, Bates ; H. W. Bates, Ent. M. M. xiv. p. 274.

Cnethocerus, g. n., Bates, *l. c.* p. 273. Near *Prionus*, with joints 3–11 of antennæ opaque, densely strigose, and sharply produced on each side at the apex. *C. messi*, sp. n., *ibid.*, Hong Kong and Japan.

Cryptobelus, g. n., J. Thomson, Bull. Soc. Ent. Fr. (5) viii. p. cxlviii. Near *Blephylidia*, but longer, more cylindrical, with different antennæ, and no teeth to the leg except three at the inner apex of each of the front tibiæ. *C. gestroi*, sp. n., *ibid.*, New Guinea.

Parandra puncticeps, sp. n., Sharp, *l. c.* p. 202, Oahu.

Cyrtognathus planicollis, sp. n., Bates, *l. c.* p. 272, N. Borneo.

Prionus corpulentus, sp. n., *id.* P. Z. S. 1878, p. 720, Murree.

Cacosceles lacordairii, sp. n., *id.* Ent. M. M. xiv. p. 273 (= *œdipus*, Lac., *nec* Newm.).

Hoplideres nyassæ, id. *l. c.* p. 272, Nyassa ; *H. rugicollis*, C. O. Waterhouse, Cist. Ent. ii. p. 289, Antananarivo : spp. nn.

Derobrachus asperatus, sp. n., Bates, *l. c.* p. 274, Costa Rica.

Xixuthrus bufo, sp. n., J. Thomson, R. Z. (3) vi. p. 67, Halmaheira.

Aulacopus foveiceps, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 109, W. Central Africa.

Colpoderus forcipatus and *substriatus*, spp. nn., *id. ibid.*, W. Central Africa.

Cerambycides.

Spondylis buprestoides on a dead hedgehog.; B. Haase, Ent. Nachr. iv. p. 25.

Pachylocerus belongs to the *Hammaticerides*, near *Metopocœlus*, and not to the *Pyresthides*, in which Lacordaire has placed it; C. A. Dohrn, S. E. Z. xxxix. p. 359.

Sagridola maculata, Guér., ♂ described from Madagascar, still further exhibiting an analogy between *Sagridola* and *Sagra* ; J. Thomson, R. Z. (3) vi. p. 33.

Mastododera lateralis, Guér., is not a sex of *M. nodicollis*, Klug, but specifically distinct ; C. O. Waterhouse, Cist. Ent. ii. p. 367.

Phyllocnema raffrayi, Thomson, was accidentally misplaced by the author among the *Prionides* ; J. Thomson, *l. c.* p. 68 [Zool. Rec. xiv. *Ins.* p. 79].

Batyle miniatus, Germ., *rutilans* and *ruber*, Lec., and *pearsalli*, Bld., = *suturalis*, Say ; G. H. Horn, Tr. Am. Ent. Soc. vii. p. 42.

New genera and species :—

J. Thomson, R. Z. (3) vi., characterizes the following :—

Stromatiodes, p. 1. Very near *Stromatium*, but with different ♀ characters, the chief one being apparently the lunate mesosternal appendage. For *S. brunneus*, ibid., Borneo.

Colynthæa, p. 5. Facies of *Callidium*; differs from *Piezocera* and *Haruspex* in the structure of antennæ. *C. grossa*, p. 6, Brazil.

Enosmæus, p. 9. Facies of *Anoplomerus*; allied to *Smodicum*. *E. cubanus*, p. 10, Cuba.

Saporæa, p. 11. Somewhat like *Comusia* and *Allogaster*, but with anterior coxæ rounded and free. *S. femoralis*, ibid., Australia.

Gelonætha, p. 12. Rather like *Tapinolachnus*. *G. curtipes*, p. 13, Mindanao.

Aquinillum, p. 13, for *A. pallidum*, p. 14, Fiji.

Aræspor, p. 14, for *A. longicollis*, p. 15, Cuba.

Herozoum, p. 15. Differs from *Aræspor* in the antennæ; the swollen prothoracic sides, the sternal appendages, &c. *H. longulum*, p. 16, Damara Land.

Psylacrida, p. 16. Apparently near *Igenia*; with shorter antennæ than *Herozoum*, and cylindrical thorax. *P. gracilis*, p. 17, Australia.

Aristobrium, p. 18. Differs from its ally, *Obrium*, in the robust antennæ, short and equal palpi, &c. *A. cyanipenne*, ibid., Cape of Good Hope.

Arymylæna, p. 19. Differs from the preceding in the less depressed head, longer antennæ, simple thorax, clavate femora, &c. *A. callidioides*, p. 20, Senegambia.

Limernæa (spelled *Lymernæa* subsequently), p. 20. Differs from the preceding in its longer, narrower, more depressed form, equal palpi, slender legs, &c. *L. picta*, p. 21, Brazil.

Urorcites, p. 21. Very near *Limernæa*. *U. cribripennis*, p. 22, Chili.

Obriaccum, p. 23, for *Obrium ? fuscatum*, Chev., and *O. senegalense*, p. 24, Senegal.

Mythozoum, p. 25. Differs from *Obriaccum* (amongst other things) in the abdomen in both sexes being alike. For *Obrium ustulatum*, Dej. (which is not a sex of *O. ? fuscatum*).

Calybistum, p. 26. Allied to the two preceding. *C. fuliginosum*, p. 27, Senegambia.

Allophyton, p. 27. Facies of *Phyton*. *A. biloculare*, p. 28, Guinea.

Nisibistum, p. 29. *N. kaisanum*, p. 30, Kaisa, E. Asia.

Cleistimum, p. 30, for *C. venatum*, p. 31, Moreton Bay, Australia.

Dictator, p. 32. Near *Phyllocnema*, but very distinct, recalling *Gnatholea* by its mandibles in the ♂. *D. postulatus*, p. 33, W. Africa.

Trinophylum, H. W. Bates, P. Z. S. 1878, p. 720. Near *Hesperophanes*, but with abruptly clavate femora, and less coarsely granulated eyes. *T. cribratum*, ibid., Murree.

Logisticus, Waterhouse, *l. c.* p. 290. Next *Artelida* in the *Toxotinæ*. An affinity shown to the *Uracanthinæ* in the produced rostrum, spined

apices to elytra, and coarsely granular eyes, but the antennæ are not inserted in the ocular emargination. Claw joint spatulate, claws strongly and suddenly bent from the base. *L. rostratus*, p. 291, Antananarivo.

Enthymius, id. *l. c.* p. 294. Near *Toxotus*; with very short muzzle, eyes not very finely granulated, neck thick, with parallel sides. *E. dubius*, p. 295, Madagascar.

Macropsebium, Bates, Tr. E. Soc. 1878, p. 191. *Necydalinæ*: nearest to *Psebium*, Pasc.; epistoma deeply separated from the head, almost articulated. *M. cotterilli*, p. 192, Nyassa.

Arrhythmus, Waterhouse, Cist. Ent. ii. p. 289. At end of the *Eligmodermineæ*, but approaching the *Callidiopsinæ* in the non-divided antennal tubercles. *A. rugosipennis*, ibid., Antananarivo.

Astrimus, Sharp, Tr. E. Soc. 1878, p. 204. *Callidiopsinæ*: but with antennal tubers rather strongly elevated and distinctly angulated; facies of *Stromatium*. For *A. obscurus*, ibid., Hawaiian Isles; probably also *Stromatium hirtum*, Fairm., and another species from Formosa.

Sotenus, id. *l. c.* p. 205. In the same group as the preceding, but only provisionally. Head very short with scabrous vertex, elytra with subseries of deep and rather large punctures, the alternate rows with erect, slender, long setæ. Facies of *Lioderes kollari*. For *S. setiger*, ibid., Oahu.

Clytarlus, id. *l. c.* p. 206. *Clytides*: for *C. robustus*, ibid., and *cristatus*, p. 207, Oahu.

Plocæderus hamifer, Bates, Tr. E. Soc. 1878, p. 190, Nyassa; *P. formosus*, Harold, MT. Münch. ent. Ver. ii. p. 109, W. Central Africa.

Pachydissus elongatus, Harold, *l. c.* p. 109, W. Central Africa; *P. mariæ*, p. 2, and *gigas*, p. 3, Thomson, R. Z. (3) vi., Borneo.

Hesperophanes cribricollis, Bates, P. Z. S. 1878, p. 720, Murree.

Elaphidium tectum, Le Conte, P. Am. Phil. Soc. xvii. p. 414, Florida.

Piezocera rubiginosa (Dej. Cat.), Thomson, *l. c.* p. 4, Bahia.

Hemilissa lævigata, id. *l. c.* p. 3, Cayenne.

Zoedia elegans, Waterhouse, Tr. E. Soc. 1878, p. 236, Tasmania (? = *Clytus v-album*, Boisd.).

Sagridola flavicollis, id. Cist. Ent. ii. p. 367, Madagascar.

Gaurotes davidis, H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 133, pl. iii. fig. 9, Central China.

Typocerus balteatus, G. H. Horn, Tr. Am. Ent. Soc. vii. p. 55, Colorado, Arizona; *T. sparsus*, Le Conte, P. Am. Phil. Soc. xvii. p. 614, Lake Superior.

Leptura rubriola, Bates, *l. c.* p. 720, Murree; "*Leptura*" (*Sibylla*?) *martialis*, p. 457, Cordova, Argentine Republic, and "*L.*" (*Capnolymma*?) *pugnax*, p. 459, Burmah (the former with spines at the apex of the middle and hinder tibiæ, the latter with spines to all the tibiæ, and both referred to *Leptura* merely to show they are not *Prionidæ* or *Lamiidæ*) C. A. Dohrn, S. E. Z. xxxix.

Pachylocerus unicolor, Dohrn, *l. c.* p. 360, Burmah.

Zonopterus grandis, Thomson, *l. c.* p. 31, Malacca.

Pachyteria ochracea, p. 136, *basalis* and *ruficollis*, p. 137, Waterhouse, Ann. N. H. (5) ii., Borneo.

Callichroma (? g. n.) *davidis*, Deyrolle, *l. c.* p. 132, pl. iii. fig. 8, Central China; *C. nyassæ*, Bates, Tr. E. Soc. 1878, p. 191, Nyassa.

Promeces suturalis, Harold, MB. Ak. Berl. 1878, p. 221, Zanzibar, Bagamoyo.

Helymæus signaticollis and *pedestris*, F. P. Pascoe, Ann. N. H. (5) ii. p. 370, Yemen.

Phymatodes maculicollis, Le Conte, *l. c.* p. 614, Lake Superior.

Clytus davidis, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 132, Central China.

Clytanthus ignobilis, Bates, P. Z. S. 1878, p. 721, Murree.

Neoclytus ascendens, Le Conte, Bull. U. S. Geol. Surv. iv. p. 462, Colorado.

Ptycholæmus lativittis, Harold, MT. Münch. ent. Ver. ii. p. 109, W. Central Africa.

Smodicum depressum, p. 6, Brazil, *brunneum* (White, MS.) and *subcylindricum*, p 7, Colombia, *similare* and *miserum*, p. 8, and *impressicolle* (Dej. Cat.), p. 9, St. Domingo, Thomson, *l. c.*

Crossidius allgewahri, Le Conte, *l. c.* p. 461, Idaho.

Temnosternus apicalis, Pascoe, *l. c.* p. 371, Rockhampton.

Agapanthia cæruleipennis, J. Frivaldszky, Term. füzetek, ii. p. 9, Asia Minor.

Lamiides.

Dorcadion. Caucasus species, p. 218; *D. olivieri*, J. Thoms., = *rufifrons*, Mots., from which *acutispinum*, Mots., is not separable, p. 221; G. Kraatz, Deutsche E. Z. 1878.

Sternotomis comes, Westw., = *cornutor*, F. (from Johanna Island, Madagascar), *nec* Klug, with correction of Munich Cat. synonymy; C. O. Waterhouse, Ann. N. H. (5) i. p. 424.

Tragocephala jucunda, Gory, ♂ from Antananarivo; *id.* Cist. Ent. ii. p. 291.

Pogonocherus, Estola, Mecas, Oberea, Tetraopes, Tetrops, and *Amphionycha*. The N. American species revised, with synonymic rectifications; G. H. Horn, Tr. Am. Ent. Soc. vii. pp. 42–50.

Acrocinus longimanus drags itself along rather than walks, and the lateral thoracic spines are not moveable; H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. cxxxix.

Tetraopes tetrophthalmus. The larva apparently feeds on the juice of the roots of *Asclepias cornuti*; W. L. Devereux, Canad. Ent. x. p. 143.

New genera and species:—

Hepomidion, J. Thomson, R. Z. (3) vi. p. 45. Near *Morimus* and *Brimus*, but more of the facies of *Dorcadion*, and with the posterior legs longer than the two other pairs. *H. stygicum*, ibid., Diamond Fields.

Cacoscapus, id. *l. c.* p. 47. Near *Diochares*, but with head more quadrate and mandibles not prominent, smaller eyes, different antennæ with

robust scape, armed with a very sharp spine at the inner apex, &c. *C. mouhoti*, p. 48, Laos.

Abatocera, id. *l. c.* p. 55. Between *Batocera* and *Apriona*, with entire scape, which is neither incised nor scarred, eyes widely separated beneath, and very long antennæ. *A. leonina*, p. 56, Menado.

Pœmenorthrus, id. *l. c.* p. 61. Facies of *Callimation* and *Pœmenesperus*, but near *Zalates*, with short antennæ, and sternal appendages much produced. *P. cinereus*, ibid., Zanzibar, mainland.

Cyocyphax, id. *l. c.* p. 66. Resembles *Praonetha*, but near *Atossa*, and forming a special group from the relative shortness of the scape of its antennæ, near the *Zygocerites*. *C. praonetoides*, ibid., Australia.

Myagrus, F. P. Pascoe, Ann. N. H. (5) ii. p. 371. Form of *Monochamus*, but with mesosternum nearer *Diochares*, from which it differs in its strong antennary tubers, separated at the base by a narrow groove, and approximated above. *M. hynesi*, id. *l. c.* p. 372, Bombay.

Neanthes, id. *l. c.* p. 372. *Monochamus*, but with basal joint of antennæ obsoletely scarred; eyes small, antennary tubes divergent. For *M. curialis*.

Leucographus, Waterhouse, Cist. Ent. ii. p. 295. Close to *Eumimetes*; coloration of *Tophoderes* (*Anthribidæ*). *L. albo-varius*, p. 296, and *variegatus*, p. 368, Madagascar.

Zaplous, Le Conte, P. Am. Phil. Soc. xvii. p. 415. *Pogonocherini*: no affinities suggested. *Z. hubbardi*, id. *ibid.*, Florida.

Somatidia longipes, Sharp, Ent. M. M. xv. p. 82, Otago.

Dorcadion lederi, p. 217, Caucasus, *lativittis*, p. 219, and *ribbei*, p. 220, Tarbagatai Mts., Siberia, Kraatz, l. c.; *D. crassipes*, p. 368, *mystacinum*, p. 369, E. Ballion, Bull. Mosc. liii. (1), Kuldja.

Phrissoma sansibaricum, Harold, MT. Münch. ent. Ver. ii. p. 51, Zanzibar.

Prosopocera poggei, id. *l. c.* p. 110, W. Central Africa.

Leprodera arista, Thomson, *l. c.* p. 46, Borneo.

Archidice alexandra, id. *l. c.* p. 47, Eastern Asia.

Rhamses vitticollis, id. Bull. Soc. Ent. Fr. (5) viii. p. xviii., Borneo.

Mecotagus birmanus, id. R. Z. (3) vi. p. 49, Burma.

Cyriocrates zonator, id. *l. c.* p. 50. Siam.

Aristobia voeti, id. *l. c.* p. 51, China.

Cereopsius tigrinus, id. Bull. Soc. Ent. Fr. (5) viii. p. xix., Borneo.

Etymestia albo-guttata, Waterhouse, Ann. N. H. (5) ii. p. 136, Borneo.

Peribasis princeps, Pascoe, *l. c.* p. 373, Labuan.

Pycnopsis variolosa, N'Gami, and *miliaris*, Angola, p. 374, *rubricata*, p. 375, Grahamstown, *id. l. c.*

Euthyastus myrrhatus, id. *l. c.* p. 374, Penang and Andamans.

Batocera sapho, p. 51, Cape York, *thysbe*, Cochin China, and *sabina*, Borneo, p. 52, *eurydice*, p. 53, Java, *fabricii* (= *octo-maculata*, Thoms., olim, *nec* Fab.), p. 54, *andamana*, ibid., Andaman Isles, Thomson, l. c.; *B. davidis*, H. Deyrolle, Ann. Soc. Ent. Fr. (5) viii. p. 131, Central China.

Apriona cribrata and *sublævis*, Sylhet, and *rheinwarti*, Java, p. 57,

malaccana, Malacca, *parvigranula*, Cochin China, and *paucigranula*, China, p. 58, *japonica*, Japan (? = *rugicollis*, Chev., var.), *multigranula*, Philippine Isles, *latifrons*, Manila, and *tigris*, Java, p. 59, Thomson, *l. c.*

Gnoma raffrayi, id. *l. c.* p. 49, Java.

Mesosa oculicollis, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 131, Central China.

Agelasta mediifusca, Pascoe, *l. c.* p. 373, and *A. ochracea*, Thomson, *l. c.* p. 60, Andaman Isles.

Coptops rufa, Thomson, *l. c.* p. 60, Andaman Isles.

Meton fasciatus, Pascoe, *l. c.* p. 372, Port Bowen.

Zalates raffrayi, Thomson, *l. c.* p. 62, Zanzibar mainland.

Anoplostetha bimaculata, Harold, *l. c.* p. 110, W. Central Africa.

Zographus ferox, id. *l. c.* p. 111, W. Central Africa.

Sternotomis consularis, id. *l. c.* p. 110, W. Central Africa.

Tragocephala histrionica and *nigro-punctata*, id. *ibid.*, W. Central Africa; *T. mima*, p. 62, and *zanzibarica*, p. 63, Zanzibar mainland, *klugi*, p. 63, and *albo-flavescens*, p. 64, Cameroons, *leonensis*, p. 64, Sierra Leone, Thomson, l. c.; *T. kaslica* ("*zanzibarica*, Thoms., Bull. 1878, No. 22, p. 219"), *id.* Bull. Soc. Ent. Fr. (5) viii. p. clxii., Zanzibar.

Ceroplesis irregularis, p. 49, Zanzibar, *poggei*, p. 111, W. Central Africa, Harold, l. c.; *C. aspersa*, Pascoe, *l. c.* p. 375, Usambara.

Phrynèta obliquata, Harold, *l. c.* p. 52, Zanzibar; *P. tristis*, p. 64, Cameroons, *melanoptera*, S. Africa, and *raffrayi*, Zanzibar mainland, p. 65, Thomson, R. Z. (3) vi.

Acridoschema bimaculata, Thomson, *l. c.* p. 67, Gaboon.

Cymatura zuber-hoferi, id. Bull. Soc. Ent. Fr. (5) viii. p. lxv., Gaboon.

Ælara variolosa, Pascoe, *l. c.* p. 375, Andaman Isles.

Micracantha nutans, Sharp, Tr. E. Soc. 1878, p. 209, Honolulu.

Xynenon larvatus, Pascoe, *l. c.* p. 376, Andaman Isles.

Mispila auguralis, id. *ibid.*, Andaman Isles.

Hoplistocerus eximius, id. *l. c.* p. 377, Bahia.

Leptostylus arcuatus, Le Conte, P. Am. Phil. Soc. xvii. p. 414, Florida.

Phytœcia armeniaca, J. Frivaldszky, Term. füzetek, ii., p. 10, Diarbekr.

Mecas ruficollis, Horn, Tr. Am. Ent. Soc. vii. p. 44, Texas, Mexico.

Oberea texana, id. *l. c.* p. 47, Texas.

Nitocris angustifrons, p. 53, Mouth of the Congo, *leucostigma* and *chrysostigma*, p. 111, W. Central Africa, Harold, *l. c.*

Astathes dioica [*-œca*], Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 133, Central China.

Tetraopes collaris, Horn, *l. c.* p. 49, New Mexico.

Hydraschema virgatum, Pascoe, *l. c.* p. 377, Brazil.

Chrysomelidæ.

E. Lefèvre, CR. Ent. Belg. xxi. p. xliii. *et seq.*, enumerates the species of various sub-families taken in Spain, Portugal, Morocco, and Brazil, by the late C. Van Volxem, and in the Caucasus by his uncle (several new).

J. S. Baly, Cist. Ent. ii. p. 369 *et seq.*, describes species collected by

Dr. Stoliczka during Forsyth's Expedition to Kashgar, 1873–74. One-third are Asiatic (only 25 species, referred to 21 genera); 17 are new.

Sagrides.

Rhagiosoma (Von Heyden, MS.), g. n., F. Chapuis, CR. Ent. Belg. xxi. p. cxliii. *Megamerites*: allied to *Polyoptilius*, but with the fourth joint of the tarsi twice as long as the preceding, and no spine on the lower margin of the hinder pair of femora. Conspicuous for reproducing an Australian form in Madagascar. *R. madagascariense*, sp. n., *id. l. c.* p. cxliv., Madagascar.

Sagra longipes, p. 337, Burma, *ferox*, p. 338, Ribé, spp. nn., J. S. Baly, J. L. S. xiv.

Donaciides.

Donacia simplex from Japan; Harold, Deutsche E. Z. 1878, p. 87.

Donacia malinowskii, Ahr., is a race of *fennica*, Payk.; *D. platysterna*, Thoms., = *impressa*, var.; G. Czwalina, Deutsche E. Z. 1878, pp. 203 & 204.

Donacia comari is the common species in Silesia, and the occurrence of intermediate forms leads to the opinion that it is only a mountain form of *sericea* [it is found near London, where there are no mountains]. *D. geniculata*, Thoms., ? = *proteus*, Kze.; K. Letzner, JB. schles. Ges. liv. [1877] pp. 214–216.

Donacia rugosa, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 415, Florida.

Criocerides.

Crioceris australis, Jacoby, = *nigripes*, Fab., ex. typ.; M. Jacoby, P. Z. S. 1878, p. 152.

Lema suffriani, id. *l. c.* p. 982, Costa Rica; *L. steinheili*, p. 155, *biarcuata*, p. 156, *haroldi*, p. 157, *limbatipennis*, p. 158, *elegans*, p. 159, *badeni*, p. 160, *id.* MT. Münch. ent. Ver. ii., Colombia; *L. kirbii*, Sierra Leone, and *livingstoni* [*i*], Niger and Senegal, p. 305, *ornatula*, p. 306, *mutabilis* and *murrayi*, p. 308, W. coast of Africa, *bouchardi*, p. 307, *subapicalis*, p. 310, and *salvini*, p. 313, Guatemala, *pulcherrima*, p. 307, *amazona*, p. 311, *fraternalis*, p. 312, *lineatipennis*, p. 314, *nitidiceps* and *vittatipennis*, p. 315, Brazil, *stevensi*, p. 309, Burma, *mouhoti*, p. 311, Laos, *steinheili*, p. 312, Colombia, J. S. Baly, Cist. Ent. ii.: spp. nn.

Crioceris discrepens[*-pans*], Baly, Cist. Ent. ii. p. 316, Laos; *C. coronata*, id. Ent. M. M. xiv. p. 177, Nyassa; *C. regeli*, E. Ballion, Bull. Mosc. liii. (1) p. 371, Kuldja: spp. nn.

Megascelidides.

Megascelis posticata and *femorata*, p. 339, Amazons, *basalis*, p. 340, Rio Janeiro, Baly, J. L. S. xiv.; *M. femoralis*, p. 149, *ornata*, p. 150, *sub-metallescens*, p. 152, *melancholica*, p. 153, *dubiosa*, p. 154, Jacoby, MT. Münch. ent. Ver. ii., Colombia: spp. nn.

Megalopides.

Mastostethus salvini, sp. n., Jacoby, P. Z. S. 1878, p. 983, Costa Rica.

Pœcilomorpha amabilis, sp. n., Baly, Ent. M. M. xiv. p. 177, Nyassa.

Clithrides.

Labidostomis nitida, sp. n., E. Ballion, Bull. Mosc. liii. (1) p. 373, Kuldja.

Coptocephala dubia, p. 370, Murree, *dimidiatipennis*, p. 371, Jhelam Valley, spp. nn., Baly, Cist. Ent. ii.

Megalostomis placida, sp. n., *id.* J. L. S. xiv. p. 341, Ega.

Cryptocephalides.

Scolochrus alutaceus, sp. n., Jacoby, MT. Münch. Ent. Ver. ii. p. 144, Colombia and Brazil.

Metallactus modestus, p. 140, *waterhousii*, p. 141, *bifasciatus*, p. 142, *columbicus*, p. 143, spp. nn., *id. l. c.*, Colombia.

Monachus nigripennis, p. 146, *atro-fasciatus*, p. 147, *flavitarsis* and *abdominalis*, p. 148, spp. nn., *id. l. c.*, Colombia.

Cryptocephalus cyaneus, p. 374, *nigerrimus*, p. 376, E. Ballion, Bull. Mosc. liii. (1), Kuldja; *C. interjectus*, Baly, Cist. Ent. ii. p. 372, Murree; *C. mayeti*, "M.", Nouv. et faits, (2) No. 21, p. 82, Montpellier; *C. nigromaculatus*, p. 134, *collaris*, p. 135, and var. *morio*, p. 136, *balyi*, p. 136, *steinheili*, p. 137, *pustulipennis*, p. 139, Jacoby, *l. c.*, Colombia: spp. nn.

Chlamydides.

Chlamys memnonia and *mœstifica*, Lac., are referred to *Diaspis*; Baly, J. L. S. xiv. p. 343.

Diaspis batesi, sp. n., *id. l. c.* p. 342, Ega.

Chlamys velutina, p. 343, Amazons, *placida*, p. 344, Ega, *chinensis*, China, and *fulvipes*, India, p. 345, *id.* l. c.; *C. cribripennis*, Le Conte, P. Am. Phil. Soc. xvii. p. 614, Detroit: spp. nn.

Lamprosomatides.

Lamprosoma tricolor, p. 346, *batesi*, p. 347, *cupricolle* and *amazonum*, p. 348, *canaliculatum*, p. 349, and *cuneatum*, p. 350, Amazons, *hypochryseum*, p. 347, Mexico, Guatemala, *tridentatum*, p. 349, Brazil, *armatum*, p. 351, Colombia, Baly, J. L. S. xiv.; *L. chapuisi*, p. 983, Costa Rica, *inornatum*, p. 984, Chiriqui, Jacoby, P. Z. S. 1878: spp. nn.

Eumolpides.

Scelodonta egregia, Lef., = *bidentata*, Baly; Baly, J. L. S. xiv. p. 252.

Rhyparida madagascariensis, *costatipennis*, and *nigricollis*, Jac., are referred to *Syagrus*, Chap.; Jacoby, P. Z. S. 1878, p. 153.

New genera and species:—

Eubrachis, [Chevr., in Dej. Cat.] Baly, J. L. S., xiv. p. 248. Differs from *Pseudocolaspis* in the straight or concave apical margin of anterior episternum, the antero-internal angle being continuous with the prosternum. *E. spinipes*, ibid., Guinea, Cameroons, *indica*, p. 249, Masuri, N. India.

Parascela, id. *l. c.* p. 222. Differs from *Pseudocolapsis* in its appendiculated claws, notched hind tibiæ, &c.; for *P. cribrata*, Schauf.

Cheiridea, id. *l. c.* p. 253. Nearly allied to *Scelodonta*, with serrulate

sides to the thorax and no supra-orbital grooves. *C. chapuisi*, ibid., Sierra Leone.

Mouhotia, id. *l. c.* p. 262. Distinguished from *Typophorus* and allies by its transverse prosternum, appendiculated claws, and emarginated four hinder tibiæ. *M. femorata*, ibid., Cambodia.

Jansonius, id. *l. c.* p. 264. Nearly allied to *Pachnephorus*, but more ovate, with transverse thorax, and much less convex and less produced anterior border to the prothoracic episternum. *J. alternatus*, ibid., Chili.

Eulampra, id. Tr. E. Soc. 1878, p. 281. Differs from *Spintherophyta* in its more elongate body, thickened antennæ in the ♂, and in the different form of the prosternum. *E. batesi*, p. 282, Amazons.

Trichochalcea, id. *l. c.* p. 295. In the second division, agreeing with *Meroda* in appendiculated claws, &c., but pubescent above, and with no notch to outer edge of four posterior tibiæ. *T. rugata*, p. 296, Brazil.

Rhabdophorus [Agassiz, 1848, amending *Rabdophorus*, Swainson, *Pisces*, 1839], E. Lefèvre, MT. Münch. ent. Ver. ii. p. 126. Near *Colaspis*, but with differently constructed thorax, and much wider prosternum. *Colaspis hypochalcea*, Har., and *R. tuberculatus* and *caliginosus*, p. 127, and *curtus*, p. 128, Colombia.

Phaneta, id. *l. c.* p. 132. Near *Colaspoides*, differing in antennæ, thorax, and prosternum. For *Chalcophana striata* and *varicornis*, Suffr., and *P. ruficollis*, ibid., Colombia.

Chrysodina lævigata, id. *l. c.* p. 112, Colombia; *C. viridula*, id. CR. Ent. Belg. xxi. p. xlv. Brazil; *C. nigrita*, Baly, Tr. E. Soc. 1878, p. 282, Para.

Chalcoplacis femorata, p. 283, *hirticollis*, p. 284, *ingenua*, p. 285, Amazons, *elephas*, p. 284, Brazil, *alternata*, Amazons and Cayenne, and *nitidicollis*, Cayenne, p. 286, Baly, *l. c.*

Lamprospharus diversicornis, p. 289, *biplagiatus*, p. 290, *pulcher* and *generosus*, p. 291, *ruficeps* and *lateralis*, p. 292, Amazons, *fulvitarsis*, p. 289, Brazil, *id.* l. c.; *L. amabilis*, p. 112, *luctuosus*, p. 113, Lefèvre, *l. c.*, Colombia.

Chalcophyma echinata [*-tum*], p. 287, *cupreata* [*-tum*], p. 288, Baly, Tr. E. Soc. 1878, Amazons.

Noda chalcea and *ocanana*, p. 113, *landolti*, *scutellaris*, and *winkleri*, p. 114, *virgulata*, *callosa*, and *medellina*, p. 115, *modesta*, *luteipes*, *columbina* [*colombiana* vel *colombica*], and *rufipes*, p. 116, *peregrina* and *læta*, p. 117, Lefèvre, *l. c.*, Colombia; *N. venustula*, Barbacena, *variabilis*, Therezopolis, *id.* CR. Ent. Belg. xxi. p. xlvi.; *N. lefevrii* and *balyi*, p. 985, *viridis* and *boucardi*, p. 986, Guatemala, *violaceipennis*, p. 987, Guatemala, Jacoby, P. Z. S. 1878.

Agbalus lateralis, Lefèvre, CR. Ent. Belg. xxi. p. xlvii., Brazil; *A. plagiatus*, p. 117, *chalybæus*, *æneus*, *rufimanus*, and *mutabilis*, p. 118, *rufotestaceus*, p. 119, *id.* MT. Münch. ent. Ver. ii., Colombia.

Polysarcus dichrous, Lefèvre, *l. c.* p. 119, Colombia.

Metaxyonycha sanguinea, id. *ibid.*, Colombia; *M. hybrida*, id. CR. Ent. Belg. xxi. p. xlvii., Barbacena; *M. rufo-limbata*, Jacoby, *l. c.* p. 987, Venezuela.

Prionodera ocularis, Lefèvre, MT. Münch. ent. Ver. ii. p. 120, Colombia; *P. elegans*, Jacoby, *l. c.* p. 987, Colombia.

Colaspis prasina, p. 120, *callichloris*, p. 121, *suturalis* and *hypochlora*, p. 123, Colombia and Mexico, *lebasi* and *strigata*, p. 121, *hypoxantha*, *femoralis*, and *inconstans*, p. 122, *formosa* and *fulvo-testacea*, p. 123, *luridula*, p. 124, Lefèvre, *l. c.*, Colombia; *C. diversa* and *chalybea*, p. xlviii., Therezopolis, *pruinosa*, ibid., *inquinata* and *anceps*, p. xlix., Sta. Cruz, *strigosa*, p. xlix., Rio Janeiro, *nigritarsis*, p. l., Barbacena, *id.* CR. Ent. Belg. xxi.

Aletes annulicornis, p. 124, *vagabundus*, *intricatus*, and *landolti*, p. 125, *bogotanus*, p. 126, *id.* MT. Münch. ent. Ver. ii., Colombia.

Otilca collaris, id. *l. c.* p. 128, Ocaña.

Chalcophana haroldi, *servula*, and *landolti*, p. 129, *puncticollis*, p. 130, *id. l. c.*, Colombia; *C. rufipennis*, Costa Rica, and *costatipennis*, Nicaragua, p. 144, *semi-rufa*, p. 988, and *uniformis*, p. 989, Costa Rica, Jacoby, P. Z. S. 1878.

Nodostoma concinnicolle, Jhelam Valley, and *plagiosum*, Murree, Baly, Cist. Ent. ii. p. 373.

Scelodonta natalensis, Pt. Natal, and *jacobyi*, Nyassa, *id.* Ent. M. M. xiv. p. 177 [the last = *vicina*, Har.; E. v. Harold, Pet. Nouv. ii. p. 206]; *S. simoni*, id. J. L. S. xiv. p. 251, Rockhampton.

Aoria mouhoti, id. J. L. S. xiv. p. 247, Cambodia.

Habrophora tibialis, Lefèvre, MT. Münch. ent. Ver. ii. p. 130, Colombia.

Leprotes fulca, p. 250, Coast of Tartary, *lewisi*, p. 251, China and Japan, Baly, J. L. S. xiv.

Pseudocolaspis longicollis, p. 259, S. India, *lefevrii*, p. 260, Arabia, Persia, *femorata*, p. 261, S. Africa, *id. l. c.*

Spharopis humeralis, Lefèvre, *l. c.* p. 130, Colombia.

Trichostola grossa, Harold, MB. Ak. Berl. 1878, p. 222, Zanzibar.

Metachroma maculipenne, E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 366, Florida; *M. cuprea* [*-reum*], Provancher, Nat. Canad. x. p. 383, Quebec.

Colasposoma tibiale and *varians*, Baly, Ent. M. M. xiv. p. 178, Nyassa; [the last = *instabile*, Har.; E. v. Harold, Pet. Nouv. ii. p. 206]; *C. sellatum*, id. J. L. S. xiv. *l. c.* p. 254, W. Australia.

Argolis steinheili, Lefèvre, *l. c.* p. 131, Colombia.

Glyptoscelis longior, Le Conte, Bull. U. S. Geol. Surv. iv. p. 462, Idaho.

Pachnephorus torridus, R. Niger, *bretinghami*, India, p. 256, *lewisi* and *porosa*, p. 257, China, Baly, J. L. S. xiv.

Typophorus atripennis, Therezopolis, and *geniculatus*, Barbacena, Lefèvre, CR. Ent. Belg. xxi. p. l.; *T. steinheili* and *exilis*, id. MT. Münch. ent. Ver. ii. p. 132, Colombia; *T. æneipennis*, Baly, Tr. E. Soc. 1878, p. 296, Para.

Paria vittaticollis, Baly, Tr. E. Soc. 1878, p. 297, Bahia; *P. cuprescens*, id. Cist. Ent. ii. p. 374, Jhelam Valley.

Syagrus rugifrons, id. J. L. S. xiv. p. 263, S. Africa.

Rhembastus parcidens, Harold, *l. c.* p. 221, Zanzibar.

Menius costatus, p. 178, Cameroons, *murrayi*, Old Calabar, and *concinnicollis*, Nyassa, p. 179, Baly, Ent. M. M. xiv. [the last = *Rhembastus puncticollis*, Har.; Harold, Pet. Nouv. ii. p. 206].

Eurydemus jansoni, Baly, J. L. S. xiv. p. 258, Cameroons.

Bedelia persica, id. *l. c.* p. 259, Persia.

Chrysochares æneus, E. Ballion, Bull. Mosc. liii. (1) p. 377, Kuldja.

Colaspoides viridicornis and *varicolor*, Lefèvre, MT. Münch. ent. Ver. ii. p. 133, Colombia; *C. viridicollis*, Jacoby, P. Z. S. 1878, p. 144, Amazons; *C. dorsata*, p. 293, Para, *ornata*, Brazil, and *deyrollii*, New Friburg, p. 294, Baly, Tr. E. Soc. 1878.

Ocnus pallidus, Baly, J. L. S. xiv. p. 255, W. Australia.

Chrysomelides.

Gastrophysa raphani. Observations on its pupation; J. A. Osborne, Ent. M. M. xv. p. 106.

Lina populi. On the noxious exhalation of its larvæ, which appears to have a deadly effect on other insects; B. Haase, Ent. Nachr. iv. p. 228.

Chrysomela cerealis swarming on box-trees; Chabon, Pet. Nouv. ii. p. 195.

The Syrian *C. angelica*, Rche., from Sind Valley; Baly, Cist. Ent. ii. p. 375.

Doryphora 10-*lineata*. Various notes in CR. Ent. Belg. xx. pp. li. & lvii. At Cape Rouge; Nat. Canad. x. pp. 185, 215 (the Canadian winter proved too rigorous for the beetle), 248, 254. On the different forms and allied species; F. Westhoff, Ent. Nachr. iv. pp. 113–118. (G. Kraatz, thereon, *tom. cit.* p. 131.) On its distribution in N. America; F. Katter, *tom. cit.* p. 265. Fowls acquire an appetite for this beetle, which is at first repugnant to them, and then they reduce the numbers considerably; the insect will feed on *Solanum dulcamara*: J. E. Bates, Canad. Ent. x. pp. 100, 137. It also eats *Hyoscyamus*; H. H. Crofts, *tom. cit.* p. 140. J. Passow (Kassel: 1878, fo.) figures the Colorado beetle in its different stages.

New species:—

Lina ignitincta, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 135, Central China.

Paralina impressiuscula, id. *ibid.*, Central China.

Spharolina davidis, id. *l. c.* p. 134, Central China.

Chrysomela cyano-purpurea, p. 379, *nigro-vittata*, p. 380, *marginicollis*, p. 382, *fulvipes*, p. 383, *ovipennis*, p. 384, E. Ballion, Bull. Mosc. liii. (1) Kuldja; *C. jacobyi*, Baly, Ann. N. H. (5) i. p. 38, Shantung; *C. atro-virens*, J. Frivaldszky, Term. köslem. xiii. p. 388, Hungary; *C. monti-vagans*, Le Conte, Bull. U. S. Geol. Surv. iv. p. 463, Mt. Lincoln.

Chrysomela (*Calligrapha*) *cephalanthi*, E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 366, Florida.

Calligrapha violaceo-maculata, Jacoby, P. Z. S. 1878, p. 147, Costa Rica.

Doryphora flavo-guttata and *punctipennis*, p. 145, Costa Rica, *flavo-marginata*, p. 146, and *insularis*, p. 147, Peru, *dorso-maculata*, p. 146, Nicaragua, *brunneipennis* and *flavipennis*, p. 989, *vittatipennis* and *porosa*, p. 990, *militaris*, p. 991, Colombia, *hybrida*, p. 991, Peru, *ocellata*, ibid., and *decorata*, p. 992, ? Costa Rica, Jacoby, l. c.; *D. modesta*, p. 86, and *waterhousii*, p. 87, Santarem, *chapuisi*, p. 87, Peru, Baly, Ann. N. H. (5)

ii.; *D. verrucosa*, p. 351, New Friburg, *buckleyi*, p. 352, and *jacobyi*, p. 354, Ecuador, *undulata*, p. 353, and *mœsta*, p. 354, Colombia, *dorso-maculata* (Jacoby, MS.), p. 353, Bahia, *id.* J. L. S. xiv.

Polysticta simonsi, Baly, Ent. M. M. xiv. p. 204, Nyassa.

Deuterocampta saundersi, id. J. L. S. xiv. p. 356, Brazil.

Labidomera imperialis, id. *l. c.* xiv. p. 355, Rio Janeiro.

Horatopyga carinata, id. Ent. M. M. xiv. p. 204, Cape of Good Hope.

Phyllocharis eximia and *jansoni*, id. Ann. N. H. (5) i. p. 39, Rockhampton, Queensland.

Phratora abdominalis, id. Cist. Ent. ii. p. 375, Murree.

Halticides.

Bargagli, Piero. La Flora delle Altiche in Europa. Bull. Ent. Ital. x. pp. 43–73, 126–142 (pt. 1); 143–153 (pt. 2); 204–215 (pt. 3); p. 216 (pt. 4); table (pt. 5).

The first part, after some general observations on the larvæ of the *Halticides* and the families of plants principally attacked by the prominent genera, contains biological data on the European species of which the food-plants or earlier stages are known, reproducing descriptions of larvæ from earlier authors; the second part gives a classified list of the beetles followed by the plants they respectively attack; and the third a botanically arranged list of the plants, with the beetles feeding on them. The fourth and fifth parts are tables showing the numerical relation between the families of plants and the species of *Halticides*, and *vice versâ*.

Graptodera lythri and its varr.; K. Letzner, JB. schles. Ges. liv. [1877] p. 216.

Orchestris, Kby., refers to *Disonycha*, and not *Phyllotreta*, and should be dropped; J. L. Le Conte, P. Am. Phil. Soc. xvii. p. 615.

Dibolia area, Melsh., very injurious to plantains in Massachusetts; S. H. Scudder, Psyche, ii. p. 154.

Psylloides chrysocephala. Notes on its economy and transformations; E. A. Ormerod, Ent. xi. pp. 217–220, figs. 1 & 2.

New genera and species:—

Niphræa, Baly, Ann. N. H. (5) i. p. 40. Closely allied to *Trichaltica*, but with the basal transverse groove extending entirely across the thorax. *N. hirtipennis*, ibid., Nyassa. The genus = *Eriotica*, Har., and the species = *fuscipennis*, Har.; E. v. Harold, Pet. Nouv. ii. p. 206.

Eutheca, Baly, Ent. M. M. xiv. p. 204. Closely allied to *Blepharida*, but with simple claws. *E. haroldi*, p. 205, Nyassa.

Arsipoda erichsoni, id. Ann. N. H. (5) ii. p. 232, Tasmania.

Podagrica robusta, Ballion, Bull. Mosc. liii. (1) p. 386, Kuldja.

Systena pallipes, Schwarz, P. Am. Phil. Soc. xvii. p. 367, Florida; *S. oberthuri*, Baly, *l. c.* p. 229, Panama.

Prasonia haroldi, Baly, *l. c.* p. 230, Paraguay.

Phygasia dorsata, id. *l. c.* p. 231, Kasia Hills, India.

Chætocnema crenulata and *quadricollis*, Schwarz, *l. c.* p. 368, Florida; *C. pinguis*, p. 417, *obesula*, p. 418, Florida, *protensa* and *cylindrica*, p. 417,

and *flavicornis*, p. 418, Michigan, *opacula*, California, and *decipiens*, Kansas, p. 418, *cribrata*, p. 419, Massachusetts, *rudis*, p. 615, Lake Superior, Le Conte, *tom. cit.*

Epitrix brevis, Schwarz, *l. c.* p. 367, Florida.

Haltica sansibarica, Harold, MB. Ak. Berl. 1878, p. 222, Zanzibar.

Disonycha fenestrata, Baly, *l. c.* p. 229, Colombia.

Phyllotreta robusta, Le Conte, *l. c.* p. 614, Detroit.

Hyphasis (Har., rechar.) *coccinelloides*, p. 312, and *picipennis*, p. 313, Sarawak, *bipustulata*, p. 313, Celebes and Burma, *nigricornis*, p. 314, N. India, *wallacii*, Malacca, and *bevani*, S. India, p. 315, Baly, *op. cit.* i.

Œdionychis mouhoti, p. 316, Siam, *pretiosa*, ibid., *circumcincta*, p. 318, *clarki*, p. 319, *rugiceps*, p. 320, *nigro-lineata*, p. 321, Brazil, *porosa*, p. 317, *limbata*, p. 318, Ecuador, *recticollis*, p. 319, *chevrolati*, p. 322, Mexico, Baly, l. c.; *Œ. bitæniata*, p. 223, *elegans*, p. 224, *posticata* and *crassa*, p. 225, *germari* and *spilota*, p. 228, Brazil, *seriata*, p. 225, Guatemala, *natalensis*, p. 226, Pt. Natal, *id. op. cit.* ii.; *Œ. indigoptera* [vox hybr.], Le Conte, *l. c.* p. 416, Florida.

Physoma violaceipennis, Baly, Ent. M. M. xiv. p. 204, Nyassa.

Myrcina spectabilis, id. Ann. N. H. (5) ii. p. 232, Madagascar; *M. chapuisi*, id. Ent. M. M. xiv. p. 205, Nyassa (= *acutangula*, Har.; Harold, Pet. Nouv. ii. p. 206).

Argopus balyi, Harold, Deutsche E. Z. 1878, p. 88, Japan.

Sphæroderma opima [*-mum*], Le Conte, *l. c.* p. 417, N. Carolina and Texas (the first American species of the genus).

Argopistes scyrtoides, id. *l. c.* p. 416, Florida.

Galerucides.

Galeruca decora swarming in millions on Mt. Washington; E. P. Austin, P. Bost. Soc. xix. p. 250.

Galeruca crataegi for four or five years regularly swarming from Feb. to June in a house at Melun; M. Girard, Bull. Soc. Ent. Fr. (2) viii. p. xciv.

New genera and species:—

Prasyptera, Baly, Ann. N. H. (5) ii. p. 411. Closely allied to *Astena*, but with shorter third joint to the antennæ. *P. wallacii*, New Guinea, Dorey, *distincta*, Wagiou, p. 412, *ornata*, New Guinea, Aru Islands, *approximata*, Malay Peninsula, p. 413, *haroldi*, p. 414, Batchian, *id. l. c.*

Megalognatha, id. *l. c.* p. 416. Separated from *Malacosoma* by the strongly exserted head, unarmed apices to the tibiæ, and shorter inflexed elytral limb. *M. elegans* and *cavicollis*, p. 416, *suturalis*, p. 417, *bohemani*, p. 418, *ventricosa* and *subcylindrica*, p. 419, South Africa, *rufiventre* [*-ter* vel *-tris*], p. 420, Nyassa.

Charæa, id. Cist. Ent. ii. p. 376. Facies of *Aphthona*, but with slender hind thighs. *C. flaviventre* [*-ter* vel *-tris*], ibid., Murree.

Macrima, id. *l. c.* p. 377. Strongly resembling *Aulacophora*, but with closed anterior acetabula and appendiculated claws. *M. armata*, ibid., Jhelam Valley.

Anthraxantha, [presumably] Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 137. Near *Stenoplatys*, but with third joint of antennæ shorter than

fourth, the rest quite filiform, thorax not dilated laterally, and elytral epipleura not prolonged to the sutural angle. *A. davidis*, id. *ibid.*, Central China.

Triaplatarthris [*Tetraplatarthrus*, vel *Tetraplatyarthrus*, from the characters], [do.] Fairmaire, *l. c.* p. 138. With joints 3, 4, 5, & 6 of antennæ flattened and enlarged. *T. pyrochroides*, id. *ibid.*, Central China.

Malaxia, [do.] *id. l. c.* p. 139. *Atysites*, with third joint of antennæ (which are distinctly shorter than the body) sub-equal to the fourth, first joint of hind tarsi as long as the three following together, &c. *M. flavovirens*, id. *ibid.*, Central China.

Aulacophora scutellata, p. 205, and *æneipennis*, p. 206, Baly, Ent. M. M xiv., Nyassa (the last = *Asbecesta cyanipennis*, Har.; E. v. Harold, Pet. Nouv. ii. p. 206).

Diabrotica sexpunctata, p. 148, *fusco-marginata*, p. 149, Costa Rica, *ventricosa*, p. 148, Panama, *multi-punctata*, Mexico, and *nigro-lineata*, Guatemala, p. 149, *viridimaculata*, Cayenne, and *gracilis*, Brazil, p. 150, *nigro-maculata*, ibid., and *variolosa*, p. 151, Ecuador, *peruana* and *sexplagiata*, p. 151, Peru (the latter also Panama), *waterhousii*, p. 993, *novemmaculata*, p. 995, and *costatipennis*, p. 996, Costa Rica, *jansoni*, p. 994, Nicaragua, *fusco-maculata*, ibid., Nicaragua, Bogota, and var. from Guatemala, *nigro-vittata*, p. 995, Mexico and Guatemala, Jacoby, P. Z. S. 1878; *D. vincta*, Le Conte, P. Am. Phil. Soc. xvii. p. 416, Florida.

Agelastica orientalis, Baly, Cist. Ent. ii. p. 379, Sanju.

Malacosoma flaviventre, id. *ibid.*, Murree.

Mimastra gracilis, id. *l. c.* p. 378, Murree; *M. soreli*, p. 414, *costata*, p. 415, id. Ann. N. H. (5) ii., China.

Scelida balyi, Jacoby, *l. c.* p. 993, no locality.

Chthoneis bivittata and *albicollis*, p. 421, *grayi*, p. 422, Baly, Ann. N. H. (5) ii., Brazil.

Lyperodes erythrocephala, id. Cist. Ent. ii. p. 380, Murree.

Calomera atro-carulea, Jacoby, *l. c.* p. 152, Peru, Panama.

Adimonia hungarica, Frivaldszky, Term. közlem. xiii. p. 340, Hungary.

Galeruca vittatipennis, p. 380, Pamir, *indica*, p. 381, Murree and N. India, Baly, Cist. Ent. ii.; *G. æneascens*, Fairmaire, Ann. Soc. Ent. Fr. (5) viii. p. 140, Central China.

Galerucella placida, Baly, Cist. Ent. ii. p. 381, Jhelam Valley.

Leptarthra collaris, id. Cist. Ent. ii. p. 382, Murree & N. India.

Cerotoma nigro-fasciata, Jacoby, *l. c.* p. 996, Costa Rica, Guatemala.

Eustetha seriata, Fairmaire, *l. c.* p. 136, Central China.

Hispides.

Xiph [*oh*] *ispa*, g. n., F. Chapuis, CR. Ent. Belg. xxi. p. cxlv. *Cryptonychites*: a special form, connecting the Australian *Eurychispites*, the African *Cryptonychi*, and the Malaysian *Oxycephala*. For *X.* [*Cœlænomenodera*] *coquereli*, Fairm., Madagascar.

Cephalolia gracilis and *subdepressa*, spp. nn., Baly, Ann. N. H. (5) i. p. 41, Amazons.

Gonophora tibialis and *lineata*, p. 42, Sulu Islands, *horsfieldi*, Java, and *crassipes*, Kai Island, p. 43, spp. nn., *id. l. c.*

Microrrhopala floridana, sp. n., E. A. Schwarz, P. Am. Phil. Soc. xvii. p. 369, Florida.

Cephalodonta haroldi, sp. n., Baly, *l. c.* p. 44, Colombia.

Cassidides.

Omoplata weyenberghi, sp. n., C. A. Dohrn, S. E. Z. xxxix. p. 452, Tucuman.

Pœcilaspis discedens, sp. n., *id. l. c.* p. 453, Catamarca.

Mesomphalia cribellata, sp. n., *id. l. c.* p. 455, Buenos Aires.

Erotylidæ.

Ægithus walckenaeri, Lac., omitted from Munich Cat., is from Bahia, and its description amended; C. A. Dohrn, S. E. Z. xxxix. p. 364.

Episcapha cæca, F., *E. repanda*, Klug, *nec* Lac., *Erotylus incertus*, Lac., *Morphoides klugi*, Lac., *M. bilineatus*, Dup., and *Homœotelus umbonatus*, Lac., varr.; various observations by Dohrn, *l. c.* pp. 444–451.

Megalodacne ulkei, Crotch. Economy and transformations in *Polypora*, Kentucky; C. Dury, Canad. Ent. x. p. 210.

Cryptodacne, g. n., Sharp, Ent. M. M. xv. p. 82. Combines the characters of *Triplax*, *Dacne*, and *Cryptophagus*, differing from the first in its less clavate antennæ, very coarsely facetted eyes, and decidedly pentamerous tarsi. For *C. synthetica*, sp. n., id. *ibid.*, Tairua, New Zealand.

Languria marginipennis, sp. n., Schwarz, P. Am. Phil. Soc. xvii. p. 357, Florida.

Megalodacne magnifica, sp. n., Harold, MT. Münch. ent. Ver. ii. p. 111, W. Central Africa.

Episcapha schweitzeri, p. 447, and *neutra*, p. 448, Monrovia, *chapuisi*, p. 449, Burma, spp. nn., Dohrn, *l. c.*

Tritoma univestris, sp. n., Reitter, Verh. Ver. Brünn, xvi. p. 166, pl. iv. fig. 31, Suram.

Coccinellidæ.

Coccinella artemisiæ, Woll., is separate from *bis-octo-notata*, Muls.; Dohrn, S. E. Z. xxxix p. 461.

Scymnus balteatus, p. 399, and *quadritæniatus*, p. 400, Le Conte, P. Am. Phil. Soc. xvii., Florida; *S. nigripennis*, id. Bull. U. S. Geol. Surv. iv. p. 453, Colorado; *S. tricolor*, Harold, Deutsche E. Z. 1878, p. 87, Japan: spp. nn.

Brachyacantha querceti, sp. n., Schwarz, P. Am. Phil. Soc. xvii. p. 362, Florida.

Hyperaspis paludicola, sp. n., *id. l. c.*, Florida.

Œneis pallida, sp. n., Le Conte, P. Am. Phil. Soc. xvii. p. 400, Florida.

Pentilia misella, Lake Superior, New York, Illinois, Florida, *marginata*, Lake Superior, and *ovalis*, Florida, spp. nn., *id. l. c.* p. 400.

Alexia punctata, sp. n., Reitter, Deutsche E. Z. 1878, p. 63, South Hungary.

HYMENOPTERA.

BY

W. F. KIRBY, M.E.S., &c.

THE GENERAL SUBJECT.

ANDRÉ, E. Voyage d'un Naturaliste. Deux kilomètres en six heures (suites). Feuil. Nat. viii. pp. 6, 25–27, 59, 60, 77–80, 104.

Chiefly relates to *Hymenoptera*.

CAMERON, P. A Contribution to the *Hymenoptera* of Sutherlandshire. P. Glasg. Soc. iii. pp. 248–253.

Remarks on the most interesting species observed, followed by a list of the *Tenthredinidæ*, *Cynipidæ*, and *Aculeata*.

CHAMBERS, V. T. On the tongue (lingua) of some *Hymenoptera*. J. Cinc. Soc. N. H. i. pp. 40–52.

The writer considers that he has proved the tongue of bees to be a tubular suctorial instrument.

CRESSON, E. T. Descriptions of new species of North American Bees. P. Ac. Philad. 1878, pp. 181–221.

——. Descriptions of new North American *Hymenoptera* in the collection of the American Entomological Society. I.—Family *Apidæ*. Tr. Am. Ent. Soc. vii. pp. 61–136.

DALLA TORRE, K. v., & KOHL, F. F. Die Chrysiden und Vesparien Tirols. Ber. Ver. Innsb. viii. pp. 52–84.

65 *Chrysididæ* and 62 *Vespidæ* enumerated. No new species.

FÖRSTER, A. Ueber den systematischen Werth des Flügelgeäders bei den Hymenopteren. Aachen : 1877, 4to, pp. 33, pl.

After preliminary observations upon the systematic value of alar neuration in the *Insecta* as a whole, the author especially discusses it as regards *Hymenoptera*, referring also to similar work by prior entomologists. He describes the various margins, nerves, areas, and areolets, giving their synonymical equivalents in a useful table, and proposes the following new classification for the larger groups :—

Stirps i., SESSILIVENTRIS : Tribes (1) *Serrifera*, Hal., (2) *Urocerata*, Latr., (3) *Holonota* [nov., p. 19 ; no exponents mentioned].

.Stirps ii., MOBILIVENTRIS : *a*, legs with two more or less distinct tibial rings, Tribes (4) *Chalcidita*, Walk., (5) *Oxyura*, Hal., (6) *Gallicola*, Latr., (7) *Entomotilla*, Dum. [= *Braconidæ*], (8) *Stibocampa* [nov., p. 19 ; = *Ichneumonidæ*], (9) *A*[*n*]*cyrogastra* [nov., p. 20 ; = *Evaniidæ*], (10) *Eutrichocera* [nov., ibid. ; = *Stephanus*, Jur.], (11) *Diplomorpha* [nov. ibid. ; = *Trigonalys*, Westw.) ; *b*, legs with only one tibial ring, (12) *Cenoptera*, Hal., (13) *Chrysostilba* [nov., p. 20 ; = *Tubilifera*, Hal., *Chrysidiformia*, Dahlb.], (14) *Lestica*, Hal. [= *Fossores*], (15) *Diploptera*, Latr., (16) *mellifera*, Latr., (17) *Heterogyna*, Latr.

Thirty forms of alar neuration are figured.

FRITSCH, K. Kleine Monographien parasitischer Hymenopteren. Verh. Ver. Rheinl. xxxv. pp. 42–82.

Descriptions of a considerable number of new genera and species.

——. Jährliche Periode der Insectenfauna von Österreich-Ungarn Denk. Ak. Wien, xxxviii. pp. 97–166, pls. vi.

Deals with seasons, localities, comparative rarity, food plants, &c., of Austrian *Hymenoptera*, with elaborate lists, tables, and diagrams summing up the results.

MOCSÁRY, A. Data ad Faunam Hymenopterologicam Sibiriæ Musei Nationalis Hungarici. Tijdschr. Ent. xxi. pp. 198–200.

Contains a list of species collected by Kindermann in Siberia, and contained in the Hungarian Museum. Four new species are described.

——. Mellifera Nova in Collectioni Musæi Nationalis Hungarici. Term. füzetek, ii. pp. 15–19, 113–123.

MORAWITZ, F. Nachtrag zur Bienenfauna Caucasiens. Hor. Ent. Ross. xiv. pp. 1–112.

Contains the results of a tour in the Southern Caucasus in 1876. Many new species are described, in addition to the following known species or new varieties : *Bombus raiellus*, Kirb., var. p. 19 ; *Anthophora pedata*, Eversm., var., p. 20, *A. caucasica*, Radoszk., redescribed, p. 23 ; *A. radoszkovskii*, Fedtsch., = *liturata*, Lep., ♀, p. 26, *ruficornis*, Fedtsch., redescribed, p. 31 ; *Eucera melanocephala*, Mor., var., p. 37 ; *Megachile fasciata* and *rufitarsis*, Smith, = *ericetorum*, Lep., ♂, ♀ ; *Andrena fonscolombii*, Dours, redescribed, p. 62, *A. flava*, Fabr., var., p. 78, *A. albopicta*, Rad., redescribed, p. 87, *A. megacephala*, Smith, noticed, p. 89 ; *Hylæus marginatus*, Thoms., = *subfasciatus*, Först., = *difformis*, Eversm., p. 100 ; *Nomada calabra*, Mor., amended description, and *N. chrysopyga*, Mor., var., p. 110. Altogether 453 species are enumerated ; but the notices of the greater part are simply confined to localities.

PROVANCHER, L. Faune Canadienne. Les Insectes Hyménoptères. Nat. Canad. x. pp. 11–18, 47–58, 65–73, 97–108, 161–170, 195–209, 225–238, 257–273, 289–299, 349–365. The *Tenthredinidæ*, *Urocerida*, *Evaniidæ*, and *Ichneumonidæ* of Canada are described as far as the genus *Ichneumon*.

RONDANI, C. Repertorio degli Insetti Parassiti e delle loro Vittime con

note ed Osservazioni. Bull. Ent. Ital. x. pp. 9–33, 91–112, 161–178.

Includes parasites (chiefly Hymenopterous) on *Lepidoptera*, *Coleoptera*, *Hymenoptera*, *Diptera*, *Hemiptera*, and *Acari*.

Rudow, F. Hymenopterologische Mittheilungen. Z. ges. Naturw. (3) iii. pp. 231–244.

A rambling paper, including the description of a new *Libellula* [!]. The notes relating to *Hymenoptera* are as follows: *Cimbex fagi*, Zadd. (transformations described), = *C. betulæ*, Zadd., var.; *C. sorbi* and *betuleti*, small varr., noticed; *Nematus valisnierii*, Hart, redescribed; *Stizus tridens* redescribed; *Bembex integra*, Fabr., redescribed; notes on gall-insects, &c.

Saunders, E. Remarks on the hairs of some of our British *Hymenoptera*. Tr. E. Soc. 1878, pp. 169–172, pl. vi.

The writer describes the varieties of structure which occur in various British Bees. He believes that plumose or branched hairs only occur in the *Anthophila*, and are designed for collecting pollen, but has not yet found them to be of any value in classification.

Smith, F. List of new *Hymenoptera* obtained by O. Lemborg, east of Moulmein, Tenasserim Province, during the months of December, 1876, and January, March, and April, 1877, with descriptions of new species. J. A. S. B. xlvii. 2, pp. 107–109.

21 species, 4 new.

——. Descriptions of new species of Hymenopterous Insects from New Zealand, collected by Prof. Hutton, at Otago. Tr. E. Soc. 1878, pp. 1–7.

Thomson, C. G. Hymenoptera Scandinaviæ. Tom. iii. (*Vespa*, *Sphex*, et *Mutilla*, Linn.), pp. 295; tom. iv. pp. 259, and tom. v. pp. 307 (*Pteromalus*, Swed.). Lund: 1874, 1876, and 1878, 8vo. [For vol. iv. pp. 1–192, inclusive, *cf.* Zool. Rec. xii. (1875) p. 397 *et seq.*]

The Swedish species are treated in the same comprehensive manner as before; but there appear to be frequent unnecessary changes of specific names, and the extent to which "subgenera" are employed is inordinately large. Vol. v. contains plate of details.

Vollenhoven, S. C. Snellen van. Pinacographia [Zool. Rec. xi. p. 444, xii. p. 384, xiv. *Ins.* p. 96]. Part 6, pp. 41–48, pls. xxvi.–xxx.; part 7, pp. 49–56, pls. xxxi.–xxxv. s'Gravenhage: 1878, 4to.

——. Espèces nouvelles ou peu connues d'Hyménoptères Térébrants. Tijdschr. Ent. xxi. pp. 153–177, pls. ix.–xi.

J. de Bellesme remarks on the buzzing of insects. They produce a sharp and grave sound, the latter by vibrations of the wings during flight, the former when at rest by agitation of the muscles of the thorax. Bull. Sci. Dép. Nord, (2) i. p. 312 [*cf.* also *anteà*, p. 8].

Y. K. Brandt publishes a paper on the nervous system of the *Hymenoptera*; Troudy Ent. Ross. ix. pp. 181–215, woodcuts. It is entirely in Russian.

G. Schoch argues that the *Hymenoptera* are the highest insects; MT. schw. ent. Ges. v. pp. 291–293.

Notes on new and rare *Hymenoptera* captured during the year 1877; F. Smith, Ent. xi. pp. 16–18.

C. W. Dale (History of Glanville's Wootton [*anteâ*, p. 14], pp. 40–79) enumerates 631 of the 4118 British species of *Hymenoptera* as found in his district. No new species are described.

K. v. Dalla Torre has completed his Catalogue of the *Apidæ* of Tyrol; Z. Ferdinand (3), Heft 21, pp. 161–196. The following varieties are noticed:—*Anthophora albigena*, Lep., var. *nigrithorax*, *A. parietina*, Fabr., var. *schencki*, p. 162, *Tetralonia salicariæ*, Lep., vars. *albiclypeata* and *flaviclypeata*, p. 163, *Nomada sexcincta*, Panz., var. *mixta*, p. 165, *Panurgus calcaratus*, Scop., var. *nigricornis*, p. 169, *Halictus leucozonius*, K., var. *nigritibialis*, p. 178, *H. tetrazonius*, Klug, var. *nitens*, p. 179, *H. cylindricus*, Fabr., var. *rhodostoma*, p. 180, *H. vulpinus*, Nyl., var. *nigriclypeata*, p. 181, *H. smeathmanellus*, K., var. *alpigena*, p. 183, *H. morio*, Fabr., var. *basalis*, p. 184, *Sphecodes fuscipennis*, var. *basalis*, p. 185, *Prosopis annulata*, L., var. *tristis*, p. 186, *P. hyalinata*, Sm., var. *lugubris*, p. 187, and *Anthidium manicatum*, L., var. *nigrithorax*, p. 193.

Additions to the fauna of Mecklenburg (*Tenthredinidæ* and *Urocerida*); R. Rudow, Arch. Ver. Mecklenb. xxxi. pp. 113–115.

Captures of *Hymenoptera* in the Upper Engadine; C. Giebel, Z. ges. Naturw. (3) ii. p. 214.

List of *Hymenoptera* occurring in Gudbrandsdal and Dovrefjeld; W. M. Schøyen, Nyt. Mag. Vidensk. xxiv. pp. 211–217 (119 species).

Additions to list of Hungarian *Hymenoptera*; A. Mocsáry & J. Frivaldszky, Term. közlem. xiii. pp. 166–172, 347–363.

List of *Hymenoptera* occurring in the provinces of Bihar and Hajdu, in Hungary; A. Mocsáry, *op. cit.* xiv. pp. 39–52.

Captures in Northern Hungary; *id. l. c.* pp. 246–285.

List of a few *Hymenoptera* captured in Transcaucasia; O. Schneider, Beitr. Kaukasusländer [*anteâ*, p. 9], pp. 91–93.

List of *Hymenoptera* captured during the expeditions to Western Yunnan; F. Moore, Anderson's Researches, pp. 916–919. The following species are redescribed and figured:—*Vespa bellona*, Smith, p. 917, fig. 9, *Bombus impetuosus*, Smith, fig. 11, and *Apis laboriosa*, Smith, fig. 10, p. 918, pl. lxxxi.

C. J. S. Bethune continues his reprint of descriptions of *Hymenoptera* from Kirby's "Fauna Boreali-Americana;" Canad. Ent. x. pp. 116–118.

Captures of *Hymenoptera* in Antigua and Martinique; T. A. Marshall, P. E. Soc. 1878, pp. xxxi.–xxxiii.

Woodcuts of fossil *Hymenoptera* from Heer; Sci. Goss. xiii. p. 84.

S. H. Scudder notices the following fossil *Hymenoptera* from the Green River shales:—*Lasius torrens* (sp. n.), p. 747, *Myrmica*, sp., and *Bracon laminarum* (sp. n.), p. 748, and *Decatoma antiqua* (sp. n.), p. 749; Bull. U. S. Geol. Surv. iv.

APIDÆ.

Andrenides.

Halictus quadricinctus, Fabr., and *Sphecodes gibbus*, L. These live

together in one nest, but it is still doubtful if the latter is a true parasite; W. Breitenbach, S. E. Z. xxxix. pp. 241–243, woodcuts.

New species:—

Colletes farinosa and *squamosa*, F. Morawitz, Hor. Ent. Ross. xiv. pp. 96 & 97, Caucasus.

Dasycolletes hirtipes, F. Smith, Tr. E. Soc. 1878, p. 7, Otago, New Zealand.

Hylæus ibex, Morawitz, *l. c.* p. 99, Caucasus.

Megacilissa mexicana, Mexico, and *electa*, Georgia, E. T. Cresson, P. Ac. Philad. 1878, p. 221.

Macropis frivaldskii, A. Mocsáry, Term. füzetek, ii. p. 119, Hungary.

Halictus alpestris, *corvinus*, and *truncaticollis*, Morawitz, *l. c.* pp. 90–92, Caucasus.

Nomia fugax, id. *l. c.* xiv. p. 93, Caucasus.

Andrena carinata, p. 62, *ranunculorum*, p. 64, *fuscocalcarata*, p. 66, *tomentosa*, p. 67, *sexguttata*, p. 68, *truncatilabris*, p. 69, *paliuri*, p. 71, *rotundilabris*, p. 72, *bisulcata*, p. 73, *cordialis*, p. 74, *tenuis*, p. 76, *formosa*, p. 78, *laticeps*, p. 79, *sylvatica*, p. 81, *melanura*, p. 82, *salicina*, p. 83, *jugorum*, p. 84, *inconstans*, p. 86, *id. l. c.*, Caucasus.

Melitta curiosa, id. *l. c.* xiv. p. 60, Caucasus.

Cilissa budensis, Mocsáry, *l. c.* p. 120, Buda.

Apides.

Osmia and parasites; J. Lichtenstein, Feuil. Nat. viii. p. 91.

Ceratina. Notes on captures of hibernating species near Marseilles, and on their peculiar odour and sexual distinctions; F. Ancey, Pet. Nouv. ii. p. 114.

Epeolus mercatus, Fabr., redescribed; E. T. Cresson, Tr. Am. Ent. Soc. vii. p. 88.

Euglossa cordata. Observations on its nest. It is probably not a parasitic species. H. Lucas, &c., Bull. Soc. Ent. Fr. (5) viii. pp. cxlii.–cxliv.

Flowers frequented by hive and humble bees; T. Mc. Gann, Sci. Goss. xiii. p. 44.

Dalla Torre, K. W. v. Bemerkungen zur Gattung *Bombus*, Latr. Ber. Ver. Innsb. viii. pp. 3–21.

He enumerates the *Bombi* found in Tyrol and Upper Austria, and describes the nests of several species. The following varieties are described:—*B. hortorum*, var. *meridionalis*, from the Southern Alps, p. 13, *B. terrestris*, var. *angustifas* [*c*] *iata*, *lineatifasciata*, and *neglecta*, from Tyrol, p. 14, and *B. mesomelas*, var. *wendica*, from the Isel Valley, p. 15, and *B. terrestris*, var. *semiferruginosus*, from Upper Austria, p. 20.

Radoszkowsky, O. Essai d'une nouvelle methode pour faciliter la détermination des espèces appartenant au genre *Bombus*. Bull. Mosc. liii. pt. i. pp. 76–91, pls. ii. A & ii. B.

Consists wholly of a table, giving the results of an examination of the length of the palpi and wings in the various species (*cf.* his former

paper, noticed in Zool. Rec. xiv. *Ins.* pp. 97 & 98). The plates are almost entirely devoted to figures of the palpi.

Schmiedeknecht, O. Monographie der in Thüringen vorkommenden Arten der Hymenopteren-Gattung *Bombus*, mit einer allgemeinen Einleitung in dieses Genus. Jen. Z. Nat. xii. pp. 303–430, pls. x. & xi.

In the introductory portion of his paper, the writer treats of the literature, habits, geographical distribution, &c., of *Bombus*. Nineteen species are described in the special part. The plates represent the male genital organs.

On the proposed importation of humble-bees into New Zealand; T. Belt, Sci. Goss. xiv. pp. 89 & 90.

Bombus sylvarum. Its nests so numerous as to interfere with mowing; T. H. Hart, Ent. xi. pp. 256 & 257.

Müller, F. Die Königinnen der Meliponen. Kosmos, iii. pp. 228–231.

The females of several species of *Melipona*, of which the drones and workers differ widely, resemble each other closely. The genera *Melipona* and *Trigona* are scarcely separable.

Girard, M. Les Abeilles, organes et fonctions, éducation et produits. Paris: 1878, 12mo, 1 col. pl. & woodcuts.

On the parthenogenesis of bees in relation to the production of drones; J. Perez & A. Sanson, C. R. lxxxvii. pp. 408 & 659, Ann. N. H. (5) ii. pp. 428 & 429, 497 & 498.

Remarks on the reproduction of hive-bees, &c.; M. Girard & J. Perez, Bull. Soc. Ent. Fr. (5) viii. pp. clxi. & clxii., cxlix. & cl., & clxxi.

On hybrid bees; J. Perez & M. Girard; C. R. lxxxvii. pp. 408–410, 755 & 756.

Behaviour of bees in a sudden shower; W. H. Penning, Sci. Goss. xiii p. 237. Their fondness for paint and smoke; Smith & Warner, *op. cit.* p. 189, & xiv. p. 213. Attracted by scented soap; H. Skeete, Scot. Nat. iv. p. 199.

Great healing properties said to be possessed by the sting of the bee; Augsburg. Abendzeitung, quoted in Ent. Nachr. iv. p. 240.

R. J. Bennett gives his experience of bee-keeping in Argyleshire during 1877; P. Glasg. Soc. iii. pp. 256 & 257.

Directions for acclimatising foreign races of bees; G. de Layens, Bull. Soc. d'Acclim. (3) v. pp. 217–220.

Cœlioxioides, g. n., E. T. Cresson, Tr. Am. Ent. Soc. vii. p. 94. Form of a narrow attenuated *Cœlioxys*; apex of abdomen stylated as in *Osyris*; neuration of fore wings very abnormal. Type, *C. punctipennis*, sp. n., *l. c.*, Mexico (neuration figured).

New species:—

Panurgus chalybæus, California. and *maurus*, Colorado, p. 61, *regularis*, California, *andrenoides*, Colorado, Texas, *nigrifrons*, Texas, and *margi-*

natus, Kansas, p. 62, *halictulus*, Colorado and Utah, and *fimbriatus*, Colorado, p. 63; E. T. Cresson, Tr. Am. Ent. Soc. vii.

Perdita (*Nomioides* ?) *zebrata* and *P. affinis*, Colorado, p. 69, *obscurata*, Georgia, and *interrupta*, California, p. 70; *id. l. c.*

Calliopsis coloradensis, p. 63, *zebratus* and *scitulus*, Colorado, and *edwardsi*, p. 64, *lateralis*, California, *pictipes*, Colorado, and *mexicanus*, Mexico, p. 65, *illinoiensis*, Illinois, and *pauper*, New York, Colorado, p. 66, *californicus* and *atriceps*, California, *atricornis* and *clypeatus*, Colorado, p. 67, *lepidus*, Georgia, and *abdominalis*, Texas, p. 68; *id. l. c.*

Macrotera texana, p. 70, and *megacephala*, Texas, *californica*, California, and *cephalotes*, Nevada, p. 71; *id. l. c.*

Osmia mandibularis, p. 102, *abjecta* and *nigrifrons*, Colorado, *faceta*, Canada, New York, &c., p. 103, *armaticeps*, Colorado, *quadriceps*, *maura*, and *cobaltina*, California, &c., p. 104, *coloradensis*, and *abnormis*, Colorado, *georgica*, Georgia, and *azteca*, Mexico, p. 105, *integra* and *marginipennis*, p. 106, *inurbana* and *bella*, Colorado, 4-*dentata*, New York, and *exigua*, California, p. 107, *id.* l. c.; *O. lapidaria*, p. 40, *subulicornis* and *campanularis*, p. 42, *nitidula*, p. 43, *minor* and *dentiventris*, p. 45, and *flavicornis*, p. 47, F. Morawitz, Hor. Ent. Ross. xiv., Caucasus; *O. affinis*, Frivaldszky, Term. közlem. xiii. p. 360, Hungary.

Chalicodoma hungarica[*-cum*], A. Mocsáry, Pet. Nouv. ii. p. 109 (1877), Buda.

Megachile totonaca, Mexico, p. 117, *mucida* and *gemula*, Georgia, p. 118, *palmeri*, Guadalupe Isl., California, *azteca*, Mexico, *sayi*, United States, p. 119, *fidelis*, p. 120, *mellitarsis*, Colorado, &c., *integra*, Texas, p. 121, *manifesta*, Colorado, *ingenua*, p. 122, *georgica* and *avara*, Colorado, &c., *otomita*, Mexico, p. 123, *addenda*, United States, *montivaga*, Colorado, p. 124, *deflexa*, Kansas, *texana*, Texas, and *generosa*, p. 125, *pinguis*, Georgia, &c., *mendica* and *relativa*, N. America, p. 126, *infragilis*, New York, *petulans*, N. Carolina, Georgia, *perbrevis*, Texas, *mexicana*, p. 127, *zapoteca*, *tuxtla*, and *tepaneca*, p. 128, *montezuma*, *toluca*, and *sumichrasti*, p. 129, *chinchimeca*, *cœlioxioides*, *zaptiana*, and *abacula*, p. 130, and *izucara*, p. 131, Mexico, E. T. Cresson, l. c.; *M. monstrifica*, p. 49, *pilicrus*, p. 52, *lævifrons*, p. 53, and *picicornis*, p. 55, F. Morawitz, *l. c.*, Caucasus; *M. bicoloriventris*, A. Mocsáry, Term. füzetek, ii. p. 122, Hungary.

Anthidium cognatum, Georgia, *aztecum*, Mexico, p. 109, *maculosum* and *mormonum*, Utah, &c., *montivagum*, p. 110, *jocosum*, Colorado, *atriventre*, California, *ridingsi*, Georgia, p. 111, *crassipes*, Florida, *edwardsi*, California, and *formosum*, p. 112, *venustum*, Colorado, and *texanum*, Texas, p. 113, *parvum*, Colorado, *pallidiventre*, California, p. 114, *lepidum*, Georgia, *ulkei*, Utah, and *gabbi*, Costa Rica, p. 115, *mexicanum*, *apicale*, *bivittatum*, p. 116, *toltecum* and *agnatum*, Mexico, E. T. Cresson, l. c.; *A. venustum* and *croceum*, F. Morawitz, *l. c.* pp. 57 & 59, Caucasus.

Alcidamea truncata, E. T. Cresson, *l. c.* p. 108, Georgia.

Chelostoma californicum, id. *l. c.*, California.

Heriades (?) *denticulatum*, id. *l. c.*, Colorado.

Ceratina mexicana and *azteca*, p. 131, *ignara* and *cobaltina*, p. 132, *id. l. c.*, Mexico.

Nomada edwardsi, California, *morrisoni*, Colorado, and *belfragii*, Texas,

p. 72, *zebrata*, Colorado, Kansas, *opposita*, California, and *adducta*, p. 73, *ridingsi*, Colorado, *affabilis*, New York, Illinois, *suavis*, California, Oregon, p. 74, *snowi*, Colorado, *heilighroldi*, Texas, *krugi*, Porto Rico, p. 75, *limata* and *mexicana*, p. 76, *pilosula*, New York, *scita*, Colorado, and *accepta*, Colorado, Kansas, p. 77, *vitticollis*, Mexico, *civilis* and *vicinalis*, p. 78, *fragilis*, Colorado, *rivalis* and *citrina*, California, p. 79, *munda*, *dilucida*, and *libata*, p. 80, *parata* and *pacata*, Colorado, *crotchi*, p. 81, and *melliventris*, California, *crudelis*, Georgia, p. 82, *id.* l. c.; *N. pectoralis*, p. 103, *coxalis*, p. 107, *emarginata*, p. 108, and *piliventris*, p. 110, F. Morawitz, *l. c.*, Caucasus.

Phiarus minutus, A. Mocsáry, Term. füzetek, ii. p. 118, Hungary.

Philoremus americanus, Canada, Colorado, *montanus*, Nevada, and *fulviventris*, California, p. 83, *P.* (?) *pulchellus*, Colorado, p. 84; E. T. Cresson, *l. c.*

Epeolus distinctus, Georgia, and *bardus*, Texas, p. 84, *zacatecus*, Mexico, *concavus* and *robustus*, New Mexico, &c., p. 85, *nevadensis*, Nevada, *californicus*, California, and *scelestus*, Texas, p. 86, *totonacus*, Mexico, *texanus*, Texas, and *occidentalis*, Colorado, p. 87, *tepanecus*, Mexico, and *lectus*, Kansas, p. 88, *agnatus* (? = *lectus*, ♂), Dacota Territory, *compactus*, Texas, Colorado, and *aztecus*, p. 89, *mexicanus*, Mexico, and *glabratus*, Georgia, p. 90; *id. l. c.*

Cœlioxys tolteca, Mexico, and *aperta*, p. 95, *deplanata*, Colorado, &c., *comstocki*, New York, p. 96, *chinchimeca*, Mexico, *lucrosa*, New York, Colorado, p. 97, *floridana*, Florida, *coloradensis*, Colorado, p. 98, *sodalis*, New York, Colorado, *mexicana* and *zapoteca*, p. 99, *azteca* and *tepaneca*, p. 100, *otomita*, p. 101, *totonaca*, Mexico, and *germana*, Illinois, p. 102; *id. l. c.*

Dioxys pannonica, A. Mocsáry, Pet. Nouv. ii. p. 109 [1877], Bu la.

Stelis australis, Georgia, *laticincta*, California, and *S.* (?) *nitida*, Canada, New York, p. 92, *subcærulea*, California, and *subemarginata*, p. 93, *monticola*, Colorado, p. 94; E. T. Cresson, *l. c.*

Crocisa elegans, F. Morawitz, *l. c.* p. 101, Caucasus; *C.* (?) *lata*, E. T. Cresson, *l. c.* p. 91, Texas.

Melecta californica and *pacifica*, p. 91, and *edwardsi*, p. 92, *id. l. c.*, California.

Osiris mexicanus and *marginatus*, i l. *l. c.* pp. 82 & 83, Mexico.

Eucera frivaldskii, A. Mocsáry, Pet. Nouv. ii. p. 109 [1877], Constantinople; *E. echii* and *perezi*, p. 277, *amplitarsis* and *parvicornis*, p. 278, *id. l. c.* (1878), Hungary; *E. paradoxa* and *pannonica*, id. Term. füzetek, ii. pp. 15 & 17, Hungary; *E. atriceps* and *discoidalis*, F. Morawitz, *l. c.* p. 37, Caucasus.

Tetralonia armeniaca and *acutangula*, F. Morawitz, Hor. Ent. Ross. xiv. pp. 33 & 35, Caucasus; *T. gabbi* and *apiculata*, E. T. Cresson, P. Ac. Philad. 1878, p. 220, Costa Rica.

Melissodes morosa, p. 193, *montezuma*, Mexico, *dubitata*, Georgia, p. 194, *nigrifrons* and *edwardsi*, p. 195, *californica*, California, *fulvitarsis*, p. 196, *frater*, Colorado, p. 197, *lepida*, Texas and Colorado, *speciosa*, Colorado, p. 198, *dilecta*, Texas and Colorado, *compta*, p. 199, *georgica*, Georgia, *coloradensis*, Colorado, p. 200, *petulca*, Georgia, p. 201, *montana*, Colorado,

&c., p. 202, *suffusa* and *fimbriata*, p. 203, *agilis*, Texas, *communis*, Georgia, Illinois, p. 204, *confusa*, Colorado, p. 205, *perplexa*, Georgia, Texas, p. 206, *condigna*, Illinois, Kansas, *stretchi*, p. 207, *actuosa*, California, *donata*, Mexico, *trifasciata*, Porto Rico, p. 208, *albilabris* and *otomita*, Mexico, p. 209, *tepida*, Nevada, *suavis*, Colorado, *lupina*, California, p. 210, *snowi*, Colorado, *tepaneca*, Mexico, p. 211, *aurigenia*, North America, p. 212, *fulvo-hirta*, Georgia, *exquisita*, Mexico, *strenua*, S. States, p. 213, *australis*, p. 214, *diminuta*, Colorado, p. 215, *olivacea* and *pinguis*, Mexico, p. 216, *afflicta* and *apacha*, Texas, &c., p. 217, *sumichrasti*, Mexico, *bituberculata*, California, p. 219, *toluca*, Mexico, and *bombiformis*, S. States, p. 219, *id. l. c.*

Melitturga caucasica, F. Morawitz, *l. c.* p. 38, Caucasus.

Anthophora vernalis, p. 20, *chrysocnemis*, p. 21, *moderna*, p. 24, *orientalis*, p. 26, *harmalæ*, p. 28, *astragali*, p. 29, and *gemella*, p. 31, *id. l. c.*, from various localities in the Caucasus; *A. tomentosa* (= *A. fulvipes*, Dours, *nec* Eversm.), A. Mocsáry, Term. füzetek, ii. p. 19, Hungary; *A. capistrata*, Texas, p. 187, *urbana*, Colorado, &c., *krugi*, Porto Rico, p. 188, *affabilis*, Texas, *simillina*, Colorado, p. 189, *pacifica* and *edwardsi*, California, &c., p. 190, *mucida*, Colorado, *miserabilis*, California, p. 191, *morrisoni*, Colorado, *crotchi*, California, and *caliginosa*, Georgia, p. 192, E. T. Cresson, *l. c.*

Xylocopa azteca, id. Tr. Am. Ent. Soc. vii. p. 133, Mexico.

Exomalopsis limata, *mexicana*, and *otomita*, p. 133, *tepaneca* and *E.* (?) *mellipes*, p. 134, *id. l. c.*, Mexico.

Tetrapedia maura, p. 134, *lugubris* and *mœsta*, p. 135, *apicalis*, *terminalis*, *fraterna*, and *calcarata*, p. 136, *id. l. c.*, Mexico; *T. abdominalis*, id. P. Ac. Philad. 1878, p. 182, Mexico.

Bombus ridingsi, West Virginia, p. 182, *morrisoni* and *appositus*, Colorado, &c., p. 183, *gelidus*, Aleutian Islands, *edwardsi* and *crotchi*, California, &c., p. 184, *couperi*, Canada, *putnami*, Colorado, *oregonensis*, Oregon, *bifarius*, Colorado, &c., p. 185, *improbus* and *mixtus*, p. 186, *juxtus*, Colorado, *vancouverensis*, Vancouver's Island, and *mexicanus*, Mexico, p. 187, *id.* l. c.; *B. variabilis*, O. Schmiedeknecht, Jen. Z. Nat. xii. p. 424, Thuringia (previously confounded with *B. muscorum*; the following references are probably applicable to this species:—*B. senilis* and *autumnalis*, Fabr., *Apis curtisella*, *sowerbiana*, and *beckwithella*, Kirb., *B. xanthurus*, Ill., *helferanus*, *tristis*, and *fieberanus*, Seidl., *venustus*, Smith, and *notomelas*, Kriechb.); *B. daghestanicus* and *mlokosccvitzii*, O. E. Radoszkowsky, Troudy Ent. Ross. x. p. xiii., Caucasus; *B. montivagus*, F. Smith, J. A. S. B. xlvii. 2, p. 168, Tenasserim.

Trigona terminata, id. *l. c.* p. 169, Tenasserim; *T. nigerrima*, *nigra*, *perilampoides*, and *thoracica*, E. T. Cresson, *l. c.* p. 181, Mexico.

Vespidæ.

C. G. Thomson (Hym. Scand. iii. 1874) divides the *Vespidæ* as follows: *Sociales* (*Vespina*, *Polistina*) and *Solitariæ* (*Discœliina* and *Odynerina*). The Swedish genera and species are treated in the same manner as in previous volumes; but very few are described as new.

Saussure, H. de. Synopsis of American Wasps: Solitary Wasps. Sm. misc. Coll. xiv. No. 254, pp. xxxv. 385, 4 col. pls. (Dec., 1875). [Noticed in Zool. Rec. xii. p. 388, and xiv. *Ins.* p. 98.*]

In the introductory portion, the author gives a sketch of his previous publications on the subject; observations on the rules of nomenclature; types (in many cases the females are very distinct, but the males are undistinguishable), preparation, and determination. The introduction concludes with an analytical table of the groups and genera. The species of many of the large genera are also tabulated. The following known species are figured:—*Zethus* (*Zethusculus*) *aztecus*, Sauss., figs. 1 & 1 *a*, *Z.* (*Z.*) *spinosus*, S., figs. 2 & 2 *a*, *Z.* (*Z.*) *montezuma*, S., figs. 3 & 3 *a*, *Z.* (*Didymogastra*) *poeyi*, S., figs. 4 & 4 *a*, *Z.* (*D.*) *chicotencati*, S., figs. 5 & 5 *a*, *Eumenes* (*Pachymenes*) *santa-anna*, S., figs. 6 & 6 *a*, *E. regulus*, S., figs. 7, 7 *a*, & 7 *b*, *E. mexicanus*, S., figs. 8 & 8 *a*, pl. i., *Montezumia huasteca*, figs. 9 & 9 *a*, *mexicana*, fig. 10, pl. ii., *Odynerus bidens*, S., figs. 14 & 14 *a*, *iturbidi*, S., figs. 15 & 15 *a*, *arvensis*, S., figs. 16 & 16 *a*, *californicus*, S., figs. 17 & 17 *a*, *sulfureus*, S., figs. 18 & 18 *a*, *leucomelas*, S., figs. 19 & 19 *a*, pl. iii., *Odynerus otomitus*, S., fig. 21, *pedestris*, S., figs. 22 & 22 *a*, *tetonacus* fig. 23, *zendalus*, S., figs. 24 & 24 *a*, *perennis*, S., fig. 25, *coyotus*, S., fig. 26, *tacubayæ*, S., fig. 27, *bacuensis*, S., figs. 28 & 28 *a*, *dilectus*, figs. 29 & 29 *a*, *denticulatus*, S., figs. 30 & 30 *a*, and *Pterochilus mexicanus*, S., figs. 31 & 31 *a*, pl. iv. One new genus and the following new subgenera are described:—*Eumenes*, sect. *Beta*, p. 88: much more slender than in *Pareumenes*, thorax cubic, as in div. *Omicron*, but more slender; to contain *Eum. nortonianus*, *cressonianus*, and *simulans*, spp. nn. (*vide* infrà). *Montezumia*, sect. *Antezumia*, p. 113: head flattened before, abdomen pediculate, pétiole composed of the first segment, the base of which is linear, and the second half campanular, not receiving the second segment; appearance like that of some *Pachymenes*; to include *M. chalybea*, *petiolata*, and *brunea* (sic), Sauss. *Montezumia*, sect. *Metazumia*, p. 114: abdomen resembles *Discælius*, but the labial palpi are 3-jointed, and the maxillary palpi 5-jointed; to include *M. huasteca*, Sauss., and *leprieuri*, Spin. *Montezumia*, sect. *Pseudozumia*, p. 128: first segment of abdomen in the form of a lengthened triangle, flattened and longitudinally striate; type, *M. indica*, Sauss.

On new *Vespidæ* in the Dresden Museum; T. Kirsch, MT. Mus. Dresd. Heft iii. pp. 375–381. Varieties of *Odynerus* (*Lionotus*) *romandinus*, Sauss., and *Vespa deusta*, Lep., are also noticed (pp. 379 & 381).

The antennæ of wasps are scent-organs; J. W. Slater, Ent. xi. p. 233.

Coleopterous parasites; Rouget, Bull. Soc. Toulouse, xi. pp. 112–114.

Polistes gallica and var. *diadema*. Their nests noticed; both forms occur near Bonn: P. Bertkau, Verh. Ver. Rheinl. xxxiii. SB. p. 106.

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* The remark in Zool. Rec. xiv. *Ins.* p. 98, as to the Sm. misc. Coll. only reaching this country as entire volumes, is amply justified by the fact of no less than three volumes, xiii., xiv., & xv., being delivered by the Smithsonian agent in London together, in July, 1879. All three bear date 1878 on their title pages; Saussure's paper, the first of vol. xiv., is dated Dec., 1875, on its separate title, and 1863 in the dedication.—Ed.

Vespa holsatica. Observations on its domestic habits; F. Katter, Ent. Nachr. iv. pp. 23 & 24.

New genera and species:—

Nortonia, Saussure, *l. c.* p. 139. Mouth-organs nearly as in *Eumenes* and *Odynerus*; body as in *Montezumia*; first segment of abdomen funnel-shaped, not sessile or petiolate. For *O. intermedius* and *symmorphus*, Sauss., and *N. tolteca*, sp. n., *l. c.* p. 140, pl. i. figs. 13 & 13 *a*, Mexico.

Microdynerus, C. G. Thomson, *l. c.* p. 58. Allied to *Lionotus*; to contain *L. alpestris* and *helveticus*, Sauss., and *exilis* (sp. n. ?), *l. c.* p. 59, locality not stated.

Vespula, id. *l. c.* p. 10. New section of *Vespa*, to include all the smaller species, *V. crabro* being treated as the type of *Vespa*.

Zethus nigricornis, Mexico, p. 22, *heydeni*, Brazil, p. 23, *olmecus*, p. 25, *toltecus*, p. 27, *imitator*, p. 33, *clypearis*, p. 34, *otomitus*, p. 37, *strigosus*, p. 42, and *zendalus*, p. 53, all from Mexico, H. de Saussure, l. c.; *Z.* (*Zethusculus*) *inca*, Kirsch, *l. c.* p. 375, Colombia.

Labus sichelianus, H. de Saussure, *l. c.* p. 57, pl. iv. figs. 20 & 20 *a*, Chili.

Eumenes auratus, p. 62, Bahia, *olivaceus*, p. 64, Surinam, *totonacus*, p. 72, *aviculus*, p. 73, *thoracicus*, p. 74, *sumichrasti*, p. 78, Mexico, *brasil*[*i*]*anus* p. 79, Brazil, *incertus*, p. 84, Para, *miles*, Guiana, Surinam, and *olmecus*, Mexico, p. 85, *infernalis*, p. 86, Brazil, Guiana, *nortonianus*, p. 88, *cressonianus*, p. 90, *simulans*, p. 91, Mexico, *wagnerianus*, p. 94, *chalicodomæ*, p. 108, Pernambuco, *id.* l. c.; *E. nanus*, Colombia, and *pusio*, Brazil, T. Kirsch, *l. c.* p. 376.

Montezumia ghilianii, Brazil, p. 121, *marthæ*, Santa Martha, Antilles, p. 124, *azteca*, Mexico, p. 125, pl. ii. figs. 10 & 10 *a*, H. de Saussure, l. c.; *M. saussurii*, T. Kirsch, *l. c.* p. 377, Woodlark Island.

Rhynchium nyassæ, id. *l. c.* p. 378, Nyassa.

Monobia bi-angulata, p. 135, pl. ii. figs. 12 & 12 *a*, *nigripennis*, p. 136, and *variabilis*, p. 137, H. de Saussure, *l. c.*, all from Mexico.

Lionotus picticrus (*Odynerus dentisquama* var., Thoms. *olim*), Sweden, *orbitalis*, S. Germany, and *punctifrons*, Switzerland, C. G. Thomson, *l. c.* p. 57.

Ancistrocerus clavipennis (*parietum* var., Wesm.), p. 76, and *pictipes*, p. 78, *id. l. c.*, Sweden.

Odynerus lativentris, id. *l. c.* p. 86, Sweden; *O. walshianus*, p. 152, Illinois, *debilis*, p. 155, United States, *sutterianus*, p. 186, California, H. de Saussure, l. c.; *O.* (*Hypancistrocerus*) *carinifer*, Cayenne, p. 378, *O.* (*Lionotus*) *pacificus*, Woodlark Island, p. 379; *O.* (*L.*) *cavicentris*, Nyassa, and *O.* (*L.*) *micado*, Japan, p. 380, T. Kirsch, *l. c.*

Pterochilus formosus, J. Frivaldszky, Term. közlem. xiii. p. 357, Hungary.

Crabronidæ.

C. G. Thomson (Hym. Scand. iii.) divides the *Fossoria* (with which he includes the *Mutillidæ*) into the following families:—*Mutillidæ*, *Scolietæ*,

Sapygidæ, *Tiphiidæ*, *Dolichuridæ*, *Pompilidæ*, *Sphegidæ*, *Pemphredonidæ*, *Bembecidæ*, *Astatidæ*, *Philanthidæ*, *Larridæ*, *Nyssonidæ*, *Mellinidæ*, *Cerceridæ*, *Trypoxylidæ*, and *Crabronidæ*.

Pompilides.

Mocsáry, A. Biologische Notizen: Lebensweise der Pompiliden im Allgemeinen. Term. füzetek, ii. pp. 123–125.

Pompilus coccineus, Fabr. Habits; P. Bertkau, Verh. Ver. Rheinl. xxxv. SB. pp. 177 & 178.

New species :—

Pompilus sabulicola, C. G. Thomson, Hym. Scand. iii. p. 147, Scania; *P. vitiosus*, F. Smith, J. A. S. B. xlvii. 2, p. 107, Tenasserim.

Priocnemis simulans, C. G. Thomson, *l. c.* p. 166, Scania; *P. nitidiventris*, F. Smith, Tr. E. Soc. 1878, p. 6, Otago, New Zealand.

Sphegides.

Maindron, M. Notes pour servir à l'histoire des Hyménoptères de l'Archipel Indien et de la Nouvelle-Guinée. 1. Observations sur quelques Sphegiens (g. *Pelopæus*) de l'Archipel Indien. Métamorphoses, Descriptions d'espèces. Ann. Soc. Ent. Fr. (5) viii. pp. 385–398, pl. ix.

The nests and transformations of *P. lætus*, Sm., are described and figured (pl. ix. figs. 1–7), and what is known of other species is also summarized. *P. intrudens*, Sm., ♂, is also described and figured (p. 394, pl. ix. fig. 8), and a list of the 20 East Indian species is added. Two species are described as new.

Ampulex compressum. Fight between this wasp and a cockroach; H. S. Schurr, Ent. xi. pp. 226–228.

Ammophila mocsarii, J. Frivaldszky, Term. közlem. xiii. p. 352, Hungary; *A. striata*, A. Mocsáry, Tijdschr. Ent. xxi. p. 200, Siberia: spp. nn

Pelopæus bruininii, p. 394, fig. 10, Celebes, and *affinis*, p. 395, fig. 9, Halmaheira, spp. nn., M. Maindron, Ann. Soc. Ent. Fr. (5) viii. pl. ix.

Larrides.

Astata femoralis, A. Mocsáry, redescribed by him; Term. közlem. xv. p. 249.

Tachytes discolor, sp. n., J. Frivaldszky, Term. közlem. xiii. p. 351, Hungary.

Bembicides.

Bembex fossorius, sp. n., F. Smith, J. A. S. B. xlvii. 2, p. 168, Tenasserim.

Nyssonides.

Larra hungarica, sp. n., J. Frivaldszky, Term. közlem. xiii. p. 354, Hungary.

Hoplisus montivagus, sp. n., A. Mocsáry, *op. cit.* xv. p. 250, Hungary.

Crabronides.

C. G. Thomson (Hym. Scand. iii. pp. 262–264) divides the 38 Swedish species of *Crabro* into the following 12 subgenera (two new), an example

of each of which is given :—*Cælocrabro* (*capitosus*, Shuck.), *Crossocerus*, St. Farg. (*palmarius*, Schreb.), *Hoplocrabro* (4-*maculatus*, Fabr.), *Blepharopus*, St. F., (*serripes*, Panz.), *Anothyreus*, Dbm. (*lapponicus*, Zett.), *Thyreopus*, St. F. (*peltarius*, Schreb.), *Ectemnius*, Dbm. (*spinicollis*, Herr.-Schäff.), *Solenius*, St. F. (*vagus*, Dahlb.), *Clytochrysus*, Moraw. (*canifrons*, Thoms.), *Crabro*, Fabr. (4-*cincta*, Fabr.), *Thyreus*, St. F. (*clypeatus*, Linn.), and *Ceratocolus*, St. F. (*alatus*, Panz.).

Crabro pterotus, Panz., recorded as new to Britain, and redescribed ; E. Capron, Ent. xi. pp. 242 & 243.

Crabro (*Ectemnius*) *rugifer*, Dahlb. Remarks on its habits; it provisions its nests with *Henops gibbosus*, Linn., a rare *Dipteron* in Belgium ; and it is attacked by a small Hymenopterous parasite of the family *Pteromalidæ*. H. Tournier, CR. Ent. Belg. xxi. pp. xv.–xviii.

Rhopalum albipes, sp n., F. Smith, Tr. E. Soc. 1878, p. 7, Otago, New Zealand.

Pemphredon flavistigma, sp. n., C. G. Thomson, *l. c.* p. 192, Sweden.

Mutillidæ.

Mutilla europæa and *stridula* are parasitic on a *Bembex* and *Dasypoda plumipes*, respectively ; J. Lichtenstein, Feuill. Nat. viii. p. 35.

Mutilla hungarica, F. Note on its stridulation ; A. H. Swinton, Ent. M. M. xv. p. 118.

Smieromyrme, g. n., C. G. Thomson, Hym. Scand. iii. p. 108. Fore wings with the basal nervure running into the postcostal nervure far before the stigma ; mesonotum with the impressed dorsal lines entire; mandibles bidentate at the tip, with a short projection beneath in the male. Type, *Mutilla rufipes*, Latr.

Formicidæ.

Dewitz, H. Ueber Bau und Entwicklung des Stachels der Ameisen. Z. wiss. Zool. xxviii. pp. 527–556, pl. xxvi.

Contains a detailed account of the structure of the sting and poison-apparatus in *Formica rufa*, a comparison with those of other ants and bees, and an abstract of the observations of other authors.

Emery, C. Catalogo delle Formiche esistenti nella collezioni nel Museo Civico di Genova. Parte seconda. Ann. Mus. Genov. xii. pp. 43–59.

Eighty-six species from Europe and the Mediterranean Region are noticed, several of which are described as new. Occasional woodcuts of details are given.

——. Liste des Formis de la Collection de feu Camille Van Volxem, avec la Description d'une espèce nouvelle. CR. Ent. Belg. xxi. pp. viii.–x.

Forel, A. Études Myrmécologiques en 1878 (1ière Partie), avec l'anatomie du gésier des fourmis. Bull. Soc. Vaud. xv. pp. 337–392, pl. xxiii.

The first part of this paper contains elaborate anatomical observations on the "gizzard" of various genera of ants. The plate contains anatomical details. The author adds the characters of the 5 families which he

admits:—*Camponotidæ*, *Dolichoderidæ*, *Dorylidæ*, *Poneridæ*, and *Myrmicidæ*. The tribes (not named) and genera belonging to the two first families are characterized, and arranged as follows:—

CAMPONOTIDÆ. (I.) *Camponotus*, Mayr., *Polyrrhachis*, Shuck., *Echinopla*, Smith, *Colobopsis*, Mayr, *Mayria*, g. n., *Myrmecopsis*, Smith, *Gigantiops*, Roger, *Œcophylla*, Sm.

„ (II.) *Myrmecocystus*, Wesm., *Polyergus*, Latr., *Formica*, Linn., *Lasius*, Sm.

„ (III.) *Brachymyrmex*, Mayr, *Myrmelachista*, Roger, *Rhopalomyrmex*, Mayr, *Gesomyrmex*, Mayr.

„ (IV.) *Prenolepis*, Mayr.

„ (V.) *Acantholepis*, Mayr, *Plagiolepis*, Mayr, *Acropyga*, Roger, *Mesoxena*, Smith.

DOLICHODERIDÆ. (I.) *Technomyrmex*, Mayr, *Bothriomyrmex*, Emery, *Iridomyrmex*, Mayr, *Dorymyrmex*, Mayr, *Liometopum*, Mayr, *Azteca*, g. n., *Tapinoma*, Först., *Linepithema*, Mayr, *Dolichoderus*, Lund, and *Leptomyrmex*, Mayr.

——. Der Giftapparat und die Analdrüsen der Ameisen. Z. wiss. Zool. xxx. (Suppl.) pp. 28–68, pls. iii. & iv.

An elaborate description of the structure of the sting, poison-glands, &c., in various species of ants.

LUBBOCK, J. On the Habits of Ants. P. R. Inst. viii. pp. 253–271.

Contains general and experimental observations on their transformations, food, enemies, character, industry, length of life, slavery, senses, intelligence, memory, communication of ideas, and relations to flowers.

——. Observations on Ants. J. L. S. xiv. pp. 265–290; abstract, Kosmos, iv. pp. 309–312.

MAYR, G. Beiträge zur Ameisen-Fauna Asiens. Verh. z.-b. Wien, xxviii. pp. 645–686.

This paper is based on a collection formed at Calcutta by Rothney, and submitted to Mayr by (the late) F. Smith. Many species, both known and new, are mentioned, and the most important remarks on the former are as follows:—*Camponotus vitiosus*, Smith, = *marginatus*, Latr. (*nec* Oliv.), *Formica mitis*, Sm., is the small worker of his *F. bacchus*, and *F. ventralis*, Sm., is probably the ♀ of the same species; *C. inconspicuus*, Mayr, = *F. irritans*, Sm.; *C. oblongus*, Sm., ♀ described; *F. ruficeps*, Sm., = *C. gilviceps*, Rog.; *C. flavo-marginatus*, Mayr, = *F. pubescens*, var. Brullé, = (*C.*) *micans*, Nyl.; *C. coxalis*, Sm., worker minor described; *F. sedula*, Sm., = his *irritabilis*; *Polyrrhachis* is divided into six groups (spp. *rastellata*, *bihamata*, *armata*, *ammon*, *relucens*, and *abrupta*); *P. globularia*, Mayr, = *lævissima*, Sm. (female described); *P. lamellidens*, Sm., worker described; *P. sumatrensis*, Sm., ♀ described; *Hypoclinea cordata*, Sm., worker minor described; *Camponotus nutans* and *venustus* and *Ponera sulcata*, Mayr, redescribed; species of *Ponera* tabulated, and *P. tesserinoda*, Emery, worker described; species of *Lobopelta* tabulated; *L. ocellifera*, Sm., is probably a highly developed worker of *mutabilis*, Sm., (*Ponera*) *ferox*, Sm., appears to be a form of *L. kitelli*, Mayr; *Typhl-*

atta, workers tabulated; *Aphænogaster famelica*, Sm., worker described; *Atta flavicollis*, Jerd., ? = *Monomorium speculare*, Mayr, and *A. minuta*, Jerd., ? = *M. vastator*, Sm.; *Phidole*, species tabulated, and *P. quadrispinosa*, Jerd., worker described; *Cremastogaster*, species tabulated.

Swinton, A. H. Note on the Stridulation of *Myrmica ruginodis*, and other *Hymenoptera*. Ent. M. M. xiv. pp. 187 & 188.

When irritated, this ant vibrates its abdomen, and gives out a sound resembling that produced by the Dipteron, *Syrilla pipiens*. It is apparently caused by the friction of a dark striated ring forming the second articulation of the pedicle.

List of ants occurring in the neighbourhood of Elberfeld; Cornelius, JB. Elberf. v. pp. 103 & 104.

Black ants in the forest of Rambouillet, near Paris, storing grain; F. Dubard, Bull. Soc. Ent. Fr. (5) viii. p. civ.

Swarms of ants in Silesia; K. Letzner, JB. schles. Ges. liv. pp. 217–219.

Corks of lemonade-bottles destroyed by ants at Riga; Seidler, Ent. Nachr. iv. p. 106.

On ants "milking" Lepidopterous larvæ; cf. *Lycænidæ* (*Lepidoptera*).

Acantholepis frauenfeldi, Mayr, ♂ described, and its differences from *A. bipartita*, Smith, pointed out; C. Emery, Ann. Mus. Genov. xii. p. 46.

Aphænogaster testaceo-pilosa, Luc., *semipolita*, Nyl., *campana*, Em., *spinosa*, Em., and *barbara*: L. C. Emery discusses various forms of these species; Ann. Mus. Genov. xii. pp. 53–58, note.

New genera and species:—

Mayria, A. Forel, Bull. Soc. Vaud. xv. p. 369. Abdomen very long and narrow; first segment more slender than the second, gradually diminishing from back to front, and very low; the whole body long and narrow; pedicle surmounted by a thick node; frontal prominences S-shaped, widely apart, and diverging; last joint of the antennæ a little dilated; otherwise as in *Camponotus*. Type, not stated.

Azteca, id. *l. c.* p. 384. Allied to *Liometopum* and *Iridomyrmex*, but differing in the structure of its "gizzard," and in there being two distinct forms of workers. Type, *L. xanthochroa*, Rog. (*sericea*, Mayr).

Lioponera, G. Mayr, Verh. z.-b. Wien, xxviii. p. 666. Allied to *Typhlatta* and *Eciton*; belongs to the *Poneridæ*, but the structure of the head makes it a connecting link with the *Myrmicidæ*. Type, *L. longitarsus*, sp. n., *l. c.* p. 667, Calcutta.

Holcomyrmex, id. *l. c.* p. 671. Antennæ twelve-jointed, three last joints shorter than the rest together, and thus allied to *Aphænogaster*; but the structure of the clypeus allies it with *Monomorium* and *Solenopsis*. To contain *M. scabriceps*, Calcutta, and *criniceps*, Tranquebar, spp. nn., *l. c.* p. 672.

Formica zealandica, F. Smith, Tr. E. Soc. 1878, p. 6, Otago, New Zealand.

Camponotus gestroi, C. Emery, Ann. Mus. Genov. xii. p. 44, Sardinia; *C. opaciventris*, G. Mayr, Verh. z.-b. Wien, xxviii. p. 648, Calcutta.

Polyrrhachis spiniger, p. 653, *aculeata* and *pubescens*, p. 657; *id. l. c.* E. Indies.

Hypoclinea gracilipes, id. *l. c.* p. 658, Calcutta.

Acropyga moluccana, id. *l. c.*, Ceram.

Anochætus punctiventris, id. *l. c.* p. 659, Calcutta, &c.

Diacamma compressum (= *Ponera australis*, Rog. *nec* Fabr.), *id. l. c.* p. 660, Sind.

Lobopelta punctiventris, id. *l. c.* p. 666, Calcutta.

Amblyopone reclinata, id. *l. c.* p. 667, Java.

Typhlatta decolor, E. Africa, p. 668, *bengalensis* and *brevicornis*, Calcutta, p. 669, *id. l. c.*

Tetramorium scabrum, Borneo, and *smithi*, Calcutta, *id. l. c.* pp. 672 & 673.

Leptothoraæ nigrita, C. Emery, *l. c.* p. 51, note, Algeria.

Monomorium orientale, G. Mayr, *l. c.* p. 670, Calcutta.

Cremastogaster subnuda, Calcutta, and *dohrni*, Ceylon, p. 682, *rogenhoferi*, Burmah, Calcutta, and Ceylon, p. 683, *artifex*, Siam, Singapore, p. 684, *rothneyi*, and *contenta*, Calcutta, and *subcircularis*, Borneo, p. 685, *id. l. c.*

Aphænogaster gracilinodis, C. Emery, *l. c.* p. 55, note, Syria.

Phidole striativentris and *rhombinoda*, p. 678, and *indica*, p. 679, *id l. c.*, Calcutta.

Cryptocerus volxemi, C. Emery, C. R. Ent. Belg. xxi. p. ix., Brazil.

Chrysididæ.

H. Tournier, Pet. Nouv. ii. pp. 105 & 106 [1877], adds 6 known and 4 new species to Chevrier's list of the *Chrysididæ* of the Leman basin. The same author, MT. schw. ent. Ges. v. pp. 305–310, adds 8 further species (1 new); *Halopyga obtusicollis*, Meg., is specifically distinct from *ovata*, Dahlb.; *C. scutellaris*, F., var. n. *modesta*, p. 306, Leman basin; *C. dichroa*, Chevr., *nec* Dahlb., = *gyllenhali*, Dbm.

Chrysididæ especially frequent *Compositæ*; F. Katter, Ent. Nachr. iv. p. 23.

Chrysis venusta, sp. n., A. Mocsáry, Term. közlem. xv. p. 247, N. Hungary.

Elampus chevrieri, sp. n., Tournier, *l. c.* p. 105, Leman basin.

Halopyga smaragdina, sp. n., *id. ibid.*, Leman basin.

Hedychrum longipilis and *viridi-aureum*, Tournier, *l. c.* p. 106, Leman basin; *H. obscurum*, Valais, and *suave*, Andalusia, p. 308, *scutellare*, p. 309, Syracuse, *id.* MT. schw. ent. Ges. v.: spp. nn.

Stilbum siculum, sp. n., Tournier, MT. schw. ent. Ges. v. p. 307, Syracuse.

Euchræus beckeri, sp. n., *id. l. c.* p. 309, Baku.

Ichneumonidæ.

Brischke, C. G. A. Die Ichneumoniden der Provinzen West- und Ost-Preussen. Schr. Ges. Danz. (2) iv. pp. 35–121.

Many of the known species are redescribed, in addition to the new ones. Tables of "hosts" are also added.

Cresson, E. T. Descriptions of *Ichneumonidæ*, chiefly from the Pacific Slope of the United States and British North America. P. Ac. Philad. 1878, pp. 348–381.

Besides new species, this paper includes descriptions of sexes of the following known species (all Cresson's, when not otherwise stated) :—*Ichneumon solitus*, ♂, and *odiosus*, ♂, p. 348, *neutralis*, ♂, *salvus*, ♂, and *indemnis*, ♀, p. 349, *purpuripennis*, ♀, and *cupitus*, ♂, p. 350, *crudosus*, ♂, *compar*, ♀, and *difficilis*, ♂, p. 351, *nuncius*, ♂, *sequax*, ♀, and *hiemalis*, ♀, p. 352, *cestus*, ♀, and *russatus*, ♀, p. 353, *semissis*, ♀, and *petulcus*, ♀, *Hoplismenus pacificus*, ♀, p. 354, *Amblyteles mormonus*, ♀, and *hiulcus*, ♀, p. 355, *Trogus edwardsi*, ♂, and *buccatus*, ♀, and *Platylabus consors*, ♂, p. 356, and *californicus*, ♀, p. 357, *Phygadeuon crassipes*, (Prov.) ♀, p. 358, *Cryptus proximus*, ♀, p. 359, *latus*, (Prov.) ♀, p. 361, *calipterus*, (Say) ♀, p. 362, and *Bassus maculifrons*, ♀, p. 374.

Holmgren, A. E. Enumeratio Ichneumonidum exhibens species in alpibus Tiroliæ captas. I. Fam. Ichneumonides et Alomyides. Verh. z.-b. Wien, xxviii. pp. 167–182.

41 species enumerated, many new. The following known species are specially noticed or described :—*Ichneumon rufinus*, Wesm., ? varieties, p. 167, *I. stramentarius*, Grav., p. 168, *I. gravipes*, Wesm., p. 171, *redimitus*, Tischb., p. 173, *intricator*, Wesm., p. 174 ; *Amblyteles divisarius*, Grav., and *johansoni*, H., p. 179 ; *Platymischus bassicus*, Tischb., p. 181, and *Dicælotus pumilus*, Grav., p. 182.

List of *Ichneumonidæ* bred from various *Lepidoptera* ; A. Harrach, Ent. Nachr. iv. pp. 233 & 234.

General notes on Ichneumons, and hints for their study ; J. B. Bridgman and E. A. Fitch, Ent. xi. pp. 34–36, 156–159.

Ichneumonides.

Exephanes occupator, Grav. On rearing the sexes ; S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 156.

Ichneumon signatipes, Prov., *nec* Cress., is renamed *stygicus* ; L. Provancher, Nat. Canad. x. p. 294.

Amblyteles fasciatorius, Fabr., is not *armatorius*, Forst., but probably = *notatorius*, Grav., = 4-*punctorius*, Mull. ; *fasciatorius*, Grav., = *armatorius*, Forst., ? = 4-*maculatus*, Grav. ♀, = *monitorius*, Panz. The latter species feeds on *Perigrapha cincta*, Fabr., in Hungary ; its food in Bavaria, where this moth does not occur, is unknown. Kriechbaumer, CB. Ver. Regensb. xxxi. pp. 50–53.

Amblyteles cerinthius, Grav. Male described, and a malformation in the eyes of a female recorded ; T. A. Marshall, Ent. M. M. xiv. p. 278.

Amblyteles occisorius, Fabr., figs. 1 & 2, *johansoni*, Holmgr., fig. 3, and *indocilis*, Wesm., fig. 4, discussed and figured ; Snellen van Vollenhoven, Pinacographia, p. 43, pl. xxvii.

Hepiopelmus leucostigmus, Grav., and *variegatorius*, Panz., figured ; *id. l. c.* figs. 5 & 6. He regards the genus as scarcely distinct from *Amblyteles*.

Listrodromus melanocephalus, Gmel., and *lapidator*, Fabr., figured, *id. l. c.* figs. 7 & 8. He calls attention to their resemblance to *Cœnocryptus apum*, Curt., and remarks on their systematic position (pp. 43 & 44). *Cf.* also *id.* Tijdschr. Ent. xxi. p. xviii.

New species :—

Exophanes femoralis, C. G. A. Brischke, Schr. Ges. Danz. (2) iv. p. 36, Prussia.

Ichneumon flaviger, *gibbosus*, *cupitheciæ*, and *tibialis*, id. *l. c.* pp. 42, 43, 45, & 46, Prussia ; *I. helleri*, p. 167, *pœgniarius*, p. 170, *conjugalis*, p. 172, *barbifrons*, p. 173, *nyssæus*, p. 174, *facetus*, p. 175, *variolosus*, p. 176, and *hæmatomerus*, p. 178, A. E. Holmgren, Verh. z.-b. Wien, xxviii., Tyrol.

Amblyteles nigrifrons and *excultus*, id. *l. c.* pp. 179 & 180, Tyrol ; *A. gracilis*, C. G. A. Brischke, *l. c.* p. 49, Prussia ; *A. albo-marginatus*, Kriechbaumer, Ent. Nachr. iv. p. 45, *A. kriechbaumeri* and *puerperæ*, p. 209, and *lethifer*, p. 210, A. Mocsáry, Ent. Nachr. iv., all from Hungary ; *A. sibiricus*, id., Tijdschr. Ent. xxi. p. 199, Siberia.

Platylabus pictus, Vollenhoven, Tijdschr. Ent. xxi. p. 157, pl. ix. fig. 2, Montpellier.

Apæleticus detritus, A. E. Holmgren, *l. c.* p. 181, Tyrol.

Phæogenes clypearis, C. G. A. Brischke, *l. c.* p. 57, Prussia.

Grotea californica, E. T. Cresson, P. Ac. Philad. 1878, p. 370, California.

Cryptides.

Brischke, C. G. A. Kurzere Mittheilungen. Ueber die Gattung *Pezomachus*, Grav. Schr. Ges. Danz. (2) iv. pp. 201–208.

19 species are discussed ; some are described as new, others probably new are described, but not named. The following synonyms occur :— *Agrothereutes hopei*, Grav., = *Hemimachus albipennis*, Ratz. ; *Pezomachus cursitans*, Grav., = *Hem. variabilis*, Ratz., = *Hemiteles palpator*, Grav. ; *P. fasciatus*, Grav., = *Hem. fasciatus*, Ratz.

Förster, A. Synoptische Uebersicht der Gattungen und Arten in der Familie der Stilpnoiden. Verh. Ver. Rheinl. xxxiii. pp. 17–196.

The characters and affinities of the group are noticed, and synoptic descriptive tables given of the genera and species. The following genera are included in the family :—*Seleucus*, Holmgr., *Zetesima*, *Xestophya*, and *Asyncrita*, gg. nn., *Stilpnus*, Grav., *Polyrrhembia* and *Exolytus*, gg. nn., and *Atractodes*, Grav. [The last genus is placed by other authors in the *Ophionides*.] A great number of new species are described, as well as the known ones : a great number are without localities ; but in such a case it is safe to suppose that they come from the district of Aix-la-Chapelle. The sexes are described in dichotomous tables.

Cryptus macrobatus, Grav., which has been made the type of the new genera *Linoceras*, Tasch. (1865), and *Xenodocon*, Först. (1868), is congeneric with *Osprynchotus capensis*, Spin. General remarks on this and allied species are added ; Kriechbaumer, Ent. Nachr. iv. pp. 221–226.

New genera and species :—

Zetesima, A. Förster, *l. c.* p. 25. Allied to *Seleucus*; type, *Z. rufipes*, id. *l. c.* p. 27, Pontresina.

Xestophya, id. *l. c.* p. 27. Allied to last; types, *X. fallax*, Aachen, and *montana*, Splügen, p. 28.

Asyncrita, id. *l. c.* p. 29. Allied to last; type, *Atractodes foveolatus*, Grav. It will also contain *A. cultellator*, Curt., and the following new species: *punctulatus*, Bernina, *rufipes*, Aachen and Cologne, and *designata*, Upper Engadine, p. 30, *microcephala*, *cultraria*, and *anceps*, Bernina, and *longiventris*, Tyrol, p. 21.

Poly [r] *rhembia*, id. *l. c.* p. 42. Allied to *Stilpnus*; type, *Hemiteles tenebricosus*, Grav. The following new species are described : *P. major*, Pontresina, p. 43, *monticola*, Splügen, *oreophila* and *canaliculata*, Upper Engadine, *oligomera* [Aachen ?], and *stygia*, Cologne, p. 44, *linearis*, *anthracina*, *latiuscula*, *procerula*, and *nigrata*, p. 45, *nigripes*, *carbonaria*, *corvina*, *splendida*, and *melanaria*, p. 46, *subcoriacea* and *albicincta* [Aachen ?], and *tibialis*, Tyrol, p. 47.

Exolytus, id. *l. c.* p. 47. Allied to last; type, *Mesoleptus lævigatus*, Grav. The following species are described as new :—*E. incertus*, *devotus*, *fulvipes*, and *consortius* (also p. 74) [Aachen ?], *ruficoxatus*, Tyrol, p. 50, *distinctus*, *promus* (also p. 71) and *anceps*, p. 51, and *speculum* [Aachen ?], *monticola*, Upper Engadine, and *angustulus*, Switzerland, p. 52, *humilis*, *agilis*, and *adæquator* [Aachen ?], and *gallicus*, S. France, p. 53, *beneplacidus* and *intermedius* [Aachen ?], and *ambulator*, S. France, p. 54, *levis*, p. 55 (also pp. 106 & 109), Switzerland, *trifoveolatus*, p. 55, *gemellus* and *incitus* [Aachen ?], *dichrocerus*, England, p. 56, *agnatus*, S. France, *ficticius* [Aachen ?], and *helveticus*, Pontresina, p. 57, *annexus*, [Aachen ?], and *congener*, Tyrol, p. 58, *cinctus* [Aachen ?], *rufipes*, S. France, and *decimeter*, Switzerland, p. 59, *nigricornis*, Eifel, *unipunctus*, and *subdentatus* [Aachen ?], and *insidiator*, Tyrol, *punctiger*, *cupidus*, and *solitarius*, p. 61 [Aachen ?], *anguinus*, Switzerland, *subimpressus*, Tyrol, *integrellus* and *tripunctus*, p. 62, *seductorius*, *approximatus*, *comtus*, and *filiventris*, p. 63, *limitaris*, *elegantulus*, *concinnus*, and *attenuatus*, p. 64, *vetustus*, *intermixtus*, and *aggressorius*, p. 65, *segregatus* and *fallax* [Aachen ?], *spoliator*, Tyrol, *tæniolatus*, Upper Engadine, p. 66, *exstirpator*, *infligens*, and *occultus*, p. 67, *gravabilis* and *remotus*, p. 68 [Aachen ?], *similatorius*, S. France, *propinquus* and *pravus*, p. 69, *deceptor* and *contrarius*, p. 70, *declinans*, p. 71 [Aachen ?], *sollicitus*, Cologne, and *æquilatus*, p. 72, *vigilatorius*, *secretus*, and *incertus*, p. 73, *melanocerus*, p. 74, *juvenilis* and *labilis* [Aachen ?], *infestus*, Cologne, *debilitatus* and *definitus* [Aachen ?], p. 76, *silesiacus* and *evagator*, Silesia, p. 77, *quietus*, Basel, *carinatus*, S. France, p. 78, and *onerosus* [Aachen ?], *pontresinensis*, Pontresina, p. 79, *purus*, *confusus*, and *cooperator*, p. 80, *incolumis* and *exstinctus* [Aachen ?], *egregius*, locality unknown, p. 81, *invitus* [Aachen ?], *alticola* and *molestus*, Pontresina, p. 82, *novellus* and *concors* [Aachen ?], *invidiosus*, Cologne, p. 83, *curiosus*, *exæquatus* and *distans*, p. 84, *percussor* and *sobrius*, p. 85, *tribulator*, *auxiliarius*, and *difformis*, p. 86, *exhaustorius* and *glabriculus*, p. 87, *retractus*, *oligomerus*, and *vacuus*, p. 88 [Aachen ?], *derasus*, Upper

Engadine, and *signatus* [Aachen ?], *complacens*, Aachen, Paris, p. 89, *hospitans*, *fundatus*, and *genitor*, p. 90, *commixtus* and *renitens*, p. 91, *ambiguus*, *tenuiventris*, and *jucundus*, p. 92, *gratiosus*, *lepidus*, *cursitans*, and *arrogans*, p. 93 [Aachen ?], *raptor*, Aachen, Montjoie, and *vicinus*, Boppard, p. 94, *blandus* [Aachen ?], *perditorius*, S. France, and *genuinus*, p. 95, *anxius*, p. 96, and *enodis* [Aachen ?], *olistherus*, Aachen, Montjoie, p. 97, 4-*tuberculatus*, p. 98, *fractus*, *circumspectus*, and *melanurus*, p. 99, *nefastus* and *exiguus*, p. 100, *volubilis* and *infirmus*, p. 101, *elaphrus*, p. 102, *optabilis* and *nosopherus*, p. 103, *biosterus* and *futilis*, p. 104, *assimilis* and *bizonulis*, p. 105 [Aachen ?], *navus* and *humilis*, p. 106, *internecivus* and *obscurellus*, p. 107, *ineditus* [Aachen ?], and *diminutus*, p. 108, *mitis*, Switzerland, *nemophilus*, p. 109, *nitidulus*, p. 110, *subsulcatus* and *erugatus* [Aachen ?], and *propugnator*, Montjoie, p. 111, *subrugosus* and *singularis*, p. 112, *brevis* and *signatus* (var.) [Aachen ?] and *binoculus*, Montjoie, p. 113, *peregrinus*, Pontresina, *leptogaster* and *delicatus*, p. 114, *homologus* and *neglectus*, p. 115, *gracilis*, *despectus*, and *flexibilis*, p. 116, *mesomeristus* and *subtilis*, p. 117, and *hypoleptus*, p. 118.

Sphalerus, g. n., Kriechbaumer, Ent. Nachr. iv. p. 41. Resembles *Cryptus*, but the areola is absent, and it is really allied to *Mesoleptus* (*Tryphonides*). Type, *S. bifasciatus*, sp. n., p. 43, Hungary.

Stilpnus pellucens [Aachen ?] and *assimilis*, Cologne, p. 33, *subzonulus*, *concinnus*, *dimidiatus*, *arridens*, *eurygaster*, and *cyclogaster*, p. 34, *subimpressus*, *placitus*, *retritus*, *luteus*, *calleus*, and *fuscicornis*, p. 35 [Aachen ?], *tersus*, Switzerland, Cologne, *politus*, *mediocris*, *canaliculatus*, and *trivialis*, p. 36, and *fulvicornis*, p. 37 [Aachen ?], *cyclodes*, Aachen, S. France, *gallicus*, S. France, *denticulatus*, *æquilongus*, and *parvulus*, p. 37, *declivis*, *novitius*, *diffinis*, and *elimatus*, p. 38, *providus*, *xanthopus*, *diversus*, *agilis*, and *conformatus*, p. 39, *morionellus*, *subtilis*, *ambulatorius*, and *dimatus* [Aachen ?], and *tersus*, Switzerland, p. 40, *unctus*, *neglectus*, *nigricoxis*, *analogus*, *leptomerus*, and *inæqualis* [Aachen ?], p. 41, A. Förster, *l. c.*

Atractodes tibialis, p. 120, *discoloripes*, *pusillus*, and *exitialis*, p. 121, *neophytus* and *analogus*, p. 122, *cultrarius* [Aachen ?] and *alpinus*, p. 123, *oreophilus*, Upper Engadine, p. 124, *insignis* and *pediophilus*, p. 125, *nigricoxis*, p. 126, *fraternus*, p. 127, *ligatus* and *lepidus*, p. 128, *indigena* [Aachen ?] and *montivagus*, p. 130, *assimilis* and *minusculus*, p. 131, *sordidus* and *cognatipennis*, p. 132, *melanocerus* and *fatalis*, p. 133 [Aachen ?], *xanthonomerus*, p. 134, Upper Engadine, *labefactor* and *designatus*, p. 135, *flavicoxis* and *cryptobius*, p. 136, *carinatus*, *fulvicornis*, and *gracilentus*, p. 137, *intersectus* and *vicinus*, p. 138, *incongruens* and *melanostomus*, p. 139, *præcantus* and *isomorphus*, p. 140, *castus* and *subdolus*, p. 141, *tenuicinctus*, p. 142, *affinis* and *homologus*, p. 143, *xanthocarpus* and *mesoxanthus*, p. 144, *incommodus* and *tenax*, p. 145, *ambifarius* and *destructor*, p. 146 [Aachen ?], *alpigradus*, Upper Engadine, and *acceptus*, p. 147 [Aachen ?], *procerus*, Upper Engadine, *helveticus*, Splügen, p. 148, *occultus* [Aachen ?], *aquilongus*, and *engadinus*, Upper Engadine, p. 149, *insignis* and *offensorius*, p. 150, *rufipes* and *proprius*, p. 151, *ecarinatus* and *separatus*, p. 152, *avidus* and *infimus*, p. 153, *vilis*, *inimicus*, and *cautior*,

p. 154, *singularis* and *præpotens*, p. 155, *expertus* and *absconditus*, p. 165, *atricornis*, *vanus*, and *conspicuus*, p. 157, *lentus* and *adversarius*, p. 158, *ebeninus* [Aachen?] and *linearis*, Splügen, p. 159, *pauxillus* and *minutus* [Aachen?], *montanus*, Upper Engadine, p. 160, *calceatus* and *agilis*, Aachen p. 161, *niger*, Montjoie, and *difformis* [Aachen?], p. 162, *curvatus*, Cologne, and *debilis* [Aachen?], p. 163, *sectator* and *breviusculus*, Eupen, *invalidus*, Cologne, *repudiatus* and *delicatulus*, p. 164, *angustulus* and *modestus*, p. 166, *inquilinus* and *subdentatus*, Aachen, &c., p. 167, *tenuis*, Tyrol, *perpusillus*, Eupen, and *subrepens* [Aachen?], p. 168, *alpigena*, Tyrol, and *callidus*, p. 169, *subsimilis* and *particeps*, p. 170, *parilis* and *placidus*, p. 171, *distinctus* and *exosus*, p. 172, *laboriosus* and *nunax*, p. 173, *bidentulus*, Aachen, and *funebris*, p. 174, *monticola*, Splügen, and *perniciosus* [Aachen?], p. 175, *alticola*, Upper Engadine, and *difficilis*, p. 176, *sulcatulus* [Aachen?], *progenitus*, Cologne, and *ultarius*, p. 177, *malevolus* and *custoditor*, p. 178, *vorax* and *abnormis*, p. 179, *dissidens* [Aachen?] and *rapinatorius*, Cologne, p. 180, *reconditus*, *suspicax*, and *tenellus*, p. 181 [Aachen?], *sponsus*, Eupen, and *declivis*, p. 182, *cryptonastes* and *dispar*, Aachen and Eupen, *sollicitator* and *solivagus*, p. 184, *rivalis* and *quærulosus*, p. 185, *genuinus* and *æmulator*, p. 186, *obsoletus*, *geminus*, and *rufocinctus*, p. 187, *intemperans* [Aachen?] and *oribates*, Upper Engadine, p. 188, *nodifer*, p. 189, *venustulus* and *corruptor*, p. 190, *inclinans* and *contrarius* [Aachen?], p. 191, *id.* l. c.; *A. spiniger*, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 171, pl. x. fig. 8, Leyden.

Phygadeuon crotchi, British Columbia, p. 357, *albirictus*, *limatus*, and *californicus*, p. 358, and *fulvescens*, p. 359, California, &c., E. T. Cresson, P. Ac. Philad. 1878.

Cryptus dirus, California, and *relativus*, British Columbia, p. 359, *pictifrons*, Wyoming, and *tejonensis*, p. 360, *pacificus*, California, and *atriceps*, Utah, p. 361, *crotchi*, p. 362, *turbatus*, *resolutus*, and *edwardsi*, p. 363, *punicus* and *purpuripennis*, p. 364, California, &c., *id.* l. c.; *C. penetrator*, F. Smith, Tr. E. Soc. 1878, p. 2, Otago, New Zealand.

Linoceras edwardsi, E. T. Cresson, *l. c.* p. 365, California.

Mesostenus nubilipennis, Georgia, p. 205, *candidus* and *fortis*, New York, p. 206, *diligens*, Illinois, and *audax*, Georgia, p. 207, *exaptus*, Massachusetts, *saundersi*, Canada West, and *laticinctus*, Louisiana, p. 208, *promptus*, Canada and Illinois, and *americanus*, Maine, Virginia, p. 209, and *macilentus*, United States, p. 210, *id.* Canad. Ent. x.; *M. gracilipes*, id. P. Ac. Philad. 1878, p. 365, California.

Mesochorus iridescens, id. *l. c.* p. 369, California.

Pezomachus niger, p. 205, *testaceipes* and *thoracicus*, p. 206, C. G. A. Brischke, Schr. Ges. Danz. (2) iv., Prussia.

Ophionides.

Ophion. General remarks, and *O. luteus*, L., *obscurus*, F., *ventricosus*, *undulatus*, and *merdarius*, Grav., *ramidulus*, L., and *repentinus*, Holmgr., figured, with details; Snellen van Vollenhoven, Pinacographia, pp. 44 & 45, pl. xxviii. figs. 1–7.

Laphyctes, g. n., A. Förster, Verh. Ver. Rheinl. xxxv. p. 71. *Anomaloidæ*: allied to *Barylypa*; types, *L. mesozonum*, Berlin, p. 72, and

insidiator, Aachen, p. 73, spp. nn., and *Anomalon uniguttatum*, Grav. (redescribed, p. 75).

Atrometus, g. n., *id. l. c.* p. 76. *Anomaloidæ*; types, *A. insignis*, Montpellier, p. 77, and *rubricatus*, Granada, p. 79, spp. nn.

New species :—

Ophion unicallosus, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 167, pl. x. figs. 4 & 4 *a*, Montpellier; *O. ferrugineus* and *inutilis*, F. Smith, Tr. E. Soc. 1878, p. 2, Otago, New Zealand; *O. costale* [*-lis*], E. T. Cresson, P. Ac. Philad. 1878, p. 366, California.

Nototrachys californicus, Cresson, *l. c.*, California.

Exochilum occidentale, id. *l. c.*, Oregon.

Anomalon edwardsi, Vancouver's Island, and *californicum*, p. 367, *verbosum* and *maceratum*, California, and *vivum*, p. 368, Oregon, *id.* l. c.; *A. melanocneme*, S. C. Snellen van Vollenhoven, *l. c.* p. 168, pl. x. figs. 5 & 5 *a*, Montpellier.

Paniscus ephippiatus, F. Smith, Tr. E. Soc. 1878, p. 3, Otago, New Zealand.

Campoplex major, E. T. Cresson, *l. c.* p. 369, Vancouver's Island.

Limneria californica, id. *l. c.*, California.

Cremastus balteatus, Breda, and *sabulosus*, Scheveningue, S. C. Snellen van Vollenhoven, *l. c.* pp. 169 & 170, pl. x. figs. 6, 7, & 7 *a*.

Pristomerus pacificus, E. T. Cresson, *l. c.* p. 370, California.

Exetastes maurus and *zelotypus*, id. *l. c.*, California.

Scolobates marshalli, S. C. Snellen van Vollenhoven, *l. c.* p. 166, pl. x. figs. 1 & 1 *a*, Pyrenees; *S. varipes* and *intrudens*, F. Smith, *l. c.* p. 3, Otago, New Zealand.

Tryphonides.

Mesoleptus. General remarks, and *M. melanocephalus*, Grav., *testaceus*, F., *gracilentus*, Holmgr., *ruficornis*, Grav., *vulneratus*, Zett., *typhæ*, Fourc., *cingulatus* and *fugax*, Grav., figured; Snellen van Vollenhoven, Pinacographia, pp. 41 & 42, pl. xxvi. figs. 1–8.

Notopygus emarginatus, Holmgr., *rufinus*, Grav., and *resplendens*, Holmgr., noticed and figured; *id. l. c.* p. 49, pl. xxxi. figs. 1–3.

Prionopoda, Holm. Affinities discussed, and *P. stictica*, Fabr., figs. 7 & 8, and *xanthopsana*, Grav., fig. 9, figured; *id. l. c.* p. 50, pl. xxxi.

Perilissus gorskii, Ratz., and *erythrocephalus*, Grav., pl. xxxii. figs. 6 & 7, *filicornis*, *seminiger*, and *vernalis*, Grav., *bucculentus*, Holmgr., *pallidus*, Grav., and *pictilis*, Holmgr., pl. xxxiv. figs. 1–6, noticed and figured; *id. l. c.* pp. 52 & 53.

Œdemopsis, Tscheck, is hardly distinct from *Eclytus*, Holmgr.; *Œ. scabriculus*, Grav., fig. 1, and *E. ornatus*, figs. 2 & 3, and *fontinalis*, Holmgr., fig. 4, figured: *id. l. c.* p. 51, pl. xxxii.

Eucerus albitarsis, Curt., = *crassicornis*, Grav., and *egregius*, Holmgr., noticed and figured; *id. l. c.* p. 53, pl. xxxiii. figs. 7 & 8. (*E. unifasciatus*, Voll., is probably a variety of the latter.)

Eucerus unifasciatus, S. C. Snellen van Vollenhoven, redescribed by him; Tijdschr. Ent. xxi. p. 159.

Bassus cinctus, Grav., ♀ described; *id. l. c.* p. 162.

New genera and species :—

Holmgrenia, Kriechbaumer, CB. Ver. Regensb. xxxi. pp. 146-156. Allied to *Xenoschesis*, and is an intermediate form connecting the *Tryphonidæ* with the *Ophionidæ*. Type, *H. pulchra*, sp. n., *l. c.* p. 148, Tegernsee.

Trichomastix, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 160. Allied to *Bassus*; antennæ filiform, pilose, 19-jointed, third joint very slender at base; third segment of abdomen greatly compressed. Type, *T. polita*, sp. n., *l. c.* p. 161, pl. ix. figs. 4 & 4 *a–c*, Holland, Silesia.

Mesoleptus coxalis, p. 65, *similis*, p. 66, and *stigmaticus*, p. 67, C. G. A. Brischke, Schr. Ges. Danz. (2) iv., Prussia; *M. innoxius*, E. T. Cresson, P. Ac. Philad. 1878, p. 371, British Columbia.

Catoglyptus scaber, C. G. A. Brischke, *l. c.* p. 68, Prussia.

Euryproctus sinister, id. *l. c.* p. 70, Prussia.

Notopygus minki [Crefeld?] and *fulvipes* (Holmgr., MS.) [Sweden?], Snellen van Vollenhoven, Pinacographia, pp. 49 & 50, pl. xxxi. figs. 4 & 5.

Perilissus singularis, id. *l. c.* p. 52, pl. xxxii. fig. 8, Rotterdam; *P. longicornis*, p. 72, *verticalis*, p. 73, *abdominalis*, p. 74, *bicolor* and *citreus*, p. 75, C. G. A. Brischke, *l. c.*, Prussia.

Eclytus semiluctuosus, Snellen van Vollenhoven, *l. c.* fig. 5, Holland.

Mesolius maculatus and *brischkii* (Holmgren, MS.), p. 79, *facialis*, p. 80, *abbreviatus* and *latipes*, p. 81, *pictus* and *cognatus*, p. 83, *elongatus*, p. 85, *agilis*, p. 86, *pectoralis*, p. 87, *nigripalpis*, p. 88, *analis* and *flavipes*, p. 89, and *clypearis*, p. 90, C. G. A. Brischke, *l. c.*, Prussia; *M. stretchi*, California, *M.* (?) *aleutianus*, Aleutian Isles, p. 371, *M.* (?) *lætus*, Vancouver's Island, and *M.* (?) *rubiginosus*, California, p. 372, E. T. Cresson, *l. c.*

Tryphon incertus and *nigrinus*, C. G. A. Brischke, *l. c.* p. 93, Prussia; *T. tejonicus*, p. 372, *lusorius* and *californicus*, p. 373, E. T. Cresson, *l. c.*, California; *T. obstructor*, F. Smith, Tr. E. Soc. 1878, p. 4, Otago, New Zealand.

Grypocentrus anomalus and *dubius*, C. G. A. Brischke, *l. c.* p. 94, Prussia.

Trematopygus facialis and *annulatus*, id. *l. c.* p. 91, Prussia.

Polyblastus ruficornis, p. 97, *validicornis*, *aberrans*, and *sclandriæ*, p. 98, *holmgreni*, p. 99, *grossus*, p. 100, and *pallipes*, p. 101, *id. l. c.*, Prussia.

Erromenus analis, p. 101, *exareolatus* and *fumatus*, p. 102, *id. l. c.*, Prussia; *E. obscurellus*, E. T. Cresson, *l. c.* p. 373, California.

Cteniscus californicus, id. *l. c.* p. 374, California; *C. autumnalis*, C. G. A. Brischke, *l. c.* p. 105, Prussia.

Exochus brunnipes, E. T. Cresson, *l. c.* p. 374, Nevada.

Orthocentrus rufescens, p. 108, *lineatus*, p. 109, *testaceipes*, *facialis*, *rufipes*, *frontalis*, and *setiger*, p. 110, and *curvicaudatus*, p. 111; C. G. A. Brischke, *l. c.*, Prussia.

Bassus frontalis and *suspiciosus*, id. *l. c.* pp. 113 & 114, Prussia; *B.* (?) *ibalioides*, Kriechbaumer, Ent. Nachr. iv. p. 211, Rosenheim; *B. cinctulus* and *decoratus*, p. 375, and *pacificus*, p. 376, E. T. Cresson, *l. c.*, California, &c.

Metopius edwardsi, id. *l. c.* p. 376, Washington Territory.

Crypturus niger, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 158, pl. ix. figs. 3 & 3*a*, S. France.

Pimplides.

Ephialtes. Kriechbaumer discusses the difficulties in the determination of species, and describes the ♀ of *E. mesocentrus*, Grav.; Ent. Nachr. iv. pp. 193–197.

Atractogaster, Kriechb. Characters remodelled; *id. l. c.* p. 197.

Pimpla. Short notes; Snellen van Vollenhoven, Tijdschr. Ent. xxi. pp. lxxiv.–lxxvii.

Pimpla angens, Gm., parasitic on a venomous spider of S. Europe; F. Télesphore, Pet. Nouv. ii. p. 266.

Acœnites nigripennis, Grav., noticed and figured by S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 165, pl. x. fig. 3.

New genera and species:—

Syene, Snellen van Vollenhqven, Tijdschr. Ent. xxi. p. lxxvi. Section of *Pimpla*; a deep transverse groove at the back of each segment of the abdomen; no type mentioned.

Phidias, id. *l. c.* p. 164. Allied to *Arenetra*; type, *P. aciculatus*, sp. n., *l. c.* p. 165, pl. x. figs. 2 & 2*a*, England.

Xylophylax, Kriechbaumer, Ent. Nachr. iv. p. 210. Allied to *Xorides*, but with characters intermediate between those of a large number of genera. (A brief preliminary indication of the characters is given; the species, presumably new, are not yet indicated or described.)

Coleocentrus occidentalis, E. T. Cresson, P. Ac. Philad. 1878, p. 376, Vancouver's Isl.

Ephialtes thoracicus, id. *l. c.* p. 377, Vancouver's Isl.; *E. melanomerus* (De Haan, MS.), S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 48, Java.

Pimpla behrensi, E. T. Cresson, *l. c.* p. 377, California.

Lissonota flavo-picta and *albo-picta*, F. Smith, Tr. E. Soc. 1878, p. 4, Otago, New Zealand.

Phytodietus exareolatus, S. C. Snellen van Vollenhoven, *l. c.* p. 163, pl. ix. fig. 5, Guelderland; *P. obscurellus*, p. 379, and *californicus*, p. 380, Cresson, *l. c.*, California.

Lampronota gelida, British Columbia, p. 377, *vivida* and *segnis*, Vancouver's Isl., and *hilaris*, California, p. 378, *edwardsi*, Vancouver's Isl., and *L.* (?) *lugubris*, British Columbia, p. 379. E. T. Cresson, *l. c.*

Poemenia insularis, id. *l. c.* p. 380, Vancouver's Isl.

Xylonomus californicus, id. *ibid.*, California.

Xorides occidentalis, id. *ibid.*, Vancouver's Isl.

Echthrus? maurus, id. *l. c.* p. 381, Vancouver's Isl.

Braconidæ.

Dendrosoter, table of species; A. Förster, Verh. Ver. Rheinl. xxxv. pp. 81 & 82.

Agathis deflagrator, Spin., and *syngenesiæ*, Esenb. (= *Vipio insularis*, Voll., olim), *umbellatorum*, *nigra*, and *breviseta*, Esenb., noticed and figured; Snellen van Vollenhoven, Pinacographia, p. 46, pl. xxix. figs. 1–5.

Orgilus punctulator and *obscurator*, Esenb., noticed and figured; *id. l. c.* p. 46, pl. xxix. figs. 8 & 9.

Zemiotes albitarsis, Curt., figured in error as *Homolobus albiditarsis*, Esenb.; *id. l. c.* p. 54, pl. xxxiv. fig. 8.

Macrocentrus and allies discussed, and the following species figured: *M. marginator* and *thoracicus*, Esenb., figs. 1 & 2, *linearis* and *pallipes*, Esenb., and *collaris*, Spin., var. ?, figs. 4–6, *Homolobus discolor*, Wesm., fig. 7, and *Zele annulicornis*, Esenb., fig. 9, noticed and figured; *id. l. c.* pp. 53–55, pl. xxxiv.

Microdon mutabilis. On the development and structure of the pupa; P. Bertkau, Verh. Ver. Rheinl. SB. pp. 95 & 96.

New genus and species :—

Bæacis, A. Förster, Verh. Ver. Rheinl. xxxv. p. 70. *Diospilidæ*; allied to *Aspidogonus*, types *Bracon dissimilis*, Esenb. (= *A. contractus*, Ratz.), *abietis*, Ratz., and *intermedia* sp. n., p. 71 [Aachen ?].

Dendrosoter insignis, Düsseldorf, and *flaviventris*, Aachen, A. Förster, *l. c.* pp. 79 & 81.

Rogas penetrator, F. Smith, Tr. E. Soc. 1878, p. 5, Otago, New Zealand.

Macrocentrus flavus, Snellen van Vollenhoven, Pinacographia, p. 54, pl. xxxiv. fig. 3, Glogau.

Laccophrys villæ-novæ, Zealand, and *medenbachi*, Arnhem, *id.*, Tijdschr. Ent. xxi. pp. 172 & 173, pl. xi. figs. 1, 1 *a*, 1 *b*, & 2.

Alysia theodori, id. *l. c.* p. 174, pl. xi. figs. 3 & 3 *a*, Loosduinen.

Mesora analis, id. *l. c.* p. 175, pl. xi. fig. 4, Zealand.

Evaniidæ.

Trigonalys nigra, Westw., (= *hahni*, Spin., = *anglicana*, Shuck., = *Abastus macquarti*, St. Farg., MS.). Jacobs recharacterizes the genus, and describes a new Belgian var. of *T. nigra* as *T. solitaria*; CR. Ent. Belg. xxi. pp. ccxl.–ccxliv.

Aulacus. Table of European species; Kriechbaumer, CB. Regensb. xxxii. p. 35, Ent. Nachr. iv. pp. 243 & 244.

Aulacus calcaratus, Kriechbaumer, CB. Regensb. xxxii. p. 35, Ent. Nachr. iv. pp. 243 & 244, Bavaria; *A. bilobatus*, L. Provancher, Nat. Canad. x. p. 237, Canada, spp. nn.

Chalcididæ.

Mayr, G. Arten der Chalcidier-Gattung *Eurytoma* durch Zucht erhalten. Verh. z.-b. Wien, xxviii. pp. 297–333.

The author discusses and fully describes 24 species, with notes on their synonymy, and the galls, &c., in which they occur. The special part of the paper is preceded by dichotomous tables, giving the sexes separately.

Stoll, O. Ueber die Zucht der Chalcidier. MT. schw. ent. Ges. v. pp. 277–285.

C. G. Thomson (Hym. Scand. iv. & v.) arranges the Swedish *Chalcididæ* as follows:—*

I. Macrocentri: *Chalcidina, Perilampina, Eurytomina, Torymina* (*Megastigmides, Torymides, Ormyrides*), *Eupelmina, Encyrtina, Aphelinina, Pirenina, Tridymina, Spalangiina, Pteromalina* (*Mischogastrides, Cleonymides, Sphegigastrides, Chiropachides, Caratomides, Colotrechnides, Pteromalides, Diparides*).

II. Microcentri. *Tetracampina, Elachistina, Elasmina, Eulophina, Entedonina, Tetrastichina, Trichogrammina.*

Classification of the *Chalcididæ* discussed and the following species figured:—*Smicra sispes*, L., *melanaria*, Dalm., and *nigrifex*, Sulz., *Chalcis flavipes*, Panz., *femorata*, Dalm., and *armata*, Panz., *Perilampus auratus*, *violaceus*, and *micans*, Dalm.; Snellen van Vollenhoven, Pinacographia, pp. 46–48, pl. xxx. figs. 1–9.

The following *Chalcididæ*, parasitic on *Trioza centranthi*, are redescribed:—*Tetrastichus obscuratus*, Först., *Encyrtus triozæ*, André, and *Agonioneurus pictus*, Först.; E. André, Ann. Soc. Ent. Fr. (5) viii. pp. 83–85.

An undetermined Chalcid, parasitic on *Mantis religiosa*, noticed; M. Girard Bull. Soc. Ent. Fr. (5) viii. pp. clxiii. & clxiv.

Saunders, S. S. On the habits and affinities of *Apocrypta* and *Sycophaga*, of the Hymenopterous family *Agaonidæ*, with description of a new species of *Apocrypta* from the figs of *Ficus sycomori* of Egypt. Tr. E. Soc. 1878, pp. 313–320.

Recapitulates what has been previously recorded, with comments; and describes the habits of various species, and also (pp. 318 & 319) the males of *Sycophaga crassipes*, Westw., and *Blastophaga grossorum*, Grav.

The *Encyrtidæ* noticed and the following species figured:—*Comys swederi*, Dalm., figs. 1 & 2, *albitarsis*, Zett., fig. 3, *mirabilis*, Westw., figs. 4 & 5, and *corniger*, Walk., fig. 6, *Encyrtus punctipes*, and *lematus*, Dalm., figs. 7 & 8, and *Baeocharis pascuorum*, Mayr, fig. 9; Snellen van Vollenhoven, *l. c.* pp. 55 & 56, pl. xxxv.

Sphæripalpus, Först, renamed *Gitognathus*, because the former name was founded on an incorrect observation; C. G. Thomson, *l. c.* iv. p. 232.

Pteromalus puparum. Habits described in detail; W. von Reichenau, Ent. Nachr. iv. pp. 214–217.

Earinus thoracicus, Esenb., and *delusor*, Wesm., noticed and figured; Snellen van Vollenhoven, *l. c.* p. 46, pl. xxix. figs. 6 & 7.

New genera and species:—

Zacrita, A. Förster, Verh. Ver. Rheinl. xxxv. p. 46. *Platygastridæ*, allied to *Anopedius*: type, *Z. longicornis*, sp. n., *l. c.*, Aachen.

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* Vol iv. pp. 1–192 inclusive is noticed in Zool. Rec. xii. (1875) p. 397 & foll.

Philotrypesis, id. *l. c.* p. 59. *Torymidæ*: type, *P. longicauda*, sp. n., *l. c.* p. 60, S. Europe, Asia Minor, bred from figs.

Charitolophus, id. *l. c.* p. 69. *Eupelmidæ*: type, *C. cærulescens*, sp. n., *l. c.* p. 70, Styria.

Urocryptus, C. G. Thomson, Hym. Scand. iv. p. 108. *Eupelmus*, with smooth abdomen: type, *E. excavatus*, Dalm.

Encarsia, A. Förster, *l. c.* p. 65. *Myinidæ*, allied to *Coccophagus*: type, *E. tricolor*, sp. n., *l. c.* p. 66, Aachen.

Centrodora, id. *l. c.* p. 66. *Myinidæ*, allied to *Plastocharis*: type, *C. amœna*, sp. n., *l. c.* p. 67, Aachen.

Plastocharis, id. *l. c.* p. 67 (= *Thysanus*, Walk., and *Triphasius*, Först., preoc.). Type, *T. ater*, Hal. (redescribed, p. 68); and add *P. subænea*, sp. n., *l. c.* p. 69, Aachen.

Asemantus, id. *l. c.* p. 51. *Hormoceridæ*: type, *A. amphibolus*, sp. n., *l. c.*, Montjoie.

Syntomocera, id. *l. c.* p. 52. *Hormoceridæ*: type, *S. clavicornis*, sp. n., *l. c.* p. 53, Aachen.

Disema, id. *l. c.* p. 54. *Hormoceridæ*: type, *D. pallipes*, sp. n., *l. c.*, Switzerland.

Terobia, id. *l. c.* p. 64. *Hormoceridæ*: allied to *Isoplata*, Först.; type, *T. dispila*, sp. n., *l. c.* p. 65, Aachen.

Eurydinota, id. *l. c.* p. 42. *Miscogastridæ*: type, *E. leptomera*, sp. n., *l. c.* p. 43, Aachen.

Acroclisis, id. *l. c.* *Miscogastridæ*: allied to *Cryptoprymna*, Först.; type, *A. nigricornis*, sp. n., p. 44, Aachen.

Pterosima, id. *l. c.* p. 44. *Microgastridæ*: type, *P. varicolor*, sp. n., *l. c.* p. 45, Aachen.

Zapachia, id. *l. c.* p. 47. *Cleonymidæ*: type, *Z. spiloptera*, sp. n., *l. c.*, Crefeld.

Hyperbius, id. *l. c.* p. 58. *Tetracampidæ*: allied to *Tetracampe* and *Epiclerus*; type, *H. flavipes*, sp. n., *l. c.*, Aachen.

Stictomischus, C. G. Thomson, *l. c.* iv. p. 234. Allied to *Gitognathus* (*Spharopalpus*, Först.); back punctate-squamate, trophi of ♂ normal. To contain *S. scaposus*, p. 235, *pleuralis*, *sericeus*, and *rugicollis*, p. 236, and *longiventris*, p. 237, Sweden.

Platygerrhus, id. *l. c.* v. p. 13. Allied to *Trigonoderus*: head triangular, narrow in front; præsternum with no triangular scutum; abdomen sessile. Type, *Pteromalus gracilis*, Dalm.

Photismus, id. *l. c.* p. 15. Differs from *Platygerrhus* by its distinctly petiolated abdomen. Type, *Pteromalus nubilosus*, Dalm.

Dimachus, id. *l. c.* p. 50. *Pteromalides*; distinguished by the bicalcarate hind tibiæ. It is divided (*l. c.*) into the following subgenera, all new:—

A. Pronoti collare haud discretum. Funiculus filiformis, postannello magno.

a. Stigma crassiusculum, radio fere brevius. Corpus breve.

Cænocrepis (type, *C. arenicola*, sp. n., *l. c.* p. 51, Sweden).

a a. Stigma tenue, radio longius.

b. Abdomen fascia basali flava.
Dimachus (type, *Pteromalus discolor*, Walk.).
b b. Abdomen fascia nulla.
Hemitrichus (type, *H. rufipes*, sp. n., *l. c.* p. 54, Sweden).

B. Pronoti collare subdiscretum.
c. Antennæ postannello parvo.
c c. Antennæ filiformes, postannello cylindrico.
Pteroscytus (type, *Pteromalus scabriculus*, Nees).
d. Antennæ breves, clavatæ.
Habritys (type, *Pteromalus brevicornis*, Ratz.).
d d. Antennæ filiformes.
Dinarmus (types, *D. acutus* and *pilosulus*, spp. nn., pp. 56 & 57, Sweden).

Homoporus, id. *l. c.* p. 64. Subgenus of *Merisus*: abdomen subovate; sometimes with the back smooth. Types, *Pteromalus fulviventris*, Walk., and *luniger*, Nees; add *H. gibbiscuta*, *chlorogaster*, and *crassiceps*, p. 66, and *crassinervis*, p. 68, spp. nn., Sweden.

Platytermus, id. *l. c.* p. 75. Subgenus of *Heuteles*, from which it differs by its broad vertex and long thorax. Types, *P. decorus*, Walk., add *P. brevicornis* and *specularis*, p. 77, *fasciculatus* (= *Mesopolobus fasciventris* and *Pteromalus trochilus*, Ratz.), p. 78, and *simplex*, p. 79, Sweden: spp. nn.

Psilonotus, id. *l. c.* p. 81. Subgenus of *Eutelus*; differs from *Amblymerus* in the antennæ being inserted hardly above the clypeus. Types, *P. aureolus* and *viridulus*, spp. nn., pp. 82 & 83, Sweden.

Stenomalus, id. *l. c.* p. 88. Subgenus of *Hetroxys*; extremity of clypeus armed with a tooth in the middle. Types, *Pteromalus crassicornis*, Dalm., and *P. muscarum*, Walk., add *S. subfumatus* and *rugosus*, spp. nn., *l. c.*, p. 90, Sweden.

Cecidostiba, id. *l. c.* p. 92. Subgenus of *Hetroxys*, allied to *Cœnacis*; metathorax short, extremity of clypeus excised in the middle; episterna of the metathorax extending to the coxæ. Types, *C. rugifrons*, *collaris*, and *truncata*, spp. nn., *l. c.* pp. 92–94, Sweden.

Cricellius, id. *l. c.* p. 102. Subgenus of *Hetroxys*; vertex not sharply bordered in the middle; postannellus small. Type, *C. decipiens*, sp. n., p. 103, Sweden.

Holcæus, id. *l. c.* p. 104. Subgenus of *Hetroxys*; differs from *Cricellius* by its large postannellus. Type, *Pteromalus dichrous*, Dalm.; add *H. torymoides*, sp. n., *l. c.*, p. 106, Sweden.

Stinoplus, id. *l. c.* p. 107. Subgenus of *Hetroxys*; collar indistinct; ventral valve not extending to the middle of the abdomen. Type, *Pteromalus militaris*, Dalm.; add *S. aureolus*, sp. n., *l. c.* p. 109, Sweden.

Habrocytus, id. *l. c.* p. 109. Subgenus of *Hetroxys*; collar broad; left mandible tridentate, and right mandible four-dentate; to contain *Pteromalus albipennis*, Walk., and allies.

Spintherus, id. *l. c.* p. 129. Subgenus of *Hetroxys*; allied to *Habroscytus*; head narrow towards the mouth; both mandibles tridentate. Type, *S. obscurus*, sp. n., *l. c.*, Sweden.

Trichomalus, id. *l. c.* p. 134. Subgenus of *Isocyrtus*; eyes smooth; vertex not broad; eyes subovate. To contain the following new species from Sweden: *T. punctinucha*, p. 134, *frontalis* and *pallicornis*, p. 136, *punctiger*, p. 137, *laticeps*, p. 138, *fasciatus* and *spiracularis*, p. 139, *lævinucha* and *submudus*, p. 140, *coxalis*, p. 141 (*Pteromalus cyniphis*, Nees, ♂), *rufimanus* (= *P. cyniphis*, Nees, ♀), *æneicoxa*, and *pedicellaris*, p. 142.

Polycelis, id. *l. c.* p. 143. Subgenus of *Isocyrtus*; eyes smooth, head short and thick, vertex broad. Types, *Pteromalus conspersus*, Walk., and *P. monospila*, sp. n., *l. c.* p. 145, Sweden.

Anoglyphis, A. Förster, *l. c.* p. 49. *Pteromeralidæ*: type, *A. nubilosa*, sp. n., *l. c.*, Crefeld.

Phanacra, id. *l. c.* p. 51. *Pteromalidæ*: type, *P. nubigera*, sp. n., *l. c.* p. 52, Aachen.

Enargopelte, id. *l. c.* p. 62. *Pteromalidæ*: allied to *Megapelte*; type, *E. obscura*, sp. n., *l. c.* p. 63, France.

Stichocrepis, id. *l. c.* p. 63. Affinities not stated. Type, *S. armata*, sp. n., *l. c.* p. 64, Tyrol.

Trichoglenus, C. G. Thomson, *l. c.* p. 149. Subgenus of *Pteromalus*; allied to *Halizous*, Thoms. (p. 147 = *Urolepis*, Walk.), wings immaculate, abdomen rounded. Type, *Pter. complanatus*, Ratz.

Catolaccus, id. *l. c.* p. 152. Subgenus of *Pteromalus*; wings wholly pubescent. Type, *C. cavigena*, sp. n., *l. c.*, Sweden.

Diglochis, id. *l. c.* p. 156. Subgenus of *Pteromalus*; metacarpus longer than radius. Type, *P. omnivorus*, Walk.

Arthrolytus, id. *l. c.* p. 158. Subgenus of *Pteromalus*; metacarpus not longer than radius; vertex not pointed in the middle. To contain *A. punctatus*, *albiscapus*, and *rugifrons*, spp. nn., pp. 158–160, Sweden.

Dibrachys, id. *l. c.* p. 160. Subgenus of *Pteromalus*; differs from *Arthrolytus* in its pointed vertex. Types, *Pter. bouchæanus*, Ratz., and *acutus*, sp. n., p. 162, Lund.

Cœlopisthus, id. *l. c.* p. 162. Subgenus of *Pteromalus*; allied to *Arthrolytus* and *Dibrachys*, but abdomen rounded. Types, *Pter. cephalotes*, Walk., and *vitripennis*, sp. n., p. 163, Sweden.

Dir[*r*]*hicnus*, id. *l. c.* p. 170. Subgenus of *Metopon*; flagellum of antennæ equally thickened in ♂, and pubescent or pilose in ♀. To contain *D. subcæruleus*, p. 170, *heterotomus*, p. 171, *sublævis* and *subincrassatus*, p. 172, and *magnicornis*, p. 173, spp. nn., Sweden.

Dichatomus, A. Förster, *l. c.* p. 48. *Elachistidæ*: allied to *Aulogymnus*; type, *D. acerinus* (Giraud, MS.), described, *ibid.*, bred from galls of *Bathyaspis*.

Rhicnopelte, id. *l. c.* p. 55. *Elachistidæ*: type, *R. fulciventris*, sp. n., *ibid.*, Aachen.

Miotropis, C. G. Thomson, *l. c.* v. p. 197. Allied to *Elachistus*; hind tibiæ bicalcarate; body not metallic. Types, *M. sulcicrista*, p. 197, *simplex* and *4-notata*, p. 199, spp. nn., Sweden.

Teleogmus, id. *l. c.* p. 212. Allied to *Olinx*; mesonotum with complete sulci. Types, *Eulophus xanthostomus*, Nees, and *T. arcticus*, sp. n., *l. c.* p. 214, Lapmark.

Sympiesis, id. *l. c.* p. 217. Allied to *Olinx*; mesonotum not divided

from the scapulæ; hind tibiæ bicalcarate; præstigma distinctly longer than radius; antennæ simple in male. Types, *Eulophus sericeicornis*, Nees, and *S. punctipleura*, sp. n, *l. c.* p. 218, Sweden.

Cratotechus, id. *l. c.* p. 219. Mesonotum as in *Sympiesus*; radius rather shorter than stigma; thorax stout. Types, *Ichneumon larvarum*, Linn., *æneicoxa*, *longicornis*, and *opaculus*, p. 221, and *ungularis*, p. 222, spp. nn., Sweden.

Microlycus, id. *l. c.* p. 223. Allied to *Eulophus*; antennæ with the funiculus white in ♀, subserrate and short; branches short in ♂. Type, *M. heterocerus*, sp. n., p. 224, Sweden.

Necremnus, id. *l. c.* p. 234. Hind tibiæ with one spur, metathorax with a carina in the middle; wings hyaline, metacarpus a little longer than the radius. Types, *Eulophus leucarthrus*, Nees, and *punctifrons*, sp. n., *l. c.* p. 235, Sweden.

Diglyphis, id. *l. c.* p. 235. Allied to *Necremnus*; scutellum with a dorsal line on each side; hind tibiæ with two spurs. Types, *D. æneiscapus* and *rugifrons*, spp. nn., p. 236, Sweden.

Solenotus, id. *l. c.* p. 237. Characters of *Diglyphis*; hind tibiæ with one spur. Type, *S. viridis*, sp. n., *l. c.*, Sweden.

Mestocharis, A. Förster, *l. c.* p. 50. *Entedonidæ*: type, *M. cyclospila*, sp. n., *l. c.*, Aachen.

Pleuropachys, C. G. Thomson, *l. c.* p. 240. Subgenus of *Entedon*, with ocelli placed in a curved line. Type, *Elachistus costalis*, Nees.

Pleurotropis, id. *l. c.* p. 249. Allied to *Entedon*; head with forked scrobe, emitting a branch on each side towards the emarginate eyes; metathorax with a distinct fold; abdomen generally convex on the back. To contain *bimaculatus*, Dalm., *Elachistus politus*, Ratz., and the following new species from Sweden:—*P. nigritarsis*, p. 251, *nitifrons* and *planiventris* p. 252, *brevicornis* and *cribrifrons*, p. 253, *strigiscuta*, p. 254, *crassicornis* and *flaviscapus*, p. 255. A second section (*Rhopalotus*, p. 255), the type of which is *Elachistus cothurnatus*, Nees, differs in the thickened antennæ of the ♀, and the 3-jointed funiculus in both sexes. Contains also the following new species:—*clavigera* and *substrigosa*, p. 256, *brachycerus* and *tetratomus*, p. 257.

Chrysocharis, id. *l. c.* p. 265. Section of *Derostenus*; abdomen of ♀ ovate or elongate; petiole short and slender; scape of antennæ sometimes wholly metallic. To contain *D. niveipes*, Thoms., &c.

Systomosphyrum, A. Förster, *l. c.* p. 60. *Tetrastichidæ*: type, *S. fulvipes*, sp. n., *l. c.* p. 61, between Malmedy and Montjoie.

Cratapus, id. *l. c.* p. 61. Allied to *Tetrastichus*. Type, *C. aquisgranensis*, sp. n., *l. c.* p. 62, Aachen.

Oxymorpha, C. G. Thomson, *l. c.* p. 280. Subgenus of *Tetrastichus*, with smooth thorax. To contain *Eulophus elongatus*, Först., *Entodon lutens*, Ratz., and *intermedius*, sp. n., p. 281, Sweden.

Leucaspis moleyrii, M. Maindron, Bull. Soc. Ent. Fr. (5) viii. p. cix., New Guinea; *L. histrio*, id. *l. c.* p. cxxx., Tidore; *L. gambeyi*, id. *l. c.* p. clxiv., New Caledonia.

Eurytoma wachtli, Brühl, *dentata*, Vienna, Tyrol, p. 308, *laserpitii* and

robusta, p. 309, Vienna, *diastrophi*, p. 311, Saxony, *tristis*, p. 312, Vienna, *curculionum*, p. 314, *auricoma*, p. 321, *nobbei*, p. 325, *saliciperdæ*, p. 326, *phanacidis*, p. 327, Vienna, *setigera*, p. 330, Lower Austria, *ononis*, p. 331, Vienna, and *jaceæ*, p. 332, Saxony, G. Mayr, Verh. z.-b. Wien, xxviii.

Coccophagus lecanii, E. A. Smith, Am. Nat. xii. p. 661, note. Parasitic on *Lecanium acericorticis*, Fitch; the maple-tree bark-louse of the United States.

Tridymus mucronatus, p. 194, *coxalis* and *flavipes*, p. 195, *productus*, p. 196, *citripes*, p. 197, *clavatus*, *convergens*, and *frenalis*, p. 199, *punctipennis*, *lævicollis*, *lævisculta*, and *pallicornis*, p. 200, and *latifrons*, p. 201, C. G. Thomson, Hym. Scand. iv., Sweden.

Semiotellus punctipennis (= *mundus* and *clarus*, Walk.), p. 202, *fumipennis* and *lævicollis*, p. 203, *id. l. c.*, Sweden.

Systasis longicornis (= *Pteromalus sylphi* and *cærulans*, Dalm.), p. 204, and *parvula*, p. 205, *id. l. c.*, Sweden.

Metastenus viridis, id. *l. c.* p. 206, Sweden.

Tricoryphus fasciatus, id. *l. c.* p. 210, Sweden.

Lamprotatus splendens, p. 222, *triangularis*, p. 223, *picinervis*, *crassipes*, and *petiolaris*, p. 224, *punctipennis* and *claviger*, p. 225, *brevicornis* and *ungularis*, p. 226, *elevatus* and *simplex*, p. 227, *curvus*, p. 228, *pilicornis*, p. 229, *parviclava*, p. 230, *genalis* and *gracilis*, p. 231, *id. l. c.*, Sweden.

Gitognathus grandiclava, id. *l. c.* p. 233.

Mischogaster gracilipes, id. *l. c.* p. 239, Sweden.

Halticoptera planiscuta, p. 248, *petiolata*, p. 250, and *crassipes*, p. 252, *id. l. c.*, Sweden.

Trigonoderus pedicellaris (= *Pteromalus quadrum*, Nees), p. 8, *trifasciatus*, p. 11, *vittiger* and *apicalis*, p. 12, *id. l. c.* v., Sweden.

Sphegigaster truncatus and *muticus*, id. *l. c.* v. pp. 21 & 22, Sweden.

Cryptoprymnus cavigena, id. *l. c.* p. 22, Sweden.

Syntomopus incisus and *oviceps*, id. *l. c.* pp. 23 & 24, Sweden.

Polycystus scapularis, id. *l. c.* p. 26, Sweden.

Pachyneuron grande, *gibbiscuta*, and *planiscuta*, id. *l. c.* p. 29, Sweden.

Ærocormus semifasciatus, id. *l. c.* p. 34, Sweden.

Pandelus flavipes, id. *l. c.* p. 35, Sweden.

Metacolus unifasciatus, id. *l. c.* p. 36, Sweden.

Dinotus bidentulus, p. 39, *calcaratus*, *clypealis*, and *pteromalinus*, p. 40, *id. l. c.*, Sweden.

Rhopalicus annellus (= *Pteromalus binotatus* and *4-notatus*, Dalm.) and *brevicornis*, id. *l. c.* pp. 41 & 43, Sweden.

Colotrechnus subcæruleus, id. *l. c.* p. 46, Sweden.

Merisus acutangulus, id. *l. c.* p. 64, Helsingborg.

Eutelus collaris (= *E. dilectus* and *immaculatus* and *Amblymerus amœnus*, Walk.), p. 73, *heterotomus*, p. 74, *punctiger* and *elongatus*, p. 75, *id. l. c.*, Sweden.

Amblymerus crassicornis (? = *modestus*, Walk.), p. 80, *pedunculi* and *squamifer*, p. 81, *id. l. c.*, Sweden.

Rhoptrocerus brevicornis, id. *l. c.* p. 85, Sweden.

Anogmus strobilorum, id. *ibid.*, Sweden.

Canacis grandiclava, p. 95, *punctulata* and *spiracularis*, p. 96, *pilosella*,

p. 97, *crassicornis*, p. 98, *parviclava* and *planiscuta*, p. 99, id. *l. c.*, Sweden.

Hetroxys elongatus, p. 100, *breviusculus* and *longicauda*, p. 102, *id. l. c.*, Sweden; *H. gribodii*, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 176, pl. xi. fig. 5, Turin.

Habroscytus trypetæ, p. 112, *dentifer* and *glabriculus*, p. 113, *fasciatus* and *cioni*, p. 115, *acutigena* and *parvinucha*, p. 117, *crassinervis*, p. 118, *radialis*, *chlorogaster*, and *dolichurus*, p. 119, *simulans* and *læviusculus*, p. 121, *longicauda* and *punctipleura*, p. 122, *bedeguaris*, p. 123, *aureolus*, p. 125, C. G. Thomson, *l. c.*, Sweden.

Isocyrtus marginatus and *dentifer*, id. *l. c.* pp. 132 & 133, Sweden.

Pteromalus planiscuta and *squamifer*, p. 155, and *submarginatus*, p. 156, *id. l. c.*, Sweden.

Metopon crassispina, p. 166, *concolor* and *punctifrons*, p. 168, *punctatum* and *æneiscapus*, p. 169, *id. l. c.*, Sweden.

Platynochilus cuprifrons, id. *l. c.* p. 185, Sweden.

Euplectrus læviscuta, id. *l. c.* p. 188, Sweden.

Elachistus petiolatus, p. 191, *æneiscapus* and *opaculus*, p. 193, *sublævis*, p. 194, *viridulus* and *punctiscuta*, p. 195, *lapponicus* and *olivaceus*, p. 196, *id. l. c.*, Sweden or Lapland.

Cirrospilus immaculatus, p. 202, *subviolaceus* and *caudatulus*, p. 203, *id. l. c.*, Sweden.

Melittobia osmiæ, id. *l. c.* p. 204, Sweden.

Elasmus viridiceps, p. 205, Lapland, *fumipennis* and *albipennis*, p. 206, Sweden, *id. l. c.*

Hemiptarsenus albicoxa (= *Eulophus anementus*, Walk., = *H. fulvicollis*, ♂, Westw.), *id. l. c.* p. 210, Sweden.

Olinx fulvicrus and *rotundiventris*, id. *l. c.* p. 216, Sweden.

Eulophus tridentatus, p. 227, *punctiscuta* and *strigiscuta*, p. 228, *punctifrons* and *subcontiguus*, p. 231, *stramineipes*, p. 232, *viridulus*, p. 233, *id. l. c.*, Sweden.

Entedon squamosus, p. 242, *subovatus*, *subimpressus*, and *tenuitarsis*, p. 243, *fuscitarsis*, *parvicalcar*, and *punctatus*, p. 244, *metatarsalis* and *longiventris*, p. 245, *elongatus* and *cioni*, p. 246, *albicrus*, *cionobius*, and *punctiscapus*, p. 247, *id. l. c.*, Sweden.

Derostenus conformis, p. 259, *lævifrons*, *punctiscuta*, and *pilicoxa*, p. 261, *latipennis* and *aurifrons*, p. 262, *filicornis* and *punctifrons*, p. 263, *petiolatus*, *punctiscapus*, and *crassiscapus*, p. 264, *niveipes* and *chrysostomus*, p. 265, *boops*, *elongatus*, and *nigricrus*, p. 266, *heterotomus*, *æneiscapus*, and *scutellaris*, p. 267, *radialis* and *varipes*, p. 269, *clypealis*, p. 270, *sulciscuta* and *parviclava*, p. 272, *abruptus* and *clavicornis*, p. 273, Sweden; *id. l. c.*

Astichus arithmeticus, id. *l. c.* p. 274, Sweden.

Euderus caudatus, p. 277, *viridis* and *obscurus*, p. 278, *id. l. c.*, Sweden.

Tetrastichus trichops, p. 282, *setifer*, p. 283, *scaposus* and *citrinus*, p. 284, *subdepressus*, p. 285, *pallicornis*, *pedicellaris*, and *compressiventris*, p. 286, *longiscapus*, p. 287, *flavimanus*, *punctiscuta*, and *crassinervis*, p. 289, *seticollis* and *deplanatus*, p. 291, *citripes*, *terminalis*, and *longicauda*, p. 292, *dolichurus* and *crassicauda*, p. 293, *micantulus*, p. 295, *brachycerus*, *obscu-*

ripes, and *claviger*, p. 296, *planiusculus*, *facialis*, and *astichus*, p. 297, and *melittobius*, p. 298, *id. l. c.*, Sweden.

Ophioneurus grandis, id. *l. c.* p. 299, Sweden.

Proctotrypidæ.

Pteratomus putnami, Pack., said to be the smallest insect known, redescribed and figured. It is probably an egg-parasite on *Megachile centuncularis*, or on a parasite of that bee. J. D. Cox, Am. Nat. xii. pp. 445–448.

New genera and species :—

Atritomus, A. Förster, Verh. Ver. Rheinl. xxxv. p. 56. *Ceraphronidæ* : allied to *Trichosteresis*, *Megaspilus*, and *Lygoceras*; type, *A. coccophagus*, sp. n., *l. c.*, Aachen.

Synarsis, id. *l. c.* p. 57. *Ceraphronidæ*: allied to *Dichogmus*, Thoms.; type, *S. pulla*, sp. n., *l. c.*, Aachen.

Proctotrypes intrudens, F. Smith, Tr. E. Soc. 1878, p. 5, Otago, New Zealand.

Spilomicrus quadriceps, id. *l. c.* p. 6, Otago, New Zealand.

Goniozus tibialis, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 177, pl. xi. fig. 6, Hague.

Cynipidæ.

(See also Aphididæ in the *Hemiptera*, infrà.)

Bassett, H. F. Agamic Reproduction among the *Cynipidæ*. P. Am. Ass. xxvi. pp. 302–306.

Contains observations on American oak-galls by the writer; and remarks on Adler's observations on those of Europe.

Hagen, H. On the Natural History of Gall-Insects. Canad. Ent. x. pp. 85–94.

Contains an abstract of Adler's observations on alternation of generations in the *Cynipidæ*.

Mayr, G. Die europäischen Cynipiden-Gallen, mit Ausschluss der auf Eichen vorkommenden Arten. (Aus dem 15 Jahresberichte der Rossauer Communal-Oberrealschule in Wien). Wien : 1876, 8vo, pp. 24, pls. iii.

Contains figures and descriptions of 20 galls belonging to the genera *Aulax*, *Diastrophus*, *Phanacis*, *Xenophanes*, *Rhodites*, *Pediaspis*, and *Bathyaspis*, found on the following genera of plants: *Triticum* or *Arrhenatherum*, *Glechoma*, *Salvia*, *Hieracium*, *Scorzonera*, *Centaurea*, *Potentilla*, *Rubus*, *Rosa*, *Sorbus*, *Acer*, and *Papaver*.

Riley, C. V. A new Oak-Gall on Acorn-cups. Tr. Ac. St. Louis, iii. pp. 577 & 578.

The gall, which he describes, occurs on every species of *Quercus* of the group of *Q. prinus*, to which it is apparently confined. The insect which produces it has not yet been determined.

E. A. Fitch completes his translations of descriptions of oak-galls from Mayr's "Mitteleuropäischen Eichengallen," with additions of his own; Ent. xi. pp. 14–16, 31–33, 87 & 88, 114 & 115, 133–136, 145–147, 180–183, 204–207, 220–226, and figures of various species. He adds a list of British species of oak-gall flies.

On dimorphism and alternation of generations in the *Cynipidæ*; Ent. M. M. xv. pp. 12 & 13.

F. Katter gives an abstract of recent observations on the *Cynipidæ*; Ent. Nachr. iv. pp. 6–8.

Short notes on alternation of generations in the *Cynipidæ*; H. F. Bassett, Canad. Ent. ix. pp. 121 & 122.

General observations on *Cynipidæ*; J. Karsch, JB. zool. Sect. Westf. Ver. 1877–78, pp. 48–53.

Andricus circulans, Mayr (new to Britain), in the acorns, and an undetermined species in the buds of *Quercus cerris*; E. A. Ormerod, Ent. xi. pp. 201–204.

Cynips kollari. On abnormal growth of the galls of this and other species; E. A. Ormerod & E. A. Fitch, Ent. xi. pp. 82–87, 129–133, woodcuts.

Neuroterus numismatis and *Spathogaster vesicatrix* are dimorphous forms; J. E. Fletcher, Ent. M. M. xiv. p. 265.

Neuroterus læviusculus. Unusual abundance of its galls in 1878; E. A. Ormerod, Ent. xi. pp. 275 & 276.

Neuroterus lenticularis. Lichtenstein describes the precautions which he has taken to observe its metamorphoses; Bull. Soc. Ent. Fr. (5) viii. pp. lxix. & lxxxi.

Diastrophus lampsanæ (Perris, MS.), sp. n., J. Karsch, JB. zool. Sect. Westf. Ver. 1877–78, pp. 46–48, pl. (gall, neuration, &c.), Münster.

Urocerida.

Tremex columba, Linn. Larva described and figured, A. S. Packard, Rep. U. S. Geol. Surv. x. p. 531.

Macrocephus ulmariæ, g. & sp. nn., described in all stages; D. H. R. von Schlechtendal, Ent. Nachr. iv. p. 153, Germany.

Xiphidion, g. n., L. Provancher, Nat. Canad. x. p. 233. Allied to *Xiphidria*; both recurrent nervures received by the second cubital cell. Type, *X. canadense*, sp. n., *l. c.*, Canada.

Xiphydria flavo-picta, sp. n., F. Smith, Tr. E. Soc. 1878, p. 1, Otago, New Zealand.

Tenthredinidæ.

Cameron, P. Notes on British *Tenthredinidæ*. Ent. M. M. xiv. pp. 265–268.

The following observations occur: *Macrophya albicincta*, Th., *nec* Sch., = *ribis*, Sch.; *ribis*, Th., *nec* Sch., = *albicincta*, Sch.; *albipunctata*, Fall., is distinct from *crassula*, Kl. (the first three species are tabulated, and

the uncertainty respecting the true larva of *M. ribis* is commented on); *Selandria cerciipes*, S. v. Voll., = *analis*, Thoms., noted as British: *Eriocampa æthiops*, auct. angl. *nec* Fab., renamed *E. caninæ* (p. 267); *Nematus vallator*, Voll., = *compressicornis*, Fabr.; *N. erythrogaster*, Thoms. (*nec* Nort.), noticed as British, and renamed *crassiventris* (p. 267); *N. canaliculatus*, Hart. (= *stenogaster*, Först., and *pleuralis*, Thoms.), and *arcticus*, Thoms., recorded as British; *N. pallicerus*, Thoms., *nec* Hart., Voll., = *turgidus*, Zadd.

[CAMERON, P.] The Fauna of Scotland, with special reference to Clydesdale and the Western district. *Hymenoptera*, Part 1 (*Tenthredinidæ*). P. Glasg. Soc. iii. App. pp. 1–52.

Much more than a local list. The introductory portion contains general remarks on the whole group, Exotic and European. Tables of the distribution of the families throughout the world, and of the genera in Scotland, Sweden, and France, and in various districts of Scotland, are also given. The author tabulates the tribes as follows:—

TENTHREDINIDÆ.

TENTHREDINA.

CIMBICIDINA (*Cephalocera*) HYLOTOMINA (*Sizygonia*).

NEMATINA.

LOPHYRIDINA PTERYGOPHORINA

LYDINA

XYELINA

CEPHINA

SIRICIDÆ.

——. On the larvæ of the *Tenthredinidæ*, with special reference to protective resemblance. Tr. E. Soc. 1878, pp. 193–199: P. Glasg. Soc. iii. pp. 352 & 353.

The larvæ of the *Tenthredinidæ* are protected by their colours, &c., in the same manner as Lepidopterous larvæ. Their habit of constantly agitating their bodies is probably intended to drive away ichneumons.

——. A Catalogue of British *Tenthredinidæ*. Glasgow: 1878, 8vo, pp. 22.

A list printed on one side only for labelling cabinets.

——. On some new genera and species of *Tenthredinidæ*. Tr. Ent. Soc. 1878, pp. 141–152.

KRIECHBAUMER, A. Ueber die *Nematus*-gallen an Weidenblättern und ihre Erzeuger. CB. Ver. Regensb. xxx. pp. 66–71, 155–157.

A long rambling discussion on the synonymy, &c., of these species and of others which have been confounded with them, and their parasites.

Cimbex (*Zaræa*) *fasciata*, Linn. Great doubt exists respecting the real male of this species; Kriechbaumer, Ent. Nachr. iv. pp. 125, 141–148. *Z. cuprea*, Aich., and *Z. fasciata*, Jur., ♂, = *Abia aurulenta*, Sich.; *A. aurulenta*, Zadd., is distinct, and is renamed *fulgens*, Zadd. (*l. c.* p. 143,

note); *id. l. c.* Linné is the only author who has described the true male of *Z. fasciata*: Kuwert, *l. c.* pp. 181 & 182, who redescribes it.

Dielocera, Curtis, recharacterized; P. Cameron, Tr. E. Soc. 1878, p. 145.

Pœcilosoma obtusum, Thoms., *nec* Klug & Hart., renamed *P. fletcheri*; id., P. Glasg. Soc. iii. App. p. 20.

Pœcilosoma pulveratum, Retz. (*obesum*, Hart.). P. Cameron has discovered that this species is parthenogenetic, and he describes its oviposition; Ent. M. M. xv. pp. 12 & 13. [As the females of the *Tenthredinidæ* are generally much more common in collections than the males, it appears probable that complete or partial parthenogenesis may occur in many other species also.]

Cryptocampus angustus, Hart., and *mucronatus*, Klug. Snellen van Vollenhoven's descriptions of their transformations translated; J. W. May, Ent. xi. pp. 243–247.

Perineura. The British species discussed, and tabulated; P. Cameron, P. Glasg. Soc. iii. App. pp. 51 & 52.

Eriocampa ovata. On its oviposition and supposed parthenogenesis; J. B. Bridgman, Ent. xi. pp. 191 & 192.

Tenthredo colon, Klug, var. from Scotland described; S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 156.

Macrophya blanda, var. ? *brevicornis*, from Egerland; *M. quadrimaculata*, variation in male, and *M. punctata*, var. with black abdomen noticed: H. Gradl, Ent. Nachr. iv. pp. 239 & 240.

Lophyrus abboti. Its ravages on the white pine in Canada; B. Gott, Canad. Ent. x. p. 99.

Tarpa spissicornis, Klug. Note on larva, &c., A. Hiendlmayr, MT. Münch. Ver. ii. p. 163; Kriechbaumer, Ent. Nachr. iv. pp. 169 & 170.

New genera and species:—

Incalia, P. Cameron, Tr. E. Soc. 1878, p. 143. Differs from *Cephalocera* by its pilose, non-clavate 7-jointed antennæ, and by possessing an appendicular cellule in the posterior wing. Type, *I. hirticornis*, sp. n., *l. c.* p. 144, Ega.

Trailia, id. *l. c.* p. 148 (*Hylotoma*, section 8, Klug.), to contain *T. urcacensis*, Rio Purus, *analis*, and *compressicornis*, Brazil, p. 149, and *T. nigro-lineata*, Bahia, p. 150, spp. nn., *l. c.*

Rusobria, id. *l. c.* p. 150 (*Hylotoma*, section 4, Klug), to contain *R. megaptera* and *carinata*, Brazil, and *R. leucosoma*, Amazonia, spp. nn., *l. c.* p. 151.

Zarca, id. *l. c.* p. 142. Differs from *Blennocampa* by its pilose antennæ thickened in the middle, its large projecting coxæ, and its long legs, with a very long basal tarsal joint. Type, *Z. apicalis*, sp. n., *l. c.* p. 143, Brazil.

Amasis sanguinea, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 154, pl. ix. figs. 1 & 1 *a*, Morocco.

Dielocera sulcicornis, Prainha, Lower Amazons, p. 145, *D.* (?) *crassicornis*, Amazons, p. 146, *D. curtisi* (= *ellisi*, Curt., ♂), Brazil, and *carbonaria*, Villa Nova, p. 147, P. Cameron, Tr. E. Soc. 1878.

Nematus clibrichellus [!], p. 32, *whitei*, p. 35, and *strongylogaster*, p. 42,

id. P. Glasg. Soc. iii. App., Scotland; *N. hibernicus*, Dublin, and *placidus*, England, *id.* Ent. M. M. xiv. p. 225.

Dolerus vulneratus, A. Mocsáry, Tijdschr. Ent. xxi. p. 199, Siberia.

Taxonus fletcheri, P. Cameron, Ent. M. M. xiv. p. 286, Worcester; *T. longipennis*, id. Tr. E. Soc. 1878, p. 141, Brazil.

Emphytus pallipes, L. Provancher, Nat. Canad. x. p. 66, Canada.

Sciapteryx punctum, id. *l. c.* p. 72, Canada.

Selandria flavicornis, id. *l. c.* p. 100, Canada.

Eriocephala atricapilla, M. F. Wocke, Z. E. Ver. schles. vi. (1877), [Germany ?].

Macrophya histrionica, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. p. 155, Beyrut; *M. contaminata*, L. Provancher, *l. c.* p. 105, Canada.

Pachyprotasis delta, id. *l. c.* p. 108, Canada.

Allantus nigrilabris, J. Frivaldszky, Term. közlem. xiii. p. 347, Hungary; *A. cogitans*, L. Provancher, *l. c.* p. 163, Canada.

Strongylogaster albo-sectus and *impressatus*, id. *l. c.* pp. 168 & 170, Canada.

Tenthredo lachlaniana, P. Cameron, P. Glasg. Soc. iii. App. p. 12, Rannoch, Germany; *T. spectabilis*, A. Mocsáry, Tijdschr. Ent. xxi. p. 199, Siberia; *T. basilaris* and *cingulata*, p. 196, *lineata* and *mellicoxa*, p. 198, *decorata*, p. 200, and *pallicoxa*, p. 201, L. Provancher, *l. c.*, Canada.

Lyda burquei and *quebecensis*, id. *l. c.* pp. 204 & 205, Canada.

LEPIDOPTERA.

BY

W. F. Kirby, M.E.S., &c.

General Notes.

The Recorder has continued his Introductory Papers on *Lepidoptera* from No. vi., *Nymphalidæ-Brassolinæ* to No. x., *Nymphalinæ* (*Napeocles*). Ent. xi. pp. 25–28, 74–76, 124–128, 154–156, 195–197, 239–241.

On the date of publication of Cramer & Stoll's Papillons Exotiques; *id.* Ent. M. M. xiv. pp. 278 & 279.

F. B. White discusses the structure of the male genital armature in European *Lepidoptera*, and figures the organs of a great number of species. He considers these characters to be of great importance both as indicating the natural affinities of families and genera, as well as in the differentiation of species. Tr. L. S. (2) i. pp. 357–369, pls. lv.–lvii.

B. Hatschek gives anatomical details on the eggs of *Bombyx chrysorrhœa*, adding observations on the nervous system of insects, and its homologies with that of other *Arthropoda*. Jen. Z. Nat. xi. pp. 115–148, pls. vii.–ix.

The extensible tubercles of the under surface of the first thoracic segment in most butterfly larvæ are probably analogous to the retractile osmatoria of swallow-tail larvæ; S. H. Scudder, Psyche, i. p. 168.

On embryonic characters in larvæ, with special reference to the *Lepidoptera*; A. Giard, CR. Ass. F. Sci. vi. pp. 660 & 661.

On protective mimicry in caterpillars; T. D. G. Carmichael, P. Phys. Soc. Edinb. iv. pp. 159–163.

General observations on broods of *Lepidoptera*, colours of larvæ, &c.; the only important point noticed is that Weismann's interpretation of the colouring of *Sphinx* larva is disputed. W. von Reichenau, Ent. Nachr. iv. pp. 241–243.

Harrach, Nahrungswechsel bei den Raupen in verschiedenen Zeiträumen, Einfluss der Futterpflanze; Ent. Nachr. iv. p. 186.

The colours of British caterpillars are tabulated, with reference to their protective character, by J. Lubbock, Tr. E. Soc. 1878, pp. 239–258.

Discussion on the colours of larvæ, with reference to Sir J. Lubbock's paper; P. E. Soc. 1878, pp. iv.–vii. *Cf.* also H. H. Crewe, Ent. xi. p. 118.

On the variation in colour and habits of the larvæ of *Catocala nupta* and *Biston hirtaria*, as modified by surrounding circumstances; H. M. Golding-Bird, Ent. xi. pp. 108–111.

Notes on various larvæ; T. Goossens, Pet. Nouv. ii. pp. 210 & 211.

It is said that cabbages may be protected from caterpillars by growing dill with them, and gooseberry bushes by growing broad beans near them; Nature, xviii. p. 318.

Mimicry in cocoons; H. Dewitz, Arch. f. Nat. xliv. 1, p. 20, Kosmos, ii. pp. 84–88.

The interior of a cocoon is always of the same temperature as the surrounding atmosphere; it is therefore no protection against cold, but exhibits mimicry in many instances; J. de Bellesme, Bull. Sc. Nord (2) i. p. 270.

On the emergence of *Lepidoptera* from their cocoons; Westwood & Weir, P. E. Soc. 1878, p. xxxix.

W. Breitenbach describes the structure of the proboscis in various *Lepidoptera*, which gradually increases in complexity from the simplest form to the highly developed organ which we find in *Ophideres*. The processes on the proboscis consist of modified hairs. It is mentioned, on the authority of R. Trimen and others, that *Achæa chamæleon* is very destructive to ripening peaches in South Africa, whereas *Egybolis vaillantina* appears only to attack fallen fruit, rotting on the ground. Arch. mikr. Anat. xiv. pp. 308–317, pl. xxi., xv. pp. 8–29, pl. ii.

H. Dewitz discusses the development of the wings of *Lepidoptera*; Z. wiss. Zool. xxx. Suppl. pp. 90 & 91 (see also *Hymenoptera*).

F. Müller publishes some highly important observations on the neuration of the wings of *Lepidoptera* in the early stages of the pupa. The neuration is much more complicated than in the fully developed insect,

proving that its development proceeds from complex to simple, and greatly strengthening the probability of the origin of the *Lepidoptera* from the *Trichoptera*. It has hitherto been supposed that the subcostal nervure in many *Pieridæ* was only four-branched; but observations on the pupa of *Callidryas argante* prove that this is not the case, but that branches five and six of the costal nervure are united. Kosmos, i. pp. 388–391.

MÜLLER, F. Ueber Haarpinsel, Filzflecke und ähnliche Gebilde auf den Flügeln mannlicher Schmetterlinge. Jen. Z. Nat. xi. pp. 89–113; Kosmos, i. pp. 260 & 261.

The writer first brings together the observations of other authors on this subject, and adds detailed observations of his own, which have led him to the conclusion that these are scent-producing organs.

SCHNEIDER, R. Die Schuppen an den verschiedenen Flügel- und Körpertheilen der Lepidopteren. Z. ges. Nat. li. pp. 1–59, pls. i.–iii.

An elaborate paper, of which it is impossible to give an abstract, detailing the writer's general and comparative observations on the character of the scales clothing different parts of the wings and body of a great number of species.

VINCENT, H. M. Notions élémentaires de Micrographie. Feuil. Nat. viii. pp. 141–143, 153, & 155, pls. iii. & iv.

Chiefly relates to scales of *Lepidoptera*.

Scales of *Lepidoptera*, &c., as microscopical objects; J. Hogg, Sci. Goss. xiii. pp. 57–60, woodcuts.

Sounds produced by *Lepidoptera*; Landois, JB. zool. Sect. Westf. Ver. 1877–78, p. 18.

F. Müller publishes further notes on the scent-organs of butterflies, and describes and figures the peculiar tufted scales on the costa of the hind wings in *Heliconius*, *Evides*, *Colænis*, and *Dione*, which have no analogues in other butterflies, except in a species of *Hesperocharis*. Both sexes likewise possess defensive scent-producing organs at the extremity of the abdomen; Kosmos, i. pp. 391–395.

In a further article (Kosmos, ii. pp. 38–41) he continues the subject, with special reference to the scales of *Dione vanillæ*, and mentions that he has at length succeeded in finding similar, but scattered, scales in the same position, in the males of *Argynnis aglaia* and *niobe*.

MÜLLER, F. Os Orgãos Odoriferos nas Pernas de certos Lepidopteros. Arch. Mus. R. Jan. ii. pp. 37–46, pls. iv. & v.

Treats of various species, including several families of moths as well as butterflies.

Remarks on the scent-scales of butterflies; A. Weismann, Zool. Anz. i. pp. 98 & 99.

Sense of smell in moths; E. L. Layard, Nature, xviii. p. 301.

SCHILD, J. Gegen die Manchester-theorie in der Schöpfung ein Lepidopterolog. Z. ges. Naturw. l. pp. 1–64.

A long controversial paper, in great part relating to *Lepidoptera*, and

discussing mimicry, and other points relative to the theories of Darwin and his followers.

Müller, F. A Correlação das Flores Versicolores e dos Insectos Pronubos. Arch. Mus. R. Jan. ii. pp. 19–23.

Relates to the flowers visited by *Heliconius apseudes*, *Daptonura lycimnia*, *Colenis julia*, *Dione juno*, *Hesperocharis anguitia*, *Eurema leuce*, *Callidryas cipris*, *Pieris elodia*, *Danais erippus*, and various *Hesperiidæ*.

F. Müller (Tr. E. Soc. 1878, pp. 211–223) publishes various important notes on Brazilian *Lepidoptera*, relating to their odour, the sounds which they produce, their power of distinguishing colours, and the correlation of habit with protective resemblance. (Discussion, P. E. Soc. 1878, pp. xxvi. & xxvii.)

Various notes on Brazilian *Lepidoptera* (chiefly, however, abstracts of those published in full in Kosmos) appear, by F. & H. Müller, in Zool. Anz. i. pp. 13 & 14, 32 & 33, 54 & 55.

Brazilian butterflies prefer yellow flowers; *id.* P. E. Soc. 1878, p. ii.

On the colouration of butterflies with reference to sexual selection; F. Müller, Kosmos, ii. pp. 41 & 42.

S. H. Scudder questions the correctness of the theory of mimicry in butterflies; Psyche, i. p. 160.

Observations on mimicry in *Lepidoptera*, &c.; C. Keller, Viert. Ges. Zürich, xxii. pp. 417.

Boll, J. Ueber Dimorphismus und Variation einiger Schmetterlinge Nord-Amerika's. Verh. Ver. Hamb. iii. pp. 135–144.

The observations in this paper relate to *Colias eurytheme*, *Pieris protodice*, *Nathalis iole*, *Vanessa interrogationis*, *Ctenucha venosa*, *Actias luna*, *Papilio turnus*, *Callimorpha interrupto-marginata*, *Catocala*, various species, &c., as observed by Boll in Texas.

Assembling in *Sphinx ligustri*, *Bombyx quercus*, *Pseudoterpna cytisaria*, *Amphidasis betularia*, *Chelonia villica*, and *Hepialus hectus* and *sylvinus*; E. K. Robinson. Ent. xi. pp. 21 & 22.

On the hybernation of various *Lepidoptera*; F. Wiesenhütter, S. E. Z. xxxix. pp. 311–314.

Observations on the pairing of *Lepidoptera*; O. Wackerzapp, Ent. Nachr. iv. pp. 161–163.

On bleaching wings of *Lepidoptera*; H. Dimmock, Psyche, i. pp. 97–99.

C. Bar discusses the classification of the *Rhopalocera*, which he arranges in the following series, based both on the position of the pupa, the position of the wings, and the development of the legs in the imago:—*Satyrides*, *Brassolides* (or *Pavonides*), *Morphides*, *Apaturides*, *Nymphalides*, *Acræides*, *Heliconiides*, *Danaides*, *Mechanitides*, *Leptalides*, *Pierides*, *Papilionides*, *Lycanides*, *Erycinides*, *Hesperiides*, *Castniides*; Ann. Soc. Ent. Fr. (5) viii. pp. 5–30.

On the analogy between the *Lepidoptera* of Europe, Chili, and New Zealand; E. Birchall & R. McLachlan, Nature, xvii. pp. 221 & 260.

Europe.

The Recorder has commenced a popular work on "European Butter-

flies and Moths," based on Berge's Schmetterlingsbuch (London: 4to). Parts i.–x., comprising pp. i.–xl., 1–40, & pl. i. (plain) & pls. ii.–xi. (col.), have appeared within the year.

F. Brüggemann notices a few synonyms overlooked in Staudinger & Wocke's Catalogue; Abh. Ver. Brem. v. pp. 597 & 598.

Great Britain:—

Extracts from the correspondence of the late J. F. Stephens relating to British *Lepidoptera* are published by F. Smith, Ent. xi. pp. 172–175.

Aberrations of *Colias edusa*, *Thecla ilicis*, *Lycæna medon*, and *Epinephile janira* described; E. Lelièvre, Feuil. Nat. viii. p. 44.

Varieties of *Clostera curtula*, *Leucania conigera*, *Charocampa porcellus*, *Eupithecia angelicata*, Prest, supposed to be a var. of *albipunctata*, *Vanessa atalanta*, *Liparis dispar*, and *Epione vespertaria*, are figured and described; Ent. xi. pp. 169 & 170, pl. ii.

S. L. Mosley has commenced a series of Illustrations of Varieties of British *Lepidoptera* (Part 1, March, Part 2, Sept., 1878. Huddersfield: royal 8vo). The two parts contain eleven coloured plates, with figures of varieties of *Colias edusa*, *Smerinthus populi*, *Callimorpha hera* and *dominula*, *Chelonia caia*, *Liparis dispar* and *monacha*, *Abraxas grossulariata*, *Vanessa urticæ*, *Bombyx quercus* var. *callunæ*, *Hybernia defoliaria*, *progemmaria*, and *leucophæaria*, and *Tryphæna orbona*.

A. Wilson has published parts ii. & iii. of his "Larvæ of British *Lepidoptera*," containing pp. 49–176, pls. ix.–xxiv. The text extends from *Procris* to *Cidaria*, and the plates from *Sesia* to *Eupithecia*.

PARFITT, E. The Fauna of Devon: *Lepidoptera*. Rep. Devonsh. Ass. x. pp. 310–588.

About 1100 species enumerated. A list of 72 species observed by H. G. Heaven on Lundy Island is appended.

Entomological Rambles, 1877; J. B. Hodgkinson, Ent. xi. pp. 8–12, 28–31, 79–82, 111–113, 178–180.

Captures at sugar and honeydew; R. South, Ent. xi. pp. 271 & 272.

C. W. Dale (History of Glanville's Wootton, pp. 138–239) enumerates 910 species of *Lepidoptera* as found in his district. No new species are described.

Captures of *Lepidoptera* in Epping Forest; A. J. R., Sci. Goss. xiii. pp. 75–77 (woodcuts of moths).

Captures of *Lepidoptera* near Dorking; A. J. R., Sci. Goss. xiv. pp. 195–198, woodcuts.

Captures in New Forest; H. C. Dent, Sci. Goss. xiv. pp. 31 & 32 (woodcuts of *Catocala sponsa*).

Captures of *Lepidoptera* in the New Forest; W. E. S., Sci. Goss. xiii. pp. 26–29 (woodcuts of butterflies).

Captures in the New Forest; Ent. M. M. xiv. pp. 184 & 185. At Bishop's Wood, near Selby; *l. c.* xv. pp. 71 & 72. At Wicken Fen; *l. c.* pp. 110 & 111. At Uxbridge, &c.; Ent. xi. p. 21. Epping Forest; *l. c.* pp. 142 & 143. At Deal; *l. c.* p. 254. Near London and Lyndhurst; *l. c.* pp. 266–269.

F. Buchanan White has continued his papers on the *Lepidoptera* of Scotland, from *Thera* to *Odezia*, thus completing the *Macro-Lepidoptera*; Scot. Nat. iv. pp. 216–223, 269–273, 319–321.

Notes on the *Lepidoptera* of Glen Tilt, including several varieties: *id. l. c.* pp. 187–190, 244–246; Ent. xi. pp. 247–250.

T. Moncreiffe continues his papers on the *Lepidoptera* of Moncreiffe Hill, noticing the variation and habits of many species; Scot. Nat. iv. pp. 191–198, 241–244, 293–297, 334–340.

W. F. Kirby has published a list of the *Lepidoptera* of the counties of Dublin and Wicklow (Brit. Ass. Guide, 1878, Fauna, pp. 12–32), but it contains nothing new.

Lithosia quadra, *Trachea piniperda*, and *Taeniocampa miniosa* recorded as new to Ireland; W. Talbot, Ent. xi. pp. 70 & 71.

France.

Captures of Southern *Lepidoptera* in Brittany; C. & R. Oberthur, Bull. Soc. Ent. Fr. (5) viii. pp. cxi. & cxii.

Short notes on French *Lepidoptera*; De Lafitole & Heylaerts, Pet. Nouv. ii. pp. 198 & 199, 206, 222 & 223, 262.

Foucart, A. Catalogue méthodique et raisonné des Lépidoptères des environs de Douai (pour servir à la faune entomologique du Département du Nord). Douai: 1876, 8vo, pp. 127.

Includes 1081 species: 527 *Macro-* and 554 *Micro-Lepidoptera*. A few aberrations, hermaphrodites, and species new to France are mentioned in the notes.

Tuniot has commenced a calendar of *Lepidoptera* of the neighbourhood of Reims; Bull. Soc. Reims, i. (not seen by the Recorder).

Captures in the Jura; F. Parent, Feuil. Nat. viii. pp. 53 & 54.

Captures of *Lepidoptera* in Loire-et-Cher; A. Houry, Feuil. Nat. viii. pp. 33 & 34, ix. p. 25.

Calendar of larvæ of French *Lepidoptera*; De Lafitole, Pet. Nouv. ii. May to July, pp. 195 & 196, 215 & 216, 218 & 219, 223, 227 & 228, 239, 247 & 248, 251 & 252, 259, 263, 266 & 267, 271 & 272, 274 & 275, 279, 282 & 283.

Captures of *Lepidoptera* in the Alps of Savoy; F. Parent, *tom. cit.* pp. 211 & 212.

Belgium.

Notes on Belgian *Lepidoptera*; Lallemand, Bull. Ent. Belg. xxi. pp. xxxii. & xxxiii.

Holland.

Additions to the Dutch fauna and captures in Holland noticed in Tijdschr. Ent. xxi. pp. xiv., xv., xxv., xxvi., lxxxiv. & lxxxv.

Germany.

Wocke, M. F. Ueber einige wenig bekannte oder neue Falter der deutschen Fauna. Z. E. Ver. schles. vi. (1877) pp. 42–52.

H. Borgmann has published "Anleitung zum Schmetterlingsfang nebst einen Verzeichniss der Macrolepidopteren der Umgegend Cassels, &c." Cassel: 1878, 8vo, 4 pls. An introductory work, not seen by the Recorder (*cf.* MT. Münch. ent. Ver. iii. p. 38).

Captures at Münster; H. Landois, JB. Zool. Sect. Westf. Ver. 1877–78, pp. 25 & 26.

Additions to the list of Silesian *Lepidoptera*; M. F. Wocke, Z. E. Ver. schles. vi. (1877) p. 53.

G. Weymer publishes an enlarged list of the *Lepidoptera* of the neighbourhood of Elberfeld (654 species); JB. Ver. Elberf. v. pp. 50–102.

C. Glitz has completed his Catalogue of the *Lepidoptera* of Hanover; JB. Ges. Hannov. xxv. pp. 23–42, xxvi. pp. 17–52. Contains 878 species of *Micro-Lepidoptera*.

L. Graeser publishes "Nachtrag z. Lepidopteren-Fauna d. Nieder-Elbe"; Verh. Ver. Hamb. iii. pp. 271–277.

Switzerland.

Calendar of larvæ and food-plants at Geneva; A. C. Corcelle, Feuil. Nat. viii. pp. 42, 88, 101, 112, 126, 149 & 150.

List of the butterflies and Sphinges of Basel (104 B.; 30 S.); H. Christ, Verh. Ges. Bas. vi. pp. 363–388.

P. C. Zeller has completed his Catalogue of the *Lepidoptera* of the Albula Pass; S. E. Z. xxxix. pp. 81–165.

Austria.

Lists of Hungarian *Lepidoptera*; G. Horváth & J. Pavel, Term. közlem. xii. pp. 25–74. Additions; A. Mocsáry & J. Frivaldszky, *op. cit.* xiii. pp. 163–166, 363–366.

Captures of *Lepidoptera* in N. Hungary; A. Mocsáry, Term. közlem. xv. pp. 244–246.

On the *Lepidoptera* of the Stilser Joch in the Tyrol; P. C. Zeller, JB. schles. Ges. liii. pp. 157–170, liv. pp. 199–208 (289 *Macro-Lepidoptera* and 256 *Micro-Lepidoptera* recorded).

Italy.

Curo, A. Nuove aggiunte al saggio di un Catalogo dei Lepidotteri Italiani. Bull. Ent. Ital. x. pp. 5–8, Saggio 113–125, 189–203, 229–243.

Extends from *Pseudoterpna* to *Eusarca*.

Failla-Tedaldi, L. Fauna Entomologica Sicula: Lepidotteri delle Madonie. Bull. Ent. Ital. x. pp. 217–227, 248–259.

79 species of *Rhopalocera* enumerated.

Iceland.

On the supposed non-existence of butterflies in Iceland; J. Rae & A. Newton, Nature, xvii. pp. 243 & 260.

Norway.

J. S. Schneider publishes "Indberetning om en i Sommeren 1876

företagen lepidopterologisk Reise"; Forh. Selsk. Chr. 1877, iv. pp. 30. A list of captures, chiefly of local interest.

On the Lepidopterous Fauna of Gudbrandsdal and Dovrefjeld; W. M. Schøyen, N. Mag. Naturv. xxiv. pp. 153–199 (includes remarks on *Melitæa athalia* and allies, and on several other species of interest).

This author also continues his "Fortegnelse over Sommerfugle fundne i søndre Odalen"; N. Mag. Naturv. xxi. pp. 139–146 (282 species).

Russia.

Notes on various Livonian *Lepidoptera*; C. A. Teich, S. E. Z. xxxix. pp. 323–328.

S. Alpheraki publishes a list of the *Lepidoptera* of the Northern Caucasus, with notes on various known species and varieties, and descriptions of some new ones; Troudy Ent. Ross. x. pp. 3–34.

He also publishes a list of the *Lepidoptera* (*Heterocera*) of Taganrog, including descriptions of some new species and varieties; *l. c.* pp. 35–53.

Notes on Russian *Lepidoptera*; N. Erschoff and others, *tom. cit.* pp. ix.–xi., xix. & xx.

Asia.

Captures at Tiflis; G. Brioninga, Troudy Ent. Ross. ix. pp. lxxii. & lxxiii.

Notes on the *Lepidoptera* of the portion of Armenia lying between Alexandropol, Kars, and Erzeroum; Nicolas Michailovitch Romanoff, Hor. Ent. Ross. xiv. pp. 483–495. Captures during the war of 1877. A small map of the district is added. Includes a new genus and species described by O. Staudinger.

O. Staudinger has published an extremely important essay on the *Macro-Lepidoptera* of Asia Minor; Hor. Ent. Ross. xiv. pp. 176–482. He first gives an account of all the various entomological expeditions to that country, especially of his own in 1875, including a full description of the localities visited, and then deals with every species known to inhabit Asia Minor separately. It will only be possible here to notice descriptions of new species or other important original observations.

F. Trybom publishes a list of 51 butterflies collected during the Swedish expedition to the Yenisei; Œfv. Ak. Förh. 1877, vi. pp. 35–51. A few new varieties are described.

W. von Hedemann publishes contributions to the Lepidopterous fauna of the Amoor; Hor. Ent. Ross. xiv. pp. 506–516.

H. Christoph publishes some notes on various *Lepidoptera*, &c., observed in the Amoor district; S. E. Z. xxxix. pp. 201–219, 401–410.

Notes on a collection of *Lepidoptera* from Wladiwostok; C. Crüger, Verh. Ver. Hamb. iii. pp. 128–133.

A second part of A. G. Butler's Illustrations of typical specimens of *Lepidoptera-Heterocera* in the Collection of the British Museum (4to, pp. x. 62, pls. xxi.–xl.) has appeared within the year. This part is devoted entirely to the *Lepidoptera-Heterocera* of Japan.

Papers on Japanese Butterflies have been published by O. E. Janson & A. G. Butler, in Cist. Ent. ii. pp. 269–273 & 281–286.

F. Moore publishes a list of the *Lepidoptera* collected by the late R. Swinhoe in the island of Hainan, and appends a table of their geographical distribution; P. Z. S. 1878, pp. 695–708.

F. Moore publishes a list of *Lepidoptera* from Western Yunnan (Anatomical and Zoological Researches, comprising an account of the two expeditions to Western Yunnan in 1868 and 1875, by J. Anderson; 2 vols. 4to, text and plates; London: 1878, *Lepidoptera*, vol. i. pp. 921–928, vol. ii. pl. lxxxi.). A few known species are redescribed and figured.

F. Moore publishes a list of the *Lepidoptera* collected by Ossian Limborg in Upper Tenasserim, with descriptions of new species; P. Z. S. 1878, pp. 821–859, pls. li.–liii.

On a small collection of *Lepidoptera* from Malacca; C. Crüger, Verh. Ver. Hamb. iii. pp. 29 & 30.

Godman, Salvin, & Druce give a list of 33 butterflies and 7 moths collected by S. N. Walter in the island of Billiton, near Sumatra; P. Z. S. 1878, pp. 637–643.

G. Semper describes 13 new butterflies from the Philippines; Verh. Ver. Hamb. iii. pp. 106–116.

Australasia.

P. C. T. Snellen has published a list of 183 butterflies (some new) collected by M. C. Piepers in S.W. Celebes; Tijdschr. Ent. xxi. pp. 1–43, pls. i. & ii.

A. G. Butler publishes a list of 7 *Lepidoptera* obtained by J. S. Whitmee in the Ellice Islands, the first recorded from the group; P. Z. S. 1878, pp. 296–298.

C. Oberthur publishes a list of 71 *Lepidoptera*, chiefly butterflies, collected by O. Beccari at Dorey, New Guinea; Ann. Mus. Genov. xii. pp. 451–470.

List of butterflies collected by Dr. Comrie in Eastern New Guinea; Godman & Salvin, P. Z. S. 1878, pp. 643–648.

Notes on the *Lepidoptera* of New Ireland (chiefly relating to butterflies, of which 63 species are known); W. Macleay, P. Linn. Soc. N. S. W. i. pp. 304 & 305.

A. G. Butler discusses the butterflies of New Zealand, of which he describes 18 known species (Tr. N. Z. Inst. x. pp. 263–274, pl. xii.). He figures *Pyrameis kershawii*, fig. 1, *Lycæna phœbe*, figs. 2 & 3, *Chrysophanus enysi*, figs. 4–6, and *C. feredayi*, figs. 7–9. The table of families of butterflies given by Bates in the "Journal of Entomology" is copied into the introductory portion of the paper.

Africa, &c.

C. Oberthur has published Part 3 of his "Études d' Entomologie" (pp. 48, pls. i.–iii. & v.), entirely devoted to the *Lepidoptera* of Eastern Africa and Algeria.

Oriental affinities in the Ethiopian Insect-Fauna (relates to *Rhopalocera*); W. L. Distant, Nature, xvii. p. 282.

Captures of *Lepidoptera* at Nemours (Algeria); Austant, Feuil. Nat. viii. pp. 110–112, 120–123. Several interesting species are noticed.

Notes on a collection of *Lepidoptera* from the Gaboon; C. Crüger, Verh. Ver. Hamb. iii. pp. 133 & 134.

Ravages of larvæ in Ascension; the *Lepidoptera* sent from the island were the following, all probably introduced: *Vanessa cardui*, *Lycæna batica*, *Agrotis segetum*, *Prodenia retina*, *Leucania loreyi* (?), *Plusia aurifera* and *u-aureum* (?), *Cosmophila xanthindyma*, and *Callopistria*, sp. R. McLachlan, Ent. M. M. xv. pp. 79 & 80.

A. G. Butler publishes a list of 56 *Lepidoptera* collected by W. D. Cowan in Madagascar, and describes several new genera and species; Ann. N. H. (5) ii. pp. 283–297.

W. Saalmüller discusses the *Lepidoptera* of Madagascar, and describes several new species; Ber. Senck. Ges. 1877-78, pp. 71–96.

Polar Regions.

The *Lepidoptera* collected by Capt. Feilden and Mr. Hart during the recent Arctic Expedition are discussed by R. McLachlan, J. L. S. xiv. pp. 108–116 (13 species). In his introductory remarks (pp. 102–104) the author records Feilden's opinion that about one month in the year is the longest period for the appearance of *Lepidoptera* in the perfect state, and about six weeks is the limit allowed to plant-feeding larvæ. During the time when there is no night, butterflies are constantly on the wing, if the sun is not obscured. McLachlan concludes that more than one year is required for most of the species to undergo their transformations. The species enumerated are: *Colias hecla*, Lef., var. *glacialis*, Macl., *Argynnis polaris*, Boisd., *A. chariclea*, Schneid., and var. *obscurata*, Macl., *Chrysophanus phlæas*, L., var. *feildeni*, Macl., *Lycæna aquilo*, Boisd., *Dasychira groenlandica*, Hom., *Mamestra feildeni*, Macl., *Plusia parilis*, Hübn., *Psychophora sabini*, W. Kirb., *Scoparia gelida*, Macl., *Penthina* sp., *Mixodia* sp., and another indeterminable *Tortrix*.

America.

Wheeler, G. M. Report upon Geographical and Geological Explorations and Surveys West of the 100th Meridian. Vol. v., Zoology. Washington: 1875, 4to.

Contains two chapters on *Lepidoptera* hitherto omitted from Zool. Rec. [for other *Insecta*, see Zool. Rec. xiii. *Ins.* pp. 11, 123, 212, & 222], viz., —Chapter viii. Report upon the collections of diurnal *Lepidoptera* made in portions of Colorado, Utah, New Mexico, and Arizona, during the years 1871, 1872, 1873, & 1874, with notes upon all species known to inhabit Colorado, by Theodore L. Mead; and a list of all species collected, by W. H. Edwards, pp. 739–794, pls. xxxv.–xxxix. Chapter ix. Report upon new species of *Zygænidæ* and *Bombycidæ* collected in portions of California and Arizona during the years 1871, 1872, & 1873, by Richard H. Stretch, pp. 797–802, pl. xl. 121 species are now known to inhabit Colorado. The notes, though interesting, are often copied, and will only occasionally require special notice here. No new butterflies are described, but several known species are redescribed or figured.

B. Gerhard's "Systematisches Verzeichniss der Macro-Lepidopteren von

Nord-America" (Leipzig: 1878, 8vo, pp. xvi., 196) will be found a useful check-list, but contains nothing new.

H. B. Möschler gives a summary of W. H. Edwards' last Catalogue of North American Butterflies, and adds some remarks on the relations of the European and N. American faunæ; S. E. Z. xxxix. pp. 227–310.

W. H. Edwards has published part vii. of the second series of his "Butterflies of North America."

H. Strecker has published "Butterflies and Moths of North America, with full instructions for Collecting, Breeding, Preparing, Classifying, Packing for Shipment, &c.; a complete Synonymic Catalogue of *Macro-Lepidoptera*, with a full Bibliography, to which is added a Glossary of Terms and descriptive List of Localities." Part 1, *Diurnes*. Reading, Pennsylvania: 1878, 8vo, pp. 283. A very complete and useful work, the nature of which is sufficiently explained by the title-page. It contains useful notes on many known species, and descriptions of a few new ones; also woodcuts of apparatus and neuration.

Parts xiv. & xv. of H. Strecker's "*Lepidoptera*: *Rhopaloceres* and *Heterocerces*," were published in 1878. The following is the synonymy of some species described as new in No. xiv.: *Satyrus ashtaroth* = *dionisus*, Scudd.; *Melitæa imitata* and *larunda* = *ulrica* and *dymas*, Edw., respectively; *Pamphila similis* = *Amblyscirtes nysa*, Edw.; *Charis guadeloupe* = *australis*, Edw.: Canad. Ent. x. p. 79.

H. Strecker "*Lepidoptera*," publishes lists of species received from Arizona (p. 130), and from the west of Hudson's Bay Territory, pp. 132–134.

C. Dury publishes a catalogue of the *Lepidoptera* observed in the neighbourhood of Cincinnati, Ohio (*Macro-Lepidoptera*); J. Cinn. Soc. N. H. i. pp. 12–23. 475 species enumerated, inclusive of *Pyralidæ*.

Captures in Colorado by P. R. Uhler, and descriptions and notes by A. R. Grote; Bull. U. S. Geol. Surv. iii. pp. 765–770, 797–801.

Captures in South-Western Colorado and New Mexico in 1877; H. Strecker, Ann. Rep. Chief of Engineers for 1878, App. SS, pp. 1847–1864, pls. i & ii.

A. R. Grote's paper on *Noctuæ* collected by A. S. Packard in Colorado (*cf.* Zool. Rec. xiii. *Ins.* p. 174) was published in Bull. U. S. Geol. Surv. iii. [1877], pp. 115–120; and not in ii. [1876], as erroneously stated in Zool. Rec. xiii.

W. H. Edwards publishes notes on 22 butterflies (one new), collected by E. Coues in Montana during 1874; *op. cit.* iv. pp. 513–517.

S. H. Scudder has published a notice of 41 butterflies, collected by E. Palmer in Southern Utah and Northern Arizona in 1877; *op. cit.* iv. pp. 253–258.

H. Edwards (P. Cal. Ac. vii. pp. 19–21) describes the early stages of the following Californian *Lepidoptera*: *Papilio philenor* (pupa), *Limenitis californica* (larva and pupa), *Lycæna antægon* (larva), *Dilephila daucus* (larva and pupa), *Smerinthus ophthalmicus* (egg and larva), *Halesidota edwardsi* (egg), *Spilosoma vestalis* (egg and larva), *Pseudohazis eglanterina* (egg and larva), *Hemileuca necadensis* (larva), *Acronycta lepusculina* (larva), *Drasteria erechtho* (egg), and *Cidaria 4-punctata* (larva

and pupa). Edwards also (*l. c.* pp. 163–173) publishes notes on various Californian *Lepidoptera*, with descriptions of various new varieties and species.

Notes on Californian Butterflies; T. L. Mead, Psyche, ii. pp. 179–184.

A. S. Packard enumerates the following *Lepidoptera* as injurious to the cranberry: *Cidaria* sp., *Tortrix vaccinivorana*, sp. n., *T. incertana*, Clem. (larva fig.), and *Anchylopera vacciniana*, Pack. (figured in all states); Hayden's Rep. U. S. Geol. Surv. x. pp. 521–525.

Notes on N. American gall-moths; D. S. Kellicott, Canad. Ent. x. pp. 201–204.

West Indies.

H. Dewitz describes and figures details of the transformations of the following Cuban *Lepidoptera*: *Danais crippus*, Cram., *Heliconia charithonia* and *Papilio polydamas*, L., *P. asterius*, *Pamphila ethlius*, and *Achlyodes flyas*, Cram., *Ancyrya vinosa*, Grote, *Hyalurga vinosa*, Drury, *Gonodonta uxoria*, Cram., *Melanchroia geometroides*, Walk., and *Conchylodes diphtheralis*, Hübn. A list of the food-plants of many Cuban species, by Gundlach, is added; Z. ges. Naturw. lii. pp. 155–174, pl. ii.

A. G. Butler publishes a list of 152 *Lepidoptera*, collected by B. B. Bowrey in Jamaica, and describes a few new species; P. Z. S. 1878, pp. 480–495.

Short notes on the *Lepidoptera* of Antigua and Martinique; T. A. Marshall, P. E. Soc. 1878, pp. xxxiv. & xxxv.

South America.

H. Burmeister has published Vol. v. of his "Description Physique de la Republique Argentine" (Buenos Aires: 1878, text 8vo, pp. vi., 524, atlas, 4to, pls. 24), containing the first portion of a monograph of the *Lepidoptera*. The first fifty pages are entirely devoted to an account of the structure, &c., of *Lepidoptera* in all their stages, the author's observations on the scales being of the greatest importance and interest, though too long to quote, and not admitting of abridgement. The butterflies, *Sphinges*, and *Bombyces* are discussed in the present volume. Only the new species, those figured, and corrections of synonymy can be here noticed. The following classification is adopted:—

Diurna or Rhopalocera.—*Papilionidæ*; *Pieridæ*; *Danaidæ*; *Heliconiidæ*; *Nymphalidæ* [*Cethosiidæ*, *Argynnidæ*, *Ageroniidæ*, *Vanessidæ*, *Falcipennes* (*Megaluridæ*, *Mysceliidæ*), *Spatulipennes* (*Eubagidæ*, *Catagrammidæ*, *Byblidæ*), *Limenitidæ*, *Apaturidæ*, *Morphoides* (*Morphoidæ*, *Brassolidæ*), *Libytheidæ*] *Satyridæ*; *Erycinidæ*; *Lycænidæ*; *Hesperiidæ* (*Pyrgidæ*, *Achlyodidæ*, *Thymelidæ* [*Pamphilidæ*, *Telegonidæ*, *Eudamidæ*], *Thamyridiidæ*); *Castniidæ*.

Crepuscularia.—*Sphingidæ* (*Euryglottidæ*, *Dilophonotidæ*, *Deilephilidæ*, *Smerinthidæ*, *Pterogonidæ*, *Philampelidæ*, *Macroglossidæ*); *Sesiidæ*.

Nocturna.—*Bombycoides*; *Glaucopidæ*; *Hepialidæ*; *Psychoides*; *Cossidæ*; *Pyromorphides*; *Liparidæ*; *Lithosiidæ*; *Arctiidæ*; *Bombycidæ*;

Saturniidæ (*Attacidæ*, *Dirphiidæ*, *Ceratocampidæ*, *Mimallonidæ*), *Notodontidæ*.

The atlas has not yet reached England, and is quoted from the text itself.

H. Dewitz, Arch. f. Nat. xliv. 1, pp. 1–96, pl. i., describes and figures the transformations of the following *Lepidoptera* from Venezuela, after Gollmar's observations: *Papilio anchisiades*, Esp., *polydamus*, L., and *asterias*, Cram., *Pieris elodia*, Hübn., *Danais archippus*, F., *Opsiphanes cassiæ*, L., *Sphinx tetrio*, L., *carolina*, L., *rustica*, F., *Euchromia eriphia*, F., *Ecpantheria cunigunda*, Cram., *Hypercchiria janus*, Cram., *riculosa*, Cram., *Hyalophora arethusa*, Walk., *Aidos amanda*, Cram., *Chrysopyga nuda*, Cram., *Streblota coras*, Cram., *Glottula timais*, Cram., *Plusia rogationis*, Guén., *Aspila tergemina*, Feld., *Melanchroia cephise*, Cram. (a looper), and *Phacellura hyalinatalis*.

H. B. Möschler publishes a series of short notes on the *Lepidoptera* figured in Sepp's Surinaamsche Vlinders; S. E. Z. xl. pp. 424–443.

166 *Sphinges* and *Bombyces*, taken by Dr. Trail on the Amazons, are enumerated, and many described as new, by A. G. Butler, Tr. E. Soc. 1878, pp. 39–84, pl. iii.

On the food-plants of Brazilian butterflies; F. Müller, S. E. Z. xxxix. p. 296.

On luminous and urticating larvæ in Brazil; T. P. Bigg-Wither, "Pioneering in South Brazil," pp. 301–303; reprinted, with comments by E. C. Rye, Ent. M. M. xiv. pp. 257–260, *cf.* also p. 278.

All Lepidopterous larvæ in Patagonia are cannibals; C. Berg, Kosmos, iii. pp. 362 & 363.

The whole of Hor. Ent. Ross. xiii. consists of a work by P. C. Zeller on exotic *Micro-Lepidoptera*, from various parts of the world, especially S. America, and is illustrated by six coloured plates. A large number of new species are described and figured, and many known ones are also discussed in detail. In most cases the former only can be fully noticed here.

Hints on sugaring; E. Levett, Sci. Gos. xiv. p. 280.

On sugaring in North America; Von Meske & Speyer, Ent. Nachr. iv. pp. 75–77.

Linoleum recommended for lining butterfly boxes; A. Hamilton, Sci. Gos. xiii. p. 164.

Collecting box recommended (tin, with damped cork) for keeping *Lepidoptera* relaxed; H. Frey, Ent. Nachr. iv. p. 129.

On destroying mites in *Lepidoptera*; Sci. Gos. xiv. pp. 21, 47.

Papilionidæ.

Ornithoptera poseidon, Doubl. Variation noticed; Godman & Salvin, P. Z. S. 1878, pp. 647 & 648.

Rarity of North American species of *Papilio* in 1878; W. H. Edwards, Canad. Ent. x. p. 140.

Papilio rutulus and *damus*, Boisd. Characters, &c., noticed; T. L. Mead, Wheeler's Report, v. pp. 741 & 742.

Papilio antimachus, Dru.: notes by D. G. Rutherford, Ent. M. M. xv.

pp. 5–9; he refers Drury's account of the habits of *Charaxes pollux* to this species, following Donovan, being unaware that Westwood exposed the error in his edition of Drury. *P. asterias* with a fungus growing on the wings; C. E. Worthington, Ent. x. p. 17. *P. asterias*, var. *utahensis*, and *P. rutulus*, var. ? from Arizona, described by H. Strecker, "Lepidoptera," p. 128; the former is also described by him in his Butt. and Moths, p. 72. *P. brutus*, Fabr., discussed by C. Oberthur, Études d'Ent. iii. pp. 11 & 12. *P. constantinus*, Ward, noticed and refigured *id. l. c.* p. 12, pl. i. fig. 1. *P. cresphontes*: its occurrence in the Northern States of America; food-plants, and habits of larva; T. E. Bean, W. Saunders, & J. Boll, Canad. Ent. x. pp. 35 & 36, 48–50, 154 & 155. *P. cynorta* and *boisduvalianus*: hermaphrodite combining the characters of these supposed species; D. G. Rutherford, P. E. Soc. 1878, p. xxiv. *P. endochus*, Boisd., redescribed; M. Saalmüller, Ber. Senck. Ges. 1877–1878, p. 85. *P. hellanicus*, Hew., = *cleotas*, Gray; H. Burmeister, Desc. Rep. Arg. v. p. 61. *P. homerus*, Fabr.: habits; D. G. Rutherford, Ent. M. M. xv. pp. 28–31. *P. indra*, Reak., figured and redescribed by W. H. Edwards, Butt. N. Amer. ii. *Pap.* pl. ix. *P. laglaizii*, A. Depuiset, redescribed and figured by him; Ann. Soc. Ent. Fr. (5) viii. pp. 141–143, pl. v. *P. lycus*, Doubl. (*niveus*, Cram., pl. cclxxviii. figs. *f* & *g*), is distinct from *niveus*, Cram., pl. clxxxviii. figs. *a* & *b*; C. Oberthur, Études d'Ent. p. 13. *P. lycophron*, Hübn.: H. Burmeister, Desc. Rep. Arg. v. p. 60, quotes as synonyms or varieties, *astyalus*, Godt., *mentor*, Dalm., *perithous*, Boisd., and *theophron* and *hippomedon*, Feld. *P. macilentus*, O. E. Janson, figured by him; Cist. Ent. ii. pl. vi. fig. 1. *P. osyris*, Feld. and *orbignianus*, Luc., are varieties of *P. serapis*, Boisd.; H. Burmeister, Desc. Rep. Arg. v. p. 64. *P. perrhebus*, Boisd. (= *P. damocrates*, Guén.), is redescribed, and larva and imago figured by H. Burmeister, Desc. Rep. Arg. v. p. 65, pl. iii. figs. 8 & 10. *P. philenor*: the supposed growth on the eye [*cf.* Zool. Rec. xiv. *Ins.* p. 125] is probably due to adherent pollen masses; F. B. White, Canad. Ent. x. p. 20. *P. podalirius*: the nervures of the wings consist of pearly white diaphanous tubes, rugose, and striated both laterally and longitudinally; they lie between the two membranes which compose the wing, and when the butterfly emerges from the pupa, they enclose a liquid (differing in colour in other species), which escapes if a nervure is injured; there are no spiral threads in the nervures, as some writers have supposed: H. Candèran, Pet. Nouv. ii. p. 250. *P. raddei*, Brem., is the spring brood of *P. mackii*, Mén.; H. Christoph, S. E. Z. xxxix. p. 211. *P. scamander* and *grayi* are identical; F. Müller, Tr. E. Soc. 1878, p. 219, note. *P. thoas*, Linn.: H. Burmeister (Desc. Rep. Arg. v.) regards the following as local forms:—*cresphontes*, Cram., *cresphontinus*, Mart. (= *aristodemus*, Esp, = *temenes*, Godt.), *ornythion*, Boisd., *pæon*, Boisd. (= *thrason*, Feld.), and *cinyras*, Mén.

Euphœades troilus. S. H. Scudder records a pupa with larval head; Psyche, i. pp. 131 & 132.

Euryades duponcheli, Luc. (♀ = *reecii*, Westw.), figs. 1, 4, & 6, and *corethrus*, Boisd., figs. 7–9, redescribed and figured by H. Burmeister, *l. c.* pp. 68 & 70, pl. iii.

Thais cerisii and var. *deyrollii*. Larvæ described; O. Staudinger, Hor. Ent. Ross. xiv. pp. 226 & 227.

Parnassius: remarks on the European species; Graeser, Verh. Ver. Hamb. iii. pp. 28 & 29. *P. delius*, Esp., var. *sminthcus*, Doubl. & Hew.: H. Strecker notices and figures an aberration from the San Juan River; Rep. Chief of Engineers for 1878, App. SS, p. 1850, pl. i. figs. 1 & 2.

Parnassius with fore-wings of *apollo*, ♂, and hind-wings of *phœbus*, ♀ (?); F. Parent, Feuil. Nat. viii. p. 53.

Parnassius nomion. Two varieties described; L. W. Schaufuss, Nunq. Ot. ii. pp. 417–422.

Parnassius mnemosyne. Scent-tufts at extremity of abdomen; Kheil, Ent. Nachr. iv. p. 83.

Parnassius sminthcus, Doubl. Habits, eggs, &c., noticed; T. L. Mead, Wheeler's Report, v. pp. 742 & 743.

Parnassius menetriesi (*clodius*, Mén., var.), H. Edwards, P. Cal. Ac. vii. p. 164, California, Utah.

New genera and species :—

Luchdorfia, C. Crüger, Verh. Ver. Hamb. iii. p. 128. Intermediate between *Euryades* and *Sericinus*. Type, *L. eximia*, sp. n., *l. c.*, Wladiwostok (afterwards said to be probably identical with *Thais puziloi*, Ersch.).

Baltia, F. Moore, Ann. N. H. (5) i. p. 228. Allied to *Mesapia*; type, *M. shawii*, Bates (redescribed, *l. c.*).

Papilio thoantides (subspecies of *thoas*), p. 59, pl. iv. fig. 9, and *microdamas*, p. 63, pl. v. fig. 8, H. Burmeister, Desc. Rep. Arg. v., Argentine Republic; *P. ophidocephalus* (= *P. menestheus*, var., Trim.), Études d'Ent. iii. p. 13, S. Africa; *P. zoroastres*, H. Druce, Ent. M. M. xiv. p. 226, Florida; *P. mariæ*, G. Semper, Verh. Ver. Hamb. iii. p. 115, Philippines; *P. syedra*, Chiriqui, and *segonax*, New Ireland, Godman & Salvin, P. Z. S. 1878, pp. 271 & 734; *P. swinhoei* and *saturata*, Hainan, p. 697, *onpape* and *mahadeva*, pl. li. fig. 1, Upper Tenasserim, p. 840, F. Moore, *l. c.*

Pieridæ.

Leptalis thermesia, Godt., figured and redescribed; H. Burmeister, Desc. Rep. Arg. v. p. 78, pl. iv. fig. 12.

Leucophasia sinapis. Its position at rest; H. Whittle & J. Jenner Weir, Ent. xi. pp. 69 & 92.

Pieris albunea, Dalm., redescribed and figured; H. Burmeister, Desc. Rep. Arg. v. p. 509, pl. xxiv. fig. 5. *P. gidica*, Godt., var. *allica*, from Lake Tzana described; C. Oberthur, Études d'Ent. iii. p. 16. *P. manni*: Meyer, and allied forms discussed; S. Alpheraki, Troudy Ent. Ross. x. pp. 4 & 5. *P. menacte*, Boisd., redescribed and figured by H. Burmeister, *l. c.* p. 87, pl. iv. fig. 10. *P. brassicæ*: pupation described and figured; J. Fullagar, Sci. Gos. xiii. pp. 229 & 230. *P. rapæ* probably introduced into America with shipping; S. H. Scudder, Psyche, i. p. 152. Parasites noticed; J.

E. Fletcher, Ent. M. M. xv. pp. 106 & 107. *P. rueppelli*, Koch, and *brassicoides*, Guér., noticed and figured by C. Oberthur, *l. c.* pp. 16 & 18, pl. i. figs. 2 & 4. *P. severina* and *mesentina*: variation; J. P. Mansel Weale, P. E. Soc. 1878, pp. viii. & ix. *P. ranrolxemi*, Capr., and *achamantis*, Berg: *cf.* Bull. E. Belg. xxi. pp. xxii.-xxiv., cc. *P. venosa*, *hulda*, *napi*, *frigida*, *pallida*, *olcracea*, *castoria*, *marginalis*, *ergane*, *rapæ*, and *novangliæ*, appear to be all forms of one polymorphic species; H. Edwards, P. Cal. Ac. vii. pp. 165–167.

Cathæmia rosenbergi, Voll. (*lorquini*, Feld.). Larva described; Piepers & Snellen, Tijdschr. Ent. xxi. p. 31.

Callidryas. Serrated costa of some species; A. G. Butler, P. E. Soc. 1878, pp. ii.-iv.

Colias alexandra, Edw. Note on earlier stages; T. L. Mead, Wheeler's Report, v. p. 749.

Colias (*Meganostoma*) *eurydice*, Boisd. Transformations and var. *amorphæ* described; H. Edwards, P. Cal. Ac. vii. pp. 60–62 & 169.

Colias chrysotheme, Esp. H. Strecker notices var. *flava*, "destitute of every trace of orange"; Butt. & Moths, p. 83.

Colias edusa suffused with rosy purple; J. Anderson & C. E. B. Hewitt, Sci. Gos. xiii. pp. 280 & 281, xiv. pp. 141 & 142. Its variation, and unusual abundance in Britain in 1877, discussed by E. A. Fitch, who figures 13 varieties and the eggs and pupa; Ent. xi. pp. 49–61 (*cf.* also R. F. Logan, P. R. Phys. Soc. iv. pp. 228–230). Its hybernation as a larva or an imago; H. Jobson & C. Willmott, Ent. xi. p. 139. Its scarcity in 1878; Ent. xi. pp. 250, 251, 253, 254, & 269.

Colias eurytheme, Boisd., redescribed and figured, with its transformations, and the forms *ariadne* and *keewaydon*, Edw.; W. H. Edwards, Butt. N. Amer. *Col.* pl. iv. *C. hecla*, Lef.: R. McLachlan describes var. *glacialis* from Hayes Sound and Discovery Bay; J. L. S. xiv. p. 108. *C. palæno*: larva described; Naacke, JB. schles. Ges. liii. pp. 154–156 (1875). *C. pelidne* and *palæno*: synonymy and variation; H. Strecker, "Lepidoptera," p. 133 (to the former he refers *labradorensis*, *interior*, and *laurentina*, Scudd., *scudderi*, Reak., and *christina*, Edw., and to the latter, *chippewa*, Edw. (= *helena*, Edw., *nec* H. S.). *C. philodice*, Godt.: H. Strecker describes varr. *nigra* and *virida*; Butt. & Moths, p. 82.

Gonepteryx rhamni feeding on *Maytenis chilensis*; N. C. Tuely, Ent. xi. p. 140.

Rhodocera farinosa, Zell. Distinctive characters discussed; O. Staudinger, Hor. Ent. Ross. xiv. pp. 225 & 226.

Callicharis auxo, Boisd., is not distinct from *evarne*, Klug., *C. keiskamma*, Trim., may be another variety; C. Oberthur, Études d'Ent. iii. pp. 18 & 19.

Anthocharis belia, var. *ochracea* from the Yenisei described; F. Trybom, Œfv. Ak. Förh. 1877, vi. p. 37; *A. ausonides*, Boisd., transformations noticed, T. L. Mead, Wheeler's Report, v. pp. 747 & 748; *A. cardamines*, ♀, with an orange spot on the underside of one fore wing, J. A. Finzi, P. E. Soc. 1878, p. xxiii.; *A. genutia*, Fabr., figs. 1–4, and *julia*, Edw., figs. 5–8, figured and redescribed by W. H. Edwards, Butt. N. Amer. ii. *Anth.* pl. ii.; *A. hyantis*, Edw., = *creusa*, Doubl., *A. sara* and

reakirti are probably varieties, *A. edwardsi*, Behr., = *lanceolata*, Boisd., H. Edwards, P. Cal. Acad. vii. pp. 168 & 169.

New species :—

Leptalis ribbei, Godman & Salvin, Ann. N. H. (5) ii. p. 265, Chiriqui; *L. mirandola*, W. C. Hewitson, Ent. M. M. xiv. p. 180, Ecuador.

Terias subdecorata, p. 699, *attenuata*, *arcuata*, and *hainana*, p. 700, F. Moore, P. Z. S. 1878, Hainan; *T. betheseba*, O. E. Janson, Cist. Ent. ii. p. 272, Yokohama.

Leucophasia vibilia, Janson, *ibid.* Nambu, N. Japan.

Picris madetes and *eurygania*, pp. 733 & 734, N. Ireland, and *lytæa*, p. 734, New Britain, Godman & Salvin, P. Z. S. 1878; *P. automate*, H. Burmeister, Desc. Rep. Arg. v. p. 85, pl. iv. fig. 11, Cordova; *P. grandidieri*, P. Mabille, Bull. Soc. Ent. Fr. (5) viii. p. lxxvii., Madagascar; *P. raffrayi*, Oberthur, Études d'Ent. iii. p. 17, pl. i. fig. 3, Lake Tzana.

Catophaga lagela, F. Moore, P. Z. S. 1878, p. 838, Tenasserim.

Appias inornata, Hainan, and *dapha*, Tenasserim, *id. l. c.* pp. 700 & 838.

Synchloe thoosa, S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 257, Mokiak Pass, Arizona.

Delias diaphana, G. Semper, Verh. Ver. Hamb. iii. p. 114, Mindanao.

Eronia trimeni (= *leda*, Trim., pl. ii. fig. 5), C. Oberthur, *l. c.* p. 20, E. Africa.

Ixias pallida, *citrina*, and *moulmeinensis*, F. Moore, *l. c.* p. 837, Tenasserim.

Thestias piepersi, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 31, pl. ii. figs. 1 & 2, Celebes.

Colias eriphyle, W. H. Edwards, Bull. U. S. Geol. Surv. iv. p. 514, Montana; *C. stoliczkana*, F. Moore, Ann. N. H. (5) i. p. 299, Ladak.

Teracolus catachrysops, A. G. Butler, Ann. N. H. (5) ii. p. 178, Masasi E. Africa.

Danaidæ.

Danais crippus and *gilippus*. On the structure of the spot on the hind wings of the males, and on the scent-producing organs; F. Müller, Arch. Mus. R. Jan. ii. pp. 25–29, pl. ii.

Danais archippus. Life-history, W. H. Edwards, Psyche, ii. pp. 169–179; transformations described, under the erroneous name of *D. berenice*, W. Colenso, Tr. N. Z. Inst. x. pp. 276–280; taken in La Vendée in September, 1877, Baret, Pet. Nouv. ii. pp. 253 & 254; *cf.* also E. de Selys-Longchamps, *op. cit.* p. 258; *C. dorippus*, Klug, noticed and figured by C. Oberthur, Études d'Ent. iii. p. 24, pl. i. fig. 5.

Euploea, Fabr. A. G. Butler divides the species formerly contained in this genus into the following genera :—*Salpinx*, Hübn., containing two sections, *Macroplœa*, Butl. (type, *phœnarcta*, Schall.), and *Salpinx*, typical; *Calliplœa*, Butl., *Trepsichrois*, Hübn., *Crastia*, Hübn., *Euplœa*, Fabr., and one new genus; J. L. S. xiv. pp. 290–303.

Euploea superba, Voll., = *badoura*, Kirb., = *schlegeli*, Feld., *E. redtenbacheri*, Feld., ♀ described; P. C. T. Snellen, Tijdschr. Ent. xxi. pp. 4 & 5.

Stictoplea, A. G. Butler, *l. c.* p. 301. Type, *Euploea gloriosa*, Butl.; add *S. microsticta*, locality unknown, *binotata*, Silhet, Darjeeling, Borneo, *inæqualis*, Amboina, and *inconspicua*, Sumatra, p. 302, and *immaculata*, Port Moresby, p. 303; *id. l. c.*, spp. nn.

New species :—

Hestia electra, G. Semper, Verh. Ver. Hamb. iii. p. 106, Mindanao.

Salpinx consanguinea, Aneiteum, New Hebrides, and *frigida*, North Ceram, p. 293, *lowii*, Borneo, and *illustris*, Sylhet, p. 294, A. G. Butler, l. c.; *S. minorata*, Hainan, p. 695, and *masoni*, Tenasserim, p. 823, F. Moore, P. Z. S. 1878.

Calliploea doryca, Dorey, and *turneri*, Darnley Island; A. G. Butler, *l. c.* pp. 295 & 296.

Crastia scudderi, Borneo, and *malayica*, Malacca, Penang, Singapore, p. 297, and *funerea* and *squalida*, Port Moresby, p. 298, *id.* l. c.; *C. cuprcipennis*, F. Moore, *l. c.* p. 823, Upper Tenasserim.

Euploea limborgi, pl. li. fig. 2, and *subdita*, F. Moore, P. Z. S. 1878, p. 823, Tenasserim; *E. crimas*, Godman & Salvin, *op. cit.* p. 733, New Ireland; *E. reaumuri* (Boisd. MS.), C. Oberthur, Ann. Mus. Genov. xii. p. 457, Dorey; *E. belinda*, A. G. Butler, *l. c.* p. 299, Sumatra; *E. althæa* and *tobleri*, G. Semper, *l. c.* pp. 106 & 107, Philippines.

Danais turneri, A. G. Butler, Ann. N. H. (5) i. p. 480, New Guinea.

HELICONIIDÆ.

Ituna phenarete, Doubl. & Hew., = *ilione*, Cram., var.; H. Burmeister, Desc. Rep. Arg. v. p. 113.

Ithomia. C. Oberthur, Bull. Soc. Ent. Fr. (5) viii. pp. cliii.–clvi., notices various species figured by Hewitson; *lavinia*, fig. 34, is renamed *ryphæna*, Boisd. MS., fig. 35, probably = *boucardi*, Druce (p. cliii.), *elara*, fig. 63, is renamed *elarina*, *inachia*, fig. 67, is renamed *pozziana* (p. cliv.), *flora*, fig. 68, is renamed *thiemei*, *phono*, fig. 80, is renamed *naxo* (Boisd. MS.), p. clv., *victorina*, fig. 75 (*nec* Guér.), is renamed *graziella*, and *iphianassa*, fig. 91, is renamed *pepita*, p. clvi.; *I. ilerdina*, var., W. C. Hewitson, Ex. Butt. v. fig. 199, from Ecuador and Nauta, is renamed by him *I. lerida*, Ent. M. M. xv. p. 153.

Tritonia munda, Weym., is scarcely more than a var. of *cupompe*, Hübn.; H. Burmeister, *l. c.* pp. 117 & 118.

Heliconia cuerate, Hübn., and *Melinæa polychrus*, Feld., are varieties of *M. ethra*, Godt.; *id. l. c.* p. 123.

New species :—

Callithomia panamensis, Godman & Salvin, Ann. N. H. (5) ii. p. 257, Panama.

Napeogenes pederetus, iid. *l. c.*, Costa Rica.

Dircenna celtina, H. Burmeister, Desc. Rep. Arg. v. p. 116, pl. iv. fig. 13, Argentine Republic, or Paraguay ?.

Ithomia asion and *jucunda*, p. 258, *cadra* and *rhene*, p. 259, Godman & Salvin, *l. c.*, all from Panama.

Tithorea pinthias, Godman & Salvin, *l. c.* p. 259, Panama, Veragua, Costa Rica, Nicaragua.

Acræidæ.

Acræa. The characters of this genus in all its stages are discussed and compared with those of other butterflies, especially *Heliconius*, *Eeides*, *Colænis*, and *Dione*; F. Müller, Kosmos, ii. pp. 218–224 (*cf.* also *antea*, General Notes).

Acræa rabbalæ, Ward, fig. 1, and *oncæa*, Hopff., var. *ncluska*, from Zanzibar, figs. 2 & 3, p. 25, and *A. petræa*, Boisd., from Chuaka, p. 26, fig. 4, noticed and figured by C. Oberthur, Études d'Ent. iii. p. 25, pl. ii. *A. thalia*, Linn., and *pellenea*, Hübn., Samml.: H. Burmeister (Desc. Rep. Arg. v. pp. 126–129) describes numerous varieties; *A. pellenea*, Hübn., Zutr., and *A. euterpe*, Feld., are probably varieties of the former.

Acræa mamita, H. Burmeister (Reise durch d. La Plata-Staat, ii. p. 168, 1861, but overlooked in all previous works on *Lepidoptera*), Desc. Rep. Arg. v. p. 129, pl. iv. fig. 14, Tucuman and Buenos Aires; *A. calida*, A. G. Butler, Ann. N. H. (5) ii. p. 288, Madagascar; *A. rueppelli*, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 80, Madagascar.

Nymphalidæ.

On the pupation of the *Nymphalidæ*; J. A. Osborne, Ent. M. M. xv. pp. 105 and 106; see also T. A. Chapman, *tom. cit.* pp. 78, 79, & 136.

W. H. Edwards publishes a series of highly interesting observations on the pupation of the *Nymphalidæ*, confirmatory of Dr. Osborne's; but his paper does not admit of abridgement. Canad. Ent. x. pp. 224–231.

Euptoieta claudia, Cram. Transformations noticed; T. L. Mead, Wheeler's Report, v. pp. 750 & 751.

Argynnis nokomis, Edw., figured, T. L. Mead, Wheeler's Rep. v. pl. xxxv. *A. alcestis*, Edw., compared with *A. aphrodite*; C. E. Worthington, Canad. Ent. x. p. 27. *A. coronis*, Behr.: S. H. Scudder describes a variety from Utah, Bull. U. S. Geol. Surv. iv. pp. 254 & 255. *A. cybele*, Fabr., var. *baal*, from Ohio, described by H. Strecker, Lepidoptera, p. 111. *A. dexamene*, Boisd., = *lathonioides*, Blanch.; H. Burmeister, Desc. Rep. Arg. v. p. 144. *A. frigga*, var. *saga* (Kaden, MS.), described by H. Strecker, Butt. & Moths, p. 117. *A. monticola*, Behr., var. *purpurascens*, from Oregon and California, described by H. Edwards, P. Cal. Acad. vii. p. 170. *A. nokomis*, Edw., var. from Colorado noticed and figured; H. Strecker, Rep. Chief of Engineers, 1878, App. SS, pp. 1853 & 1854, pl. i. figs. 3 & 4. *A. paphia*, L., transformations described, W. Buckler, Ent. M. M. xiv. pp. 252–256; ♂ attracted by a recently killed ♀, W. W. Fowler, Ent. xi. pp. 208 & 209; variation in ♂ tending towards the *valesina* form, J. J. Weir, P. E. Soc. 1878, pp. xliii. & xliv. *A. polaris*, Boisd., and *charielea*, Schneid., noticed by R. McLachlan, J. L. S. xiv. pp. 109 & 110, the latter species is excessively variable, and var. *obscurata*, from 81° 42′ N., is described at p. 110. *A. selene* recorded as new to Ireland, E. Birchall, Ent. M. M. xiv. p. 211.

Lemonias helcita, Boisd., is apparently distinct from *palla*, Boisd., and the differences are pointed out; S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 255.

Melitæa nubigena, Behr. Supposed larva described; T. L. Mead, Wheeler's Report, v. p. 758. *M. minuta*, Edw., and *leanira*, Feld., figured; *id. l. c.* v. pl. xxxvi. figs. 1 & 2, & pl. xxxvii. figs. 5–8. *M. leanira*, Boisd., var. *obsoleta*, from California, described; H. Edwards, P. Cal. Ac. vii. p. 171. *M. phaeton*, Drury, H. Strecker describes var. *superba* from Long Island and New York, Butt. & Moths, p. 125. *M. trivia* and *didyma* are distinct, but the varieties run so close that it is difficult to find satisfactory characters to separate them; the broods of the latter are parallel with those of *Argynnis bellona* and *myrina*, noticed by Scudder; O. Staudinger, Hor. Ent. Ross. xiv. pp. 266–269.

Phyciodes tharos, Drury. W. H. Edwards figures and redescribes this species, with its transformations, and a long series of varieties, including *morpheus*, Fabr., *marcia*, *phaon*, and *vesta*, Edw., and *packardi*, Saund., Butt. N. Amer. ii. *Phyc.* pls. ii. & iii.

Anartia silvæ, H. Burmeister (Reise durch die La Plata-Staaten, ii. p. 168, Tucuman) = *A. amalthea*, ♂, Desc. Rep. Arg. v. p. 156.

Grapta comma and *interrogationis*. Notes on breeding the various forms of these species; W. H. Edwards, Canad. Ent. x. pp. 69–74.

Vanessa antiopa. Hybernation in captivity; C. G. Siewers, Canad. Ent. x. pp. 115 & 116. *V. c-album*, Linn.: H. Strecker places *faunus*, Harr., and *hylas* and *rusticus*, Edw., as varieties of this species; Butt. & Moths, pp. 129 & 130. *V. californica*: habits and transformations described; H. Edwards, P. Cal. Ac. vi. pp. 146–149. *V. c-aureum*, Linn.: on the identification of this species, *cf.* Janson & Kirby, Cist. Ent. ii. pp. 269–271, 385 & 386, and H. Strecker, Butt. & Moths, p. 128. *V. io*, variety, H. Marsh, Ent. xi. p. 251; slight var. from Japan, H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. lx.; var. *exoculata* noticed, G. Weymer, JB. Ver. Elberf. v. p. 58. *V. levana*: P. Kramer discusses Weismann's observations on the seasonal dimorphism of this species, pointing out various points respecting which he considers the conclusions uncertain, or further observations necessary; Arch. f. Nat. xliv. 1, pp. 411–419. *V. polychloros* and *xanthomelas*: specimens from Asia Minor and Algeria throw doubt on the distinctness of these two supposed species; O. Staudinger, Hor. Ent. Ross. xiv. pp. 263 & 264. *V. urticæ*: the pupa is attached to the old skin of the larva by a membrane sufficiently strong to support it during the last moments of pupation; J. A. Osborne, Ent. M. M. xv. pp. 59–61. Var. *ichnusoides*, De Selys, redescribed and figured by E. Lambrichs, Ann. Ent. Belg. xxi. pp. 9 & 10, pl. i. figs. 4 & 5. *V. cardui*: aberrations described and figured by H. Donckier de Donceel, Ann. Ent. Belg. xxi. pp. 10 & 11, pl. i. figs. 1–3; H. Strecker describes var. *ate*, Butt. & Moths, p. 137; abundance in Belgium in 1878, Lallemand, Bull. E. Belg. xxi. pp. cci. & ccii; great flight observed at Palermo, July, 1878, M. Palembo, Zool. Gart. xix. p. 383.

Pyrameis carye and *atalanta*: Hybrid described, H. Edwards, P. Cal. Ac. vii. pp. 171 & 172. *P. huntera*: larva described from the island of Maui; T. Blackburn & N. C. Tuely, Ent. M. M. xv. pp. 16 & 17; Bra-

zilian var. taken at Wokingtou; Gibson & Carmichael, P. Phys. Soc. Edinb. iv. pp. 163 & 164. *P. tameamea*, Esch., N. C. Tuely, Ent. M. M. xiv. p. 234.

Thaleropis ionia, Ev. Larva described, O. Staudinger, Hor. Ent. Ross. xiv. pp. 259–262. Genus recharacterized, p. 262.

Junonia andremiaja and *musa* are not sexes, but distinct species; A. G. Butler, Ann. N. H. (5) ii. p. 286.

Ergolis obscura, Feld., ♀ described; P. C. T. Snellen, Tijdschr. Ent. xxi. p. 9.

Catagramma cynosura, Hew., *nec* Doubl. & Hew., is renamed *C. militaris*; C. Oberthur, Bull. Soc. Ent. Fr. (5) viii. p. clvii.

Godartia wakefieldi, Ward, noticed and figured; C. Oberthur, Études d'Ent. p. 28, pl. ii. fig. 5.

Aterica meleagris: protective assimilation to the colour of the ground; D. G. Rutherford, P. E. Soc. 1878, p. xlii. For similar remarks on other *Lepidoptera*, cf. *tom. cit.* pp. xliii. & xlv.

Many dark species of *Limenitis*, *Neptis*, and *Athyma* occurring in the Southern Philippines, are replaced by white species in Luzon and Borneo; G. Semper, Verh. Ver. Hamb. iii. p. 112.

Synchloe crocale, Edw., redescribed and figured; T. L. Mead, Wheeler's Report, v. p. 765, pl. xxxvii. figs. 1–4.

Epicalia acontius and *Myscelia orsis*: scent-producing organs described and figured; F. Müller, Arch. Mus. R. Jan. ii. pp. 32–35, pl. iii.

Limenitis weidemeyeri, *californica*, and *lorquini* figured; T. L. Mead, Wheeler's Report, v. pl. xxxviii. figs. 1–6. *L. ephestion*, Stoll: H. Strecker notices varr. *viridis* and *rubidus*, Butt. & Moths, p. 144. *L. lorquini*: H. Edwards describes var. *cæsi* from Vancouver's Island; P. Cal. Ac. vii. p. 172. *L. misippus*, Linn.: H. Strecker describes varr. *floridensis*, *nigra*, and *pseudodorippus*, l. c. p. 143.

Charaxes azota, W. C. Hewitson, ♂ described by him, Ent. M. M. xiv. p. 181 (the species was originally described as a *Philognoma*). *C. candiope*, Godt. (= *antamboulou*, Luc.) redescribed; M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 82.

Heteropsis drepana probably belongs to the *Nymphalinæ*, near *Cænophlebia* and *Siderone*; A. G. Butler, Ann. N. H. (5) ii. p. 284.

New genera and species :—

Prodryas, S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 520. Allied to *Hypanartia*; type, *P. persephone*, sp. n., *l. c.* p. 524, Tertiary strata of Florissant, Colorado. Interesting as being the first fossil butterfly found in America.

Corypharola, A. G. Butler, Ann. N. H. (5) ii. p. 284. Allied to *Paphia*, *Kallima*, and *Doleschallia*; type, *Kallima eurodoce*, Westw.

Cirrochroa surya, F. Moore, P. Z. S. 1878, p. 827, Tenasserim.

Argynnis arge, H. Strecker, Butt. & Moths, p. 114; California; *A. kriemhild*, id. Rep. Chief of Engineers, 1878, p. 1854, pl. i. figs. 5 & 6, Arizona, Colorado; *A. electa*, W. H. Edwards, Field and Forest, iii. p. 143, Colorado; *A. liliana*, H. Edwards, P. Cal. Ac. vii. p. 170, Napo County.

Melitæa imitata and *larunda*, H. Strecker, Lepidoptera, p. 132, Texas;

M. alma, id. *l. c.* p. 135, pl. xv. figs. 1, 1, Arizona and Utah; *M. niphona* and *scotosia*, A. G. Butler, Cist. Ent. ii. pp. 281 & 282, Japan.

Phyciodes thebais, Mexico and Guatemala, p. 268, *boucardi*, Mexico, *subota*, Guatemala and Costa Rica, and *drymæa*, Guatemala, p. 268, *cyneas*, Mexico, and *nebulosa*, Guatemala, p. 269; Godman & Salvin, P. Z. S. 1878. *P. chromis* and *diallus*, Chiriqui, p. 260, *poltis*, Mexico, and *fulgora*, Costa Rica, p. 261, *sopolis*, Vera Paz, and *sosis* and *cassiopea*, Costa Rica, p. 262, *durnfordi*, Buenos Aires, and *taphius*, Ecuador, p. 263; *iid.* Ann. N. H. (5) ii.

Eresia mechanitis, Nicaragua, and *drypetis*, Panama and Guatemala, *iid.* P. Z. S. 1878, p. 269; *E. epione*, iid. Ann. N. H. (5) ii. p. 263, Antioquia.

Eurema charon, W. C. Hewitson, Ent. M. M. xv. p. 151, Ecuador.

Vanessa pryeri, O. E. Janson, Cist. Ent. ii. p. 269, pl. v. fig. 2; *V. fentoni*, A. G. Butler, *tom. cit.* p. 281, both from Japan; *V. ladakensis*, F. Moore, Ann. N. H. (5) i. p. 227, Ladak and Yarkand.

Araschnia fallax, O. E. Janson, *l. c.* p. 271, pl. v. fig. 3, Yokohama.

Kallima limborgi, F. Moore, P. Z. S. 1878, p. 828, Tenasserim.

Doleschallia comrii, Godman & Salvin, P. Z. S. 1878, p. 646, pl. xl. figs. 1 & 2, New Guinea.

Eubagis cæade, H. Burmeister, Desc. Rep. Arg. v. p. 170, Buenos Aires; *E. geta*, Godman & Salvin, Ann. N. H. (5) ii. p. 264, Bolivia.

Catagramma zerynthia, H. Burmeister, *l. c.* p. 173, pl. v. fig. 9, Argentine Republic (= *sorana*, Godt.; *id. l. c.* p. 511).

Callithea bartletti, Godman & Salvin, Ann. N. H. (5) ii. p. 264, Lower Ucayali and Rio Napo.

Ergolis alternus, F. Moore, P. Z. S. 1878, p. 698, Hainan.

Crenis vadimonis, H. Druce, Ent. M. M. xiv. p. 226, Cameroons.

Timetes phiale, Godman & Salvin, P. Z. S. 1878, p. 270, Guatemala.

Limenitis pintuyana, G. Semper, Verh. Ver. Hamb. iii. p. 109, Philippines.

Herona angustata, F. Moore, *l. c.* p. 829, Tenasserim.

Penthema darlisa, id. *l. c.*, Tenasserim.

Parthenos apicalis, id. *l. c.*, Tenasserim.

Panopea expansa, A. G. Butler, Ann. N. H. (5) ii. p. 177, Masasi, East Africa.

Pseudacræa drusilla, M. Saalmüller, Ber. Senck. Ges. 1877–1878, p. 81, Madagascar.

Lebadea attenuata, F. Moore, *l. c.* p. 829, Tenasserim.

Neptis hainana and *rihodona*, id. *l. c.* pp. 697 & 698, Hainan; *N. adara*, *meetana*, and *plagiosa*, id. *l. c.* p. 830, Upper Tenasserim; *N. trigonophora*, A. G. Butler, Ann. N. H. (5) ii. p. 177, Masasi, E. Africa; *N. cyanifera*, id. *op. cit.* i. p. 481, New Guinea; *N. excellens*, id. Cist. Ent. ii. p. 282, Japan; *N. papua* (Boisd., MS.), C. Oberthur, Ann. Mus. Genov. xii. p. 460, Dorey; *N. heliobole*, G. Semper, *l. c.* p. 110, Mindanao.

Athyma cosmia and *magindana*, id. *l. c.* pp. 110 & 111, Philippines.

Adelpha sophax, Godman & Salvin, Ann. N. H. (5) ii. p. 265, Costa Rica, New Granada; *A. falcata*, Guatemala, and *diocles*, Chiriqui, *iid.* P. Z. S. 1878, p. 270.

Apatura doxocopa (= *agathina*, Hübn., *nec* Cram.), H. Burmeister, *l. c.* p. 184, Corrientes.

Aterica atrovirens, P. Mabille, Bull. Soc. Ent. Fr. (5) viii. p. lxxvii., Madagascar.

Symphædra pardalis, F. Moore, P. Z. S. 1878, p. 699, Hainan.

Adolias parcata, fig. 3, *discispilota*, fig. 2, and *taooana*, id. *l. c.* p. 831, pl. lii., Tenasserim.

Tanæcia leucotænia, G. Semper, *l. c.* p. 113, Philippines.

Charaxes antonius, id. *ibid.*, Mindanao; *C. cowani*, A. G. Butler, Ann. N. H. (5) ii. p. 285, Madagascar; *C. samatha*, p. 831, *desa* and *agna*, p. 832, F. Moore, *l. c.*, Upper Tenasserim.

Morphidæ.

Thaumantis louisa, Wood-Mason, redescribed and figured by him; J. A. S. B. xlvii. pt. 2, p. 175, pl. xi. Also redescribed by F. Moore; P. Z. S. 1878, p. 827.

Æmona lena, Atkinson, redescribed and figured by F. Moore, Anderson's Researches, i. p. 924, ii. pl. lxxxi. fig. 1.

Morpho epistrophis, Hübn., described and refigured; H. Burmeister, Desc. Rep. Arg. v. p. 190, pl. v. fig. 7.

New species :—

Zeuxidia masoni, F. Moore, P. Z. S. 1878, p. 826, Tenasserim.

Clerome sappho and *kleis*, G. Semper, Verh. Ver. Hamb. iii. pp. 108 & 109, Philippines.

Brassolidæ.

Narope testacea, Godman & Salvin, Ann. N. H. (5) ii. p. 259, Chiriqui.

Satyridæ.

Antirrhæa archæa, Hübn. Scent-organs described and figured; F. Müller, Arch. Mus. R. Jan. iii. pp. 1–7, pl. i.

Zophoessa andersoni, Atkinson, redescribed and figured by F. Moore, Anderson's Researches, i. p. 922, ii. pl. lxxxi. fig. 3.

Zethera. G. Semper discusses this genus, and gives full descriptions of all the known Philippine species; Verh. Ver. Hamb. iii. pp. 117–127.

Euptychia celmis, Godt. Variation described by H. Burmeister; Desc. Rep. Arg. v. pp. 211–213. He includes *E. melchiades*, Butl., as one variety, and figures another as *E. bonaerensis*; id. *l. c.* pl. viii. fig. 5.

Neonympha eurytris. Transformations described; W. H. Edwards, Canad. Ent. x. pp. 105–108. He agrees with Scudder as to the great resemblance between the *Satyridæ* and *Hesperiidæ*, which he considers to be closely related.

Erebia tyndarus, var. *callias*, Edw., contrasted with the type; T. L. Mead, Wheeler's Report, v. pp. 775 & 776.

Erebia ligea, var. *jeniseiensis*, p. 37, and *E. cyclopius*, var. *intermedia*, p. 46, from the Yenisei, described; F. Trybom, Œfv. Ak. Förh. 1877,

pt. vi. *E. medea* : dimorphism ; H. Goss, Ent. M. M. xiv. pp. 217–219. *E. niphonica*, O. E. Janson, figured by him ; Cist. Ent. ii. pl. v. fig. 5.

Mycalesis antahala, Ward, redescribed ; M. Saalmüller, Ber. Senck. Ges. 1877–1878, p. 78.

Arge mauritanica, C. Oberthur, noticed and figured by him ; Études d'Ent. iii. p. 41, pl. v. fig. 3.

Satyrus ægeria hybernating in the pupa state ; R. M. Sotheby, Ent. xi. p. 251. *S. wheeleri*, Edw., figured ; T. L. Mead, Wheeler's Report, v. pl. xxxix. *S. beroe*, Freyer, and varieties, discussed ; O. Staudinger, Hor. Ent. Ross. xiv. pp. 283 & 284. *S. circe*, Fabr., var. *silenus* : a form from Amasia with the white band obsolete ; *id. l. c.* p. 276. *S. hermione*, var. *cypriaca*, from Cyprus, described ; *id. l. c.* p. 274. *S. janira* : habits ; it simulates a withered leaf ; J. W. Salter, Ent. xi. p. 208. Var. figured and described by C. A. Briggs ; Ent. xi. p. 1. Ab. *hispulla*, Esp., noticed from Nassau ; A. Fuchs, S. E. Z. xxxix. pp. 329–331. *S. morania* and *quies*, Berg, figured and redescribed by H. Burmeister : Desc. Rep. Arg. v. pp. 204 & 206, pl. viii. figs. 2 & 3. *S. pelopea*, Klug : O. Staudinger discusses the various forms of this species, and describes varr. *guriensis* (*beroe*, var. Led.), from E. Armenia, and *alpina*, from S.E. Caucasus and W. Siberia ; *l. c.* pp. 278–281. *S. mamurra* is distinct, and varr. *lydia* and *obscura*, from Bosz-Dagh and Taurus respectively, described ; *id. l. c.* pp. 281–283. *S. tithonus*, var. from Tenby noticed ; G. W. Oldfield, Ent. xi. pp. 228 & 229.

Epinephile pasiphae, var. *philippina*, from Algeria ; Austant, Feuil. Nat. viii. p. 120.

Epinephile gyrtone, Berg, figured and redescribed by H. Burmeister ; Desc. Rep. Arg. v. p. 208, pl. viii. fig. 4.

Epinephile lycaon, Rod. : var. from N. Caucasus described ; S. Alpheraki, Troudy Ent. Ross. x. p. 11. *E. tithonus* (abnormal) and *E. jurtina* (partially gynandromorphic) ; J. O. Westwood, P. E. Soc. 1878, pp. liv. & lv.

Hipparcha hyperanthus, var. noticed ; J. J. Weir, P. E. Soc. 1878, p. xxxix. *H. semele* : protective variation ; *id. l. c.* pp. xlix. & l.

Pronophila phaselis, Hew., belongs to *Oxeoschistus* ; Godman & Salvin, P. Z. S. 1878, p. 267.

Cœnonympha arcania ♂ and *hero* ♀ in cop. ; F. Krause, Ent. Nachr. iv. p. 49.

Taygetis chelis, Fabr., redescribed and figured by H. Burmeister ; *l. c.* p. 201, pl. viii. fig. 1.

Calapa, g. n., F. Moore, P. Z. S. 1878, p. 825. Allied to *Mycalesis* ; type, *M. maasicles*, Hew.

New species :—

Zethera musides, G. Semper, Verh. Ver. Hamb. iii. p. 122, Philippines ; *Z. diadem* [*at*] *oides*, F. Moore, P. Z. S. 1878, p. 824, pl. li. fig. 3, Upper Tenasserim.

Euptychia philodice, p. 264. *rogersi* and *retones*, p. 265. Godman & Salvin, P. Z. S. 1878, Costa Rica ; *E. spartacus*, H. Burmeister, Desc. Rep. Arg. v. p. 214, pl. viii. fig. 6, Province of Entrerios.

Chionobas ivallda, T. L. Mead, Canad. Ent. x. p. 196, boundary line of California and Nevada.

Pararge achemenides, A. G. Butler, Cist. Ent. ii. p. 283, Japan.

Satyrus ashtaroth, H. Strecker, Lepidoptera, p. 129, Arizona; *S. mopsus*, P. Mabille, Bull. Soc. Ent. Fr. (5) viii. p. lxxvi., Madagascar.

Neominois dionysus, S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 254, Arizona, Utah.

Hipparchia lehana, F. Moore, Ann. N. H. (5) i. p. 227, Ladak.

Bletogona erebia, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 7, pl. i. fig. 1, Celebes.

Mycalesis bicristata and *fuliginosa*, p. 81, *andravahana* and *mæva*, p. 82, P. Mabille, Bull. Soc. Zool. Fr. iii.; *M. ankoma* and *strato*, id. Bull. Soc. Ent. Fr. (5) viii. p. lxxvi.; *M. perdita*, A. G. Butler, Ann. N. H. (5) ii. p. 283: all from Madagascar.

Strabena argyrina, P. Mabille, *l. c.* p. lxxv.; *S. smithi*, id. Bull. Soc. Zool. Fr. iii. p. 81; both from Madagascar.

Erites angularis, F. Moore, P. Z. S. 1878, p. 825, Tenasserim.

Hyphthima sakalava and *leucoubensis*, M. Saalmüller, Ber. Senck. Ges. 1877–1878, pp. 79 & 80, Madagascar.

Cœnonympha eryngii (*californica*, var.), H. Edwards, P. Cal. Ac. vii. p. 172, California.

Lymanopoda ecopis, Godman & Salvin, P. Z. S. 1878, p. 266, Costa Rica.

Pedaliodes triaria and *cremera*, iid. *l. c.* pp. 266 & 267, Costa Rica.

Oxeoschistus rogersi, iid. *l. c.* p. 267, Costa Rica and Chiriqui.

Pronophila orsedice and *palades*, Ecuador, *pelinæa* and *palæpolis*, Bolivia, W. C. Hewitson, Ent. M. M. xiv. p. 227.

EURYTELIDÆ.

Elymnias hainana, F. Moore, P. Z. S. 1878, p. 697, Hainan; *E. tinctoria*, id. *l. c.* p. 826, Upper Tenasserim: spp. nn.

LIBYTHEIDÆ.

Libythea larvata, sp. n., H. Strecker, Lepidoptera, p. 130, Texas.

ERYCINIDÆ.

Emesis diogenea, Prittw., and *ocypore*, Hübn., are varieties of one species; H. Burmeister, Desc. Rep. Arg. v. pp. 222 & 223.

Lemonias cythera, Edw., figured; T. L. Mead, Wheeler's Report, v. pl. xxxvi. figs. 3 & 4.

Saribia, g. n., A. G. Butler, Ann. N. H. (5) ii. p. 289. Allied to *Abisara*; type, *Emesis tepahi*, Boisd.

New species:—

Zemeros confucius, F. Moore, P. Z. S. 1878, p. 701, Hainan.

Taxila fasciata, id. *l. c.* p. 802, pl. lii. fig. 1, Tenasserim.

Sospita saturata, id. *l. c.* p. 701, Hainan.

Abisara angulata, id. *l. c.* p. 833, Tenasserim; *A. rogersi*, H. Druce, Ent. M. M. xv. p. 101, Angola.

Mesosemia thyestes, Chanchamayo, Peru, and *sylcia*, Bolivia; *id. l. c.*

Eurygona hypophœa and *leucorrhoa*, p. 360, *amphidecta*, *inconspicua*, and *russata*, p. 361, all from Veragua and Chiriqui, and *inconspicua*, also from Costa Rica, Godman & Salvin, P. Z. S. 1878; *E. phelina*, Venezuela, and *alcmena*, Ecuador, p. 101, and *julia*, Santarem, p. 102, H. Druce, *l. c.*

Limnas melanochlora and *cæruleata*, Godman & Salvin, P. Z. S. 1878, p. 362, both from Veragua and Chiriqui.

Cyrenia pyrippe, iid. *l. c.*, Veragua.

Ithomeis imitatrix (= *culema*, Butl. & Druce, *nec* Hew.), *iid. l. c.* p. 362, Veragua, Costa Rica.

Riodina lysistratus, H. Burmeister, Desc. Rep. Arg. v. p. 221, pl. viii. fig. 7, Rio Guaiquiraro.

Symmachia rhacotis, Godman & Salvin, *l. c.* p. 363, Guatemala and Honduras.

Mesene ignicauda, Veragua, *silaris*, Nicaragua, and *tyriotes*, Veragua, Chiriqui, and Calobre, *iid. l. c.*

Pachythone gigas, iid. *l. c.* p. 364, Panama.

Charis velutina, Guatemala, *crocea*, Veragua and Calobre, and *holosticta*, Veragua, p. 364, *pœciloptera*, Veragua, Chiriqui, and *ochrias*, Costa Rica, p. 365, *iid.* l. c.; *C. guadeloupe*, H. Streeker, Lepidoptera, p. 131, Texas.

Tharops purpurata, Guatemala and Veragua, and *isthmica*, Veragua and Calobre; Godman & Salvin, *l. c.* pp. 365 & 366.

Lemonias pelarge, Guatemala, *theages*, Veragua and Costa Rica, and *debilis*, Veragua, Chiriqui, and Nicaragua, p. 366, and *hypoglauca*, p. 367, Mexico, *iid.* l. c.; *L. tenellus*, H. Burmeister, *l. c.* p. 225, pl. viii. fig. 8, Argentine Republic.

Nymphidium hæmatostictum, Panama, and *ictericum*, Veragua and Chiriqui, p. 367, *sicyon*, Guatemala, *adelphinum*, Costa Rica and Calobre, and *velabrum*, Veragua and Calobre, p. 368; Godman & Salvin, *l. c.*

Theope isia, Guatemala, p. 368, *barea* and *canina*, both from Veragua and Chiriqui, and *decorata*, Nicaragua, p. 369; *iid. l. c.*

Lycænidæ.

The concluding portion of W. C. Hewitson's "Illustrations of Diurnal Lepidoptera" (Part viii. London: Dec. 1878, pp. 209-228; suppl. pp. 17-35; titles, indices, and pls. 84-92; suppl. pls. i. *a*, *b*, iii. *a*, *b*, iv. *a*, v. *a*, *b*, vii. & viii.) chiefly contains descriptions and figures of previously known species, as follows:—

Thecla oxida, figs. 721-723, and *fricahlszkii* (Led.), figs. 726-728, p. 212, and *arria*, figs. 729 & 730, p. 213, pl. lxxxv.

Poritia hewitsoni, Moore, p. 214, fig. 1, *plearata*, figs. 3-5, *potina*, figs. 6 & 7, and *pharyge*, figs. 8 & 9, p. 215, *phalia*, figs. 10 & 11, and *promula*, figs. 12 & 13, p. 216, pl. lxxxviii., *phalena*, figs. 14 & 15, p. 216, *pheretia*,

figs. 16–18, and *philota*, figs. 19 & 20, p. 217, and *pediada*, p. 218, figs. 21 & 22, pl. lxxxix.

Pseudodipsas digglesi and *cephenes*, pp. 218 & 219, pl. lxxxix. figs. 1 & 2, 3 & 4.

Lycænesthes lycænoides, Feld., pl. xcii. fig. 30, and *lycænina*, Feld., figs. 6 & 9, p. 219, *ligures*, figs. 1 & 2, and *licates*, figs. 3 & 4, p. 220, pl. xc., *sylvanus*, Dru., fig. 41, *larydas*, Cram., fig. 40, pl. xcii. and *sichela*, Wallengr. (= *liodes*, Hew.), p. 222, *lysicles*, p. 224, figs. 15 & 16, *leptines*, figs. 23 & 24, and *lyzanius*, figs. 27 & 28, p. 226, *lusones*, figs. 17 & 18, and *lacides*, figs. 19 & 20, p. 227, *lucretilis*, figs. 29 & 30, p. 228, pl. xci. and *otacilia*, Trim., pl. xcii. figs. 35–37.

The following known species are redescribed and figured in the Supplement:—

Hewitsonia boisduvali, p. 17, pl. i. *a*, figs. 1 & 2.

Epitola honorius, Fabr., p. 17, figs. 3–5, *ceraunia*, figs. 6 & 7, and *posthumus*, Fabr., fig. 8, p. 18, pl. i. *a*, *cephena*, figs. 9 & 10, *hyetta*, figs. 11 & 12, *gerina*, figs. 13 & 14, and *zelza*, figs. 15 & 16, p. 19, *carcina*, figs. 17 & 18, and *cercene*, figs. 19 & 20, p. 20, pl. i. *b*.

Amblypodia perimuta, p. 21, pl. vii. fig. 61, and *avidiena*, p. 23, pl. viii. figs. 72 & 73.

Myrina jalindra, Horsf., p. 24, pl. iii. *a*, figs. 96–98, *genuba*, figs. 103 & 104, and *nomenia*, figs. 105 & 106, p. 25, *symira*, figs. 107 & 108, and *bimaculata*, figs. 111 & 112, p. 26, and *pallene*, Wallengr., p. 27, figs. 113 & 114, pl. iii. *b*.

Iolaus inores, p. 27, figs. 44 & 45, *bolissus*, figs. 48 & 49, *aphnæoides*, Trim., figs. 50 & 51, *carina*, figs. 52–54, p. 28, *cytæis*, figs. 55 & 56, and *timon*, Fabr., fig. 57, p. 29, pl. iv. *a*.

Deudorix diocles, p. 29, fig. 57, *deritas*, figs. 58 & 59, and *dariaves*, figs. 60–62, p. 30, and *deliochus*, figs. 68 & 69, p. 31, pl. v. *a*.

Hypolycæna aruma, figs. 47 & 48, *mera*, figs. 49 & 50, and *naara*, figs. 51 & 52, p. 33, pl. v. *b*.

Liphyra leucyania, p. 34, figs. 1 & 2, and *vininga*, p. 35, fig. 3, pl. v. *b*.

All the above species are Hewitson's, when not otherwise specified.

Weismann publishes analytical tables of the European species of *Thecla*, *Polyommatus*, and *Lycæna*; Bull. Ent. Belg. xxi. pp. lxxxvii.–xcvi.

E. Jenner publishes an analytical table of Swiss Butterflies (*Lycænidæ*); MT. schw. ent. Ges. v. pp. 293–296.

Supposed occurrence of [*Lycæna*] "*dispar*" at Belfast; W. Hambrough, Sci. Gos. xiii. p. 45.

Chrysophanus helloides, Boisd. Supposed larva described; T. L. Mead, Wheeler's Report, v. pp. 780 & 781.

Lycæna melissa, Edw., figured, T. L. Mead, Wheeler's Report, v. pl. xxxvi. figs. 5–8. *L. sapiolus*, Boisd., and *lycea*, Edw., larvæ noticed; *id. l. c.* pp. 784 & 785.

Chrysophanus. R. W. Fereday discusses the New Zealand species (Tr. N. Z. Inst. x. pp. 233–239, pl. viii.), in continuation of a former paper. He notices and figures: *C. salustius*, Fabr., p. 253, figs. A & B; *C. maui*,

Fered., p. 254, fig. C; *C. feredayi*, Bates, fig. D, and *rauparaha*, Fered., figs. E & F, p. 255, and *boldenarum*, White, p. 256, fig. G. Most of the above species are redescribed in full. *C. phlæas*, Linn.: var. *feildeni*, described from lat. 81° 45′, R. McLachlan, J. L. S. xiv. p. 111; var. described and figured by W. P. Weston, Ent. xi. p. 25; var. *fasciata* from Florida, described by H. Strecker, Butt. & Moths N. Amer. p. 101.

Cupido cuchylas, Hübn., and *coritas*, Guér., are distinct; C. Oberthur, Ann. Mus. Genov. xiii. p. 464. *C. pheres*, Boisd.: a variety from Utah and Arizona, described by S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 256.

Lycæna alcxis, hermaphrodite, left side ♂, right side ♀; A. J. Rose, Ent. xi. p. 209. *L. aquilo*, Boisd., noticed from lat. 81° 45′, R. McLachlan, J. L. S. xiv. p. 111. *L. icarus*: G. Weymer describes var. *armata*, from Elberfeld; JB. Ver. Elberf. v. p. 55. *L. lucia*, Kirb., varr. *nigra* and *intermedia*, noticed by H. Strecker, Butt. & Moths, p. 95. *L. lucia* and *pseudargiolus*: note on times of appearance; E. C. Howe, Canad. Ent. x. p. 219. *L. pseudargiolus*: the transformations are described (*violacea*, *neglecta*, and *lucia* are only forms of the same insect), and the habits of the larvæ are described; they, and various other larvæ of the genus, protrude an organ from the eleventh segment which emits a drop of clear green fluid, much liked by ants, which "milk" them for it, and also drive away parasites when they attack the larvæ; figures of the organs are also added; W. H. Edwards, Canad. Ent. x. pp. 1–14, 131–136, 160 (see also H. C. McCook, Am. Nat. xii. pp. 442–445, fig. 8). *L. scudderi*: larva described; W. Saunders, Canad. Ent. x. pp. 14 & 15. *L. violacea*: the black form appears to occur only in the male; W. H. Edwards, *l. c.* p. 80.

Thecla rubi: on its supposed stridulation; A. H. Swinton, Ent. M. M. xiv. pp. 209 & 210, woodcut. *T. sepium*, var. *fulvescens*, and *T. melinus*, var. *pudica*, both from California, described by H. Edwards, P. Cal. Ac. vii. p. 172.

Iolaus iulus, Hew.: C. Oberthur describes a variety (?) from Zanzibar; Études d' Ent. iii. pp. 21 & 22.

New genera and species:—

Mahathala, F. Moore, P. Z. S. 1878, p. 702. Allied to *Amblypodia*; type, *A. ameria*, Hew.

Thamala, id. *l. c.* p. 834. Allied to *Deudorix*; type, *T. miniata*, sp. n., *l. c.* pl. lii. fig. 6, Tenasserim.

Narathura, id. *l. c.* p. 835. Type, *Amblypodia hypomuta*, Hew. *A. epimuta*, Hew., *nec* Moore, is renamed *N. moolaiana*.

Surendra, id. *l. c.* Type, *Amblypodia quercetorum*, Moore.

Thaduka, id. *l. c.* p. 836. Allied to *Mahathala*; type, *T. multicaudata*, sp. n., *l. c.* pl. lii. fig. 7, Tenasserim.

Lucia dilana, id. *l. c.* p. 701, Hainan: *L.* (?) *substrigata*, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 15, pl. i. fig. 2, Celebes.

Chrysophanus tama (? = *boldenarum*, var.), R. W. Fereday, Tr. N. Z. Inst. x. p. 259, New Zealand (pl. vii. figs. A–C, supposed larva described l. c.); *C. editha*, T. Mead, L. Canad. Ent. x. p. 198, Lake Tahoe.

Polyommatus yarkundensis, p. 229, and *kashgharensis*, Yarkand, *lehanus*, Leh, Ladak, p. 230, F. Moore, Ann. N. H. (5) i.; *P. satraps*, O. Staudinger, Hor. Ent. Ross. xiv. p. 230, Asia Minor; *P. similis*, F. Moore, P. Z. S. 1878, p. 702, Hainan.

Pithecops nihana, id. *l. c.*, Hainan.

Lampides aberrans, A. G. Butler, Ann. N. H. (5) ii. p. 289, Madagascar; *L. atrigemmata*, id. *l. c.* p. 290, Madagascar; *L. micrargus*, id. Cist. Ent. ii. p. 283, Japan; *L. mithridates*, O. Staudinger, *l. c.* p. 247, Asia Minor; *L. speciosa*, H. Edwards, P. Cal. Ac. vii. p. 173, California.

Cupido piepersi, *latimargus*, and *philatus*, P. C. T. Snellen, *l. c.* pp. 16, 19, 21, pl. i. figs. 3–5, Celebes; *C. arinia*, (Boisd., MS.) C. Oberthur, Ann. Mus. Genov. xiii. p. 465, Dorey; *C. ramonza*, M. Saalmüller, Ber. Senck. Ges. 1877–1878, p. 84, Madagascar.

Holochila blackburni, N. C. Tuely, Ent. M. M. xv. p. 9, Sandwich Islands.

Thecla teresina, figs. 707 & 708, Chiriqui, p. 209, *feretria*, figs. 709 & 710, and *zava*, figs. 711 & 712, p. 210, locality unknown, *duma*, fig. 713, Bogota, *tera*, figs. 714 & 715, Chiriqui, *munatia*, figs. 716 & 717, Guatemala, p. 211, pl. lxxxiv., *mirma*, figs. 718–720, locality unknown, and *mishma*, figs. 724 & 725, Colombia (Sierra Nevada), pp. 212 & 213, pl. lxxxv., W. C. Hewitson, Ill. D. Lep.; *T. thargelia*, p. 230, fig. 9, *nannidion*, p. 231, fig. 10, *phrynisca*, p. 232, fig. 11, and *sanguinalis*, p. 239, fig. 12, H. Burmeister, Desc. Rep. Arg. v. pl. viii., Argentine Republic; *T. licinia* and *rutila*, P. Mabille, Bull. Soc. Ent. Fr. iii. p. 83, Madagascar; *T. kali* and *lotis*, H. Strecker, Lepidoptera, p. 129, Arizona; *T. fasciata*, O. E. Janson, Cist. Ent. ii. p. 272, pl. v. fig. 4, Yokohama; *T. putnami*, Utah, and *adenostomatis*, S. California, H. Edwards, P. Cal. Ac. vii. pp. 143 & 144.

Lycænesthes lycambes, N. India, figs. 11 & 12, *leocrates*, Macassar, figs. 5 & 10, p. 220, *lochias*, Madagascar, figs. 7 & 8, *lemnos*, Delagoa Bay, figs. 13 & 14, pl. xc., *levis*, locality unknown, pl. xci. figs. 21 & 22, p. 221, *lychnides*, p. 224, pl. xci. fig. 32, & pl. xcii. fig. 38, Old Calabar, *lachares*, Cameroons, figs. 33 & 34, and *lamprocles*, fig. 31, p. 225, and *lamias*, p. 227, figs. 25 & 26, both from West Africa, pl. xci., W. C. Hewitson, Ill. D. Lep.; *L. monteironis*, p. 223, Angola and Calabar, and *thyrsis*, p. 224, pl. xcii. figs. 42–44, Gaboon and Fernando Po, W. F. Kirby in W. C. Hewitson's Ill. D. Lep.

Pseudodipsas villosa, P. C. T. Snellen, *l. c.* p. 24, pl. i. fig. 6, Celebes.

Poritia phraatica, W. C. Hewitson (= *pleurata*, ♀, Hew., olim), *l. c.* p. 214, pl. lxxxviii. fig. 2.

Aphnæus apelles, C. Oberthur, Études d'Ent. iii. p. 22, Zanzibar.

Hypolycæna wardi and *mermeros*, P. Mabille, Bull. Soc. Zool. Fr. iii. p. 82, Madagascar; *H. amba*, W. F. Kirby, *l. c.* Suppl. p. 32, pl. v. *b*, figs. 44–46, Malacca.

Iolaus laon, W. C. Hewitson, *l. c.* Suppl. p. 28, pl. iv. *a*, figs. 46 & 47, Gold Coast.

Myrina fabronia, locality unknown, figs. 89–91, and *tarpina*, Andaman Islands, figs. 93 & 94, p. 23, *burbona*, Sumatra, fig. 95, pl. iii. *a*, *creta*, Congo, figs. 99 & 100, p. 24, *derpiha*, Aru, p. 25, figs. 101 & 102, and

cyara, Darjeeling, figs. 109 & 110, p. 26, pl. iii. *b*, W. C. Hewitson, l. c.; *M. nivea*, Billiton Island, figs. 3 & 4, and *hiemalis*, Burma, figs. 5 & 6, Godman & Salvin, P. Z. S. 1878, p. 640, pl. xl.

Deudorix diopolis, locality unknown, p. 30, figs. 63 & 64, *diencces*, Singapore, p. 31, figs. 65–67, and *diyllus*, Sierra Leone, p. 32, figs. 70 & 71, pl. v. *a*, W. C. Hewitson, l. c.; *D. indrasari*, P. C. T. Snellen, *l. c.* p. 26, pl. i. fig. 7, Celebes; *D. suffusa*, F. Moore, P. Z. S. 1878, p. 834, pl. lii. fig. 8, Tenasserim.

Amblypodia grynea, Java, p. 20, figs. 59 & 60, *bazaloides*, locality unknown, figs. 62 & 63, and *bupola*, Darjeeling, figs. 64 & 65, p. 21, pl. vii., *ocomaculata*, Sumatra, figs. 66 & 67, *buxtoni*, Sumatra and Malacca, figs. 68 & 69, and *capeta*, Sumatra, figs. 70 & 71, p. 22, pl. viii. W. C. Hewitson, l. c.; *A. taooana*, F. Moore, P. Z. S. 1878, p. 835, Tenasserim.

Hesperiidæ.

P. Mabille has published a catalogue of 182 species of *Hesperiidæ* in the Brussels Museum (Ann. Ent. Belg. xxi. pp. 12–14). He divides the family as follows:—

Fam. *Urbicolæ*, Linn.

Sect. 1. *Hesperiidæ*, Latr.

Tribe 1. *Pyrrhopygini* (*Pyrrhopyga*).

Tribe 2. *Eudamini* (*Erycides, Myscelus, Spathilepia, Phanus, Hyalothyreus, Augiades, Goniloba, Thymele, Telegonus, Eudamus, Telemiades, Achalarus, Æthilla, Thanaos, Camptopleura, Anastrus, Antigonus, Leucochitonea, Spilothyrus, Pyrgus*).

Sect. 2. *Astyci*, Scudd.

Tribe 1. *Ismenini* (*Spioniades, Cecropterus, Ectomis, Astrapes, Entheus, Ancistrocampta, Plesioneura, Tanyptera, Ismene, Erionota*).

Tribe 2. *Carystini* (*Thracides, Proteides, Carystus*).

Tribe 3. *Pamphilini* (*Pamphila, Ancyloxypha, Cyclopides, Heteropterus*).

Tribe 4. *Tagiadini* (*Pythonides, Cyclosemia, Helias, Anisochoria, Achlyodes, Pterygospidea, Astictopterus, Tagiades*).

He also (*l. c.*) redescribes the following known species:—*Pyrrhopyga semidentata*, Mab., p. 14, *luteizona*, Mab., p. 15, *patrobas*, Hew., p. 19, *gnetus*, Fabr., p. 20, *Telegonus megalurus*, and *albo-ciliatus*, Mab., p. 25, *Eudamus virescens*, Mab., p. 20, *Telemiades inops*, Mab., p. 21, *Erionota irava*, Moore, p. 35, *Tagiades japetus*, Cram., p. 43, and *nepos*, Latr., p. 44.

A. Speyer discusses the characters of the *Hesperiidæ*, and recharacterizes the European genera at great length. He proposes the name *Catodaulis* (pp. 179 & 186) for *Pyrgus tethys*, Mén. [already the type of *Daimio*, Murr.], and restricts *Pyrgus* to *althææ*, *proto*, and *sao*, and allies, retaining Rambur's name *Scelothrix* for the species allied to *sidæ*, *alveus*, and *malvæ*; S. E. Z. xxxix. pp. 167–193.

Speyer's paper on the classification of the European *Hesperiidæ* is translated in Canad. Ent. x. pp. 121–129, 144–154, 163–170. It is also noticed by E. A. Fitch, Ent. xi. p. 116.

MÜLLER, F. A prega costal des Hesperideas. Arch. Mus. R. Jan. iii. pp. 41–50, pls. v. & vi.

The structure of the costal fold of many species belonging to various genera is described, and wings and scales of different forms figured in illustration.

Ismene florestan and *Pyrgus elma*; larva noticed, J. P. Mansel Weale, P. E. Soc. 1878, p. x.

Thracides salius, Cram., var. *trimacula* from Brazil; P. Mabille, *l. c.* p. 35.

Ocytes ridingsi, Reak., male described; T. L. Mead, Wheeler's Report, v. p. 788.

Pamphila utha, Hew., redescribed from Jamaica; A. G. Butler, P. Z. S. 1878, p. 482.

Astictopterus xanites, Butl., var. from Java described; P. Mabille, *l. c.* p. 43.

Plesioneura liliana, Atkinson, redescribed and figured by F. Moore, Anderson's Researches, i. p. 926, ii. pl. lxxxi. fig. 2.

Erynnis icelus with a notch in each costa, supposed to be produced by injury to the pupa; H. K. Morrison, Psyche, ii. p. 155.

Hesperia musculus, Burm., = *Helias ascalon*, Staud. var.; H. Burmeister, Desc. Rep. Arg. v. p. 262.

Megathymus yuccæ: additional notes by C. V. Riley, Tr. Ac. St. Louis, iii. pp. 566–568.

Ægiale cofaqui, H. Strecker, noticed and figured by him; Lepidoptera, p. 135, pl. xv. figs. 2, 2.

New genera and species :—

Dyscophus, H. Burmeister, Desc. Rep. Arg. v. p. 291. Allied to *Eudamus*: type, *Pap. sebaldus*, Cram. (*crameri*, Latr.); add *eurybates*, *ramusis*, and *salatis*, Cram., and *D. faustinus*, sp. n., *l. c.* pl. ix. fig. 11, Argentine Republic.

Hyalothyrus, P. Mabille, Ann. Ent. Belg. xxi. p. 23. Allied to *Phareus*: type, *Pap. nitocris*, Cram.

Dicranaspes, id. *l. c.* p. 24. Section of *Thymele*: type, *Pap. idas*, Cram.

Euthymele, id. *l. c.* Section of *Thymele*, to contain *aulestes* and *apastus*, Cram., *mercatus*, Fabr., and *alardus*, Stoll.

Ectomis, id. *l. c.* p. 31. Placed next to *Cecropterus*: type, *E. adoxa*, sp. n., *l. c.* p. 32, locality not stated.

Erionota, id. *l. c.* p. 34. Allied to *Ismene*: to contain *Pap. thrax*, Linn., *Hesperia hypaepa*, Hew., and *H. iraca*, Moore.

Calliana, F. Moore, P. Z. S. 1878, p. 686. Affinities not stated: type, *C. pieridoides*, sp. n., *l. c.* p. 687, pl. xlv. fig. 2, N. E. Bengal?

Pithauria, id. *l. c.* p. 689. Allied to *Pamphila*: type, *Hesperia murdava*, Moore (figured, pl. xlv. fig. 13).

Halpe, id. *l. c.*. Allied to *Pamphila*, to contain *Hesperia beturia* and

dolopia, Hew.; *Pamphila luteisquama*, Mab., *H. ceylonica*, Ceylon, and *radians*, N. W. Himalaya; spp. nn., *l. c.* p. 690, pl. xlv. figs. 9 & 1.

Corone, P. Mabille, Pet. Nouv. ii. p. 205. Allied to *Pamphila*: type, *C. ismenoides*, sp. n., *l. c.*, Australia (*Pamph. dysmephila* and *niveostriga*, Trim., probably belong to this genus).

Cyclosemia, id. *l. c.* p. 222. Allied to *Pythonides* and *Tagiades*: type, *Pap. herennius*, Cram., but will also include *paulinus*, Cram., *binoculus*, Möschl., and *fissimacula* and *anastomosis*, spp. nn., *l. c.* p. 230, Brazil.

Thymele trebia and *ganna*, H. B. Möschler, Verh. z.-b. Wien, xlviii. pp. 203 & 204, Venezuela.

Telegonus granadensis (= *aulestes*, Cram., var. ?), p. 204, *zohra* and *coas*, p. 205, and *cænosa* (Herr.-Schäff., MS.), p. 206, from Venezuela, *gizela*, Colombia, and *mardonius*, Central America, p. 207, and *nicomedes*, Colombia and Brazil, p. 208; *id. l. c.*

Thracides ethemides, H. Burmeister, Desc. Rep. Arg. v. p. 279, Corrientes.

Conognathus celendris, W. C. Hewitson, Ann. N. H. (5) i. p. 347, Amazon.

Gegenes hainanus, F. Moore, P. Z. S. 1878, p. 703, Hainan.

Eudamus punctiger, Burmeister, *l. c.* p. 292, pl. ix. fig. 12, Rio, and Argentine Republic.

Ismene nestor, H. B. Möschler, *l. c.* p. 208, Java; *I. subfusciata*, Moore, P. Z. S. 1878, p. 686, Ceylon.

Erycides licinus, H. B. Möschler, *l. c.* p. 209, Colombia and Chiriqui.

Pyrrhopyga menecrates, p. 13, Peru, *hewitsoni*, p. 19 (= *vulcanus*, Hew., fig. 2), *perplexus*, p. 20, *pseudognetus*, *menechmus*, and *sosia*, p. 21, *fallax*, p. 22, localities not stated; P. Mabille, Ann. Ent. Belg. xxi. *P. styx*, H. B. Möschler, *l. c.* p. 209, Colombia.

Carystus erebina (Hoppf., MS.), p. 211, *argus*, p. 212, *kasus* and *tersa*, p. 213; H. B. Möschler, *l. c.*, all from Colombia. *C. argyrocoryne* and *argyris*, Brazil, and *telegonus*, Philippines; P. Mabille, Pet. Nouv. ii. p. 205. *C. calonice*, p. 270, pl. ix. fig. 9, and *odilia* and *micylla*, p. 272; H. Burmeister, *l. c.*, Argentine Republic.

Proteides pauper, Colombia, and *merenda*, Brazil; P. Mabille, *l. c.* pp. 201 & 202.

Spioniades clinius, id. *l. c.* p. 201, Cayenne.

Pamphila selas, China and Thibet, *ophites*, Antilles and Brazil, *gambica*, Senegambia, *phormio*, Para, and *sulfurina*, Cayenne and Venezuela, p. 233, and *pythias*, Philippines, p. 234, *trachala*, Java, and *rectivitta*, Celebes and Australia (?), p. 237, *fitjiensis*, Oceania, *tyro*, Brazil, and *heterospila*, Peru, p. 238, *lyco*, Peru, *dravida*, India, *vetula*, Brazil, *cærulans*, *lento*, and *humeralis*, Para, p. 242, *melanion*, Oceania, and *grandis*, Borneo, p. 261, *ariel*, *gillias*, and *sinnis*, Madagascar, p. 285, P. Mabille, Pet. Nouv. ii.; *P. phormio*, S. America, *sulfurina*, Cayenne and Venezuela, p. 57, *pythias* and *taxilus*, Java, *id.* Ann. Ent. Belg. xxi.; *P. palmarum*, figs. 6 & 7, p. 690, *bambusæ*, figs. 11 & 12, and *subochracea*, from Calcutta, *brahma*, fig. 8, Masuri, p. 691, and *siva*, Khasia Hills, p. 692, pl. xlv.; *masoni*, p. 842, pl. lii. fig. 3, Tenasserim, F. Moore,

P. Z. S. 1878; *P. jansonis*, p. 284, *rikuchina* and *florinda*, p. 285, and *leonina*, p. 286, all from Japan, A. G. Butler, Cist. Ent. ii.; *P. insolata*, id. P. Z. S. 1878, p. 483, Jamaica; *P. ancus*, p. 214, *obsoleta*, p. 215, *irma* and *geisa*, p. 216, *lumida*, p. 217, *golenia* and *pericles*, p. 218, all from Colombia, *fettingi*, p. 219, Sumatra, *philino*, p. 220, Himalaya, and *perfida*, p. 221, Colombia, H. B. Möschler, l. c.; *P. similis*, H. Strecker, Lepidoptera, p. 131, Texas; *P. stratyllis* and *cerymicoides* (Berg, MS.), pl. ix. fig. 10, H. Burmeister, *l. c.* p. 270, Corrientes; *P. rhena*, p. 115, *rhesus* and *morrisoni*, p. 116, *phylace*, p. 117, W. H. Edwards, Field and Forest, iii., Southern Colorado.

Apaustus sulla, *tanaquilas*, and *valerius*, H. B. Möschler, *l. c.* pp. 221–223, Colombia.

Ancyloxypha radiola, P. Mabille, Ann. Ent. Belg. xxi. p. 39, locality not stated.

Hesperia narooa, pl. xlv. fig. 4, Bombay and Ceylon, and *kumara*, Canara and Ceylon, p. 688, *seriata* and *bada*, Ceylon, *bevani*, Moulmein and Calcutta, and *farri*, Calcutta and Cherra Punji, p. 688, *toona*, N.E. Bengal, and *subgrisea*, pl. xlv. fig. 5, Ceylon, p. 689, *quinigera*, p. 703, Hainan, *moolata*, p. 843, Upper Tenasserim, F. Moore, P. Z. S. 1878; *H. netopha*, West Africa, and *nyassæ*, Lake Nyassa, p. 345, and *vermiculata*, Sumatra, p. 346, W. C. Hewitson, Ann. N. H. (5) i.; *H. physoptila*, H. Burmeister, *l. c.* p. 250, Corrientes; *H. epicaste*, Brazil, p. 201; *H. alcandra*, *phylo*, and *pullata*, Brazil, *tetra* and *punctum*, Cayenne, and *hilarina*, Para, p. 229, P. Mabille, Pet. Nouv. ii.

Spilothyrus notabilis, H. Strecker, Lepidoptera, p. 131, Texas.

Pyrgus xanthus, W. H. Edwards, *l. c.* p. 142, Southern Colorado.

Syrichthus cenchreus, W. C. Hewitson, *l. c.* p. 346, Para.

Leucochitonea lathœa, Bolivia, and *lyrœa*, locality unknown, p. 151, *carina*, Para, and *elelea*, Cayenne, p. 152, and *falisca*, Cayenne, p. 153, *id.* Ent. M. M. xv.; *L. pulverosa*, P. Mabille, *l. c.* p. 201, Cayenne.

Ancistrocampta anchialus, id. *l. c.* p. 201, Brazil.

Ceratrichia flava, Cameroons, and *aretina*, Calabar; W. C. Hewitson, Ann. N. H. (5) i. p. 343.

Astictopterus varones, Sumatra, *harmachis*, Sumatra and Malacca, p. 341, *ozias*, Java, *othonias*, Borneo, p. 342, and *vibius*, Gaboon, p. 343, W. C. Hewitson, Ann. N. H. (5) i.; *A. olivascens*, p. 692, Moulmein and Darjiling, *subfasciatus*, p. 842, Upper Tenasserim, F. Moore, P. Z. S. 1878, p. 842, India.

Plesioneura tola, Tondano, p. 340, *crona*, Batchian, and *cythna*, hab. ?, W. C. Hewitson, l. c.; *P. auricittata* and *albifascia*, F. Moore, P. Z. S. 1878, p. 843, pl. liii. figs. 2 & 3, Tenasserim; *P. ruficornis*, P. Mabille, Ann. Ent. Belg. xxi. p. 32, Java; *P. renardi* (Boisd., MS.), C. Oberthur, Ann. Mus. Genov. xiii. p. 467, Dorey; *P. hyalinata*, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 87, Madagascar.

Heteropterus libya, S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 258, Beaver Dam, Arizona.

Cyclopides subvittatus, Moulmein and Darjiling, and *subradiatus*, Khasia Hills, F. Moore, P. Z. S. 1878, pp. 692 & 693; *C. lynx*, H. B. Möschler, *l. c.* p. 210, Africa ?; *C. empyreus* and *catocalinus*, P. Mabille, Pet. Nouv.

ii. p. 285, Madagascar; *C. frater*, id. Ann. Ent. Belg. xxi. p. 40, Peru, Bolivia.

Amblyscirtes æmus, Southern Colorado, and *nilus*, Texas, W. H. Edwards, Field and Forest, iii. p. 118.

Pholisora pirus, id. *l. c.* p. 119, Southern Colorado.

Isotinon atkinsoni, fig. 10, Darjiling, *khasianus*, Khasia Hills, and *masuriensis*, fig. 3, Masuri, p. 693, pl. xlv., *I. subtestaceus*, p. 844, Tenasserim, F. Moore, P. Z. S. 1878.

Pythonides leucaspis, Ann. Ent. Belg. xxi. p. 41, & Pet. Nouv. ii. p. 230, Cayenne and Brazil, *grandis*, l. c. p. 261, Para, P. Mabille; *P. cobarus*, H. B. Möschler, *l. c.* p. 211, Colombia.

Thanaos stigmata, Masuri, *indistincta*, Moulmein, and *obsoleta*, Cherra Punji, Assam; F. Moore, P. Z. S. 1878, p. 694.

Nisoniades perforata, H. B. Möschler, *l. c.* p. 223, Colombia and Chiriqui.

Achlyodes vulgata, p. 224, and *mithrax* (Herr.-Schäff., MS.), both from Colombia, *athymnios*, Central America, p. 225, *jamaicensis*, Jamaica, and *neæris*, Colombia, p. 226, *auxo* (Herr.-Schäff., MS.), Colombia, p. 227, and *lemur*, p. 228, Colombia and Chiriqui; *id. l. c.*

Arteurotia cambyses, Bolivia, and *castolus*, Brazil, W. C. Hewitson, Ann. N. H. (5) i. p. 347; *A. bufonia* (Hopff., MS.), H. B. Möschler, *l. c.* p. 229, Colombia.

Camptopleura iphicrates, P. Mabille, Pet. Nouv. ii. p. 197, Brazil.

Antigonus dichrous, *incisus*, Brazil and Cayenne, *corrosus*, Cayenne, and *variegatus*, Brazil, *id. l. c.* p. 198; *A. excisus*, id. *ibid.* and Ann. Ent. Belg. xxi. p. 29, Peru, Brazil.

Helias brusus, p. 257, pl. ix. fig. 7, *clericalis*, p. 258, pl. ix. fig. 8, *gonoptila*, p. 260, *tucumana*, p. 261, H. Burmeister, *l. c.*, Argentine Republic.

Cecropterus zeutus, H. B. Möschler, *l. c.* p. 229, Colombia.

Tagiades litigiosa (Herr.-Schäff., MS.), H. B. Möschler, *l. c.* p. 230, Silhet; *T. gilolensis*, P. Mabille, Pet. Nouv. ii. p. 261, Gilolo; *T. meetana*, F. Moore, P. Z. S. 1878, p. 842, pl. liii. fig. 1, Tenasserim; *T.* (?) *fuscula*, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 42, pl. ii. fig. 3, Celebes.

Pterygospidea grisea, Gaboon, *kchelatha*, Macassar, and *sephara*, Brazil, W. C. Hewitson, Ann. N. H. (5) i. p. 344.

Sphingidæ.

The odour in a Brazilian *Sphinx* proceeds from a tuft of hair on each side of the base of the abdomen. Similar scent-producing tufts exist on the legs of several other moths. F. Müller, Kosmos, iii. pp. 84 & 85.

Notes on Sphinges captured by flowers; *id. l. c.* pp. 178 & 179.

H. Strecker has published a series of notes on Butler's Revision of the *Sphingidæ* (Lepidoptera, pp. 139–143), but they are too numerous and brief to be quoted in detail.

W. H. Edwards has published a list of the Sphinges of California and the adjacent districts (P. Cal. Ac. vi. pp. 86–94), enumerating 25 species, some new, with remarks on the habits, &c., of the known species, redescriptions of *Arctonotus lucidus*, Boisd. (p. 87), and *Proserpinus clarkiæ*,

Boisd. (p. 89), and notices varieties of *Smerinthus palliolatus*, H. Edw., and *modestus*, Harr. (pp. 91 & 92). *Sphinx oreodaphne*, H. Edw., may = *S. chersis*, Hübn. var. (p. 93).

B. Pickman Mann gives an index to the descriptions of larvæ of N. American *Sphingidæ*. Several new descriptions appear, by Andrews and Scudder. Psyche, ii. pp. 65–79.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures *Hemaris radians*, Walk., and *alternata*, Butl., p. 3, and *Triptogon piccipennis*, *Pergesa mongoliana*, and *Hylæcus caliginosus*, all of Butler, p. 4; pl. xxi. figs. 2–6.

H. Strecker figures and notices *Macroglossa crato*, Boisd., *Pterogon terlooi*, H. Edw., *Sphinx hageni*, Grote, and *Lapara bombycoides*, Walk.; Lepidoptera, pp. 125 & 127, pl. xiv. figs. 1, 2, 6, & 7.

Acllopus titan, Cram., redescribed, and pupa figured; H. Burmeister, Desc. Rep. Arg. v. p. 358, pl. xi. fig. 4.

Macroglossa fuciformis and *bombyliformis*, Linn., discussed; O. Staudinger, Hor. Ent. Ross. xiv. p. 301. *M. stellatarum* visiting artificial flowers; Valette & De Borre, Bull. E. Belg. xxi. pp. lxvii. & lxviii.: mistaking knots in wood for holes; C. G. O'Brien, Nature, xvii. p. 402.

Euproserpinus phaeton, Grote & Rob.; A. R. Grote, Canad. Ent. x. pp. 94–97.

Thyreus abboti, Swains. Transformations described, and larva and imago figured, by W. Saunders, *tom. cit.* pp. 130 & 131.

Pachygonia fusca, Fabr., redescribed and figured; H. Burmeister, Desc. Rep. Arg. v. p. 357, pl. x. fig. 7.

Dilephila livornica. Variety of larva; S. Ebrard, Feuil. Nat. viii. p. 13, pl.

Dilephila daucus, Cram., redescribed and figured; H. Burmeister, *l. c.* p. 338, pl. xvi. fig. 4. *D. euphorbiæ*, var. *paralias*, Nick., noticed; O. Staudinger, *l. c.* p. 297. *D. porcellus*, var. ? *suellus*, from Asia Minor and the Southern Caucasus, described; *id. l. c.* p. 298.

Darapsa versicolor, Harr. Transformations described; G. D. Hulst, Canad. Ent. x. pp. 64–66.

Philampelus achemon, Drury. Transformations described and figured; W. Saunders, *l. c.* pp. 101–103.

Chærocampa celerio. A larva supposed to belong to this species (new to Ireland) recorded by W. F. Kirby; Ent. M. M. xiv. p. 185.

Macrosila cluentius. Proboscis; F. Müller, P. E. Soc. 1878, pp. ii. & iii.; Nature, xvii. p. 221.

Sphinx: the male of a Brazilian species emitting a musk-like odour; F. Müller, P. E. Soc. 1878, p. ii. *S. ello*: larva destructive to manioc in Cayenne; C. Bar, Bull. Soc. Ent. Fr. (5) viii. p. clxxiii. *S. eurylochus*, Phil., = *paphus*, Cram., *S. diffissa*, Butl., and *petuniæ*, Boisd., = *cestri*, Blanch., *S. anteros*, Mén., = *justiciæ*, Walk.; H. Burmeister, *l. c.* pp. 320, 321, & 324. *S. ligustri*: a specimen bred without hind wings; B. Cooper, Ent. xi. p. 20. Moulting of larva; W. Condy, Ent. xi. p. 144. Note on its parasite, *Trogus lutorius*; G. C. Bignell, Ent. xi. p. 274. *S. sanipteri*, Streck., = *S. pinastri*; H. Strecker, Lepidoptera, p. 143.

Isognathus metascyron, Butl., and *Anceryx pedilanthi*, Boisd. (= *Sphinx*

fasciata, Swains.), are varieties of *S. scyron*, Cram.; H. Burmeister, *l. c.* p. 328.

Acherontia atropos. On its occurrence in Northern Europe as a summer visitor or otherwise; W. M. Schøyen, N. Mag. Naturv. xxiv. pp. 150–152. Breeding; J. Anderson, Ent. xi. pp. 188 & 189. A decapitated head uttering its cry several times in succession [?]; Tuniot & Buchillot, Bull. Sci. Dép. Nord, (2) i. pp. 64 & 65.

Smerinthus austanti, Staud., noticed by Bellier de la Chavignerie, who proposes to change the name to *S. poupillieri*; Pet. Nouv. ii. p. 193 (*cf.* Austant, *tom. cit.* pp. 199 & 200, and others, pp. 203 & 204). *S. meander*, Boisd. (?), redescribed; M. Saalmüller, Ber. Senck. Ges. 1877–1878, p. 90. *S. ocellatus*: a specimen bred without eyes on the wings; Dekerman-Roy & Ollivry, Pet. Nouv. ii. p. 253. E. de Selys-Longchamp suggests that it may be a hybrid between this species and *S. populi*; *l. c.* pp. 257 & 258.

New species:—

Hemaris rubens, Oregon and California, and *cynoglossum*, California and Vancouver's Island; H. Edwards, P. Cal. Ac. vi. p. 88.

Macroglossa saga, A. G. Butler, Ent. M. M. xiv. p. 206, & Ill. Lep. Het. ii. p. 3, pl. xxi. fig. 1, Japan; *M. ulalume*, H. Strecker, Lepidoptera, p. 135, pl. xv. fig. 3, Oregon; *M. senta*, id. Rep. Chief of Engineers, 1878, App. SS, p. 1858, pl. ii. fig. 1, New Mexico.

Proserpinus terlooi, H. Edwards, P. Cal. Ac vi. p. 90, Mazatlan.

Perigonia ixion (? = *nephus*, Boisd.), H. Burmeister, Desc. Rep. Arg. v. p. 515, pl. x. fig. 6, Buenos Aires.

Darapsa clara, H. Druce, Ent. M. M. xiv. p. 249, Paraguay.

Chærocampa belti, Nicaragua, p. 248, *salvini*, Guatemala, *titana*, *lælia*, and *libya*, Chiriqui, p. 249, *id.* l. c.; *C. xylobates*, H. Burmeister, *l. c.* p. 355, Areca.

Philampelus eos, id. *l. c.* p. 350, pl. x. fig. 1, Buenos Aires.

Dilophonota cercyon and *hippothoon*, pl. x. fig. 5, *id. l. c.* pp. 332 & 333, Argentine Republic.

Sphinx elsa, p. 126, pl. xiv. figs. 4 & 5, and *vashti*, p. 136, pl. xv. fig. 4, H. Strecker, Lepidoptera, both from Arizona.

Basiana stigmatica, P. Mabille, Bull. Soc. Z. Fr. ii. p. 491, Congo.

Smerinthus imperator, H. Strecker, *l. c.* p. 125, pl. xiv. fig. 3, Arizona.

Zonilia raffrayi, C. Oberthur, Études d'Ent. iii. p. 31, pl. iii. fig 2, Abyssinia [probably = *vau*, Walk.]; *Z. heydeni*, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 89, Madagascar.

Nephele bipartita, A. G. Butler, Ann. N. H. (5) ii. p. 455, Old Calabar.

ÆGERIIDÆ.

A. G. Butler discusses the structure of the *Ægeriidæ*, and considers them to be intermediate between the *Pyralidæ* and *Gelechiidæ*; Tr. E. Soc. 1878, pp. 121–125, pl. v. (*cf.* also P. E. Soc. 1878, p. xi.).

Sesia chalcidiformis, Hübn.: O. Staudinger describes var. *expleta* from S.E. Europe and Asia Minor; Hor. Ent. Ross. xiv. pp. 310–314. He also (*l. c.*) points out the differences between *chalcidiformis*, Hübn., and *schmidtiformis*, Freyer, and redescribes *S. polariformis*, Led. (p. 303).

New species:—

Melittia œdipus, C. Oberthur, Études d'Ent. iii. p. 30, pl. iii. fig. 1, Zanzibar.

Sphecia contaminata, A. G. Butler, Ill. Lep. Het. ii. p. 59, pl. xl. fig. 2, Japan.

Sciapteron regale, id. *l. c.* p. 60, pl. xl. fig. 3, Japan.

Ægeria hector and *tenuis*, id. *l. c.* figs. 4 & 8, Japan.

Tinthia editha and *constricta*, id. *l. c.* p. 61, pl. xl. figs. 9 & 10, Japan.

Sesia laticincta, Rio Janeiro, and *albicalcarata*, Buenos Aires, H. Burmeister, Desc. Rep. Arg. v. p. 361; *S. haberhaueri*, O. Staudinger, Hor. Ent. Ross. xiv. p. 308, Taurus.

AGARISTIDÆ.

Vithora agrionides, Butl., figured with wrong antennæ, is the same as *Phalæna stratonice*, Cram. It belongs to the *Zerenidæ*, and may be placed in the genus *Cistidia*, Hübn., to which *V. indrasana*, Moore, also belongs. P. C. T. Snellen, Tijdschr. Ent. xxi. pp. 115–118.

Butler replies to Snellen's remarks on his *Vithora agrionides*, which he considers undoubtedly to belong to the *Agaristidæ*, and to be perfectly distinct from *Cystidia stratonice*, Cram.; Ent. M. M. xv. pp. 36 & 37.

Mimeusemia persimilis and *Vithora agrionides* of A. G. Butler are redescribed and figured by him; Ill. Lep. Het. ii. p. 3, pl. xxii. figs. 2 & 3.

Agarista eriopis, Herr.-Schäff. (?), redescribed; M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 88.

Scudyra noctuina, sp. n., A. G. Butler, Ent. M. M. xiv. p. 206, & Ill. Lep. Het. ii. p. 3, pl. xxii. fig. 1, Japan.

Eusemia hypopyrrha, id. Cist. Ent. ii. p. 297, Madagascar; *E. incongruens*, id. P. Z. S. 1878, p. 381, Abyssinia; *E. metallica*, Congo, and *obryzos*, Madagascar, P. Mabille, Bull. Soc. Z. Fr. iii. pp. 88 & 89: spp. nn.

CHALCOSIIDÆ.

A. G. Butler redescribes and figures *Pidorus atratus*, Butl., and *Laurion remota*, Walk.; Ill. Lep. Het. ii. p. 9, pl. xxiii. figs. 9 & 10.

Himantopterus. A species from Zanzibar noticed; A. Rogenhofer, Verh. z.-b. Wien (SB.) xxviii. p. 42.

Pompelon ampliatum, sp. n., A. G. Butler, P. Z. S. 1878, p. 387, Macassar.

Chalcosia nympha, sp. n., F. Moore, *tom. cit.* p. 704, Hainan.

ZYGÆNIDÆ.

F. Buchanan White describes and figures the genital armature of various *Zygænidæ*; Ann. Soc. Ent. Fr. (5) viii. pp. 467–476, pls. xi. & xii.

Northia tenuis, *Procris esmeralda*, and *Zygæna niphona* of A. G. Butler are redescribed and figured by him; Ill. Lep. Het. ii. p. 4, pl. xxi. figs. 7–9.

Zygæna brizæ, Esp., var. *corycia*, from Asia Minor, described by O.

Standinger; Hor. Ent. Ross. xiv. p. 318. *Z. carnioiica*, Scop., var. *taurica*, from Asia Minor, described; *id. l. c.* p. 325. *Z. cedri*, var. *staudingeri*, from Algeria, described; Austaut, Pet. Nouv. ii. p. 243. *Z. filipendulæ*: a September brood noticed in 1877; H. C. Lang, Ent. xi. pp. 69 & 70. *Z. gurda*, Led., = *filipendulæ*, var. *ramburi*, Led.; O. Staudinger, *l. c.* pp. 320 & 321. *Z. hilaris*, Ochs.: P. Millière describes var. *ononidis*, from Cannes; Pet. Nouv. ii. pp. 249 & 250. His remarks respecting *Z. orana* are criticized by L. Austant; *tom. cit.* p. 258. *Z. seriziata*, C. Oberthur, noticed and figured by him; Études d'Ent. iii. p. 41, pl. v. fig. 7. *Z. trifolii*: pupation; "P. G.," Pet. Nouv. ii. pp. 243 & 244.

Syntomis and *Naclia*. Table of Mascarene species given by P. Mabille; Bull. Soc. Z. Fr. iii. pp. 84 & 85.

Syntomis. F. Moore (Anderson's Researches, pl. lxxxi.) redescribes and figures his *S. andersoni*, fig. 4, p. 926, *sladeni*, fig. 8, and *atkinsoni*, fig. 5, p. 927, *fitchii*, fig. 6, and *grotii*, fig. 7, p. 928.

New genera and species:—*

Eurata (Boisd. MS.), H. Burmeister, Desc. Rep. Arg. v. p. 377. Allied to *Hæmaterion*. To contain *Glaucopis sericaria*, Perty, *igniventris*, *patagiata*, and *hermione*, spp. nn., pp. 378–380, Cordova, &c., *selva*, Herr. Schäff., *strigiventris*, Guér. (= *helena*, Herr.-Schäff.), *histrio*, Guér., and *frigida*, sp. n., *l. c.* p. 516, Buenos Aires.

Copæna (Boisd., MS.), *id. l. c.* Types, *Zygæna maia*, *eriphia*, and *eryx*, Fabr.

Stylura, H. Burmeister, *l. c.* p. 390; type, *Urodus forficula*, Herr.-Schäff.

Upenora, id. *l. c.* p. 413. Allied to *Penora*; type, *U. fumida*, sp. n., *l. c.* p. 414, Buenos Aires.

Zygæna felix and *allardi*, C. Oberthur, Études d'Ent. iii. p. 42, pl. v. figs. 4 & 5, Algeria.

Ino capitalis, O. Staudinger, Hor. Ent. Ross. xiv. p. 317, Asia Minor.

Syntomis rufina, Abyssinia, and *ceres*, Zanzibar, C. Oberthur, *l. c.* pp. 30 & 31, pl. iii. figs. 4 & 5; *S. masoni*, *disrupta*, *albifrons*, and *berinda*, F. Moore, P. Z. S. 1878, p. 845, pl. liii. figs. 4, 5, 6, & 8, Tenasserim; *S. reducta*, p. 84, *anapera* and *cuniculina*, p. 85, P. Mabille, Bull. Soc. Z. Fr. iii., Madagascar.

Thyretes negus, C. Oberthur, *l. c.* p. 31, pl. iii. fig. 2, Abyssinia.

Pseudonaclia sylvicolens, A. G. Butler, Ann. N. H. (5) ii. p. 293, Madagascar.

Naclia pygmula, C. Oberthur, *l. c.* p. 33, pl. iii. fig. 6 [E. Africa ?]; *N. quadrimacula*, *tenera*, and *trimacula*, P. Mabille, *l. c.* p. 85, Madagascar.

Pseudosphex polybioides, H. Burmeister, Desc. Rep. Arg. v. p. 372, Buenos Aires.

Glaucopis myrrhine, id. *l. c.* p. 375, Buenos Aires.

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* The genera taken up by Burmeister from Boisduval's MS., and therefore included here, are not really new, but have been already taken up by other entomologists, though not fully characterized before.—W. F. K.

ARCTIIDÆ.

Spilarctia imparilis, p. 4, pl. xxii. fig. 4, *Rhyparioides nebulosa* and *Diacrisia subvaria*, p. 5, pl. xxiii. figs. 2 & 3, redescribed and figured by A. G. Butler; Ill. Lep. Het. ii.

Epanycles stellifera, Butl., = (*Aclytia*) *obscura*, Mösch.; *id.* Tr. E. Soc. 1878, p. 46.

Arctia docta, var. *arizoniensis*, from Arizona, described by R. H. Stretch; Wheeler's Report, v. p. 799, pl. xl. figs. 2 & 3.

Arctia antholea, Boisd., probably = *Euprepia pudica*, Esp.; W. V. Andrews, Canad. Ent. x. p. 59. *A. arge*: larva described; *id.* Psyche, ii. p. 79. *A. caia*, var. *wiskotti*, from Asia Minor, described; O. Staudinger, Hor. Ent. Ross. xiv. p. 333. *A. cervinoides*, H. Strecker, noticed and figured by him; Rep. Chief of Engineers, 1878, App. SS, p. 1860, pl. ii. fig. 4. *A. lubricipeda*: habits, &c., of larva; E. Birchall, Ent. xi. pp. 76–79. *A. purpurata*, var. *caucasica*, described; S. Alpheraki, Troudy Ent. Ross. x. pp. 14 & 15.

Chelonia villica, var. described and figured by H. Goss, Ent. xi. pp. 73 & 74.

Callimorpha dominula, var. *bithynica*, described; O. Staudinger, *l. c.* p. 332. *C. lecontii*, Boisd., and *interrupto-marginata*, Beauv.: hybrids described and figured, by H. Strecker, P. Davenp. Soc. ii. pp. 275 & 276, pl. iv. figs. 5–7. *C. interrupto-marginata*: note on larva; C. G. Siewers, Canad. Ent. p. 84.

Nemeophila plantaginis: its varieties discussed, and abb. *hospita*, W. V., and *geometrica*, Grote, figured; H. Strecker, *l. c.* pp. 272 & 273, pl. ix. figs. 2 & 3.

Spilosoma placidum, Friv., discussed, and larva described; O. Staudinger, *l. c.* pp. 339–341.

Purius vulpinus, Walk., = *Antarctia brunnea*, Hübn., var.; H. Burmeister, Desc. Rep. Arg. v. p. 450.

Ecpantheria obliterata and *simplex*, Walk., are sexes, and perhaps = *eridanus*, Cram.; A. G. Butler, Tr. E. Soc. 1878, p. 51.

Halesidota agassizi, Pack., var. *alni* (larva) described; H. Edwards, P. Cal. Ac. vii. pp. 128–130.

Euhalesidota: notes on a new species (unnamed) from Florida; A. R. Grote, Canad. Ent. x. p. 78.

Anisota, sp. and larva; C. G. Siewers, *l. c.* pp. 84 & 85.

Gnophæla hopfferi, var. *discreta*, from Arizona, described; R. H. Stretch, *l. c.* p. 802.

Ocnogyna parasita, Hübn., var. *intermedia*, from Asia Minor, described; O. Staudinger, *l. c.* p. 335.

Palustra. C. Berg discusses this genus, which he places between *Antarctia*, Hübn., and *Ocnogyna*, Led., and describes two new species; S. E. Z. xxxix. pp. 221–230.

New genera and species:—

Daphænura, A. G. Butler, Ann. N. H. (5) ii. p. 457. Allied to

Eucharia, Hübn. (type, *hebe*, L.); type, *D. fasciata*, sp. n., *l. c.*, Madagascar.

Attatha, F. Moore, P. Z. S. 1878, p. 847. Allied to *Euplagia*; type, *Hypercompa regalis*, Moore.

Teracotona, A. G. Butler, P. Z. S. 1878, p. 382. Allied to *Phragmatobia*; type, *Aloa rhodophæa*, Walk.; add *T. roseata*, sp n., *l. c.*, Natal.

Atyphopsis, id. Tr. E. Soc. 1878, p. 49. Type, *A. modesta*, sp. n., *l. c.*, Amazons.

Langueys, id. *l. c.* Allied to *Glanycus*; type, *G. nigro-rufus*, Walk.

Psychophasma, id. *l. c.* p. 51. Allied to *Phægoptera*; type, *Halesidota albidator*, Walk. (= *H. vitripennis*, Walk., = *H. erosa*, Herr.-Schäff.; *H. cinerea* and *degenera* may also belong to the present genus).

Ctenucha sanguinaria, H. Strecker, Rep. Chief of Engineers, 1878, App. SS, p. 1858, pl. ii. fig. 2, Rio Blanco.

Acridopsis pusilla and *lucis*, A. G. Butler, Tr. E. Soc. 1878, pp. 44 & 45, Amazons.

Pionia notata, id. *l. c.* p. 45, Rio Jutahi; *P. calopteridia*, id. P. Z. S. 1878, p. 381, Para, Venezuela.

Androcharta claripennis, id. Tr. E. Soc. 1878, p. 46, Jutahi.

Caryatis syntomina, id. Ann. N. H. (5) ii. p. 456, Old Calabar.

Charidea rubricincta and *obsoleta*, H. Burmeister, Desc. Rep. Arg. v. pp. 386 & 516, Buenos Aires.

Eucharia centenaria (Kinkelin, MS.), *id. l. c.* p. 476, Zarate.

Halesidota fuscipennis, p. 441, Buenos Aires, *picturata* (Berg, MS.), p. 442, Lake Conchas and Uruguay, *rectilinea*, Argentine Republic, p. 445, *cancellata* and *trifasciata*, Buenos Aires, pp. 445 & 446, *id.* l. c.; *H. anone*, A. G. Butler, Tr. E. Soc. 1878, p. 50, pl. iii. fig. 3, Amazons; *H. ambigua*, H Strecker, P. Davenp. Soc. ii. p. 274, pl. ix. fig. 7, Colorado.

Arctia orientalis, F. Moore, Ann. N. H. (5) i. p. 230, Somamurg; *A. oithona*, H. Strecker, Lepidoptera, p. 131, Texas; *A. genetura* and *quadrinotata*, id. P. Davenp. Soc. ii. pp. 270 & 271, pl. ix. figs. 5 & 6, Colorado; *A. f-pallida*, id. Rep. Chief of Engineers, 1878, App. SS, p. 1860, pl. ii. fig. 3, Rio Navajo; *A. albicancellata*, H. Burmeister, *l. c.* Buenos Aires; *A. yarrowi*, R. H. Stretch, Wheeler's Report, v. p. 800, pl. xl. figs. 2 & 3, Arizona.

Euchætes elegans, id. *l. c.* p. 797, pl. xl. figs. 5 & 6, California.

Leucaretia albida, id. *l. c.* p. 798, pl. xl. figs. 4 & 5, California, Costa Rica.

Chelonia rubriceps, P. Mabille, Bull. Soc. Z. Fr. iii. p. 88, Madagascar.

Trichosoma huguenini (P. Millière, MS.), C. Oberthur, Études d' Ent. iii. p. 42, Algeria.

Spilosoma leprieuri, id. *l. c.* p. 43. pl. v. fig. 2, Algeria; *S. aspersa*[-*sum*], P. Mabille, *l. c.* p. 89, Madagascar; *S. antigone*, H. Strecker, Rep. Chief of Engineers 1878, App. SS, p. 1860, Rio Blanco; Georgia.

Ocios laminifera, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 91, Madagascar.

Ocnogyna herrichi, O. Staudinger, Hor. Ent. Ross. xiv. p. 337, Asia Minor (= *læwii*, var. ♂, Herr.-Schaff., p. 32, fig. 165).

Ecpantheria reducta, A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 799, Colorado.

Alpenus purus, A. G. Butler, P. Z. S. 1878, p. 382, Abyssinia.

Phaos vigens, Tasmania, *nigriceps*, Victoria and Sydney, and *notatum*, Sydney, p. 383, *nexum*, Victoria, and *lacteatum*, Moreton Bay, p. 384; A. G. Butler, *l. c.*

Areas virginalis, A. G. Butler, Ann. N. H. (5) ii. p. 456, Madagascar.

Phægoptera subtilis, id. Tr. E. Soc. 1878, p. 51, Amazons.

Antarctia multifarior (Berg, MS.), H. Burmeister, *l. c.* p. 452.

Motada jansonis, A. G. Butler, Tr. E. Soc. 1878, p. 53, Rio Juruá.

Palustra burmeisteri, C. Berg, Ann. Soc. Arg. 1877, p. 18, S. E. Z. xxxix. pp. 224, 387 & 388, pl. i. fig. 1, Uruguay; *P argentina*, id. An. *l. c.*, p. 22, S. E. Z. *l. c.* p. 227, Buenos Aires.

LITHOSIIDÆ.

F. Moore has published a "Revision of certain Genera of European and Asiatic *Lithosiidæ*, with characters of new genera and species"; P. Z. S. 1878, pp. 3–37, pls. i.–iii. He arranges the principal Asiatic genera of *Lithosiinæ* as follows:—

A. Fore-wing with subcostal vein 5-branched, median vein 4-branched: *Eligma*, *Macrobrochis*, *Tripura*, *Paraona*, *Atolmis*, *Sidyma*, *Churinga*, *Vamuna*, *Mahavira*, *Korawa*, *Hesudra*, *Ghoria*, *Chrysæglia*, *Œonistes*, *Lithosia*.

B. Fore-wing with subcostal vein 5-branched, median vein 3-branched: *Simareea*, *Tarika*, *Brunia*, *Gandhara*, *Collita*, *Katha*, *Eilema*, *Manulea*, *Systropha*, *Chrysorrhabdia*, *Capissa*, *Dolgoma*, *Mithuna*, *Cossa*, *Ranghana*, *Tegulata*.

B. *a*. Hind-wing with a recumbent plumose lappet:—*Nishada*.

B. *b*. Fore-wing with a recumbent plumose lappet:—*Teulisna*, *Macotasa*, *Zadadra*, *Prabhasa*, *Gampola*.

C. Fore-wing with subcostal vein 4-branched, median vein 3-branched: *Pelosia*.

D. Fore-wing with a plumose, lappet-covered, sac-like cavity on the costal border; 5 subcostal and 3 median branches:—*Doliche*, *Bizone*, *Cyana*.

E. Aberrant group; fore-wing with 5 subcostal and 4 median branches: *Baroa*, *Agrisius*, *Lyclene*, *Barsine*, *Miltochrista*, *Setinochroa*, *Setina*, *Nudaria*, and *Œmene*.

Many of the known genera, as well as the new ones, are subsequently characterized and their types indicated; and the following corrections of synonymy occur with regard to the former:—*Surina*, Walk., = *Panglima*, Moore, = *Eligma*, Hübn.; *Samera*, Wallengr., = *Pelosia*, Hübn.; *Cyllene*, Walk., = *Lyclene*, Moore. The affinities of the new genera may be seen from the foregoing table.

Miltochrista pulchra and *aberrans*, p. 5, figs. 6 & 7, *rosaria* and *calamina*, figs. 8 & 10, *Melanaema venata*, fig. 5, pl. xxii. p. 6, *Lithosia adaucta*, fig. 6, p. 6, *pavescens*, fig. 5, pl. xxiii. and *lævis*, fig. 12, *Œonistis dives*,

fig. 11, and *Œmene fasciata*, fig. 9, pl. xxii. p. 7, *Eugoa grisea* and *Pterodecta gloriosa*, p. 8, pl. xxiii. figs. 1 & 4, all of A. G. Butler, figured and redescribed by him, Ill. Lep. Het. ii.

Josioides abscissa, Hübn., probably = *J. myrrha*, Cram., var. ♀; *id.* Tr. E. Soc. 1878, p. 54.

Bepara egaca, Walk., = *Phaochlæna subapicalis*, Walk., ♀; *id. l. c.* p. 59.

Retila enoides, Boisd., probably = *Josia* (*Phintia*) *lanceolata*, Walk., *id. l. c.*

Deiopeia pulchella. Life-history; W. H. Tugwell, Ent. xi. pp. 186–188. *D. speciosa*, Walk. [*venusta*, Dalm.], larva noticed; A. G. Butler, P. Z. S. 1878, p. 484.

Nola subchlamydula, var. ? from Asia Minor described by O. Staudinger, Hor. Ent. Ross. xiv. p. 328.

Paida mesogona and allies noticed; P. Mabille, Pet. Nouv. ii. p. 274.

Adelphoneura nerias, Feld., = *Glissa bifacies*, Walk., = *Josia* (*Phalcidon*) *prolifera*, Walk.; A. G. Butler, Tr. E. Soc. 1878, p. 61.

Callidula felderi, Brem., has the habits of a butterfly, and may be allied rather to the *Libythæidæ* than to the *Lithosiidæ*; H. Christoph, S. E. Z. xxxix. p. 211.

Hypsinæ. Stridulating apparatus existing in both sexes; F. Moore, P. Z. S. 1878, p. 3.

Digama, Moore, recharacterized, p. 4, *D. hearseyana*, Moore, and *insulana*, Feld., redescribed, pp. 4 & 5; F. Moore, P. Z. S. 1878.

Chrysorabdia viridata, Walk., figured; *id. l. c.* pl. ii. fig. 1.

A. G. Butler redescribes and figures *Psychogoes aterrima* and *Psychostrophia melanargia*; Ill. Lep. Het. ii. pp. 8 & 9, pl. xxiii. figs. 8 & 7.

Aletis. List of known species, and *helcita*, Dru. (*nec* Clerck), renamed *drurii*; id. P. Z. S. 1878, p. 386.

New genera and species:—

Manoleneura, A. G. Butler, Tr. E. Soc. 1878, p. 56. Affinities uncertain; type, *M. anomala*, sp. n., *l. c.* p. 57, Amazons.

Lygrotes, id. *l. c.* p. 57. Allied to last; type, *L. arctipennis*, sp. n., *l. c.* Lago Macaco.

Mitradæmon, id. *l. c.* p. 60. Allied to *Sagaris*; type, *M. velutinum*, sp. n., *l. c.* pl. iii. fig. 1, Amazons.

Barsinella, id. P. Z. S. 1878, p. 385. Allied to *Barsine*; type, *B. mirabilis*, sp. n., *l. c.* fig., Espiritu Santo.

Paraona, F. Moore, P. Z. S. 1878, p. 8. Type, *Crambomorpha splendens*, Butler (figured, pl. i. fig. 1).

Churinga, id. *l. c.* p. 9. Type, *C. rufifrons*, sp. n., *l. c.* p. 10, pl. i. fig. 12 (add *Lithosia beema*, Moore).

Vamuna, id. *l. c.* p. 10. Type, *Lithosia remelana*, Moore; add *V. maculata* and *bipars*, spp. nn., *l. c.* pl. i. figs. 5 & 11, Darjiling.

Mahavira, id. *l. c.* p. 11. Type, *M. flavicollis*, sp. n., *l. c.* pl. i. fig. 3, Darjiling.

Korawa, id. *l. c.* Type, *K. pallida*, sp. n., *l. c.* p. 12, Darjiling.

Hesudra, id. *l. c.* Type, *H. divisa*, sp. n., *l. c.* pl. i. fig. 4, Darjiling.

Ghoria, id. *l. c.* Types, *G. albo-cinerea*, p. 13, pl. i. fig. 10, and *sericeipennis*, p. 13, both from Darjiling, spp. nn.

Simarcca, id. *l. c.* p. 14. Type, *Lithosia basinota*, Moore (figured, pl. i. fig. 16).

Tarika, id. *l. c.* Types, *Lithosia varana*, Moore (figured, pl. i. fig. 8), and *T. nivea* (Walk., MS.), sp. n., *l. c.* p. 15, Darjiling.

Brunia, id. *l. c.* p. 15. To contain *Lith. antica*, Walk. (figured, pl. i. fig. 9), *L. natara*, Moore, and *L. sarawaca*, Butl.

Gandhara, id. *l. c.* Type, *Lith. serva*, Walk. (figured, pl. i. fig. 7).

Collita, id. *l. c.* p. 16. To contain *Lith. griseola* (type), *complanula*, and *straminecola*, from Europe, *L. vetusta*, Walk. (China), and *C. lilacina*, W. Yunnan, and *parva*, pl. i. fig. 13, Darjiling, spp. nn.

Katha, id. *l. c.* To contain the European *Lith. helveola*; *L. apicalis*, *intermixta*, and *brevipennis*, Walk.; *L. nigrifrons*, Moore (figured, pl. i. fig. 15); and *K. terminalis*, pl. i. fig. 14, Darjiling, and *cucullata*, Andamans, spp. nn., *l. c.*

Capissa, id. *l. c.* p. 19. To contain *Lithosia innotata*, Butl. (figured, pl. ii. fig. 2), *L. vagesa* and *sambara*, Moore, *L. insolita* and *nigripars*, Walk., and *C. auriflava*, Nepal, and *pallens*, pl. ii. fig. 3, Darjiling, p. 19, *flavens*, Cashmere, and *fasciata*, pl. ii. fig. 4, Ceylon, p. 20, spp. nn.

Dolgoma, id. *l. c.* p. 20. Type, *Lith. reticulata*, Moore; will also contain *L. angulifera*, Feld. (described, *l. c.*), and *D. brunnea*, sp. n., *l. c.* pl. ii. fig. 8, Darjiling.

Mithuna, id. *l. c.* p. 21. Type, *M. quadriplaga*, sp. n., *l. c.* pl. ii. fig. 9, Darjiling.

Ranghana, id. *l. c.* p. 22. Type, *R. punctata*, sp. n., *l. c.* pl. ii. fig. 12, Calcutta.

Nishada, id. *l. c.* p. 23. Type, *N. flabrifera*, sp. n., *l. c.*, Calcutta (*L. chilomorpha*, Snell., & *rotundipennis*, Walk., which are probably synonymous, belong to *Nishada*).

Macotasa, id. *l. c.* p. 24. Type, *M. biplagella* (Walk., MS.), sp. n., *l. c.* p. 25, pl. ii. fig. 14, Borneo.

Zaladra, id. *l. c.* p. 25. Type, *Lith. distorta*, Moore (figured, pl. ii. fig. 15).

Prabhasa, id. *l. c.* Types, *P. venosa*, fig. 16, Darjiling, *flavicosta*, fig. 17, Cherra Punji, and *costalis*, North China, spp. nn., *l. c.* p. 26, pl. ii.

Gampola, id. *l. c.* p. 26. Type, *G. fasciata*, sp. n., *l. c.* p. 27, pl. ii. fig. 18, Ceylon.

Baroa, id. *l. c.* p. 28. Type, *Cycnia punctivaga*, Walk.

Hypsa canaraica and *sericea*, F. Moore, P. Z. S. 1878, p. 3, India; *H. concinnula* and *chionea*, P. Mabille, Bull. Soc. Z. Fr. iii. pp. 85 & 86, Congo.

Pitasila moolaica, Moore, *l. c.* p. 847, pl. liii. fig. 10, Tenasserim.

Digama similis, Simla, and *figurata*, Burmah, *id. l. c.* p. 5.

Calpenia khasiana, id. *ibid.*, Khasia Hills.

Neochera heliconioides, id. *l. c.* p. 6, Luzon.

Macrobrochis leucospilota, Cherra Punji, Assam, and *nigrescens*, N.E. Bengal, *id. l. c.* p. 8; *M. strigilata*, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 91, Madagascar.

Sidyma apicalis, F. Moore, *l. c.* p. 9, pl. i. fig. 2, Darjiling.

Chrysæglia ferrifasciata, id. *l. c.* p. 13, pl. i. fig. 6, Nepal and Darjiling.

Manulea calamaria, id. *l. c.* p. 18, N.W. Himalayas.

Systropha dorsalis, Darjiling, and *auriflua*, pl. ii. fig. 7, Manpuri, N.W. India, *id. l. c.* p. 18.

Cossa quadrisignata, fig. 10, Darjiling, *pallida*, N.W. Himalaya, p. 21, and *brunnea*, fig. 11, Darjiling, p. 22, *id. l. c.* pl. ii.

Tegulata basistriga, Ceylon, and *protuberans*, Darjiling, *id. l. c.* pp. 22 & 23, pl. ii. figs. 5 & 6.

Teulisna tenuisigna, id. *l. c.* p. 24, pl. ii. fig. 3, Sikkim.

Bizone bellissima, fig. 13, Masuri, p. 27, *coccinea*, fig. 14, Sikkim, and *alba*, N. China, p. 28, *id. l. c.* pl. iii.

Barsine flammealis, fig. 15, India, p. 28, *gloriosa*, fig. 16, Khasia Hills, *punicea* and *inflexa*, fig. 17, p. 29, and *flavivenosa*, fig. 18, p. 30, Darjiling, *id. l. c.* pl. iii.

Lycleue rubricosa, fig. 1, Bombay, *artocarpi* and *radians*, fig. 2, p. 30, and *delicata*, Darjiling, *prominens*, fig. 3, Cherra, Khasia Hills, *zebrina*, fig. 4, Calcutta, and *palmata*, fig. 5, N.E. Bengal, p. 31, *interserta*, fig. 6, *obsoleta*, fig. 7, and *discistriga*, Darjiling, and *inconspicua*, N. India, p. 33, *terminata*, Khasia Hills, *assamica*, fig. 8, Assam, *spilosom*[*at*]*oides*, N.W. India, and *indistincta*, fig. 9, Darjiling, p. 33, *id. l. c.* pl. iii.

Œmene maculifascia, fig. 10, p. 33, Darjiling, *sinuata*, fig. 11, Cherra Punji, pl. iii., *subcinerea*, N.W. India, *modesta*, Formosa, and *tenebrosa*, Bombay, p. 34, *id. l. c.*

Setina punctilinea, Ceylon, p. 34, *discisigna*, Cherra, and *nebulosa*, Darjiling, p. 35, *id. l. c.*

Setinochroa aurantiaca, pl. iii. fig. 12, Khasia Hills, *pallida*, Manpuri, N.W. India, p. 35, and *postica*, N.W. Himalayas, p. 36, *id. l. c.*

Nudaria fasciata, id. *l. c.* p. 36, Darjiling.

Emydia ampla, A. R. Grote, Canad. Ent. x. p. 232, Colorado.

Deiopeia heterochroa, P. Mabille, Bull. Soc. Z. Fr. iii. p. 88, Madagascar.

Cisthene sanguinea, Rio Jutahi, and *C. rhodosticta*, Rio Purus, A. G. Butler, Tr. E. Soc. 1878, p. 53; *C. niveata*, id. P. Z. S. 1878, p. 384, Espiritu Santo.

Hypoprepia cadaverosa, H. Strecker, P. Davenp. Soc. ii. p. 270, pl. ix. fig. 4, Colorado.

Mapha lacteata, Rio Javary, and *aurea*, Rio Mauhes, A. G. Butler, Tr. E. Soc. 1878, p. 54; *M. ditis*, id. P. Z. S. 1878, p. 385, Espiritu Santo.

Eudoliche achatina and *sordida*, id. Tr. E. Soc. 1878, p. 55, Rio Jutahi.

Eustixis minima, id. *l. c.*, Rio Jutahi.

Rœselia antennata, p. 57, Rio Solimoës, and *snelleni*, p. 58, Rio Jutahi, *id. l. c.*

Nola gigantula, O. Staudinger, Hor. Ent. Ross. xiv. p. 328, Amasia.

Agylla mira, A. G. Butler, *l. c.* p. 58, pl. iii. fig. 2, Amazons.

Ephialtias basalis, id. *l. c.* p. 59, Pará.

Scotura venata, Rio Juruá, and *auriceps*, Para and Ega, *id. l. c.* p. 60.

Hypocrita flaviceps, H. Burmeister, Desc. Rep. Arg. v. p. 425, Buenos Aires.

Josia tenuivitta, A. G. Butler, *l. c.* p. 61, Para and Serpa.

Crocota fragilis, H. Strecker, Rep. Chief of Engineers, 1878, App. SS, p. 1859, Pagosa Springs.

Phœochlæna solilucis, A. G. Butler, *l. c.* p. 62, Rio Solimoës.

Cincia pallida, id. P. Z. S. 1878, p. 484, Jamaica.

Ochria niveo-picta, id. *l. c.* p. 485, Jamaica.

Eudule aurora, Corrientes, and *hesperina*, Buenos Aires, H. Burmeister, *l. c.* pp. 427 & 428; *E. limbata*, id. *l. c.* p. 518, pl. xxiv. fig. 4, Grand Chaco.

Chærotriche mirifica, A. G. Butler, Ann. N. H. (5) ii. p. 458, Old Calabar.

Lithosia sanguinolenta, Madagascar, *imitans*, *simulans*, and *L.* (*Pædia*) *costimacula*, Congo, P. Mabille, Bull. Soc. Z. Fr. iii. p. 87.

Sozuza argentea, A. G. Butler, *l. c.* p. 457, Madagascar.

Caloschemia monilifera, P. Mabille, *l. c.* p. 86, Madagascar.

Aletis tenuis, Zanzibar, and *variabilis*, Ambriz and Angola, A. G. Butler, P. Z. S. 1878, pp. 385 & 386.

Nyctemeridæ.

New genera and species :—

Helicomitra, A. G. Butler, Ann. N. H. (5) ii. p. 458. Allied to *Pterothysanus*; type, *H. pulchra*, l. c., Madagascar.

Hylemera, id. *l. c.* p. 293. Allied to *Secusio*; type, *H. tenuis*, l. c. p. 294, Madagascar.

Deilemera signata, id. P. Z. S. 1878, p. 386, Darnley Island.

Nyctemera biformis, P. Mabille, Bull. Soc. Z. Fr. iii. p. 87, Madagascar.

Liparidæ.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures his *Leucoma auripes*, p. 9, pl. xxiv. fig. 1, *Aroa jonasi* and *Artaxa intensa*, pl. xxiii. figs. 11 & 12, *Lymantria fumida*, fig. 4, p. 10, and *aurora*, fig. 5, and *Dasychira lunulata*, fig. 8, p. 11, pl. xxiv.

Eloria intacta, Walk., = *E. spectra*, Hübn.; A. G. Butler, Tr. E. Soc. 1878, p. 63.

Porthesia chrysorrhœa, Linn.: ravages of larva at Arnhem in 1876; Brants, Tijdschr. Ent. xxi. p. xxiii.

Laria rossi, Curt., recorded from Mount Washington; A. R. Grote, Psyche, i. p. 131.

Leucoma salicis, var. *sohesti*, from Belgium, described; Capronnier, Bull. Ent. Belg. xxi. pp. cxcix. & cc.

Ocneria dispar and *Porthesia chrysorrhœa*, noticed; Brants, Tijdschr. Ent. xxi. pp. xxii. & xxiii. *O. dispar*, hermaphrodite, right ♀, left ♂; A. Weithofer, Verh. Ver. Brünn, xv. p. 39. *O. lapidicola*, Herr.-Schäff.: larva described by O. Staudinger, Hor. Ent. Ross. xiv. pp. 352–354.

Dasychira grœnlandica, Homeyer, noticed; R. McLachlan, J. L. S. xiv. p. 112.

Anaphe panda, Boisd. (?) : large cluster of cocoons; D. G. Rutherford, P. E. Soc. 1878, p. xxiii.

New genera and species :—

Pachylælia, A. G. Butler, Tr. E. Soc. 1878, p. 63. Allied to *Lælia*; type, *P. translucida*, sp. n., *l. c.*, Prainha.

Sulychra, id. *l. c.* p. 64. Allied to *Archylus*; type, *S. argentea*, sp. n., *l. c.*, Amazons.

Euproctis kargalica and *lactea*, F. Moore, Ann. N. H (5) i. p. 231, Yarkand.

Archylus nigrisparsus, A. G. Butler, *l. c.* p. 64, pl. iii. fig. 8, Amazons.

Carama pura, id. *ibid.*, Rio Juruá.

Caviria sulphurea, H. Burmeister, Desc. Rep. Arg. v. p. 517, pl. xxiv. fig. 3, Las Conchas.

Cypra marginepunctata, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 92, Madagascar.

Liparis melanocera, p. 89, *vitrina*, *heptasticta*, and *barica*, p. 90, P. Mabille, Bull. Soc. Z. Fr. iii., Madagascar.

Orgyia (*Dasychira*) *velutina*, id. *ibid.*, Madagascar.

Dasychira mascarena and *ampliata*, A. G. Butler, Ann. N. H. (5) ii. pp. 294 & 460, Madagascar.

Ptilophora kashghara, F. Moore, *op. cit.* i. p. 231, Kashgar.

Gogane atra, A. G. Butler, *op. cit.* ii. p. 459, Madagascar.

Anaphe venata, id. *ibid.*, Old Calabar.

Dreata taooensis, F. Moore, P. Z. S. 1878, p. 848, pl. liii. fig. 7, Tenasserim.

Psychidæ.

Observations on *Psychidæ*; Rouast & Reynaud, Feuil. Nat. viii. pp. 146–148, 155 & 156.

Notes on *Psychidæ*, with descriptions of new species; H. Edwards, P. Cal. Ac. vii. pp. 140–143.

Phryganidea californica: habits and transformations; H. Edwards & J. Behrens, Rep. U. S. Geol. Surv. ix. pp. 808 & 809, pl. xx. fig. 22 (♂).

New genera and species :—

Liothula, R. W. Fereday, Tr. N. Z. Inst. x. p. 260. Allied to *Metura*; type, *L. omnivora*, sp. n., *l. c.* pl. ix. figs. A 1–4 (imago, case, and dipterous parasite), New Zealand.

Orophora, id. *l. c.* p. 261. Type, *O. toumatou*, sp. n., *l. c.* p. 262, pl. ix. figs. B 5 & 6 (imago, case, and food-plant), New Zealand.

Psyche fragmentalis and *coniferella* (cases only), H. Edwards, P. Cal. Ac. vii. p. 142, California.

Œceticus davidsoni, id. *ibid.* (case only; fig.), California.

Fumea pronubella, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 130, pl. vii. figs. 1–6, Java.

Notodontidæ.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures his *Phalera*

signata, p. 11, pl. xxiv. fig. 9, *Bireta pallida*, pl. xxv. figs. 10 & 11, *Dicranura felina* and *Peridea gigantea*, figs. 3 & 6, p. 12, *Hypodonta corticalis* and *Gelastocera exusta*, figs. 7 & 2, pl. xxiv., and *Gonoclostera latipennis*, pl. xxvii. fig. 2, p. 13.

Dicranura vinula. Parasites on larva; S. C. Curtis, Ent. xi. pp. 251 & 252.

Streblota, Hübn. (intermediate between *Stauropus* and *Notodonta*) re-characterized, and *S. nesea*, Cram., and *vidua*, Sepp, noticed; C. Berg, An. Soc. Arg. v. pp. 177–180. The larva of *S. nesea* is figured by H. Burmeister, Desc. Rep. Arg. v. pl. xxiii.

Notodonta bicolora; J. Chappell, Ent. M. M. xiv. pp. 234 & 235.

Cnethocampa processionea noticed; Brants, Tijdschr. Ent. xxi. pp. lxxxvii.–lxxxix. *C. solitaria*, Freyer: habits of larva; O. Staudinger, Hor. Ent. Ross. xiv. p. 363.

Tifama simois, Walk., and probably also *megalops*, Sepp, = *chera*, Dru.; *simois*, Cram., is a species of *Bombycocera* (*Limacodidæ*): A. G. Butler, Tr. E. Soc. 1878, p. 68.

Platyodonta calpe, Feld., = *Pantana rubrana*, Walk.; A. G. Butler, Tr. E. Soc. 1878, p. 72.

Rosema, Walk., belongs to the *Notodontidæ*; *R. demorsa*, Feld., = *epigena*, Sepp: *id. l. c.* p. 68.

New genera and species:—

Tecmessa, H. Burmeister, Desc. Rep. Arg. v. p. 504. Allied to *Cerura*; type, *Thosea annulipes*, C. Berg, An. Soc. Arg. v. p. 186 (*Tecmessa annulipes*, sp. n., Burmeister, *l. c.* p. 505, Argentine Republic).

Calledema, A. G. Butler, Tr. E. Soc. 1878, p. 65. Allied to *Edema*; type, *C. marmorea*, sp. n., *l. c.*; add *C. sodalis*, sp. n., *l. c.* p. 66, pl. iii. fig. 7, Amazons.

Leptosphetta, id. *l. c.* p. 67. Allied to *Sphetta* and *Calledema*; type, *L. rabdina*, sp. n., *l. c.*, Rio Jutahi.

Olcecloslera, id. *l. c.* p. 70. Allied to *Ichthyura*; type, *O. irrorata*, sp. n., *l. c.*, Rio Jutahi.

Orthoclostera, id. *l. c.* Allied to the last and to *Ichthyura*; type, *O. peculiaris*, sp. n., *l. c.*, Rio Negro. (Appears also to be allied to *Ingura*, which is wrongly classed with the *Noctuæ*; l. c. p. 71.)

Datanoides, id. Ent. M. M. xiv. p. 206. Allied to *Anzabe*, but with the aspect of *Datana*; type, *D. fasciata*, sp. n., *l. c.* p. 207, Japan.

Closterothrix, P. Mabille, Bull. Soc. Z. Fr. iii. p. 91. Allied to *Crateronyx*; type, *C. gambeyi*, sp. n., Madagascar.

Edema pulchra, A. G. Butler, Tr. E. Soc. 1878, p. 64, pl. iii. fig. 6, Amazons.

Hyboma talæ, C. Berg, An. Soc. Arg. v. p. 184 (*Edema talæ*, H. Burmeister, Desc. Rep. Arg. v. p. 506, Buenos Aires).

Etobesa xylophasioides, A. G. Butler, *l. c.* p. 68, Rio Juruá.

Rosema fulvipennis, id. P. Z. S. 1878, p. 387, St. Paulo.

Tifama exusta, id. Tr. E. Soc. 1878, p. 68, pl. iii. fig. 10, Rio Jutahi.

Closteromorpha modesta, id. *l. c.* p. 69, Parentins.

Lepasta conspicua, id. *l. c.* p. 71, Rio Negro.

Crinodes ritsemæ, id. Ann. N. H. (5) ii. p. 178, Rio Madeira.
Symmerista amazonica, id. *l. c.* p. 179, Santarem.
Streblota bonaerensis, C. Berg, An. Soc. Arg. v. p. 180; H. Burmeister, Desc. Rep. Arg. v. p. 501, Argentine Republic.
Harpyia annulifera, C. Berg, *l. c.* p. 183, Buenos Aires.
Datana robusta, H. Strecker, Lepidoptera, p. 131, Texas.
Heterocampa salicis, H. Edwards, P. Cal. Ac. vii. p. 121, California.

Limacodidæ.

Monema flavescens, Walk., redescribed and figured; Butler, Ill. Lep. Het ii. p. 14, pl. xxv. fig. 5.
Nyssia, Walk. (*nec* Guén.), renamed *Neomiresa*; id. Tr. E. Soc. 1878, p. 74. *Nyssia fumosa*, Walk., = *Bomb. vidua*, Sepp, = *B. nesea*, Cram.; *id. l. c.* p. 75. [Cf. *Streblota*, suprà, *Notodontidæ*.]

New genera and species.—

Anchirithra, A. G. Butler, Cist. Ent. ii. p. 297. Affinities not stated; type, *A. insignis*, sp. n., *l. c.* p. 298, Madagascar.
Statherinia, id. Tr. E. Soc. 1878, p. 73. Allied to *Scopelodes*; type, *Oxytenis semilutea*, Walk.

Miresa amazonica, id. *ibid.*, Rio Javary.
Neomiresa rufa, id. *l. c.* p. 74, Saõ Paulo.
Natada sericea, id. *l. c.* p. 75, Amazons.
Talima latescens, id. *ibid.*, Rio Jutahi.
Morasa lorimeri, id. P. Z. S. 1878, p. 387, Natal.
Parasa singularis, id. Cist. Ent. ii. p. 298, Madagascar.
Neara ebenaui, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 92, Madagascar.

Drepanulidæ.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures his *Oreta calida* and *turpis*, figs. 6 & 8, p. 14, *calceolaria* and *pulchripes*, figs. 4 & 7, *Drepana scabiosa*, fig. 9, and *Hypsomadius insignis*, fig. 3, p. 15, pl. xxv.
Spidia, g. n., A. G. Butler, Ann. N. H. (5) ii. p. 460. Allied to *Drepana*: type, *S. fenestrata*, sp. n., *l. c.*, Old Calabar.

Saturniidæ.

Lelièvre, E. Note sur quelques *Bombyx* sericigènes exotiques nouvellement importés en France. Feuil. Nat. viii. pp. 83 & 84, ix. pp. 11 & 12.

The mode of extrication of various *Attaci* from the cocoon is discussed by Packard & McLaren, Am. Nat. xii. pp. 379–383, 454–456. These moths possess a strong black spine at the base of each fore-wing, which Packard calls cocoon-cutters, and figures at p. 381. These are employed for piercing and penetrating the cocoon, by pushing aside, or perhaps by cutting the threads.

The *Saturniidæ* appear to employ both mechanical and chemical means in extricating themselves from their cocoons; C. E. Worthington, Canad. Ent. x. pp. 158 & 159. See also A. S. Packard and others, *op. cit.* pp. 98, 99, & 220.

Notes on the larvæ of American *Attaci*; R. Thaxter, Psyche, i. pp. 194 & 195.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures *Caligula japonica*, Moore, pl. xxvi. fig. 2, and his own *C. japonica*, pl. xxv. fig. 2, p. 16, *Rhodia fugax* and *Brahmæa japonica*, pl. xxvi. figs. 1 & 3, and *Tropæa gnoma*, pl. xxv. fig. 1, p. 17.

Samia gloveri, aberr., and *Bunæa eblis*, Streck., noticed and figured by H. Strecker, Lepidoptera, p. 128, pl. xiv. figs. 8 & 9.

On rearing *Attacus yamamai*, *pernyi*, and *polyphemus*; A. Wailly, Ent. xi. pp. 264 & 265.

Samia columbia, Smith. Larva described and figured, F. B. Caulfield & C. H. Fernald, Canad. Ent. x. pp. 41–48; the moth emits the same peculiar smell as *S. cecropia*, A. R. Grote, *op. cit.* p. 60. *S. gloveri*, Streck., larva described, and compared with those of allied species; H. Strecker, P. Davenp. Soc. ii. pp. 276–278.

Callosamia promethea: breeding habits, C. R. Webster, Psyche, ii. pp. 185–188; the males are apparently attracted by a volatile exhalation which is perceived by the antennæ.

Saturnia isabellæ, Graells: M. Bastelberger suggests that this may be an African species accidentally introduced into Spain; S. E. Z. xxxix. pp. 193 & 194. *S. pernyi*, on rearing, Zimmermann, Verh. Ver. Hamb. iii. pp. 23 & 24, and Präger, S. E. Z. xxxix. pp. 245 & 246. *S. pyri* and *spini*, on rearing hybrids, A. Steffek, Term. füzetek, ii. pp. 115–117, 179 & 180, Ent. Nachr. iv. pp. 130 & 131, W. Umgelter, *tom. cit.* p. 175, and Verh. Ver. Brünn, xv. p. 37; the former crossed also with *polyphemus*, id. *op. cit.* xvi. p. 31.

Antheræa yama-mai. General remarks on this and other silk-worms, with figures of the larva and imago of *Samia cecropia*; L. Provancher, Nat. Canad. x. pp. 87–94.

Io gayi, Boisd., = *griseo-flava*, Phil., *I. lucasi*, Boisd., = *erythrops*, Blanch., *I. amœna*, Boisd., = *illustris*, Walk., *I. brasiliensis*, Boisd. & Walk., are identical, *I. scapularis*, Boisd., = ? *irene*, Cram., var., *I. coræsus*, Boisd., = ? *liberia*, Cram., var.; C. Berg, Bull. Ent. Belg. xxi. p. xiv.

Hyperchiria varia, Walk. [*io*, Fabr.]. An aberration and an hermaphrodite described and figured by H. Strecker, Lepidoptera, pp. 138 & 139, pl. xv. figs. 15 & 16.

Gloveria arizonensis, Packard, ♀ described and figured; *id. l. c.* p. 136, pl. xv. fig. 6.

Coloradia pandora, Blake, ♂ described and figured; *id. l. c.* p. 137, pl. xv. fig. 7.

Pseudohazis hera, Harr. H. Strecker discusses and figures the different varieties of this species, including *eglanterina*, Boisd., and *nuttalli* and *arizonensis*, Streck.; *l. c.* pp. 137 & 138, pl. xv. figs. 8–14.

Melanothrix pulchricolor, Feld., = *Gnophos ? nymphaliaria*, Walk., A. G. Butler, Ann. N. H. (5) i. p. 463.

Ceratocampa brissoti, Boisd., = *regalis*, Fabr., var., *C. cacicus*, *ducalis*, and *opaca*, Boisd., = *imperialis*, Fabr., varr.; H. Burmeister, Desc. Rep. Arg. v. pp. 486–491.

Brahmæa lunulata, Brem., varr. *ledereri*, Rog., and *christophi* (var. n., p. 360) discussed, and larvæ described; O. Staudinger, Hor. Ent. Ross. xiv. pp. 359–361. The genus is referred to the *Endromidæ*.

New genera and species :—

Ceranchia, A. G. Butler, Ann. N. H. (5) ii. p. 461. Allied to *Saturnia*; type, *C. apollina*, sp. n., *l. c.*, Madagascar.

Gonimbrasia, id. *l. c.* p. 462. Allied to *Imbrasia*; type, *G. obscura*, sp. n., *l. c.*, Old Calabar.

Stibolepis, id. *l. c.* p. 463. Allied to *Melanothrix*, and *Sarmalia*; type, *S. nivea*, sp. n., *l. c.*, Old Calabar.

Attacus perspicuus, id. *l. c.* p. 463, Old Calabar; *A. pryeri*, id. P. Z. S. 1878, p. 388, Yokohama; *A. rhombifer*, H. Burmeister, Desc. Rep. Arg. v. pl. xxiv. fig. 1, S. America.

Antheræa billitonensis, F. Moore, P. Z. S. 1878, p. 642, Billiton Island.

Copaxa discrepans, A. G. Butler, Ann. N. H. (5) ii. p. 461, Old Calabar; *C. gemmifera*, id. P. Z. S. 1878, p. 387, Ambriz and Lake Nyassa (?).

Hyperchiria lilith, H. Strecker, Lepidoptera, xv. p. 139, pl. xv. fig. 17, Georgia.

Io superba, H. Burmeister, *l. c.* p. 483, pl. xxiv. fig. 2, Tucuman and Bolivia.

Automeris serpina, A. G. Butler, Tr. E. Soc. 1878, p. 76, Serpa.

Saturnia said, C. Oberthur, Études d'Ent. p. 34, pl. iii. fig. 7, Bagamoyo.

Dirphia consularis (larva figured, pl. xix. fig. 5) and *tribunalis*, H. Burmeister, *l. c.* p. 476; *D. javarina*, A. G. Butler, *l. c.* p. 80, Rio Javary.

Ceratocampa (*Dryocampa*) *bilineata*, H. Burmeister, *l. c.* p. 495, pl. xxiv. fig. 8, Uruguay.

Bombycidæ.

A. G. Butler (Ill. Lep. Het. ii.) redescribes and figures *Cifuna locuples*, Walk., and his own *Trabala cristata*, p. 18, pl. xxvii. figs. 6 & 1, *Odonestis excellens*, pl. xxvi. figs. 4 & 5, *spectabilis* and *superans*, pl. xxvii. figs. 3 & 4, p. 19, and *Œona segregata*, p. 20, pl. xxvi. figs. 6 & 7.

Gastropacha californica, Pack. Habits of larva; H. Edwards, Rep. U. S. Geol. Surv. ix. pp. 807 & 808.

Bombyx canensis, Mill., noticed by C. Oberthur, Bull. Soc. Ent. Fr. (5) viii. pp. lxxxi.–lxxxiii.; *B. quercus*, notes on its parthenogenesis, and on the difficulty of rearing the larvæ, R. Laddiman, Ent. xi. pp. 270 & 271.

Chondrostega pastrana, Led. Supposed larva described; O. Staudinger, Hor. Ent. Ross. xiv. pp. 355 & 356.

Clisiocampa sylvatica and *americana*. The larvæ mature in autumn, and hybernate in the eggshell, but are very liable to the attacks of a species of *Trombidium* in addition to other parasites; W. Saunders, Canad. Ent. x. pp. 21–23.

Artace punctivena, Walk., = *albicans*, Walk.; A. G. Butler, Tr. E. Soc. 1878, p. 84.

Bombyx mori. On the anatomy and physiology of the silk-glands of the silkworm; T. W. van Lidth de Jeude, Zool. Anz. i. pp. 100–102. On the hatching of its eggs; M. Girard, Pet. Nouv. ii. pp. 230 & 231.

New genera and species :—

Aristhala, F. Moore, P. Z. S. 1878, p. 704. Allied to *Ocinara*, *Ernolatia*, *Trilocha*, and *Bombyx*; type, *A. hainana*, sp. n., *l. c.* p. 705, Hainan.

Prismoptera, A. G. Butler, Tr. E. Soc. 1878, p. 78. Allied to *Ernolatia*; type, *P. opalina*, sp. n., *l. c.* pl. iii. fig. 9, Prainha.

Anthocroca, id. *l. c.* p. 78. Allied to *Bombyx* and *Norasuma*; type, *Bomb. domina*, Cram.; add *A. muscosa*, fig. 4, *cuneifera*, fig. 4, and *hiemalis*, id. *l. c.* p. 79, pl. iii. Amazons, spp. nn.

Perophora traili and *bactriana*, A. G. Butler, Tr. E. Soc. 1878, p. 77, Amazons.

Hydrias fasciolata, *morosa* and *distincta*, p. 81, *melancholica*, and *crebina*, p. 82, and *terranea*, p. 83; *id. l. c.*, Amazons.

Ocha turpis and *exigua*, p. 83, and *pallida*, p. 84, *id. l. c.*, Amazons.

Artace rivulosa, id. *l. c.*, Rio Negro.

Trabala stumpfi, M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 93, Madagascar.

Lebeda badia and *cervicolora*, id. *l. c.* p. 94, Madagascar.

Bombyx luteus, C. Oberthur, Études d'Ent. iii. p. 44, Algeria.

Clisiocampa proxima, *innocens*, and *pauperata*, H. Burmeister, Desc. Rep. Arg. v. pp. 460–462, Argentine Republic.

Apha tychoona, A. G. Butler, Ent. M. M. xiv. p. 207; Ill. Lep. Het. ii. p. 18, pl. xxvii. fig. 5, Japan.

Zeuzeridæ.

Stygia. O. Staudinger describes the neuration, and variation in different species; Hor. Ent. Ross. xiv. pp. 342–347.

Endagria algeriensis, Ramb., noticed and figured by C. Oberthur, Études d'Ent. iii. p. 45, pl. v. fig. 1.

Cossus ligniperda; Codet, Pet. Nouv. ii. p. 194. Pupa formed under stones; Xambeu, *op. cit.* p. 211. Cannibalism of larva; "C. C.," Sci. Goss. xiv. p. 233.

New species :—

Phragmataecia territa, O. Staudinger, Hor. Ent. Ross. xiv. p. 341, Asia Minor.

Endagria emilia, id. *l. c.* p. 347, Asia Minor.

Zeuzera cretacea, A. G. Butler, Ann. N. H. (5) ii. p. 463, Madagascar.

Endoxyla melanoleuca and *strigilata*, H. Burmeister, Desc. Rep. Arg. v. pp. 407 & 408, Buenos Aires.

HEPIALIDÆ.

Hepialus excrescens and *æmulus*, A. G. Butler, redescribed and figured by him; Ill. Lep. Het. ii. p. 20, pl. xxvii. figs. 7 & 8. *H. lætus*, O. Staudinger, noticed and figured by N. M. Romanoff, Hor. Ent. Ross. xiv. p. 489, pl. iii. fig. 1.

Hepialus auratus, A. R. Grote, Canad. Ent. x. p. 18, New York; *H. sangaris*, H. Strecker, Lepidoptera, p. 136, pl. xi. fig. 5, Arizona: spp. nn.

NOCTUIDÆ.

GROTE, A. R. Descriptions of new *Noctuæ*, with Remarks on the variation of Larval Forms in the Group. Ann. Lyc. N. Y. xi. pp. 300–306 (Dec., 1876).

The introductory part of the paper relates more to representative European and N. American forms than to larvæ.

——. Descriptions of *Noctuidæ*, chiefly from California. Bull. U. S. Geol. Surv. iv. pp. 169–187.

Includes numerous remarks on known species, of which only the more important require special notice here.

R. Thaxter describes the larvæ of *Apatela radcliffii*, Harv., *A. spinigera*, Grote, *Calocampa nupera*, Lintn., *C. curcimacula*, Morr., and *Calpe canadensis*, Beth.; Psyche, ii. pp. 121–123.

On the Insect Fauna of the White Mountains (chiefly respecting *Noctuæ*, and controversial); Morrison & Grote, Psyche, i. pp. 85, 99 & 100.

List of *Noctuidæ* taken near Newton, Mass.; R. Thaxter, Psyche, ii. pp. 34–39, 80.

Bryophila raptricula, Hübn. O. Staudinger describes var. *striata* from Asia Minor; Hor. Ent. Ross. xiv. p. 366.

Acronycta myricæ, Guén., = *A. euphorbiæ*, var. *montivaga*, Guén.; Staudinger & White, Scot. Nat. iv. p. 199, & Ent. xi. p. 41, but *cf.* N. F. Dobree, Ent. xi. p. 69.

Panthea leucomelana, Morr., probably = *Audela acronyctoides*, Walk.; A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 169.

Orthosia pistacina, ab. *rubetra*, ♂ in cop. with *Miselia oxyacanthæ*, ♀; Stockmayer, Ent. Nachr. iv. p. 20.

Leucania turca with pollinia of *Habernaria bifolia* attached to the trunk; J. J. Weir, P. E. Soc. 1878, p. xxxix.

Tapinostola bondi. Habits of larva; W. H. Tugwell, Ent. xi. p. 252.

Porrima sanguinea, Geyer. Structural characters noticed; A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 798.

Hydræcia micacea noticed; Mabille & Ragonot, Bull. Soc. Ent. Fr. (5) viii. p. cxx.

Gortyna flavago. Larva supposed to be injurious to potatoes, by boring into the stems; R. McLachlan, P. E. Soc. 1878, p. xli.

Xylophasia indocilis, Walk., = *Apamea gemina*, pale var.; *X. libera*,

Walk., = *finitima*, Walk., a species allied to *A. connexa*: A. G. Butler, Ann. N. H. (5) i. p. 84.

Xylomiges conspicillaris. Transformations described; W. Buckler, Ent. M. M. xv. pp. 17–19.

Nephelodes violans. Transformations described; G. H. French, Canad. Ent. x. p. 61.

Eulonche oblinita, Grote. Larva described; L. W. Goodell, Canad. Ent. x. p. 66.

Mamestra albicolon: var. from the Caucasus described; S. Alpheraki, Troudy Ent. Ross. x. pp. 16 & 17. *M. furva*: transformations described; W. Buckler, Ent. M. M. xiv. pp. 182–184. *M. olivacea*, Morr.: dark var. from Colorado noticed; A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 797.

Miana furuncula. Larva described; G. T. Porritt, Ent. M. M. xv. p. 91.

Agrotis raddei, Christoph, = *fimbriola*, Esp. var.; *A. birivia*, var. ? *taurica*, from the Taurus, described: O. Staudinger, Hor. Ent. Ross. xiv. pp. 370 & 371. *A. cupido*, and var. *brunnicipennis*; *cupidissima*, and var. *lætula*, p. 234; *placida* and *alternata*, p. 235, noticed by A. R. Grote Canad. Ent. x. *A. ripæ*: larva described; *A. desyllii*, Picrr., is only a local variety of this species; M. Girard, Ann. Soc. Ent. Fr. (5) viii. p. 243. *A. rufipectus*, Morr., ♀ described; A. R. Grote, Ann. Lyc. N. Y. xi. p. 304.

Triphæna: fossil pupa supposed to belong to this genus; J. Zool. vi. p. 68. *T. pronuba* intoxicated with sugar every night for over three weeks; H. T. Dobson, Jun., Ent. xi. pp. 117 & 118.

Cerastis vaccinii. A specimen noticed at sugar for over fifty nights during the winter; J. T. Carrington, *tom. cit.* p. 118.

Noctua ditrapezium and *rhomboidea*. Larvæ described; G. T. Porritt & B. Lockyer, *tom. cit.* pp. 141 & 142, 209–211.

Glæa. List of N. American species; A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 181.

Lithophane viridipallens, Grote; ♂ described by him, *l. c.* p. 180.

Orrhodia ligula, Esp., = *vaccinii*, var., M. Standfuss, JB. schles. Ges. lv. pp. 189 & 190.

Anchocelis pistacina: a variety noticed; F. Stewart, Ent. xi. pp. 20 & 21.

Xanthia: habits of larvæ; Berce & Corcelle, &c., Pet. Nouv. ii. pp. 215 & 217.

Auchmis intermedia, Brem., redescribed by A. G. Butler, Ann. N. H. (5) i. p. 196.

Eudryas gloveri, Grote: larva described; H. Strecker, Lepidoptera, p. 132, Texas.

Hadena congermana, Morr., belongs to *Mamestra*; A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 187. *H. monoglypha*, Hübn.: var. *uniformata*, from Elberfeld, noticed; G. Weymer, JB. Ver. Elberf. v. p. 78.

Polia pygmæa, Staud., is from Smyrna, not Naxos; O. Staudinger, Hor. Ent. Ross. xiv. p. 381.

Rhododipsa volupia, Fitch: generic characters noticed; A. R. Grote, Bull. U. S. Geol. Surv. iii. pp. 797 & 798.

Arzama obliquata, Grote: larva described; C. E. Worthington, Canad. Ent. x. p. 15.

Mochlocera (Zell.) *zelleri*, Grote: genus and species recharacterized by A. R. Grote, P. Bost. Soc. xix. p. 264.

Doryodes acutaria, H. S. & Guén., = *Agriphila bistrialis*, Hübn., *id.* Bull. U. S. Geol. Surv. iv. p. 179.

Agrophila deleta, Staud., redescribed by C. Oberthur, Études d'Ent. iii. p. 45.

Zotheca tranquilla, var. *viridula*, from California, described by A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 180.

Melicleptria venusta, H. Edw., = *prorupta*, Grote; *id. l. c.* p. 182.

Annaphila: list of species; *id. l. c.* p. 183.

Heliaca callicore, O. Staudinger, fully described by him; Hor. Ent. Ross. xiv. p. 398.

Ædophron phlebophora, Led.: larva described; *id. l. c.* p. 401.

Charielea victorina, Sodoffsky: larva described; *id. l. c.* p. 402.

Acontia ursula, Friv.: larva described; *id. l. c.* p. 404.

Thalpochares arcuinna, Hübn., and varieties discussed, and *T. kuelekana*, Staud., described in full; *id. l. c.* pp. 404–409. *T. pallidula*, Herr.-Schäff., discussed; *id. l. c.* pp. 411–413.

Megalodes eximia, Freyer: larva described; *id. l. c.* p. 407.

Erastria includens, Walk., = *Elousa albicans*, Walk.; A. G. Butler, P. Z. S. 1878, p. 486.

Dichaggris melanura, Herr.-Schäff, var. *grisescens*, from N. Persia, described; O. Staudinger, *l. c.* p. 427.

Oraesia rectistria, Guén., belongs to *Calpe*; A. G. Butler, Ann. N. H. (5) i. p. 203.

Plusia gamma captured by a flower of *Physianthus*; C. R. Digby, Ent. M. M. xv. p. 138. Habits of larva; Chaboz, Bull. Soc. Ent. Fr. (5) viii. pp. cli.–cliii. *P. interrogationis*: larva noticed; Naacke, JB. schles. Ges. liii. p. 156. *P. parilis*, Hübn., noticed, from Hayes Sound; R. McLachlan, J. L. S. xiv. p. 114.

Amphipyra pyramidoides: hibernation; R. Thaxter & C. V. Riley, Psyche, i. pp. 106 & 107, & 152.

Spintherops limbata, Staud., described in full; O. Staudinger, *l. c.* pp. 424–426.

Panopoda. There are but two American species, namely *rufimargo*, Hübn. (= *rubricosta* and *roseicosta*, Guén., and *cressoni*, Grote) and *carneicosta*, Guén.; A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 184.

Anomis fulcida, Guén., is a *Gonitis*; A. G. Butler, Ann. N. H. (5) i. p. 203.

Ophideres. Proboscis minutely described and figured; R. B. Read, P. Linn. Soc. N. S. W. iii. pp. 150–154, pl. xiv.

Ophideres and *Catocala*. Note on proboscis; P. C. T. Snellen, Tijdschr. Ent. xxi. pp. xiv. & xv.

Parthenos, Hübn. (*Noctuidæ*, nec *Nymphalidæ*), renamed *Euparthenos*; A. R. Grote, Ann. Lyc. N. York, xi. p. 301.

Catocala. List of species captured in Racine County; P. R. Hoy, Tr. Wiscons. Soc. iii. pp. 96 & 97. H. Edwards discusses and redescribes the

Californian species, and also several new, enumerating 14 in all; P. Cal. Ac. vi. pp. 184 & 185, 207–215. A. G. Butler (Ill. Lep. Het. ii. pl. xxxiii. figs. 4–10) redescribes and figures his *C. nivea*, p. 38, *ella*, *jonasi*, *mirifica*, and *xarippe*, p. 39, and *esther* and *volcanica*, p. 40. *C. faustina*, var. *zillah*, *perdita*, H. Edwards, and *stretchi*, Behr., noticed from Arizona; H. Strecker, Lepidoptera, pp. 129 & 130.

Pheocyma, *Bolina*, *Ypsia*, *Pseudanthracia*, and *Zele*. A. R. Grote remarks on these genera; Bull. U. S. Geol. Surv. iv. p. 185.

Homoptera posterior and *terrosa* (? Guén.), Walk., are one species; A. G. Butler, P. Z. S. 1878, p. 487.

Syneda limbolaris and *Grammodes grandirena*, Walk., are one species; *id. ibid.*

Syneda alleni, A. R. Grote, ♂, described by him; Bull. U. S. Geol. Surv. iv. p. 183.

Bolina ? *confirmans*, Walk., belongs to *Biula*; A. G. Butler, P. Z. S. 1878, p. 487.

Cyligramma argillosa, Guén., redescribed; M. Saalmüller, Ber. Senck. Ges. 1877–78, p. 95.

Sypna picta and *fumosa*, A. G. Butler, redescribed and figured by him; Ill. Lep. Het. ii. pp. 40 & 41, pl. xxxiii. figs. 2 & 3.

Peosina mexicana, Walk., = *numeria*, Dru.; *P. numeria*, Walk., is renamed *Hypogramma confusa*: id. P. Z. S. 1878, p. 487.

Erebus odora, Linn., *odorata*, Clerck, and *agarista*, Cram., are differentiated by A. G. Butler, P. Z. S. 1878, p. 488. *E. odora*, scent fans; R. Meldola, P. E. Soc. 1878, p. lii.

Phurys garnoti, Guén., belongs to *Trigonodes*; A. G. Butler, *l. c.* p. 488.

Remigia disseverans and *persubtilis*, Walk., are one species; *id. l. c.* p. 489.

Thermesia monstratura, Walk., belongs to *Azazia*; id. *l. c.*

Rhescipha, Walk., recharacterized by A. G. Butler, Tr. E. Soc. 1878, p. 72. Type, *Bombyx servia*, Cram.

New genera and species :—

Victrix, O. Staudinger, Hor. Ent. Ross. xiv. p. 490. Allied to *Bryophila*; type, *V. karsiana*, sp. n., *l. c.* pl. iii. fig. 2, Armenia.

Micardia, A. G. Butler, Ann. N. H. (5) i. p. 81. Allied to *Leucania*; to contain *M. argentata* (type) and *pulchra*, spp. nn., *l. c.* and Ill. D. Lep. ii. p. 23, pl. xxviii. figs. 3 & 4, both from Japan; and *Leucania pulcherrima*, Moore.

Radinacra, id. Ann. N. H. (5) i. p. 161. Allied to *Caradrina*; type, *R. palpalis*, sp. n., *l. c.*; Ill. Lep. Het. ii. p. 25, pl. xxix. fig. 7, Japan.

Triphænopsis, id. Ann. N. H. (5) i. p. 163. Allied to *Triphæna*; type, *T. lucilla*, sp. n., *ibid.*, & Ill. Lep. Het. ii. p. 25, pl. xxxiii. fig. 1, Japan; also *Triphæna nectens*, from India.

Brachyxanthia, id. *l. c.* p. 169. Allied to *Xanthia* and *Xestia*; type, *B. peculiaris*, sp. n., *l. c.*; Ill. Lep. Het. ii. p. 31, pl. xxx. fig. 11, Japan.

Aplectoides, id. Ann. N. H. (5) i. p. 193. Allied to *Aplecta*; to contain *A. condita*, Guén. (type), and *A. nitida*, sp. n., *l. c.* p. 194, Japan.

Plataplecta, id. *l. c.* p. 195. Allied to last; to contain *Polia soluta*,

Walk. (type), and *Pl. subviridis*, sp. n., *ibid.*, and Ill. Lep. Het. ii. p. 32, pl. xxxi. fig. 3, Japan.

Scedopla, id. *l. c.* p. 201. Allied to *Placodes*; type, *S. regalis*, sp. n., *ibid.*, Japan.

Perinania, id. *l. c.* p. 289. Allied to *Nania*; type, *P. lignosa*, sp. n., *ibid.*, and Ill. Lep. Het. ii. p. 37, pl. xxxii. fig. 7, Japan.

Chrysorethrum, id. Ann. N. H. (5) i. p. 292. Allied to *Catocala*; type, *C. amata*, Brem.; add *C. sericeum*, sp. n., *ibid.*, and Ill. Lep. Het. ii. p. 42, pl. xxxiv. fig. 4, Japan.

Calliscotus, id. P. Z. S. 1878, p. 489. Allied to *Euclidia*; type, *C. bowreyi*, sp. n., *ibid.*, Jamaica.

Sphida, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 179. Differs from *Arzama* by its horned clypeus; type, *A. obliquata*, Grote & Rob.

Copablepharon, L. F. Harvey, Canad. Ent. x. p. 56. Allied to *Arsilonche*; type, *Ablepharon absidum*, Harv.

Gonophora derasoides, A. G. Butler, Ann. N. H. (5) i. p. 77, Japan.

Cymatophora ampliata and *octogesima*, id. *l. c.* p. 78, & Ill. Lep. Het. ii. p. 21, pl. xxviii. figs. 1 & 2, Japan.

Oxicesta marmorea, F. Moore, Ann. N. H. (5) i. p. 231, Yarkand.

Apatela pallidicoma, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 169, Massachusetts and New York; *A. theodori*, id. Canad. Ent. x. p. 237, Colorado.

Acronycta kargalica, F. Moore, Ann. N. H. (5) i. p. 232, Yarkand; *A. leucocuspis* and *incerta*, A. G. Butler, *tom. cit.* p. 78, Japan; *A. postica*, O. Staudinger, Hor. Ent. Ross. xiv. p. 364, Asia Minor.

Mythimna placida, *rufipennis*, *grandis*, and *divergens*, A. G. Butler, *l. c.* p. 79, & Ill. Lep. Het. ii. pp. 21 & 22, pl. xxviii. figs. 5–8, Japan.

Leucania salebrosa, *singularis*, and *ærata*, id. Ann. N. H. (5) i. p. 80, Japan. For the two first species, see also Ill. Lep. Het. ii. p. 22, pl. xxviii. figs. 10 & 11.

Alysia grisea, id. Ann. N. H. (5) i. p. 82, Japan.

Dandaca senex, id. *ibid.*, Japan.

Ochria fortis, id. *ibid.*, & Ill. Lep. Het. ii. p. 23, pl. xxviii. fig. 9, Japan.

Gortyna acuminata, A. G. Butler, Ann. N. H. (5) i. p. 83, & Ill. Lep. Het. ii. p. 24, pl. xxix. fig. 1, Japan.

Hydræcia tibetana, F. Moore, *l. c.* p. 232, Leh and Ladak.

Prodenia ignobilis and *pauper*, A. G. Butler, P. Z. S. 1878, p. 485, Jamaica.

Decelea bowreyi, id. *l. c.* p. 486, Jamaica.

Xylophasia sodalis, id. Ann. N. H. (5) i. p. 83, & Ill. Lep. Het. ii. p. 24, pl. xxix. fig. 2, Japan.

Xylomyges tabulata, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 181, Centre, N. Y.

Mamestra discalis, id. *l. c.* iii. p. 797, Colorado; *M. novercа*, id. Canad. Ent. x. p. 236, Nebraska, Colorado; *M. canescens*, F. Moore, *l. c.* p. 233, Yarkand; *M.* (?) *feildeni*, R. McLachlan, J. L. S. xiv. p. 112, Dobbin Bay.

Apamea conciliata, A. G. Butler, Ann. N. H. (5) i. p. 84, & Ill. Lep. Het. ii. p. 24, pl. xxix. fig. 3, Japan.

Miana vulnerata and *segregata*, Butler, Ann. N. H. (5) i. pp. 84 & 85, & Ill. Lep. Het. ii. p. 25, pl. xxix. figs. 4 & 5, Japan.

Caradrina subaquila and *clara*, E. F. Harvey, Canad. Ent. x. p. 57, Texas.

Amyna stellata, A. G. Butler, Ann. N. H. (5) i. p. 162, & Ill. Lep. Het. ii. p. 26, pl. xxix. fig. 6, Japan.

Agrotis illoba, *ingrata*, *odiosa*, and *ustulata*, id. Ann. N. H. (5) i. p. 162, Japan (*A. ingrata* and *ustulata* are redescribed and figured, Ill. D. Lep. ii. p. 27, pl. xxix. figs. 9 & 10); *A. hodna*, C. Oberthur, Études d'Ent. iii. p. 45, pl. v. fig. 8, Algeria; *A. tibetana*, F. Moore, *l. c.* p. 233, Leh, Ladak; *A. hilliana*, L. F. Harvey, Canad. Ent. x. p. 55, New York State; *A. piscipellis*, A. R. Grote, *tom. cit.* p. 234, Colorado and Nevada; *A. perconflua* and *placida*, id. Ann. Lyc. N. York, xi. pp. 304 & 305, New York; *A. jamnalis*, Albany, p. 169 (? = *dilucida*, Morr., pt.), *opacifrons*, Centre, N. Y., and *apposita*, Vancouver's Island, p. 170, *juncta*, Nova Scotia, *micronyx*, California, *mercenaria*, Texas, and *idahoensis*, Idaho, p. 171, *rosaria* and *evanidalis*, California, *eriensis*, Erie County, N. Y., and *lacunosa* (Morr., MS.), California, p. 172, *atrifera* and *bicollaris* (with short descriptions of allied known species), California, p. 173, *pluralis*, Nevada, p. 174, *albalis*, Nevada, and *fishi*, Maine, p. 175, *id.* Bull. U. S. Geol. Surv. iv.

Acopa perpallida, id. Canad. Ent. x. p. 68, Southern Kansas.

Hermonassa cecilia, A. G. Butler, Ann. N. H. (5) i. p. 164, Japan.

Spalotis nitens, id. *l. c.* p. 164, & Ill. Lep. Het. ii. p. 27, pl. xxix. fig. 8, Japan; *S. undulans*, F. Moore, *l. c.* p. 233, Yarkand.

Graphiphora exusta, p. 164, *canescens*, *caliginea*, and *G.* (?) *pacifica*, p. 165, A. G. Butler, Ann. N. H. (5) i., Japan (*G. exusta*, *canescens*, and *pacifica* are redescribed and figured, Ill. Lep. Het. ii. pl. xxix. fig. 11, pl. xxx. figs. 1 & 2); *G. rubrica*, L. F. Harvey, Canad. Ent. x. p. 58, California; *G. contrahens*, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 180, Nova Scotia.

Ochropleura stupenda, A. G. Butler, Ann. N. H. (5) i. p. 166, & Ill. Lep. Het. ii. p. 29, pl. xxx. fig. 3, Japan.

Semiophora pallescens, A. G. Butler, Ann. N. H. (5) i. p. 166, & Ill. Lep. Het. ii. p. 29, pl. xxx. fig. 4, Japan.

Taeniocampa tabida, p. 166, *carnipennis* and *ella*, p. 167, A. G. Butler, Ann. N. H. (5) i., & Ill. Lep. Het. ii. pp. 29 & 30, pl. xxx. figs. 5–7, Japan; *T. chiklika*, F. Moore, *l. c.* p. 234, Yarkand.

Orthosia rupicapra, O. Staudinger, Hor. Ent. Ross. xiv. p. 390, Asia Minor; *O. lizetta*, A. G. Butler, Ann. N. H. (5) i. p. 167, & Ill. Lep. Het. ii. p. 29, pl. xxx. fig. 8, Japan.

Glaea deleta, A. R. Grote, Psyche, ii. p. 80, Newton, Massachusetts.

Eupsilia tripunctata, A. G. Butler, Ann. N. H. (5) i. p. 168, & Ill. Lep. Het. ii. p. 30, pl. xxx. fig. 9, Japan.

Dasycampa fornax (possibly = *Hoporina* (?) *castaneo-fasciata*, Motsch.), *id.* Ann. N. H. (5) i. p. 168, Japan.

Hoporina sericea, id. *l. c.*, & Ill. Lep. Het. ii. p. 31, pl. xxx. fig. 10, Japan.

Mesogona contracta, id. Ann. N. H. (5) i. p. 169, & Ill. Lep. Het. ii. p. 31, pl. xxxi. fig. 1, Japan.

Cosmia distincta, id. Ann. N. H. (5) i. p. 192, & Ill. Lep. Het. ii. p. 32, pl. xxxi. fig. 2, Japan.

Oncocnemis homogena, A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 800, Colorado.

Hadena vigilans and *ducta*, Maine, and *cristata* (Harvey, MS.), p. 176, *tusa*, California, and *occidens*, Nevada, p. 177, *id. l. c.* iv.; *H. hilli*, id. Ann. Lyc. N. York, xi. p. 305, New York; *H. senescens*, Lewis Co., N. Y., *algens*, Maine, and *genitrix*, Nebraska, Colorado, and Nevada, A. R. Grote, Canad. Ent. x. pp. 235–237; *H. morna*, H. Strecker, Rep. Chief of Engineers, 1878, App. SS, p. 1861, Rio Blanco; *H. stoliczkana*, F. Moore, Ann. N. H. (5) i. p. 234, Yarkand; *H. gnoma*, A. G. Butler, *tom. cit.* p. 195, & Ill. Lep. Het. ii. p. 32, pl. xxxi. fig. 7; *H. lucia*, id. Ann. N. H. (5) i. p. 195, both from Japan; *H. mendax*, O. Staudinger, Hor. Ent. Ross. xiv. p. 383, Asia Minor.

Raphia fasciata, A. G. Butler, Ann. N. H. (5) i. p. 193, & Ill. Lep. Het. ii. p. 33, pl. xxxi. fig. 5, Japan.

Polia medialis, A. R. Grote, Ann. Lyc. N. York, xi. p. 306, New York; *P. diffusilis*, L. F. Harvey, Canad. Ent. x. p. 56, New York State.

Tricholita fistula, id. *ibid.*, California.

Dryobota opina, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 178, California.

Arzama diffusa, id. *l. c.* p. 179, Maine.

Ufeus unicolor, id. *ibid.*, Illinois.

Lithophane lepida (Lintner, MS.), *id. l. c.* p. 181, Maine; *L. saga*, A. G. Butler, Ann. N. H. (5) i. p. 198, Japan.

Phlogophora beatrix, A. G. Butler, Ann. N. H. (5) i. p. 193, Japan.

Dianthœcia pumila, O. Staudinger, Hor. Ent. Ross. xiv. p. 378, Asia Minor; *D. graminicolens*, A. G. Butler, *op. cit.* ii. p. 295, Madagascar.

Eurois virens, id. *op. cit.* i. p. 194, Japan.

Calocampa fumosa and *formosa*, id. *l. c.* p. 196, & Ill. Lep. Het. ii. p. 33, pl. xxxi. figs. 8 & 9, Japan.

Xylina pruinosa and *arctipennis*, id. Ann. N. H. (5) i. pp. 197 & 198, Japan. (*X. pruinosa* also Ill. Lep. Het. ii. p. 34, pl. xxxi. fig. 6.)

Cucullia fraterna, id. Ann. N. H. (5) i. p. 198, Japan; *C. antipoda*, H. Strecker, Lepidoptera, p. 129, Arizona.

Ædophron gracilis, id. *ibid.*, Arizona.

Calesia flabellifera, F. Moore, P. Z. S. 1878, p. 849, Tenasserim.

Heliothis lanul and *gloriosa*, H. Strecker, Lepidoptera, p. 132, Texas; *H. sulmala*, id. Rep. Chief of Engineers, 1878, App. SS, p. 1862, pl. ii. fig. 6, Pagosa Springs; *H. michalis*, A. R. Grote, Canad. Ent. x. p. 68, Kansas; *H. adaucta*, A. G. Butler, Ann. N. H. (5) i. p. 199, Japan; *H. hybleoides*, F. Moore, *tom. cit.* p. 234, Yarkand; *H. crotchi*, H. Edwards, P. Cal. Ac. vi. p. 135, San Diego.

Melicleptria venusta, Oregon, p. 133, *vaccinia* (Behr, MS.), and *fasciata*, California, p. 134, and *oregonica* (Behr, MS.), p. 135, Oregon, *id. l. c.*

Axenus ochraceus, San Diego, and *amplus*, Oregon, *id. l. c.* p. 136.

Tarache semiopaca, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 182, Montana.

Anaphila diciuula, id. *l. c.* p. 183, California; *A. arcalis* (Behr, MS.),

p. 136, *lithosina* (Behr, MS.) and *amicula*, p. 137, *germana* and *domina*, p. 138, and *superba*, p. 139; H. Edwards, *l. c.*, all from California.

Anarta kellogi, California, and *crocea*, Oregon; *id. l. c.* p. 133.

Heliophila amygdalina, L. F. Harvey, Canad. Ent. x. p. 57, Maine.

Acontia microcycla, P. Mabille, Bull. Soc. Z. Fr. iii. p. 94, Madagascar.

Erastria stygia, A. G. Butler, Ann. N. H. (5) i. p. 199, Japan; *E.* (?) *diaphana*, O. Staudinger, Hor. Ent. Ross. xiv. p. 415, Asia Minor.

Thalpochares squalida and *uniformis*, id. *l. c.* pp. 413 & 414, Persia. (The former = *griseola*, Ersch.; p. 414, note.)

Exyra rolandiana, A. R. Grote, (transformations described by R. Thaxter), Psyche, ii. p. 38, Newton, Massachusetts.

Anthophila paradisea, A. G. Butler, *l. c.* p. 199, and Ill. Lep. Het. ii. p. 34, pl. xxxi. fig. 4, Japan.

Callopistria obscura and *æthiops*, A. G. Butler, Ann. N. H. (5) i. p. 200, Japan.

Lygranthœcia acutilinea, A. R. Grote, Canad. Ent. x. p. 232, Colorado.

Schinia gulnare, H. Strecker, Pr. Davenp. Soc. ii. p. 274, pl. ix. fig. 1, Illinois.

Plusia typinota and *jessica*, p. 201, *purissima* and *mikadina*, p. 202; A. G. Butler, *l. c.*, Japan; (*P. typinota* and *purissima*, cf. also Ill. Lep. Het. ii. pp. 34 & 35, pl. xxxi. figs. 10 & 11); *P. sackeni*, A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 800, Colorado.

Calpe excavata and *sodalis*, A. G. Butler, Ann. N. H. (5) i. pp. 202 & 203, & Ill. Lep. Het. ii. p. 35, pl. xxxii. figs. 1 & 2, Japan.

Deva splendida, id. Ann. N. H. (5) i. p. 203, Japan.

Gonitis commoda, id. *l. c.* p. 203, & Ill. Lep. Het. ii. p. 36, pl. xxxii. fig. 3, Japan.

Amphipyra crebina and *tripartita*, id. Ann. N. H. (5) i. pp. 287 & 288, Japan. (*A. tripartita*, cf. also Ill. Lep. Het. ii. p. 36, pl. xxxii. fig. 4.)

Orthogonia crispina, id. Ann. N. H. (5) i. p. 288, & Ill. Lep. Het. ii. p. 36, pl. xxxii. fig. 6, Japan.

Mormo mucivirens, id. Ann. N. H. (5) i. p. 289, & Ill. Lep. Het. ii. p. 37, pl. xxxii. fig. 5, Japan.

Nonia muscosa, id. Ann. N. H. (5) i. p. 290, Japan.

Toxocampa lilacina and *enormis*, id. *l. c.* p. 290, & Ill. Lep. Het. ii. pp. 37 & 38, pl. xxxii. figs. 8 & 9, Japan.

Nyctipao latitia, id. Ann. N. H. (5) i. p. 291, Japan.

Spiramia interlineata, id. *l. c.* p. 291, & Ill. Lep. Het. ii. p. 41, pl. xxxiv. fig. 2, Japan.

Hypopyra martha, id. Ann. N. H. (5) i. p. 291, & Ill. Lep. Het. ii. p. 41, pl. xxxiv. fig. 3, Japan; *H. malgassica*, P. Mabille, Bull. Soc. Z. Fr. iii. p. 93, Madagascar.

Ophiusa dulcis, id. Ann. N. H. (5) i. p. 293, & Ill. Lep. Het. ii. p. 42, pl. xxxiv. fig. 5, Japan; *O. allardi*, C. Oberthur, Études d' Ent. iii. p. 35, pl. ii. fig. 6, Zanzibar; *O. dædalea*, P. Mabille, *l. c.* p. 93, Madagascar.

Audea ochreipennis, A. G. Butler, Ann. N. H. (5) ii. p. 295, Madagascar.

Catocala augusta, San Diego, p. 184, *cleopatra*, California, p. 209, *mariana*, Vancouver's Island, p. 210, *perdita* and *hippolyte*, California, *luciana*, Colorado, p. 211, and *cassandra*, Mexico, p. 213, H. Edwards, l. c.; *C. ulalume*, H. Strecker, Lepidoptera, p. 132, Texas; *C. beaniana*, Illinois, and *westcotti*, Illinois and Wisconsin, A. R. Grote, Canad. Ent. x. p. 195.

Achæa indistincta, A. G. Butler, P. Z. S. 1878, p. 488, Jamaica; *A. sypnoides*, id. Ann. N. H. (5) ii. p. 464, Old Calabar.

Euclidia consors, id. *op. cit.* i. p. 293, & Ill. Lep. Het. ii. p. 42, pl. xxxiv. fig. 6, Japan.

Remigia annetta, id. Ann. N. H. (5) i. p. 293, & Ill. Lep. Het. ii. p. 43, pl. xxxiv. fig. 7, Japan.

Azazia unduligera, id. Ann. N. H. (5) i. p. 293, & Ill. Lep. Het. ii. p. 43, pl. xxxiv. fig. 8, Japan.

Selenis lauta, id. Ann. N. H. (5) i. p. 294, & Ill. Lep. Het. ii. p. 44, pl. xxxiv. fig. 1, Japan.

Capnodes sericea and *cremata*, id. Ann. N. H. (5) i. pp. 294 & 295, & Ill. Lep. Het. ii. p. 44, pl. xxxiv. figs. 9 & 10, Japan; *C.* (?) *calida*, id. P. Z. S. 1878, p. 490, Jamaica.

Bolina evelina, id. *l. c.* p. 487, Jamaica.

Melipotis stygialis, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 184, Illinois.

Poaphila placata, Georgia, and *irrorata*, Florida, A. R. Grote, Bull. U. S. Geol. Surv. iv. pp. 184 & 185; *P. cinerea*, A. G. Butler, *l. c.* p. 488, Jamaica.

Rhescipha elegans, id. *l. c.* p. 489, Jamaica. (Allied to *R. servia*; the genus comes near *Tetratocera*.)

Deltoididæ.

Zanclognatha lævigata, A. R. Grote. Variation noticed by him; Bull. U. S. Geol. Surv. iv. p. 186.

Dercetis, g. n., *id. l. c.* p. 186. Allied to *Hypena*, but with a superficial resemblance to *Aventia* and to the *Pyralidæ*; types, *D. vitrea*, Buffalo, and *pygmæa*, Texas, spp. nn., *l. c.* p. 187.

New species:—

Zanclognatha minimalis, id. *l. c.* p. 186, Maine, New York.

Platydia casta, A. G. Butler, Ill. Lep. Het. ii. p. 54, pl. xxxviii. fig. 1, Japan.

Dichromia claripennis and *amica*, id. *l. c.* pp. 54 & 55, pl. xxxviii. figs. 2 & 1, Japan.

Hypena vigens, *ella*, *stygiana*, and *columbaria*, id. *l. c.* p. 55, pl. xxxviii. figs. 4–7, Japan; *A. lunifera*, id. P. Z. S. 1878, p. 492, Jamaica.

Gabala argentata, id. Ill. Lep. Het. ii. p. 56, pl. xxxix. fig. 3, Japan.

Herminia arenosa, id. *ibid.* pl. xxxviii. fig. 8, Japan.

Bocana niphona, id. *ibid.* fig. 9, Japan.

Glossina achatina, id. *ibid.* fig. 10, Japan.

Geometridæ.

Notes on the larvæ of various *Geometræ*; T. Goossens, Pet. Nouv. ii. p. 202.

Eumacaria brunneata, Pack., p. 66, *Eubyia cognataria*, Guén., and *Cymatophora crepuscularia*, Pack., p. 67. Larvæ described; L. W. Goodell, Canad. Ent. x.

Urapteryx sambucaria, var. *persica*, Mén., redescribed from the Caucasus; S. Alpheraki, Troudy Ent. Ross. x. p. 21.

Pericallia syringaria only occasionally double-brooded in Britain; H. T. Dobson & E. A. Fitch, Ent. xi. pp. 272 & 273.

Odontopera bidentata, Clerck. The male will pair several times; F. Sintenis, S. E. Z. xxxix. pp. 398 & 399.

Biston hirtaria. Supposed barren ♀; R. McLachlan, Ent. M. M. xv. p. 14.

Biston stratarius, Hufn. Var. described by G. Weymer, JB. Ver. Elberf. v. p. 95.

Cleora viduaria. Disappearance from the New Forest; W. W. Fowler, Ent. xi. p. 273.

Boarmia crepuscularia noticed; *B. biundularia*, Borkh., is only an aberration; A. Bachstein, Ent. Nachr. iv. pp. 78 & 79.

Boarmia abietaria. Natural history; W. Buckler, Ent. M. M. xiv. pp. 219–222.

Tephrosia biundalaria, egg; J. Hellins, *op. cit.* p. 236. *T. punctulata*: larva described; G. T. Porritt, *op. cit.* pp. 235 & 236.

Acidalia aversata, note on rearing; Chaboz, Bull. Soc. Ent. Fr. (5) viii. pp. xxxix. & xl. *A. contiguaria*: habits; S. J. Capper, Ent. xi. pp. 241 & 242. *A. degeneraria*, Hübn.: A. Fuchs describes ab. *bilinearia* in all stages, from Nassau; S. E. Z. xxxix. pp. 331–333. *A. herbariata*, Fabr.: transformations described; F. J. M. Heylaerts, fils, Ann. Ent. Belg. xxi. pp. 5–8. *A. imitaria*: larva described; H. Goss, Ent. M. M. xv. p. 108 (*cf.* also R. South, *tom. cit.* p. 138. *A. incanaria* and *interjectaria*: larvæ described; G. T. Porritt, Ent. xi. pp. 18 & 19, 91 & 92. *A. inornata*, Haw., and *deversaria*, Herr.-Schäff.: A. Fuchs compares them in their various stages, and finds no constant differences between them; S. E. Z. xxxix. pp. 333–338. *A. ornata*, Scop.: O. Staudinger describes var. (?) or sp. n. (?) *aquata*, from Asia Minor; Hor. Ent. Ross. xiv. p. 440. *A. promutata*: larva described; G. T. Porritt, Ent. M. M. xiv. pp. 279 & 280. *A. rufaria*, var. from Caucasus described; S. Alpheraki, Troudy Ent. Ross. x. p. 19.

Selidosema plumaria. Larva described; G. T. Porritt, *op. cit.* xv. p. 137.

Fidonia chrysitaria, Luc., var. *kabylaria*, also from Algeria, described and figured by C. Oberthür, Études d'Ent. iii. p. 47, pl. v. figs. 6 & 6 *b*.

Pellonia calabraria, Zell. Transformations described by A. Fuchs, S. E. Z. xxxix. pp. 338–344.

Abraxas adustata, var. *inspersata* from Asia Minor described by O. Staudinger, *l. c.* p. 443; *A. grossulariata*, autumnal pupation, H. Silcock, Ent. M. M. xv. p. 150; *A. junctilineata*, Walk., redescribed and figured; A. G. Butler, Ill. Lep. Het. ii. p. 53, pl. xxxvii. fig. 5.

Anisopteryx pometaria, Harr., and *A. æscularia*, W. V.: C. V. Riley points out their differences, and corrects the errors into which Packard has fallen respecting the former; Tr. Ac. St. Louis, iii. pp. 573–577.

Chimatobia boreata and *brumata* noticed; S. C. Snellen van Vollenhoven, Tijdschr. Ent. xxi. pp. xvii. & xviii.

Hibernia leucophæaria. G. Weymer describes var. *merularia* from Elberfeld; JB. Ver. Elberf. v. p. 94.

Emmelesia taeniata. Larva described; J. B. Hodgkinson, Ent. xi. pp. 231 & 232.

Eupithecia debiliata. On rearing; Harrach, Ent. Nachr. iv. p. 187.

Eupithecia fathmaria, Oberth., belongs to *Evacidalia*, Pack.; C. Oberthur, Études d'Ent. iii. p. 46.

Synopsia serrularia, Eversm., and *phæoleucaria*, Led., are identical; O. Staudinger, Hor. Ent. Ross. xiv. p. 451.

Psychophora sabini, Kirb., noticed by R. McLachlan, J. L. S. xiv. pp. 114 & 115. He considers it to be allied to *Cidaria*.

Cidaria hastata, Linn. A variety noticed and figured by H. Strecker, Rep. Chief of Engineers, App. SS, 1878, p. 1864, pl. ii. fig. 7; *C. reticulata*, transformations described, W. Buckler, Ent. M. M. xv. pp. 61–63; *C. suffumata*, var. described and figured, J. T. Carrington, Ent. xi. p. 97.

Lygris reticulata, an insect not likely to be introduced with its food-plant (*Impatiens noli-me-tangere*) being found in Britain, furnishes presumptive evidence that the latter is truly indigenous; F. B. White, Nature, xviii. p. 278.

Thera variata. Pupa with the markings of the larva; G. C. Bignell, Ent. xi. p. 142.

Eubolia arenacearia, Hübn., var. *flavidaria*, Ev., noticed; S. Alpheraki, Troudy Ent. Ross. x. p. 39. *E. bipunctaria*, transformations described, G. T. Porritt, Ent. M. M. xv. pp. 37 & 38.

New genera and species:—

Thiopsyche, A. G. Butler, Ann. N. H. (5) i. p. 393. Allied to *Rumia*; type, *T. pryeri*, sp. n., *l. c.*, Japan.

Dasycephala, O. Staudinger, Hor. Ent. Ross. xiv. p. 445. Allied to *Himera* and *Odontopera*; type, *O. modesta*, sp. n., *ibid.*, Taurus.

Descoreba, A. G. Butler, *l. c.* p. 394. Allied to *Caberodes*; type, *D. simplex*, sp. n., *ibid.*, Japan. (*Aspilates niponaria*, Feld., also belongs to this genus.)

Niphonissa, id. *l. c.* p. 394. Allied to *Monoctenia*; type, *N. arida*, sp. n., *ibid.*, Japan.

Aracima, id., Ill. Lep. Het. ii. p. 50. Allied to *Agathia*; type, *A. muscosa*, sp. n., *l. c.* p. 51, pl. xxxvi. fig. 8, Japan (*Thalassodes cælataria* and *Macaria vagata* also belong here).

Potera, F. Moore, P. Z. S. 1878, p. 852 (*Zerenidæ*). Type, *P. marginata*, sp. n., *ibid.* pl. liii. fig. 9, Tenasserim.

Microeschus, A. G. Butler, Ann. N. H. (5) i. p. 402. Allied to *Hyria*; type, *H. elitaria*, Walk.; add *M. aureus*, sp. n., *l. c.*, Japan.

Thysanochilus, id. *l. c.* p. 404. Allied to *Corycia*; type, *T. pyrus*, sp. n., *ibid.*, Japan.

Pachyligia, Butler, *l. c.* p. 442. Allied to *Ligia*; type, *P. dolosa*, ibid., also *P. modesta*, l. c. p. 443, spp. nn., Japan.

Lygranea, id. *l. c.* p. 447. Allied to *Lobophora*; type, *L. fusca*, sp. n., *ibid.*, Japan.

Urapteryx veneris, id. *l. c.* p. 392; *U. delectans*, id. Ill. Lep. Het. ii. p. 45, pl. xxxv. fig. 2, Japan.

Epione arenosa, *leda*, and *strenioides*, id. *l. c.* p. 46, pl. xxxv. figs. 1, 5, & 6, Japan.

Hyperythra niphonica, id. *l. c.* p. 46, pl. xxxv. fig. 11, Japan; *H. angulifascia*, F. Moore, P. Z. S. 1878, p. 851, pl. liii. fig. 11, Tenasserim.

Omiza schistacea, id. *ibid.* fig. 12, Tenasserim.

Endropia mactans, A. G. Butler, Ann. N. H. (5) i. p. 393, Japan.

Metrocampa venerata and *punctuligera*, P. Mabille, Bull. Soc. Z. Fr. iii. p. 91, Landana.

Ellopia formosa, A. G. Butler, Ill. Lep. Het. ii. p. 47, pl. xxxv. fig. 8, Japan.

Eurymene excelsa, H. Strecker, Rep. Chief of Engineers, 1878, App. SS, p. 1863, pl. ii. fig. 9, Pagosa Springs.

Charodes dictynna, A. G. Butler, *l. c.* p. 45, pl. xxxv. fig. 7, Japan.

Lagyra falcigera, id. *ibid.* fig. 4, Japan.

Heterolocha debilis, id. *l. c.* p. 47, pl. xxxv. fig. 9, Japan.

Bizia sulphurea, id. *ibid.* fig. 10, Japan.

Phigalia cinctaria, G. H. French, Canad. Ent. x. p. 157, Illinois.

Amphidasys superans, A. G. Butler, *l. c.* p. 48, pl. xxxv. fig. 3, Japan.

Bronchelia gravilinearia, W. V. Andrews, Canad. Ent. x. p. 108, Indiana.

Buzura multipunctaria, A. G. Butler, *l. c.* p. 48, pl. xxxvi. fig. 1, Japan.

Hemerophila senilis, id. *ibid.* pl. xxxv. fig. 12, Japan.

Elphos insueta, id. *ibid.* pl. xxxvi. fig. 2, Japan.

Boarmia maoticaria and var. *decoloraria*, from Taganrog and Asia Minor respectively, S. Alpheraki, Troudy Ent. Ross. x. p. 38, & O. Staudinger, Hor. Ent. Ross. xiv. p. 453; *B. conferenda*, *lunifera*, *displicens*, and *leucophæa*, p. 395, *angulifera*, *agitata*, *grisea*, and *senex*, p. 396, and *insolita*, p. 397, A. G. Butler, Ann. N. H. (5) i., all from Japan; *B. delicata*, id. P. Z. S. 1878, p. 490, Jamaica.

Tephrosia charon and *ignobilis*, id. Ann. N. H. (5) i. p. 397, Japan.

Gnophos mutilata and *zacharia*, O. Staudinger, *l. c.* pp. 454 & 457, Amasia; *G. stoliczkaria*, F. Moore, Ann. N. H. (5) i. p. 235, Yarkand.

Hypochroma pryeri and *superans*, A. G. Butler, *l. c.* p. 398, Japan.

Bylizora virescens, id. *ibid.*, Japan.

Phorodesma chlorophyllaria, H. v. Hedemann, Hor. Ent. Ross. xiv. p. 510, pl. iii. fig. 7, Askold.

Nemoria albo-undulata, id. *l. c.* p. 511, pl. iii. fig. 8, Amoor.

Geometra usitata, A. G. Butler, Ill. Lep. Het. ii. p. 49, pl. xxxvi. fig 3, Japan; *G.* (?) *vestita* and *zimmermanni*, H. v. Hedemann, *l. c.* pp. 508 & 509, pl. iii. figs. 3 & 6, Amoor.

Thalera crenulata, A. G. Butler, Ann. N. H. (5) i. p. 399; *T. protrusa*, id. Ill. Lep. Het. ii. p. 50, pl. xxxvi. fig. 10, both from Japan; *T. rufolimbaria*, H. v. Hedemann, *l. c.* p. 512, pl. iii. fig. 5, Amoor.

Iodis claripennis, A. G. Butler, Ann. N. H. (5) i. p. 399, & Ill. Lep. Het. ii. p. 49, pl. xxxvi. fig. 4, both from Japan; *I. kin* [*g*] *stonensis* [Kinston is in N. Carolina], *id.* P. Z. S. 1878, p. 490, Jamaica.

Thalassodes prærupta and *ambigua*, p. 49, and *vallata*, p. 50, *id.* Ill. Lep. Het. ii. pl. xxxvi. figs. 5, 6, & 9; *T. marina*, id. Ann. N. H. (5) i. p. 399: all from Japan.

Agathia carissima, id. Ill. Lep. Het. ii. p. 50, pl. xxxvi. fig. 7, Japan; *A. lacunaria*, H. v. Hedemann, *l. c.* p. 512 pl. iii. fig. 4, Askold.

Ephyra splendens, A. G. Butler, *l. c.* p. 51, pl. xxxvii. fig. 1, Japan.

Eumelea stellata, A. G. Butler, Ann. N. H. (5) ii. p. 464, Old Calabar.

Ophthalmodes squalida, id. *l. c.* p. 465, Old Calabar.

Anisodes hadassa, id. *l. c.* p. 400, Japan.

Micronia fasciata and *malgassaria*, P. Mabille, Bull. Soc. Z. Fr. iii. p. 92, Madagascar.

Hyria vinacea, A. G. Butler, P. Z. S. 1878, p. 491, Jamaica.

Asthena corculina, *superior*, and *confusa*, p. 400, and *nupta*, p. 401, *id.* Ann. N. H. (5) i. (*Acidalia sylvestraria* and *byssinata* also noted as belonging to *Asthena*).

Acidalia unistirpis and *steganioides*, id. Ill. Lep. Het. ii. p. 51, pl. xxxvii. figs. 7 & 8; *A. harma* and *jakima*, id. Ann. N. H. (5) i. p. 401, Japan; *A. intermedia*, O. Staudinger, *l. c.* p. 436, Asia Minor; *A. nielseni* and *falcki*, H. v. Hedemann, *l. c.* pp. 514 & 515, pl. iii. figs. 9 & 10, Amoor; *A. ranataria*, C. Oberthur [= *A. mediaria*, (?) Oberth., olim], Études d'Ent. iii. p. 46, Algeria.

Argyris superba, A. G. Butler, Ill. Lep. Het. ii. p. 52, pl. xxxviii. fig. 2, Japan.

Erosia moza, p. 402, *rapha* and *azela*, p. 403, A. G. Butler, Ann. N. H. (5) i., Japan; *E. incongrua*, id. P. Z. S. 1878, p. 491, Jamaica.

Erebomorpha consors, id. Ill. Lep. Het. ii. p. 52, pl. xxxvii. fig. 3, Japan.

Cabera eliela, id. Ann. N. H. (5) i. p. 403, Japan.

Corycia virgo and *sacra*, id. *l. c.* p. 404, Japan.

Macaria zachera and *maligna*, id. *l. c.* p. 405, Japan.

Bithia amasa, id. *ibid.*, Japan.

Aplodes undinaria, H. Strecker, Rep. Chief of Engineers, 1878, App. SS, p. 1862, pl. ii. fig. 8, Rio Navajo.

Pellonia auctata, O. Staudinger, *l. c.* p. 447, Asia Minor.

Fidonia stalachtaria, H. Strecker, *l. c.* p. 1863, pl. ii. fig. 6, Rio Navajo; *F. zerenaria*, P. Mabille, *l. c.* p. 92, Congo.

Lozogramma bela and *amelia*, A. G. Butler, *l. c.* p. 406, Japan.

Selidosema sordida, id. *ibid.*, Japan.

Drepanodes fernaldi, A. R. Grote, Canad. Ent. x. p. 17, Maine and Massachusetts.

Heterusia (*Scordylia*) *davidata*, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 148, pl. viii. figs. 11–13, Peru ?.

Euschema excubitor and *aurilimbata*, F. Moore, P. Z. S. 1878, p. 846, Tenasserim.

Abraxas whitelii and *elegans*, A. G. Butler, Ill. Lep. Het. ii. pp. 52 &

53, pl. xxxvii. figs. 4 & 6; *A. conspurcata*, p. 440, *miranda* and *placida*, p. 441, *id.* Ann. N. H. (5) i.: all from Japan.

Rhyparia fraterna, id. Ill. Lep. Het. ii. p. 53, pl. xxxvii. fig. 9, Japan.

Euchera agnes, id. Ann. N. H. (5) i. p. 441, Japan.

Deroca phasma, id. *l. c.* p. 442, Japan.

Lomaspilis opis, id. *ibid.*, Japan.

Hybernia declinans, O. Staudinger, *l. c.* p. 448, Amasia; *H. dira*, A. G. Butler, *l. c.* p. 443, Japan.

Larenta hemana, id. *l. c.* p. 444, Japan.

Hypsipetes (?) *anomala*, id. P. Z. S. 1878, p. 491, Jamaica.

Hyposidra ochrea, id. *l. c.* p. 492, Jamaica.

Eupithecia limbata and *separata*, p. 476, *furcata* and *albo-fasciata*, p. 479, and *nigritaria*, p. 480, O. Staudinger, *l. c.*, Asia Minor; *E. vario-strigata*, S. Alpheraki, Troudy Ent. Ross. x. p. 40, Taganrog and Tauria; *E. sophia* and *invisa*, p. 444, *excisa*, *rufescens*, *proterva*, and *caliginea*, p. 445, A. G. Butler, Ann. N. H. (5) i., Japan.

Collix vashti, id. *l. c.* p. 445, Japan.

Thera kashghara, F. Moore, Ann. N. H. (5) i. p. 236, Yarkand.

Scotosia lucicolens, A. G. Butler, Ill. Lep. Het. ii. p. 54, pl. xxxvii. fig. 10, Japan.

Marmopteryx formosata, H. Strecker, *l. c.* p. 1864, Rio Florida.

Lobophora julia, *volitans*, and *terranea*, A. G. Butler, Ann. N. H. (5) i. p. 446.

Melanthia casta, id. *l. c.* p. 447, Japan.

Melanippe inquinata, *supergressa*, and *hecate*, id. *l. c.* p. 448, Japan.

Anticlea consanguinea, id. *l. c.* p. 449, Japan.

Coremia livida and *frigida*, id. *l. c.* pp. 449 & 450, Japan.

Cidaria approximata, p. 466, *impunctata*, p. 469, and *hortulanaria*, p. 470, O. Staudinger, *l. c.*, Asia Minor; *C. melancholica* and *obscura*, p. 450, *ærosa*, *tetrica*, and *cineraria*, p. 451, and *jamesa*, p. 452, A. G. Butler, *l. c.*, Japan.

Eubolia niphonica, id. *l. c.* p. 452, Japan; *E. hopfferaria*, O. Staudinger, *l. c.* p. 458, Asia Minor.

Eratina staudingeri, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 130, pl. viii. figs. 14–16, Peru ?.

Pyralidæ.

A. R. Grote has published "Preliminary Studies on the North American *Pyralidæ*. I.;" Bull. U. S. Geol. Surv. iv. pp. 669–705. A great number of known genera and species are enumerated in this paper, many of which are redescribed, in addition to the new ones. The neuration of several genera is figured.

A. R. Grote's papers on new Pyralides, Canad. Ent. x. pp. 23–30, also contain observations on various known N. American species.

Epipaschiæ. Under this name, A. R. Grote establishes a new family, which he places between the *Pyralidæ* and *Phycidæ*. It contains the genera *Epipaschia*, *Mochlocera*, *Cacozelia*, *Toripalpus*, and *Tetralopha*, of all of which the neuration is figured. *Deuterollyta borealis*, Grote, = *Ep. superatalis*, Clem. Bull. U. S. Geol. Surv. iv. pp. 685–692.

Epipaschia, Clem., recharacterized and referred to the *Pyralidæ*; A. R. Grote, P. Bost. Soc. xix. pp. 262 & 263. The type, *E. superatalis*, Clem., is also redescribed, *l. c.* p. 263.

Ebulea verbascalis: natural history; W. Buckler, Ent. M. M. xv. pp. 102–104.

Hydrocampa nymphæata, ab. *nigra* described; Foucart, Cat. Lep. Dours, p. 76.

Botis glomeralis, Walk., = *octomaculata*, Linn., *subsequalis*, Guén., = *inæqualis*, Guén., *haruspica*, G. & R., and ? *proceralis*, Led., = *sumptuosalis*, Walk., *B. catenulalis*, Grote, = *mustelinalis*, Pack., *thescalis*, Zell. (*nec* Led.) = *gentilis*, Grote, *euphæsalis*, Walk., and ? *subjectalis*, Led., = *magniferalis*, Walk., *hircinalis*, Grote, = *subolivalis*, Pack.; A. R. Grote, Bull. U. S. Geol Surv. iv. pp. 675–683. *B. asinalis*: larva described; G. T. Porritt, Ent. ix. pp. 190 & 191.

Scopula ferrugalis: natural history; W. Buckler, Ent. M. M. xiv. pp. 200–204. *S. occidentalis*, Pack., = *Eurycreon rantalis*, Grote; A. R. Grote, *l. c.* p. 685. *S. sticticalis* noticed; Keppen, Troudy Ent. Ross. ix. p. l.

Acentropus niveus. J. W. Dunning discusses Ritsema's & Snellen's observations, as confirming his own opinion that there is only one species; Tr. E. Soc. 1878, pp. 271–280. C. Ritsema publishes another long contribution to the history of this insect; Tijdschr. Ent. xxi. pp. 81–114, pls. v. & vi.

New genera and species:—

Cacozelia, A. R. Grote, P. Bost. Soc. xix. p. 263. Allied to *Epipaschia*; type, *C. basiochrealis*, sp. n., *l. c.* p. 264, Texas.

Toripalpus, id. *l. c.* p. 265. Allied to *Tetralopha*; type, *T. breviornatalis*, sp. n., *ibid.*, Texas, Colorado.

Prorasea, id. Bull. U. S. Geol. Surv. iv. p. 669. Allied to *Acopa*; type, *P. simalis*, sp. n., *l. c.* p. 670, Oregon and Montana.

Aedis, id. *l. c.* p. 670. Allied to last; type, *A. funalis*, sp. n., *ibid.*, California.

Arta olivalis, id. Canad. Ent. x. p. 24, Texas.

Stemmatophora nivalis, id. Bull. U. S. Geol. Surv. iv. p. 671, Sierra Nevada, California.

Emprepes nuchalis, California, and *libella*, United States, *id. l. c.* p. 675.

Pyrausta cuprealis, F. Moore, Ann. N. H. (5) i. p. 235, Cashmere.

Asopia cohortalis, A. R. Grote, Canad. Ent. x. p. 233, Colorado.

Hymenia crebina, A. G. Butler, Ill. Lep. Het. ii. p. 57, pl. xxxix. fig. 1, Japan.

Cataclysta callichromalis, P. Mabille, Bull. Soc. Z. Fr. iii. p. 94, Madagascar.

Margaronia neomera, A. G. Butler, *l. c.* p. 57, pl. xxxix. fig. 5, Japan.

Glyphodes sylpharis, id. *ibid.* fig. 2, Japan.

Botys jessica, *protensa*, and *chlorophanta*, id. *l. c.* p. 58, pl. xxxix. figs. 6–8, Japan; *B. phyllophila*, id. Ann. N. H. (5) ii. p. 296, Madagascar; *B. butyrosa*, p. 493, *lucilla* and *olivia*, p. 494, *id.* P. Z. S. 1878, Jamaica; *B. venalis*, Buffalo, and *trimaculalis*, p. 24, *fuscimaculalis* and

flavicoloralis, p. 25, Texas, *stenopteralis*, Maine, and *talis*, Alabama, p. 26 (the latter redescribed, *id.* Bull. U. S. Geol. Surv. iv p. 681); A. R. Grote, Canad. Ent. x.; *B. volupialis*, id. Bull. &c., iii. p. 799, Denver, *albiceralis*, id. *op. cit.* iv. p. 678, Colorado.

Zophodia dentata, id. *op. cit.* iii. p. 799, Colorado.

Homophysa peremptalis, p. 28, Massachusetts, and *eripalis*, p. 29, Texas, *id.* Canad. Ent. x.

Ebulea aurorina, A. G. Butler, Ill. Lep. Het. ii. p. 58, pl. xxxix. fig. 9, Japan.

Samea chlorophasma, id. P. Z. S. 1878, p. 493, Jamaica.

Pionea sodalis, id. Ill. Lep. Het. ii. p. 59, pl. xxxix. fig. 4, Japan.

Crocidophora pantherata, id. *ibid.* fig. 10, Japan.

CRAMBIDÆ.

Scoparia resinea, Haw., var. *orientalis*, from Patigorsk, described; S. Alpheraki, Troudy Ent. Ross. x. p. 26.

Ephestia elutella: enormous web formed by its larva on the walls and ceiling of a chicory warehouse at York; Nature, xvii. p. 402.

Nephopteryx latifasciatella, Pack., = *Pempelia ovalis*, Pack., ♀; A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 696.

Myelois pinguis: larva described; W. Buckler, Ent. M. M. xv. pp. 162–164.

Stamnodes depeculata, Led., var. *narzanica*, from Kislovodsk, described; S. Alpheraki, Troudy Ent. Ross. x. p. 23.

Schœnobius macrinellus, Zell., = *perstrialis*, Hübn.; P. C. Zeller, Hor. Ent. Ross. xiii. p. 12.

Ancylolomia taprobanensis, P. C. Zeller, redescribed and figured by him; *l. c.* p. 25, pl. i. fig. 8.

Crambus aurosus, Feld. & Rog., and *immunellus*, Zell., described; *id.* l. c. pp. 45 & 47. *C. contaminellus*: transformations described; W. Buckler, *l. c.* pp. 38 & 39.

Argyria croceivittella, Walk., redescribed and figured by P. C. Zeller, *l. c.* p. 60, pl. i. fig. 23.

Albinia wockiana, Briosi [Zool. Rec. xiv. *Ins.* p. 179], fully redescribed and figured by the author; Atti Acc. Rom. (3) Mem. Cl. Sci. fis. i. pp. 1247–1270, pls. i. & ii. Injurious to vines.

New genera and species:—

Honora, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 702. Probably equivalent to *Stenoptycha*, sect. C, Von Hein.; type, *H. mellinella*, sp. n., *l. c.* fig. 11 (neuration), Texas.

Dakruma, id. *l. c.* Differs from *Homœosoma* by the 11-veined primaries; antennæ of males not constricted at base; veins 3 and 4 of hind wings furcate beyond the cell. Type, *D. turbatella*, sp. n., *l. c.* fig. 12 (neuration), Maine.

Pinipestis, A. R. Grote, Canad. Ent. x. p. 19; type, *Nephopteryx zimmermanni*, Grote; add *P.* (?) *abietivorella*, id. Bull. U. S. Geol. Surv. iv. p. 701, Massachusetts.

Cecidiptera excœcariæ, g. & sp. nn., C. Berg, S. E. Z. xxxix. pp. 230–237, pl. i. figs. 2, 2 *a–i*. Allied to *Zophodia* (*Phycidæ*); described and figured in all stages; Prov. Corrientes, Argentine Republic. *Cf.* also H. Weyenbergh, Tijdschr. Ent. xxi. pp. 119–125.

Eudorea granitalis and *transversalis*, F. Moore, Ann. N. H. (5) i. p. 235, Yarkand.

Scoparia gelida, R. McLachlan, J. L. S. xiv. p. 115, lat. 82° 30′.

Melissoblaptes gularis, p. 74, pl. i. fig. 26, pl. ii. fig. 27, Japan, and *M.* (*Epinorius*) *suffusus*, p. 76, pl. ii. fig. 28, New Friburg; P. C. Zeller, Hor. Ent. Ross. xiii.

Anerastia ignobilis, A. G. Butler, P. Z. S. 1878, p. 494, Jamaica.

Homœosoma venosella, F. Moore, Ann. N. H. (5) i. p. 236, Yarkand. *H. stypticella*, A. R. Grote, Bull. U. S. Geol. Surv. iv. p. 703, fig. 13 (neuration), United States.

Acrobasis tricolorella, id. *l. c.* p. 694, Maine.

Myelois griseella and *undulosella*, F. Moore, *l. c.* p. 236, Yarkand.

Nephopteryx marmorata, S. Alpheraki, Troudy Ent. Ross. x. p. 44, Taganrog and Sarepta.

Euzophera intricata (Staud., MS.), *id. l. c.* p. 46, Taganrog, Dalmatia.

Pempelia pravella, A. R. Grote, *l. c.* p. 694, fig. 8 (neuration), Maine.

Schœnobius terreus, figs. 1 *a* & *b*, Madagascar, and *immanis*, fig. 2, Buenos Aires; P. C. Zeller, *l. c.* pp. 10 & 11, pl. i.

Chilo angustipennis, p. 15, fig. 3, New Zealand, *C.* (*Donacoscaptes*) *validus*, p. 16, figs. 4 *a* & *b*, Chiriqui, *C. prodigialis*, p. 18, fig. 5, New Friburg, and *C. heracleus*, p. 20, fig. 6, Brazil?; *id. l. c.* pl. i. *C. acuminatus*, A. G. Butler, Ill. Lep. Het. ii. p. 61, pl. xl. fig. 1, Japan.

Ancylolomia sansibarica, P. C. Zeller, *l. c.* p. 23, pl. i. fig. 7, Zanzibar.

Prionopteryx elongata, p. 27, Chiriqui, *texturella*, p. 28, Zanzibar, and *bergii*, p. 30, Buenos Aires; *id. l. c.* pl. i. figs. 9–11.

Diptychophora straminella, New Friburg, and *octavianella*, Chiriqui; *id. l. c.* pp. 32 & 33, pl. i. figs. 12 & 13.

Crambus spiculellus, p. 35, fig. 14, *subæqualis*, p. 37, *stilatus*, p. 38, fig. 15, Buenos Aires, *quinquareatus*, p. 40, fig. 16, Texas, *humidellus*, p. 42, *atro-signatus*, p. 43, fig. 17, Japan, *expansellus*, p. 48, fig. 18, Chiriqui, *incanellus*, p. 50, fig. 19, Ubaque and New Friburg, *hemiochrellus*, p. 51, *pectinifer*, p. 53, fig. 20 *a*, *b*, Texas, and *quadrinotellus*, p. 55, fig. 21, Chiriqui, *id. l. c.* pl. i.; *C. argyrophorus*, A. G. Butler, *l. c.* p. 61, pl. xl. fig. 5, Japan; *C. caucasicus*, S. Alpheraki, *l. c.* p. 27, Kislovodsk.

Argyria obliquella, p. 58, fig. 22, Japan, *pontiella*, p. 61, fig. 24, Chiriqui, *mesodonta*, p. 62, Chanchamayo, *opposita*, p. 64, Chiriqui, *sordipes*, p. 67, Buenos Aires, *furvicornis*, p. 68, hab. ?, *simplex*, Japan, and *pentaspila*, New Friburg, p. 70, P. C. Zeller, Hor. Ent. Ross. xiii. pl. i.; *A. vestalis*, A. G. Butler, P. Z. S. 1878, p. 494, Jamaica.

Eromene chiriquitensis, P. C. Zeller, *l. c.* p. 72, pl. i. fig. 25, Chiriqui.

TORTRICIDÆ.

On collecting and pinning Tortrices; C. H. Fernald, Canad. Ent. x. pp. 82 & 83.

Notes on the transformations of various species of *Eupœcilia*, *Cochylis*, and *Orthotænia* ; C. G. Barrett, Ent. M. M. xv. pp. 141–149.

Penthina postremana, Zell., bred from wild balsam, recorded as new to Britain, J. B. Hodgkinson, Ent. xi. pp. 160 & 161, & Ent. M. M. xv. pp. 14 & 15; redescribed, and distinctive characters discussed, C. G. Barrett, *l. c.* pp. 39–41.

Tortrix, sp. from Colorado, described by A. R. Grote, Bull. U. S. Geol. Surv. iii. p. 800; *T.* (*Lophoderus* ?) *sarothrura*, Feld. & Rog., described from Mexico, P. C. Zeller, Hor. Ent. Ross. xiii. p. 105 ; *T. viburnana* discussed, W. M. Schøyen, N. Mag. Naturv. xxiv. pp. 146–149.

Pædisca saligneana, Clem. Transformations described ; D. S. Kellicott, Canad. Ent. x. p. 202.

Dichrorampha alpinana, Tr., var. *quæstionana* (Mann, MS.), from the Albula Pass, described by P. C. Zeller, S. E. Z. xxxix. p. 114.

Coccyx distinctana noticed, T. Moncreiffe, Scot. Nat. iv. p. 341 ; it is quite distinct in the larva state from *hyrciniana*, J. H. Wood, Ent. M. M. xv. pp. 108 & 109 ; *C. ochsenheimeriana*, Zell., recorded as new to Britain, and redescribed, C. G. Barrett, Ent. M. M. xv. p. 146.

Ephippiphora obscurana, Steph., = *gallicolana*, Zell., W. P. Weston, Ent. xi. pp. 237–239 ; *E. nigricostana*, habits of larva, W. Warren, Ent. M. M. xv. pp. 15 & 16.

Carpocapsa pomonana and *Heusimene fimbriana* sometimes form their pupæ in bark ; H. Sharp, Ent. ix. p. 41.

Carpocapsa pomonella, larvæ and pupæ eaten by *Tenebrioides laticollis*, Horn ; C. D. Zimmerman, Canad. Ent. x. p. 60. *C. saltitans*, Westw., note on the "jumping seeds" of Mexico, containing larvæ of this species ; J. Spiller, P. E. Soc. 1878, pp. xlv. & xlvi.

Sciaphila stratana, Zell. : S. Alpheraki describes var. *orientana* from Taganrog, Troudy Ent. Ross. x. p. 48.

Grapholitha nigricana, Herr.-Schäff., recorded as new to Britain, and redescribed ; C. G. Barrett, Ent. M. M. xiv. p. 241.

Setiostoma swederiana, Stoll (= *Grapholitha trabeana*, Feld. & Rog.), redescribed ; P. C. Zeller, Hor. Ent. Ross. xiii. p. 187.

Hypolepia sequella, larva noticed ; W. Machin, Ent. xi. p. 20.

Argyrolepia (*Eupœcilia*) *mussehliana* rediscovered near Pembroke, after having been lost sight of in Britain for many years ; C. G. Barrett, Ent. M. M. xv. p. 39.

Eupœcilia maculosana, larva and habits described ; J. H. Wood, Ent. M. M. xv. pp. 149 & 150.

Brachytænia hartmanniana, Linn. (*scriptana*, Hübn.). A remarkable var. feeding on apple instead of willow, described by C. G. Barrett, *op. cit.* xiv. pp. 241 & 242.

New genera and species :—

Auchoteles, P. C. Zeller, Hor. Ent. Ross. xiii. p. 83. Allied to *Cacœcia*, and perhaps = *Uzela*, Walk. ; types, *A. perforatana*, p. 84, Australia ? or Brazil ?, and *sobriana*, p. 87, Brazil, spp. nn., *l. c.*

Cer[at]orrhineta, id. *l. c.* p. 116. Placed between *Tortrix* (*Œnectra*) and *Sciaphila*; remarkable for its knotted antennæ. Type, *C. calidana*, sp. n., *l. c.*, Cuba.

Teras multifidana, p. 77, pl. ii. fig. 29, Bogota, *thammiana*, p. 79, Chanchamayo, and *chiriquitana*, p. 80, Chiriqui, id. *l. c.*

Tortrix (*Anacrusis*) *atro-sparsana*, p. 87, Brazil, *T.* (*Cacœcia*) *revolutana*, p. 89, Chiriqui, *T.* (*C.*) *abscisana*, p. 90, fig. 30, Barro Blanco and Venezuela, *T.* (*C.*) *concavana*, p. 91, Chiriqui, *T.* (*C.*?) *dispositana*, p. 94, fig. 31, Bogota, *T.* (div. C.) *spoliana*, p. 96, fig. 32, Bogota, *T.* (div. C.) *lutosulana*, p. 98, fig. 33, Ubaque, and varr. *memoriana*, p. 100, and *miserulana*, p. 101, fig. 34, also from Ubaque, *T.* (div. C.) *ambitana*, p. 102, figs. 35 *a* & *b*, Bogota, *T.* (*Loxotænia*) *vitiana*, p. 103, fig. 36, Colombia, *T.* (*Æsiocopa*) *vacivana*, p. 106, Chiriqui, *T.* (*Batodes*) *teratana*, p. 108, Chiriqui, *T.* (*Œnectra*) *rostellana*, p. 110, figs. 37 *a* & *b*, Bogota, *T.* (*Œ.*) *exsectana*, p. 111, fig. 38, Baranquilla, *T.* (*Œ.*) *laterculana*, p. 113, Mexico, *T.* (*Œ.*?) *rectilineana*, p. 115, Chiriqui, *id. l. c.* pl. ii.; *T. vacciniivorana*, A. S. Packard, Rep. U. S. Geol. Surv. x. p. 522, New Jersey (with magnified figures of larva and pupa).

Sciaphila radicana, p. 118, fig. 39, *trajectana*, p. 120, fig. 40, and *invitana*, p. 121, fig. 41, Bogota, *insipidana*, p. 122, locality unrecorded, *leucomelana*, p. 124, fig. 42, Chipo, and *crebrana*, p. 126, fig. 43, P. C. Zeller, *l. c.* pl. ii.

Conchylis tricesimana, p. 128, Chiriqui, *pruinosana*, p. 129, fig. 44, *submissana*, p. 131, fig. 45, *swammerdamiana*, p. 133, fig. 46, and *ochrimixtana*, p. 134, Bogota, *lorana*, p. 135, fig. 47, Fusagasuga, *delicatulana*, p. 137, Bogota, *diemeniana*, p. 138, Van Diemen's Land, and *C.* (?) *ciliosana*, p. 139, fig. 48, Cuequeta, *id. l. c.* pl. ii.; *C. dives*, A. G. Butler, Ill. Lep. Het. ii. p. 61, pl. xl. fig. 7, Japan; *C. stoliczkana*, F. Moore, Ann. N. H. (5) i. p. 237, Yarkand.

Bactra fuscidorsana, p. 141, *cultellana*, p. 143, and *neuricana*, p. 144, P. C. Zeller, *l. c.*, Bogota.

Penthina deletana (Staud., MS.), S. Alpheraki, Troudy Ent. Ross. x. p. 29, Caucasus.

Paedisca chloroticana, p. 145, fig. 49, *pyrrhulana*, p. 147, fig. 50, Bogota, *pristinana*, p. 148, fig. 51, Ubaque, *veternana*, p. 150, fig. 52, and *satellitana*, p. 152, Bogota, P. C. Zeller, *l. c.* pl. ii.; *P. worthingtoniana*, C. H. Fernald, Canad. Ent. x. p. 83, N. Illinois.

Steganoptycha erschoffiana, p. 457, pl. ii. fig. 159, Bogota, and *peruviana*, Peru, P. C. Zeller, *l. c.*

Grapholitha (*Pœcilochroma*) *nolckeniana*, p. 154, fig. 53, and *G.* (*P.*) *pollutana*, p. 156, fig. 54, Bogota, *G. piriferana*, p. 158, Chiriqui, *G.* (*Hedia*) *augmentana*, p. 160, Cuba, *G.* (*H.*) *condensatana*, p. 162, Chiriqui, *G.* (*Coptoloma* ?) *figurana*, p. 163, fig. 55, St. Thomas, *G. truncatulana*, p. 165, fig. 56, Bogota, P. C. Zeller, *l. c.* pl. ii.; *G. taleana*, A. R. Grote, Canad. Ent. x. p. 54, Illinois.

Dichrorampha circumfusana, p. 166, figs. 57 *a*, *b*, & 58, and *sarmentana*, p. 169, fig. 59, P. C. Zeller, *l. c.* pl. ii., Bogota.

Exartema fagigemmaana, V. T. Chambers, Canad. Ent. x. p. 74, Kentucky.

TINEIDÆ.

Notes on *Tineina* bred in 1877 and 1878; J. H. Threlfall, Ent. M. M. xv. pp. 89 & 90, & Ent. xi. pp. 199–201, including a specimen supposed to be *Gelechia cinticulella*, Herr.-Schäff., new to Britain.

Notes on *Tineina* observed at the Scilly Islands; F. J. H. Jenkinson & H. T. Stainton, *op. cit.* xv. pp. 88 & 89.

Notes on Pembrokeshire *Tineina*; C. G. Barrett, *op. cit.* xiv. pp. 268–272.

Notes on various *Tineina*; M. Wocke, JB. schles. Ges. lv. pp. 191–193.

Notes on Australian *Micro-Lepidoptera*, E. Meyrick, Ent. M. M. xv. pp. 70 & 71.

Frey & Boll have published a third instalment of their papers on Texan *Tineina*, remarking on various known species, and describing many new ones; S. E. Z. xxxix. pp. 249–279.

V. T. Chambers publishes descriptions of new *Tineina* from Texas, and others from more northern localities, including also remarks on many known species; Bull. U. S. Geol. Surv. iv. pp. 79–106. He also publishes a list of the food-plants of North American *Tineina* (l. c. pp. 107–123), and an "Index to the described *Tineina* of the United States and Canada," in which, unfortunately, both the genera and species are arranged in alphabetical instead of systematic order; *l. c.* pp. 125–167. For notes on larvæ of *Tineina*, especially *Lithocolletis*; id. Psyche, ii. pp. 137 & 153.

Notes on clothes-moths; C. V. Riley, Ent. xi. pp. 212 & 213.

Choreutis pretiosana, Dup., var. *fuscidorsis*, from Cuequeta and Ubaque, described by P. C. Zeller, Hor. Ent. Ross. xiii. p. 170.

Brenthia pavonacella, Clem.: habits, larva, &c.; V. T. Chambers, Canad. Ent. x. pp. 76 & 77.

Simaethis. P. C. Zeller (*l. c.* redescribes *S. rimulatus*, Zell., p. 174, pl. ii. fig. 62, *albertiana*, Cram., p. 179, *houttuinalis*, Cram., p. 182, *hubneriana*, Cram., p. 183, and *fuesliniana*, Cram., p. 185.

Choregia, Feld. & Rog., characterized, *id. l. c.* p. 191; type, *C. fulgens*, F. & R. (of which their *C. violacea* may be the ♀), from Bogota, described in full, p. 192. (Belongs to the *Choreutidæ*?)

Anaphora pusilla, Zell., described in full, *id. l. c.* p. 196. (The genus probably = *Acrolophus*, Poey; p. 197.)

Setomorpha (*Safra*) *bogotatella*, Walk., redescribed in full; *id. l. c.* p. 205.

Ochsenheimeria (?) *horridella*, Zell., redescribed; *id. l. c.* p. 221.

Tinea ferruginella feeds on the seeds of *Artemisia absinthium*; G. C. Bignell, Ent. M. M. xv. p. 110.

Hyponomeuta padella and *Bombyx mori*. Specimens with the head of the larva, and without antennæ, noticed by H. Lucas, Bull. Soc. Ent. Fr. (5) viii. pp. xciv. & xcv.

Hyponomeuta internella and *circumdatella*, Walk., redescribed, and the latter referred to *Peccadia*; P. C. Zeller, *l. c.* pp. 223 & 237.

Gelechia, *Hamadryas*, *Phatusa*, and *Epicorthylis*. V. T. Chambers

discusses several American species; Canad. Ent. x. pp. 50–54. *G. 4-maculella*, Chamb. (preoccupied) is renamed *pravinominella*, p. 50, *G. solanivella* and *hermannella*, transformations described by Chambers and Murtfeldt, pp. 51–53; *Epicorthylis inversella*, Zell., redescribed, p. 54.

Hamadryas, Clem. (preoccupied in *Lepidoptera*) is renamed *Euclemensia*; A. R. Grote, Canad. Ent. x. p. 69.

Hagno, Chamb., = *Psilocorsis*, Clem., and is only a section of *Cryptolechia*; *C. (H.) faginella*, Chamb., is redescribed; V. T. Chambers, Bull. U. S. Geol. Surv. iv. pp. 84–86.

Pronuba yuccasella. A German translation of C. V. Riley's article has appeared in S. E. Z. xxxix. pp. 377–382. Riley publishes further remarks on this insect, and on the fertilization of *Yucca*, in reply to doubts thrown on the accuracy of his observations by Chambers, Zeller, and Boll; Tr. Ac. St. Louis, iii. pp. 568–573.

Depressaria heracliella, parasites; G. C. Bignell, Ent. xi. pp. 254 & 255.

Gelechia flavella and *pinguinella*. Larvæ noticed; E. L. Ragonot, Bull. Soc. Ent. Fr. (5) viii. pp. cxx. & cxxi. *G. gerronella*, Zell.: habits; H. T. Stainton, Ent. M. M. xv. p. 89.

Philonome clemensella, V. T. Chambers, redescribed by him; Canad. Ent. x. pp. 238 & 239.

Crameria nobilitella, Cram., redescribed; P. C. Zeller, *l. c.* p. 241.

Cryptolechia. P. C. Zeller discusses this genus, and arranges 83 species under the sections *Psilocoris*, Clem., *Cryptolechia*, Zell. (with two subsections), and *Stenoma* (with four subsections); *l. c.* pp. 258–261. He also (*l. c.*) notices or redescribes *C. carnea* and *tenera*, Zell., p. 263, *tortricella*, Walk., *sesquitertia*, Zell., p. 281, *mendax*, Zell., p. 285, and *renselariana*, Cram., p. 288.

Antæotricha walchiana, Cram., noticed, and *griseana*, Fabr., described in full and figured, pl. iv. fig. 95, *id. l. c.* pp. 305 & 315.

Coptotelia fenestrella, Mor. Var. from Chiriqui noticed; *id. l. c.* p. 378.

Œcophora bimaculella, Don., p. 388, *irruptella*, Walk., p. 390, and *marionella*, Newm., noticed or redescribed; *id. l. c.*

Cleodora pallidella and *pallidistrigella*, V. T. Chambers, redescribed by him; *l. c.* pp. 91 & 92.

Coriscium and *Coleophora*. Notes on various American species; *id.* Canad. Ent. x. pp. 109–114. *C. argenti-albella*, Chamb. (Canad. Ent. v. p. 75, *nec* vi. p. 128) is renamed *argentella* [but, as the original name must, of course, stand for the first species described under it, *argentella* cannot be retained].

Laverna circumscriptella, Zell., redescribed; *id. l. c.* p. 239.

Coleophora clypeiferella, Hofm., and *squalorella*, *fuscedinella*, and *lutipennella*, Zell., noticed; O. Hofmann, CB. Ver. Regensb. xxxi. pp. 30 & 31.

Chrysocorys festaliella has the same habits as the species of *Stathmopoda*; H. T. Stainton, Ent. M. M. xv. p. 69. See also T. Moncrieffe, Scot. Nat. iv. p. 341.

Elachista cerussella. Larva feeds on *Phalaris arundinacea*; W. C. Boyd, P. E. Soc. 1878, p. xxxviii. *E. collitella*, Dup., from Tenby,

noticed as new to Britain; C. G. Barrett, Ent. M. M. xiv. p. 271. *E. gregsoni*, Staint.: its pupation and probable identity with *E. nigrella*, Haw., noticed by H. T. Stainton, *l. c.* xiv. p. 279. *E. stabilella*: note on larva, which feeds on *Aira cæspitosa*; W. Warren, Ent. M. M. xv. pp. 16 & 69.

Lithocolletis. Notes on the American species; V. T. Chambers, Psyche, ii. pp. 81–87. A species, too much worn for description, recorded from Fusagasuga, thus establishing the occurrence of the genus in Tropical America; P. C. Zeller, *l. c.* p. 448.

Bucculatrix ceibæ, Zell., redescribed; *id. l. c.* p. 454.

New genera and species:—

Acureuta, P. C. Zeller, Hor. Ent. Ross. xiii. p. 198. Allied to *Amydria*; to contain *A. aspera*, p. 199, Colombia, *lentiginosa*, p. 201, Brazil and Peru, *circumdata*, p. 203, Bogota (? = *Scardia nivosa*, Feld. & Rog.), and *pircunia*, p. 204, Buenos Aires: spp. nn.

Dysgnorima, id. *l. c.* p. 255. Allied to *Depressaria*; type, *D. subannulata*, sp. n., *l. c.* p. 256, pl. iii. figs. 73 *a* & *b*, Bogota.

Ecliptoloma, id. *l. c.* p. 326. Allied to last; type, *E. hemiommata*, sp. n., *l. c.* p. 327, pl. iv. figs. 102 *a* & *b*, Tropical America?.

Clistothyris, id. *l. c.* p. 330. Allied to *Gelechia*; type, *C. villosula*, sp. n., *l. c.* p. 331, pl. iv. figs. 104 *a* & *b*, Ubaque.

Dasycarea [*-ria*], id. *l. c.* p. 373. Allied to *Gelechia*; type, *D. viridisquama*, sp. n., *l. c.* pl. v. figs. 128 *a* & *b*, Bogota.

Copocercia, id. *l. c.* p. 374. Allied to *Sophronia*; type, *C. crambinella*, sp. n., *l. c.* p. 375, pl. v. figs. 129 *a* & *b*, Bogota.

Stomylia, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 142. Allied to *Symmoca*, &c.; type, *S. erosella*, sp. n., *l. c.* pl. viii. figs. 1–6, Java.

Peleopoda [*Peliadop-*], Zeller, *l. c.* p. 385. (*Œcophoridæ*.) Type, *P. lobitarsis*, sp. n., *l. c.* p. 386, pl. v. figs. 134 *a–c*, Chiriqui.

Falculina, id. *l. c.* p. 387. Allied to *Cryptolechia*; type, *F. ochricostata*, sp. n., *l. c.* pl. v. figs. 135 *a* & *b*, S. America?.

Metamorpha (Staint., MS.), Frey & Boll, S. E. Z. xxxix. p. 277. Allied to *Cosmopteryx*; type, *M. miraculosa*, sp. n., *l. c.* p. 278, Texas.

Acanthocnemes, V. T. Chambers, Bull. U. S. Geol. Surv. iv. p. 104. Allied to *Phyllocnistis*; type, *A. fusco-scapulella*, sp. n., *l. c.*, Texas.

Choreutis blandinalis, P. C. Zeller, Hor. Ent. Ross. xiii. p. 171, pl. ii. fig. 60, Cuequeta.

Brenthia quadriforella, id. *l. c.* p. 172, pl. ii. fig. 61, Australia?.

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Choregia ignita, id. *l. c.* p. 195, Cuba.

Anaphora leucodoci s, id. *l. c.* p. 197, Cuba and Brazil?. *A. texanella*, V. T. Chambers, Bull. U. S. Geol. Surv. iv. p. 79, Texas.

Tinea nigriceps, p. 208, and *dividuella*, p. 210, Bogota, *cumulatella*, p. 211, Fusagasuga, *pallidorsella*, p. 212, Ubaque, *familiaris*, p. 214, Fusagasuga, *caducella*, p. 216, Chipo, *scrutatricella*, p. 217, Bogota?, and *latipennella*, p. 219, Ubaque; P. C. Zeller, l. c. *T. orientalis*, H. T. Stainton,

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Adela optima, A. G. Butler, Ill. Lep. Het. ii. p. 62, pl. xl. fig. 6, Japan. *A. iochera*, P. C. Zeller, *l. c.* p. 220, Texas.

Micropteryx maschukella, S. Alpheraki, Troudy Ent. Ross. x. p. 31, Mount Mashuk (Caucasus).

Hyponomeuta morbillosa, P. C. Zeller, *l. c.* p. 222, pl. iii. fig. 1, Zanzibar; *H. zelleriella*, V. T. Chambers, *l. c.* p. 80, Texas.

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Prays stratellus, P. C. Zeller, *l. c.* p. 243, pl. iii. fig. 74, Bogota; *P.* (?) *hilarella*, P. C. T. Snellen, Tijdschr. Ent. xxi. p. 133, pl. vii. figs. 7–11, Surinam.

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Dasycera nonstrigella, V. T. Chambers, Bull. U. S. Geol. Surv. iv. p. 92, Texas; *D.* (?) *bernsteiniella*, P. C. T. Snellen, *l. c.* p. 145, pl. viii. figs. 7–10, Salawatty.

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Coleophora texanella, Texas, *cinerella* and *multipulvella*, Kentucky, and *fusco-strigella*, Texas, p. 93, and *biminimmaculella* [!], Texas, *quadrilineella* and *ochrella*, p. 94, Kentucky, V. T. Chambers, Bull. U. S. Geol. Surv. iv.; *C. vernoniæella*, id. Canad. Ent. vi. p. 114, Missouri & Kentucky.

Cosmopteryx 4-lineella, id. Bull. U. S. Geol. Surv. iv. p. 95, Texas.

Eriphia (?) *albilineella* and *E.* (?) *nigrilineella*, id. *l. c.* pp. 95 & 96, Texas.

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Platyptilia fuscicornis, p. 460, *gilvicolor*, p. 462, fig. 160, *pyrrhina*, p. 464, fig. 161, and *sordipennis*, p. 466, Bogota, and *tecnidion*, p. 468, fig. 162, St. Thomas; P. C. Zeller, Hor. Ent. Ross. xiii. pl. v.

Mimeseoptilus albistriolatus, p. 469, fig. 163, and *gilvidorsis*, p. 471, fig. 164, Bogota, *fumiventris*, p. 472, fig. 165, Saacha, on the road to Canaos, *M.* (*Œdematophorus*) *nodipes*, p. 473, fig. 166, *M.* (*Œ.*) *fusciciliatus*, p. 475, fig. 167, and *M.* (*Œ.*) *conjunctus*, p. 477, fig. 168, Bogota, *id. l. c.*

Lioptilus lenis, p. 478, fig. 169, Bogota, *thomæ*, p. 480, fig. 170, St. Thomas, *pelospilus*, p. 481, and *nigro-sparsus*, p. 482, Chanchamayo, and *ochricostatus*, p. 484, fig. 171, Bogota, *id. l. c.* pl. v.; *L. minutus*, S. Alpheraki, Troudy Ent. Ross. x. p. 32, Patigorsk.

Aciptilia malacensis, P. C. Zeller, *l. c.* p. 485, Malacca.

Alucitidæ.

Orneodes hexadactylus. Homology of its scales with those of other *Lepidoptera*; Jourdain, Bull. Soc. Sci. Nancy (2) iii. fasc. vi. p. 19.

Alucita synnephodactyla, S. Alpheraki, Troudy Ent. Ross. x. p. 33, Patigorsk; *A. nasuta*, P. C. Zeller, Hor. Ent. Ross. xiii. p. 486, pl. v. figs. 172 *a* & *b*, Ubaque.

DIPTERA.

BY

W. F. KIRBY, M.E.S., &c.

THE GENERAL SUBJECT.

BELLESME, JOUSSET DE. Recherches expérimentales sur les fonctions du Balancier chez les Insectes Diptères. Paris: 1878, 8vo, pp. 95, woodcuts.

The writer begins by describing the structure of the halteres, and quoting from Künckel d'Herculais the opinions of previous authors as to their functions.. He then discusses the phenomena of flight and the conditions most favourable to accurate experiment, and details the results of experiments. The removal of the halteres renders flies incapable of flight; if more than half is removed, they describe a parabola, and fall on their backs, and fall in a similar manner after the first effort if they attempt to rise from a plane surface; and slighter mutilations affect the flight more or less considerably. He then discusses the phenomena of the flight of insects, and concludes that the removal of the halteres affects the centre of gravity, and thus renders the insects incapable of ascending flight.

BIGOT, J. M. F. Diptères nouveaux ou peu connus. Ann. Soc. Ent. Fr. (5) viii. pp. 31–48, 213–240, 401–446.

The characters of the genera *Pyrellia*, Rob. Desv., and *Ocyptera*, Latr., and the various families and genera of *Asilidæ* are discussed. The following notes occur:—*Laphria posticata*, Macq., is distinct from that of Say; *Volucella evecta*, Walk., is an *Eristalis*.

MIK, J. Dipterologische Untersuchungen. JB. Ak. Gymn. Wien, 1878, pp. 26, pl. i.

A large number of new genera and species of *Dolichopodidæ*, and 2 new *Empidæ* are described.

PORTCHINSKY, I. Matériaux pour servir à l'histoire de la faune Russe et Caucasienne. Les Diptères bombiformes. Troudy Ent. Ross. x. pp. 102–198, pl. iii.

A long paper, almost entirely in Russian, but a few new species and varieties are diagnosed in Latin, and tables are given of the various *Bombi* and *Diptera* which resemble each other.

Rondani, C. Muscaria exotica musei civici Januensis observata et distincta. iv. Hippoboscita exotica non vel minus cognita. Ann. Mus. Genov. xii. pp. 150–169.

Two new genera and 17 new species are characterized, and the following known species redescribed:—*Nycteribia jenynsi*, Westw., p. 151, *Lipoptena capreoli*, Rond., p. 152, *Myiophthiria reduvioides*, Rond., p. 154, *Ornithomyia batchiana*, Bell., and *fusciventris*, Wied. (? = *testacea*, Macq.), p. 158, *O. polita*, Say, p. 159; *Hippobosca canina*, Rond., *equina*, Linn., and *aegyptiaca*, Macq., p. 164, and *camelina*, Sav., p. 165.

Siebke, H., & Schneider, J. Sparre. Enumeratio Insectorum Norvegicorum. Fasc. iv. Catalogum Dipterorum continentem. Christiania: 1877, 8vo, pp. xiv., 255, map.

223 genera and 1853 species enumerated. Circumstances detailed in the preface compel Schneider to defer the publication of Catalogues of the remaining Orders of Norwegian insects for the present. The following species, &c., of Siebke's, are redescribed:—*Stratiomys paludosa*, p. 6, *Hilara tarsata*, p. 27, *Helophilus borealis*, p. 54, *Sarcophaga magnicornis*, p. 96, *Cordylura similis*, p. 140, *Psiloptera bipunctata*, Loew, var. *albitarsis*, p. 150, *Agromyza dorsata*, p. 179, *Hirtea femoralis*, p. 187, *Campolomyia alpina*, p. 206, *Sciara rufescens*, Zett., ♂, p. 214, *Erioptera arcolata* and *4-vittata*, pp. 218 & 219, *Limnobia parva* and *macroura*, pp. 225 & 226, *Tipula circumdata*, p. 231, *salicetorum* and *opaca*, p. 235, *Trichocera hirtipennis*, p. 240, *Boletophila dubia*, p. 242, *Gnoriste longirostris*, p. 244, and *Boletina conformis*. In addition to these, varieties of several other species are described, but not named.

C. W. Dale (History of Glanville's Wootton, pp. 239–293) enumerates 787 *Diptera* and 38 *Aphaniptera* as found in his district. Several new species are curtly described, and the following mentioned as new to Britain: *Platyptera modesta*, Zett., and *rufa*, Meig., *Diastata nebulosa*, Fall., *Selachops flavo-cincta*.

Plague of flies at Kilrea, in Ireland; E. A. Stewart, Sci. Goss. xiv. pp. 140 & 141.

List of *Diptera* occurring in Gudbrandsdal and Dovrefjeld; W. M. Schøyen, Nyt. Mag. Vidensk. xxiv. pp. 217–229 (22 species).

Short notes on Belgian *Diptera*, including an account of the larva of *Erebia tremula*; Jacobs, CR. Ent. Belg. xxi. pp. clii. & cliii.

Capture of *Diptera* in the Upper Engadine; C. Giebel, Z. ges. Naturw. (3) ii. pp. 215 & 216.

Additions to list of Hungarian *Diptera*; A. Mocsáry & J. Frivaldszky, Term. közlem. xiii. pp. 172–175, 367–371.

List of *Diptera* occurring in the provinces of Bihar and Hajdú, Hungary; A. Mocsáry, *op. cit.* xiv. pp. 53–61.

Captures in Northern Hungary; *id. op. cit.* xv. pp. 255–259.

List of a few *Diptera* taken in Transcaucasia; O. Schneider, Beitr. Kaukasusländer, p. 90.

List of *Diptera* captured on the expeditions to Western Yunnan; F. Moore, Anderson's Researches, pp. 919 & 920.

Remarks on a collection of *Diptera* from New Zealand ; Lincke, S. E. Z. xxxix. pp. 237 & 238.

Captures of *Diptera* in Martinique and Antigua; T. A. Marshall, P. E. Soc. 1878, pp. xxxv. & xxxvi.

Notes on *Diptera* parasitic on toads, hares, &c. ; Méguin & Girard, Bull. Soc. Ent. Fr. (5) viii. pp. iii.–v., xiii. & xiv.

Notes on luminous insects, especially *Diptera*; C. R. Osten-Sacken, Ent. M. M. xv. pp. 43 & 44.

Stomoxys calcitrans, and a new species of *Pangonia*, the cause of an outbreak of malignant pustule among cattle in New Caledonia; Méguin & Germain, Bull. Soc. Ent. Fr. (5) viii. pp. cxliv. & cxlv.

S. H. Scudder notices the following fossil *Diptera* from the Green River shales : *Chironomus* sp., *Dicranomyia primitiva*, Scudd., p. 749, *Diadocidia* (?) *terricola*, sp. n., and *Sackenia* sp., p. 750, *Stenocinclis* (g. n., near *Dioctria*, but the third longitudinal vein rises from the first before the middle of the wing, instead of from the second after its emission from the first); type, *S. anomala* (sp. n.), p. 751, *Milesia quadrata* (sp. n.), p. 752, *Chilosia ampla* (sp. n.), p. 753, *C.* sp., *Syrphus* sp., *Poliomyia* (g. n., of doubtful position, between the *Syrphidæ*, *Pipunculidæ*, and *Myopidæ*), p. 754, type, *P. recta* (sp. n.), p. 755, *Dolichopus* sp., *Tachina* sp., *Sciomyza* (?) *manca* (sp. n.), p. 756, and *S.* (?) *disjecta* (sp. n.), p. 758; Bull. U. S. Geol. Surv. iv.

CECIDOMYIIDÆ.

Löw, F. Mittheilungen über Gallmücken. Verh. z.-b. Wien, xxviii. pp. 387–406, pl. iv.

This paper contains descriptions of new species, notes on various galls the flies of which are unknown, and remarks on the following species, the three first of which are discussed in detail : *Cecidomyia betulæ*, Winnertz (pl. iv. figs. 4 *a* & *b*), *C. salicina*, Schrank, *Diplosis aphidimyza*, Rond., and *D. centaureæ*, Löw.

Tchernaieffsky, V. Sur une nouvelle maladie de la vigne. Troudy Ent. Ross. x. pp. 199–204, pl. ii.

A paper entirely in Russian, but apparently relating to a species of *Cecidomyia*.

Thomas, F. Ein neuer Stachelbeerfeind. Z. ges. Naturw. xlix. pp. 130–135.

A *Cecidomyia* larva, which destroys the blossoms of the gooseberry. The writer thinks that it may have been imported from America, and suggests its possible identity with *C. grossulariæ*, Fitch.

Notes on 23 new galls produced by *Cecidomyiidæ*; id. *op. cit.* li. pp. 703–706.

Cecidomyia sp. feeding on cranberry noticed, and transformations figured ; A. S. Packard, Rep. U. S. Geol. Surv. x. p. 525.

Cecidomyia ulmariæ. The development of its galls described and figured ; E. A. Ormerod, Ent. xi. pp. 12–14, figs. 1–5.

Hormomyia reaumuriana, sp. n., F. Löw, Verh. z.-b. Wien, xxviii. p. 387, pl. iv. figs. 1 *a–c*, Europe.

Cecidomyia lichtensteini, S. Europe, p. 392, pl. iv. figs. 2 *a–c*, and *laricis*, Styria, p. 393, spp. nn., *id. l. c.*

Diplosis corylana, id. *l. c.* p. 396, pl. iv. fig. 5, Vienna; *D. pini-rigida*, A. S. Packard, Rep. U. S. Geol. Surv. x. p. 527, Maine: spp. nn.

Bibionidæ.

On fossil species belonging to the genera *Plecia* and *Protomyia*; A. Giard, C. Brongniart, & Oustalet, Bull. Sci. Nord, (2) i. pp. 12–16, 73–81, 106 & 107.

Protomyia oustaleti, C. Brongniart, is now referred by him to *Plecia*; Bull. Soc. Ent. Fr. (5) viii. pp. xlvii. & xlviii. Many fossil species referred to *Protomyia* and *Bibio* belong to *Plecia*, and the genus *Protomyia* will probably have to be suppressed. See also Oustalet, *op. cit.* pp. lx. & lxi.

Simuliidæ.

Simulium reptans, Latr., and *maculatum*, Meig., destructive to horses and cattle in the meadows of the Elbe; Rudow, Ent. Nachr. iv. pp. 213 & 214.

Chironomidæ.

Chironomus plumosus (Blood-worm). Larva and pupa described and figured; E. Cox, Ent. xi. pp. 261–263.

Chironomus sp. Larva described and figured; *id.* Sci. Gos. xiv. pp. 269 & 270.

Blepharoceridæ.

Loew, H. Revision der *Blepharoceridæ*. Z. E. Ver. schles. vi. [1877] pp. 54–98, plate.

Not seen by the Recorder; one species (*Liponeura brevirostris*) is described as new.

Culicidæ.

"Kunga cake," a substance extensively used for food by the natives in the neighbourhood of Lake Nyassa, is prepared from swarms of a small species of *Corethra*; A. Eaton, P. E. Soc. 1878, p. lvi.

Culex mosquito. On the presence of hæmatozoa in its blood; T. R. Lewis, P. A. S. B. 1878, pp. 89–93.

Limnobiidæ.

Trochobola, Osten-Sacken. J. Mik discusses the three described species—*annulata*, L., *argus*, Say (possibly a variety of the first), and *cæsarea*, O.-S., which is undoubtedly distinct; Verh. z.-b. Wien, xxviii. pp. 617–625, pl. x. figs. 7–12 (details of *T. annulata* and *cæsarea*).

TIPULIDÆ.

BELING, T. Zweiter Beitrag zur Naturgeschichte (Metamorphose) verschiedener Arten aus der Familie der Tipuliden. Verh. z.-b. Wien, xxviii. pp. 21–56.

Describes or remarks on the transformations of 32 species.

Tipula oleracea. Habits of larva; B. H. Cowper, Ent. M. M. xv. pp. 111 & 112.

Cylindrotoma. Note on larvæ of this genus and allies; C. R. O. S. [Osten-Sacken ?], Ent. Nachr. iv. p. 5.

STRATIOTOMYIIDÆ.

Trichochæta, g. n., J. M. F. Bigot, Bull. Soc. Ent. Fr. (5) viii. p. xxii. Type, *T. nemoteloides*, sp. n., *l. c.*, Ternate.

Euplomyia, g. n., *id. l. c.* p. xxxv. Type, *E. cothurnata*, sp. n., *l. c.*, Batchian.

TABANIDÆ.

Tabanus gigas, var. *tricolor*, Zell., described and figured; J. Porchinsky, Troudy Ent. Ross. x. p. 150, pl. iii. fig. 1.

Tabanus carabaghensis, sp. n., *id. l. c.* p. 154, pl. iii. fig. 2, Caucasus.

Pangonia neocaledonica, sp. n., Mégnin, Bull. Soc. Ent. Fr. (5) viii. p. cxlv., New Caledonia.

LEPTIDÆ.

Glutops, g. n., E. Burgess, P. Bost. Soc. xix. p. 321. *Leptidæ*, allied to *Symphoromyia*. May be known by its *Musca*-like body, large head, and conical protuberances on the face, covered with long hair. Type, *G. singularis*, sp. n., *l. c.* p. 122, pl. ix. figs. 2 *a–d*, Massachusetts.

THEREVIDÆ.

Thereva fuscipennis, Meig., recorded as new to Britain; B. Cooke, Ent. M. M. xv. p. 19.

ACROCERIDÆ.

Lasia kletti, C. R. Osten-Sacken, Wheeler's Report, v. p. 805, figs. 1–3, Arizona.

Holops nigrapex and *virens*, J. Bigot, Bull. Soc. Ent. Fr. (5) viii. pp. lxxi. & lxxii., Chili.

CYRTIDÆ.

Oligoneura, g. n., J. Bigot, Bull. Soc. Ent. Fr. (5) ix. p. lxxi. Allied to *Cyrtus*, but tarsi with two pulvilli; type, *O. ænea*, sp. n., *l. c.*, Japan.

Bombyliidæ.

Chapman, T. Algernon. On the Economy, &c., of *Bombylius*. Ent. M. M. xiv. pp. 196–200.

Chiefly relates to the habits and transformations of *B. major*, which are fully described. The larva is parasitic in the cells of *Andrena labialis*.

On *Diplocampta paradoxa*, Jaenn., and allied species; Van der Wulp, Tijdschr. Ent. xxi. pp. 189–193.

Epibates ostensackeni, sp. n., E. Burgess, P. Bost. Soc. xix. p. 323, pl. ix. figs. 1 & 1 *a*, Colorado.

Nemestrinidæ.

Palembolus, g. n., S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 526. Allied to the S. African genus *Megis*; the first N. American form recorded belonging to the Rhyncocephalous division of the *Nemestrinidæ*; type, *P. florigerus*, sp. n., *l. c.* p. 528, Tertiary Shales of Florissant, Colorado (fossil).

Asilidæ.

Cyrtopogon meyerdueri, J. Mik, is said by Loew to be the same as *C. quadrizonatus*, Loew, but the latter appears to be an undescribed species; J. Mik, Verh. z.-b. Wien, xxviii. p. 626.

Dioctria kowarzi, sp. n., J. Frivaldszky, Term. közlem. xiii. p. 36 8, Hungary.

J. M. F. Bigot, Ann. Soc. Ent. Fr. (5) viii., describes the following new species :—

Laphria varipes, S. Europe ?, p. 222, *semifulva*, E. Indies, p. 223, *melania*, Moluccas, and *claripennis*, Ceylon, p. 224, *franciscana*, California, and *rubescens*, Colombia, p. 225, *calopogon*, Australia, and *corallogaster*, N. America, p. 226.

Pogonosoma arachnoides, p. 227, Mexico.

Andrenosoma vidua, p. 228, Australia.

Dasyllis albicollis, p. 229, S. America.

Dasythrix (?) *nigrapex*, p. 229, Natal.

Maira paria, E. Indies, and *cambodgiensis*, Cambodia, p. 230, *bisnigra* and *smaragdina*, Batchian, p. 231, *pachycera*, and *waigiensis*, Waigiou, p. 232.

Thereutria caligula, p. 233, Australia.

Lamprozona castaneipes, p. 234, Chili.

Cormansis eupoda, Mexico, p. 234, and *cyanescens*, Chili, p. 235.

Aphestia nigra, p. 235, Mexico.

Atomosia soror, p. 236, Mexico.

Eumecosoma dicroma, p. 236, Brazil.

Lampria scapularis, Para, and *parvula*, Brazil, p. 237.

Cerotania (?) *nigra* and (?) *dubia*, p. 238, Mexico.

Phoneus flavotibius, p. 239, Haiti.

Michotamia annulata, p. 239, Burmah.

Microstylum amoyense, Amoy, p. 401, *erythropygum*, p. 402, and *basirufum*, Assam, *brevipennatum*, E. Indies, p. 403, *eximium* and *hæmorrhoidale*, p. 404, *nitidiventris*, Burmah, *nigrum*, Cambodia, p. 405, *villosum*, Cape of Good Hope, and *sagitta*, Natal, p. 406, *varipennatum*, p. 407, *capucinum*, Cape of Good Hope, and *nigribarbatum*, p. 408, *elongatum* and *fulvicaudatum*, Natal, p. 409, and *fulvigaster*, Mexico, p. 410.

Dasypogon pekinense [*-sis*: πώγων, a beard, is masculine], N. China, p. 410, *japonicum*, Japan, and *bilimbatum*, p. 411, and *quadrinotatum*, California, p. 412.

Saropogon scalare, E. Indies, and *hyacinthinum*, p. 413, *nigrinasutum* and *fraternum*, Chili, and *semirufum*, Australia, p. 414.

Diogmites atratus, p. 415, *rufibasis*, Brazil, and *D.* (?) *notatus*, Amazons, p. 416.

Laparus (?) *pictitarsis*, p. 417, California.

Allopogon gracile, p. 418, Uruguay.

Scilopogon gougeleti, p. 418, *olcesci* [sic: ? *olcesii*], Tangiers, and *rubiginosum*, N. America, p. 419.

Stenopogon bicolor, S. Europe, p. 420, *fusco-limbatum*, Mexico, and *fraternum*, Australia, p. 421, *albibasis*, California, p. 422.

Anisopogon vespoides and *senile*, p. 423, California.

Lastaurus fenestratus, p. 424, N. Granada.

Lochites testaceus, Burmah, p. 425, *asiloides*, Brazil, and *fulvus*, Amazons, p. 426, and *nigriventris*, Chili, p. 427.

Stenobasis modestus, p. 427, Amazons.

Xyphocerus maculatus, p. 428, *variegatus*, Cape of Good Hope, and *fulvicollis*, Natal, p. 429.

Laphyctis stigmaticalis, p. 430, Ceylon.

Lasiocnemus calceolatus, p. 430, Amazons.

Cacodæmon quadrinotatum, p. 431, Chili.

Bathypogon cinereum, Colombia, and *parvum*, Chili, p. 432, *maculipes*, Australia, p. 433.

Triclis notata, p. 433, N. America.

Scylaticus pantherinus, Senegal, and *ruficauda*, Amazons, p. 434, *vertebratus*, Java, and *rubripes*, Chili, p. 435.

Cyrtopogon (?) *rufitibiale*, p. 436, Europe.

Holopogon tenerum, Chili, and *nitidiventris*, p. 437, and *H.* (?) *appendiculatum*, California, p. 438.

Olipogon atrum, p. 439, Natal.

Stichopogon punctiferum, Mauritania, p. 439, *scalare*, Fiji, and *cinctellum*, Tidore, p. 440.

Gonioscelis calopus and *maculiventris*, p. 440, Natal.

Codula quadricincta, p. 442, Australia.

Ceraturgus geniculatus, p. 443, Mexico.

Damalis saigonensis, p. 443, Saigon.

Leptogaster simplex, Ceylon, and *scapularis*, California, p. 444, *nubeculosus*, Colombia, and *antipodus* [*-dum*], Tasmania, p. 445, *fulvipes*, Ternate, p. 446.

EMPIDÆ.

Empis dasychira, sp. n., J. Mik, JB. akad. Gymn. Wien, 1878, p. 24, Gastein.

Ardoptera oblongo-guttata, sp. n., C. W. Dale, "History of Glanville's Wootton," p. 264, Dorset.

Rhamphomyia erberi, sp. n., J. Mik, *l. c.* p. 22, Dalmatia.

Dolichopodidæ.

Kowarz, F. Die Dipteren-Gattungen *Argyra*, Macq., und *Leucostola*, Löw. Verh. z.-b. Wien, xxviii. pp. 437–462, pl. v.

The European species, including 2 new ones, are described in full, and dichotomous tables are prefixed. The plate is devoted to details. (*Cf.* J. Mik, *tom. cit.* SB. p. 32.)

Porphyrops holmgreni, Mik, = *Rhaphium spinicoxa*, Zett.; *Asyndetus latifrons*, Loew, is a *Diaphorus*; *A. varus*, Loew, ♀ described; *Sphyrotarsus argyrostomus*, both sexes fully described: J. Mik, Dipterologische Untersuchungen.

New genera and species :—

Pœcilobothrus, J. Mik, *l. c.*, to contain *Gymnopternus regalis*, and allies.

Pterostylus, id. *l. c.* Type, *Gymnopternus aberrans*, Loew.

Macellocerus, id. *l. c.*, intermediate between *Tachytrechus* and *Halticericerus*.

Dasyarthrus, id. *l. c.* Type, *Gymnopternus inornatus*, Loew.

Lasiargyra, id. *l. c.* Allied to *Argyra*.

Acropsilus, id. *l. c.* Type, *Chrysotus niger*, Loew.

Micromorphus, id. *l. c.* Type, *Hydrophorus albipes*, Zett.

Oligochætus, id. *l. c.*, section of *Medeterus*.

Lamprochromus, id. *l. c.* Type, *Chrysotus elegans*, Meig.

Ectomus, id. *l. c.* Allied to *Campsicnemus*.

Allæoneurus, id. *l. c.* Allied to *Liancalus*.

Schœnophilus, id. *l. c.* Allied to *Thinophilus*; type, *D. versatus*, Walk.

Hypocharassus, id. Verh. z.-b. Wien, xxviii. p. 627. Allied to *Machærium*, but the first joint of the antennæ set with bristles above; type, *H. gladiator*, sp. n., *l. c.* p. 629, pl. x. figs. 1–6, Georgia.

Dolichopus gubernator, id. Dipterologische Untersuchungen, Austria.

Hercostomus lorifer, id. *l. c.*, California.

Orthochile rogenhoferi, id. *l. c.*, S. Tyrol.

Xiphandrium ca[l]linotum, id. *l. c.*, Bohemia, Austria.

Argyra lœwi, p. 446, and *spoliata*, p. 455, F. Kowarz, Verh. z.-b. Wien, xxviii., both from Bohemia.

Syrphidæ.

J. Portschinsky (Troudy Ent. Ross. x. pl. iii.) describes and figures several varieties of *Chilosia ochracea*, from the Caucasus (pp. 161–164, figs. 3–6), and *Volucella bombylans*, var. *caucasica* (p. 167, fig. 7). He also figures the ♀ of *Eristalis apiformis*, Fall., and *Mallota tricolor*, Loew (figs. 8 & 11).

Acrochordonodes, g. n., J. M. F. Bigot, Bull. Soc. Ent. Fr. (5) viii. p. xcvii. Allied to *Stenogastra*, but abdomen slightly depressed, not

broad, but neither contracted nor cylindrical, the segments above and on each side forming a strong tubercle; type, *A. vittatus*, sp. n., *l. c.*, Cayenne.

Mallota rossica, sp. n., J. Portschinsky, Troudy Ent. Ross. x. p. 175, pl. iii. figs. 9 & 10, Russia.

Merodon caucasicus, p. 181, pl. iii. fig. 12, and *gudaurensis*, p. 182, *id. l. c.*, Caucasus, spp. nn.

Conopidæ.

Conops flavipes, var. described; H. Gradl, Ent. Nachr. iv. p. 238.

Muscidæ.

Hagen, H. A. On Larvæ of Insects discharged through the Urethra. P. Bost. Soc. xx. pp. 107–118.

Relates chiefly to Dipterous larvæ (*Homalomyia*, &c.).

Meade, R. H. Notes on the *Anthomyiidæ* of North America. Ent. M. M. xiv. pp. 250–252.

Contains the results of his examination of a large collection, and points out the great similarity of most of the species to those of Europe.

J. Portschinsky publishes a long paper, entirely in Russian (Troudy Ent. Ross. ix. pp. 3–177, pls. i.–iii., and woodcuts), on *Diptera* parasitic on man. Three species of *Sarcophila* are diagnosed in Latin.

A. Lelièvre publishes a list of the species of *Lucilia* and allies which he has met with in the neighbourhood of Valenciennes. His synonymic notes appear to be only suggestions, and are therefore not reproduced here. Bull. Sci. Nord (2) i. pp. 85–87.

Teeth of the Blowfly described and figured; L. G. Mills, Sci. Gos. xiv. pp. 147–150, woodcuts.

A larva belonging to the *Muscidæ* inhabiting the rolled tips of the fronds of *Pteris aquilina*; F. Thomas, Z. ges. Nat. li. p. 706.

Sarcophila meigeni, Schm. (*Sarcophaga ruralis*), Meig., redescribed and figured; Portschinsky, *l. c.* p. 117, pl. iii. figs. 1–3.

Lucilia bufonivora and its parasites; J. Lichtenstein, Feuil. Nat. viii. p. 35.

Glossina morsitans noticed; Hartmann, SB. Nat. Fr. xix. pp. 205 & 206.

Anthomyia nigritarsis, Zett., mining in *Atropa belladonna*; Kriechbaumer, CB. Ver. Regensb. xxx. p. 158.

Amphipogon spectrum, Wahlb. J. Mik discusses the habits and characters of this species, and refers the genus to the neighbourhood of *Mycetaulus*; Verh. z.-b. Wien, xxviii. pp. 473–476, fig.

Alophora (*Hyalomyia*) *aurigera*, Egger. Sexes described; E. Girschner, S. E. Z. xxxix. pp. 195 & 196.

Trypeta sp. injurious to celery; Heaton & Fitch, Ent. xi. p. 257.

Parydra pinguis, Walk., redescribed by H. Loew, Z. ges. Nat. li. p. 199.

New genera and species:—

Laglaizia, J. M. F. Bigot, Bull. Soc. Ent. Fr. (5) viii. p. xxii. Allied to *Diopsis*: type, *L. calliptera*, sp. n., *l. c.*, New Guinea.

Callisto [*r*] *rhina*, id. *l. c.* Apparently belongs to Rondani's section, *Loncheina*; type, *C. vittigera*, sp. n., *l. c.* p. xxxiv., Ternate.

Ceratopelta, id. *l. c.* p. xxxiv. Allied to *Platystoma* (*Trypetidæ*); type, *C. tricolor*, sp. n., *l. c.* p. xxxv., New Guinea.

Sarcophila wohlfahrti, p. 120, figs. 4–6 (*S. magnifica*, Schm.), and *maxima*, p. 122, figs. 7 & 8: Portschinsky, Troudy Ent. Ross. ix. pl. iii. Russia, &c. (Pls. i. & ii. represent the transformations of the former.)

Phumosia tessellata, Senegal, and *trifaria*, Natal, J. M. F. Bigot, Ann. Soc. Ent. Fr. (5) viii. pp. 31 & 32.

Pyrellia sivah, India, p. 33, *stella*, Ceylon, *gemma*, Bissao, and *viola*, p. 34, *spinthera*, Natal, and *scapulata*, p. 35, *iris*, Mexico, *chloe*, Quito, and *flora*, Haiti, p. 36, *egle*, Australia, and *pepita*, Celebes, p. 37, *id. l. c.*

*Cosmina diadema*ta, id. *l. c.* p. 37, Cape of Good Hope.

Ochromyia hemichlora, Natal, and *nigrifrons*, Brazil, *id. l. c.* pp. 38 & 39.

Cyrtoneura pictipennis, id. *l. c.* p. 39, Brazil.

Ocyptera trinacrina, Sicily, and *californica*, p. 42, *fumipennis*, p. 43, California, *binotata*, Baltimore, and *obscura*, p. 44, Brazil, *apicalis*, Chili, and *tristis*, Australia, p. 45, *soror*, p. 46, and *simplex*, p. 47, Mexico, *id. l. c.*

Celyphus harmandi, H. Lucas, Bull. Soc. Ent. Fr. (5) viii. p. xl., Cochin China (= *Paracelyphus hyacinthus*, Guér.; see J. M. F. Bigot, *tom. cit.* p. xlix. Lucas, *l. c.* pp. xlix. & l., admits their resemblance, and subsequently, pp. lxx. & lxxi., their identity); *C. galamensis*, Bigot, *tom. cit.* p. xlix., Galam, Senegal.

Paralimna decipiens, H. Loew, Z. ges. Nat. li. p. 195, Texas.

Notiphila macrochæta, Texas, p. 194, *avia*, Hudson's Bay, p. 195, and *erythrocera*, Cuba, p. 196, *id. l. c.*

Psilopa æneo-nigra, p. 196, *pulchripes* and *atrimana*, p. 197, *id. l. c.*, Texas, &c.

Athyroglossa glaphyropus, id. *l. c.* p. 197, Texas.

Pelina truncatula, id. *l. c.* p. 198, Texas.

Parydra unituberculata, Colombia, p. 200, *imitans*, Massachusetts and *limpidipennis*, Colombia, p. 201, and *appendiculata*, p. 202, *id. l. c.*

Œstridæ.

Œstrus equi and *hæmorrhoidalis* and *Pharyngomyia picta*, Meg., noticed; Mégnin, Bull. Soc. Ent. Fr. (5) viii. pp. xl., xli., & lxxiv. See also A. Laboulbène, *op. cit.* p. liii.

Phoridæ.

Leptophora perpusilla, g. & sp. nn., G. A. Six, Tijdschr. Ent. xxi. p. 185, Holland.

Phora carpentieri, sp. n., Gobert, Bull. Soc. L. N. Fr. No. 55 (1877), p. 202, France.

Streblidæ.

Kolenatia, g. n., C. Rondani, Ann. Mus. Genov. xii. p. 169. Allied to *Raymondia* and *Brachytarsina*; type, *Strebla wiedemanni*, Kol. (excl. syn.).

Brachytarsina (Macq.; recharacterized, *l. c.*) *amboinensis*, sp. n., *id. l. c.* p. 166, Amboina.

Strebla (Wied.; recharacterized, p. 167) *mexicana*, sp. n., *id. l. c.* p. 168, Mexico.

Hippoboscidæ.

Lipoptena cervi, L. On the loss of its wings; P. Bertkau, Verh. Ver. Rheinl. xxxv. SB. pp. 178 & 179.

Ornithoica [*-œca*], g. n., C. Rondani, Ann. Mus. Genov. xii. p. 159. Allied to *Ornithomyia* and *Olfersia*; type, *O. beccariina*, sp. n., *l. c.* p. 160, Amboina.

New species :—

Lipoptena mazamæ, id. *l. c.* p. 153, S. and Central America.

Myiophthiria capsoides, Philippines; and *lygœoides*, Amboina, *id. l. c.* pp. 154 & 155.

Ornithomyia andaiensis, New Guinea, *gestroi*, Island of Galita, *bellardiana*, Mexico, and *hatamensis*, New Guinea, *id. l. c.* pp. 155–158.

Olfersia macquarti (= *fusca*, Macq., olim), p. 160, N. Granada, *pallidilabris*, p. 161, and *obliquinervis*, Mexico, and *papuana*, New Guinea, p. 162, *id. l. c.*

Hippobosca bactriana, id. *l. c.* p. 165, Persia and Massowa.

Nycteribidæ.

Cyclopodia albertisi, C. Rondani, Ann. Mus. Genov. xii. p. 150, Goram.

Nycteribia ferrarii, Batavia, and *bellardii*, S. America, *id. l. c.* pp. 151 & 152.

(APHANIPTERA.)

Pulicidæ.

Bertè, F. Contribuzione all' anatomia ed alla fisiologia delle antenne degli Afanitteri. Atti Acc. Rom. (3) Mem. Sci. Fis. ii. pp. 24–29, pl.

Relates to *Pulex irritans*.

Pulex gliris, p. 290, on dormice, *furoris* [sic], on ferrets, *mustelæ*, on weasels, *cuniculi*, on rabbits [described in two words!], p. 291, spp. nn., C. W. Dale, "History of Glanville's Wootton."

Ceratophyllus sorecis [sic], on shrews, *minor*, on moles, (*Ceratopsyllus*) *gallinulæ*, in moorhens' nests, *monedulæ*, in jackdaws' nests, *turdi*, in song-thrushes' nests, p. 291, *viscivora* [sic], in stone-thrushes' nests, *merulæ*, in blackbirds' nests, *garruli*, in jays' nests, *pyrrhulæ*, on bullfinches, *citrinellæ*, in yellowhammers' nests, *pratensis*, in meadow-pipits' nests, *atricapillæ*, in blackcaps' nests, *cinereæ*, in whitethroats' nests, *arvensis*, in skylarks' nests, *trochili*, in willow-wrens' nests, *caudati*, in long-tailed tits' nests, *spini* [sic], off siskin, *anas* [*œnadis*!], in stock-doves' nests, p. 292, *palumbi*, p. 293, in wood-pigeons' nests, spp. nn., *id. l. c.* [the descriptions occupying from two to nine words!].

NEUROPTERA.

BY

ROBERT MCLACHLAN, F.R.S., F.L.S., &c.

THE GENERAL SUBJECT.

BRAUER, FRIEDRICH. Ueber einige neue Gattungen und Arten aus der Ordnung der Neuropteren, Lin. SB. Ak. Wien, lxvii. Abth. 1, pp. 193–206.

——. Verzeichniss der Neuropteren Deutschlands und Œsterreichs. Auszug die Neuropteren Europa's von Prof. Dr. Brauer, mit Zusätzen und Verbesserungen von ebendems. Ent. Nachr. iv. pp. 69–74, 85–90.

MCLACHLAN, ROBERT. Scientific Results of the second Yarkand Expédition, based upon the collections and notes of the late Ferdinand Stoliczka, Ph.D. *Neuroptera*, pp. 1–6. Calcutta: 1878, 4to. Printed by order of the Government of India.

Notices 15 species, of which 4 are *Odonata*, 1 *Ephemeridæ*, 3 *Perlidæ*, 1 *Myrmeleonidæ*, 3 *Chrysopidæ*, and 3 *Trichoptera*. The general aspect is European; all the Dragon-flies are European, two of them being British.

PROVANCHER, L. Additions et Corrections aux Névroptères de la Province de Québec. Nat. Canad. x. pp. 124–147, 367–369.

Concludes with a table supposed to facilitate the determination of Canadian *Neuroptera*, and with a list in which 139 species are enumerated.

RUDOW, F. Verzeichniss der in Mecklenburg bis jetz aufgefundenen Neuropteren. Arch. Ver. Mecklenb. xxxi.

Not seen by the Recorder.

Additions, &c., to the Hungarian fauna are given by A. Mocsáry in Term. közlem. xv. pp. 259 & 260.

Species (in all groups) found in Gudbransdal and the Dovrefjeld, in Norway, including many new to that country, are enumerated by W. M. Schøyen, in N. Mag. Naturv. xxiv. pp. 208–211.

Notes on captures by A. E. Eaton in France; McLachlan, Ent. M. M. xv. p. 112.

TRICHOPTERA.

MCLACHLAN, ROBERT. A Monographic Revision and Synopsis of the *Trichoptera* of the European Fauna. Part vii. pp. 349–428, pls. xxxviii.–xliv. (June, 1878). London and Berlin: 8vo.

Occupied by the *Hydropsychidæ* (with which the *Œstropsidæ* are united). As in former Records, only the new genera and species are here noticed, in consequence of the intricacies of synonymy.

FRITZ MÜLLER gives notes on the cases of various Brazilian species in anticipation of a more extended memoir on the subject, and calls attention to the homology existing between the wing-nervures of Trichopterous insects and those of *Lepidoptera*; P. E. Soc. 1878, pp. lv.–lvi.

Additions to the species found in the Clyde Valley; F. G. Binnie, P. N. H. Soc. Glasg. iii. p. 258.

Indusia calculosa, Scudder, Bull. U. S. Geol. Surv. iv. p. 542. This name is proposed for certain fossil caddis-worm cases from Wyoming, considered to be analogues of those found in the Indusial Limestone of Auvergne, and possibly belonging to the *Limnophilidæ*.

Limnophilidæ.

Limnophilus griseus appearing in an immense swarm at Halle and vicinity; Taschenberg, Z. ges. Naturw. (3) iii. p. 344.

Stenophylax micravlax, sp. n., McLachlan, Sci. Results Yarkand Expedition, Neuropt. p. 3, woodcuts, Leh.

Sericostomatidæ.

ROUGEMONT, PH. DE. Ueber *Helicopsyche*. Zool. Anz. 1, pp. 393 & 394.

Announces the breeding of *Helicopsyche* (referred to *agglutinans*) from cases found at Amalfi, near Naples.

SIEBOLD, C. VON. La *Helicopsyche agglutinans* in Italia; lettera seconda agli entomologi Italiani. Bull. Ent. Ital. x. pp. 81–90.

Concerns the discovery of cases of *Helicopsyche* by G. B. Adami at Edolo in Brescia, with general remarks.

Dinarthrum inerme, sp. n., McLachlan, Sci. Results Yarkand Expedition, Neuropt. p. 5, woodcuts, Leh.

Hydropsychidæ.

R. McLachlan (Revision and Synopsis, pt. vii.) describes 73 species as belonging to the European fauna, and figures details of all (with one or two exceptions). He divides the family into five sections as follows:—1, equivalent to the family *Œstropsidæ* of Brauer, perhaps scarcely distinct from 2, which includes *Macronema* and allies; 3, consisting of the single genus *Hydropsyche*; 4, *Philopotamus*, *Polycentropus*, and allies; 5, *Tinodes*, *Psychomyia*, and allies.

F. A. Forel attributes certain sculptured markings on the limestone pebbles on the shores of Lake Leman to the action of the larvæ of some species of this family; Bull. Soc. Vaud. (2) xv. Proc. verb. p. 29.

New genera :—

Holocentropus, McLachlan, *l. c.* p. 400. Established for the reception of *Polycentropus dubius* (as type), *P. picicornis*, &c.

Lype, id. *l. c.* p. 422. Separated from *Psychomyia* on account of the dilated intermediate legs of the ♀, the presence of an elongated ovipositor in that sex, &c. Includes *P. phæopa*, Steph., *reducta*, Hag., and *L. sinuata*, sp. n., p. 424, pl. xlv., Austria and Finland.

New species :—

Hydropsyche stimulans, McLachlan, *l. c.* p. 369, pl. xxxix., Turkistan.

Diplectrona atra, p. 377, pl. xl., Tyrol.

Philopotamus insularis, p. 384, Guernsey.

Dolophilus pullus, p. 389, pl. xli., Switzerland and Saxony.

Wormaldia triangulifera, p. 390, pl. xli., France, *mediana*, p. 391, Scotland (and Hungary ?).

Tinodes braueri, p. 414, pl. xliv., Greece, *manni*, p. 415, pl. xliv., Asia Minor, *locuples*, p. 417, pl. xliv., Sicily, *pallidula*, p. 419, pl. xliv., Saxony and France, *zelleri*, p. 420, pl. xliv., Carinthia, *rostocki*, ibid., pl. xliv., Saxony, Silesia, Greece.

Hydroptilidæ.

GUINARD, EUGÈNE. Métamorphoses d'un genre nouveau de Phryganide (*Leiochiton fagesii*). Mém. Ac. Montp. ix. pp. 139–143, pl. vi.

Concerns a species of this family found near Montpellier; the details not sufficiently precise for purposes of identification (the larva has been previously noticed as *Hydroptila flabellifera*, Bremi).

NEUROPTERA-PLANIPENNIA.

Panorpidæ.

Bittacus hageni, Brauer, found at St. Cloud; Poujade, Bull. Soc. Ent. Fr. (5) viii. p. cxix.

Holcorpa, g. n., Scudder, Bull. U. S. Geol. Surv. iv. p. 540. Proposed for a fossil from Western N. America (*H. maculosa*, id. *l. c.* p. 542), considered as undoubtedly pertaining to this family, and remarkable for the apparently almost total absence of transverse nervules in the wings.

Sialidæ.

Neuromus dichrous, sp. n., Brauer, SB. Ak. Wien, lxvii. Abth. 1, p. 205, Borneo.

Corydalites fecundum. Under this name Scudder (Bull. U. S. Geol. Surv. iv. p. 537) describes certain fossils from Western N. America, presumed to represent the eggs of an insect allied to *Corydalis*, and double the size of *S. cornuta*.

Myrmeleonidæ.

Dendroleon pantherinus, F., occurs at Fontainebleau; Poujade, Bull. Soc. Ent. Fr. (5) viii. p. cxix.

Myrmeleon formicalynx pupating without forming a cocoon; F. Rudow, Ent. Nachr. iv. p. 272.

Ascalaphidæ.

Ascalaphus longicornis. Notes on eggs and young larvæ of this species found by Ragonot in the Forest of Lardy, near Paris. McLachlan, P. E. Soc. 1878, p. 1; Ragonot, Bull. Soc. Ent. Fr. (5) viii. p. cxx.

According to A. Giard, Bull. Sci. Nord, (2) i. p. 115, the fossil described by Oustalet as *Ascalaphus edwardsi* has no connection with this group, but probably pertains to the *Orthoptera*.

Chrysopidæ.

Hypochrysa nobilis, Heyden, occurs at Fontainebleau; Poujade, Bull. Soc. Ent. Fr. (5) viii. p. cxix.

Chrysopa tenella, Schneider. Notes on its occurrence in Britain; McLachlan, Ent. M. M. xv. p. 91.

Osmylidæ.

Sisyra. The three European species are found at Paris; McLachlan, Bull. Soc. Ent. Fr. (5) viii. p. cxviii.

Pseudo-Neuroptera.

Thysanura.

Smynthurus lupulinæ, Bourlet, mistaken for *Phylloxera*, and erroneously considered to cause damage to vines at Bar-le-Duc, in France. Mégnin, Bull. Soc. Ent. Fr. (5) viii. p. cxxxv.

Notes on three Arctic species found N. of 78° during the voyage of the 'Alert' and 'Discovery,' are given by the Recorder in P. L. S., xiv. p. 119.

Podur[o]hippus, g. n. Mégnin, Bull. Soc. Ent. Fr. (5) viii. p. cxiv. Between *Achorutes* and *Lipura*. Without scales; abdomen of nine segments; short saltatory apparatus; the joints of the antennæ unequal. Type, *P. pityriasicus*, sp. n., *ibid.*; found on horses affected with pityriasis at Bolbec, in Normandy.

Smynthurus quadrimaculatus, sp. n., Ryder, P. Ac. Philad. 1878, p. 335, fig., United States.

Mallophaga.

Gurlt, —. Neue Verzeichniss der Thiere auf welchen Schmarotzer-Insecten leben. Arch. f. Nat. xliv. pp. 162–210.

A useful list of mammals and birds known to be infested by *Mallophaga* (and *Anoplura*), with the names of the parasites.

A *Physostomum* ("not unlike *Ph. mystax*") found on a linnet in England, noticed and figured by W. A. Hyslop, Sci. Gos. xiv. p. 233.

Notes on 7 species found north of 78° during the voyage of the 'Alert' and 'Discovery' toward the North Pole, are given by the Recorder, *l. c.* pp. 118 & 119. They comprise *Docophorus ceblebrachys*, Nitzsch, on

Nyctea scandiaca; *D.* sp. ? on *Tetrao rupestris*; *D.* sp. ? on *Bernicla brenta*; *Nirmus cingulatus*, Burm., on *Tringa canutus*; *N. phœonotus* on *Phalaropus lobatus*; *Colpocephalum*, sp. ? on *Strepsilas interpres*; and *Menopon gonophæum*, Burm., var. ?, on *Corvus corax*.

New genera and species :—

Acidoproctus, g. n., Piaget, Tijdschr. Ent. xxi. p. 179. Separated from *Nirmus* by the crenulation of the front of the head, a second band on the abdomen, and the conical form of the two terminal segments. Includes *Nirmus stenopygus*, Nitzsch, and the following spp. nn. : *A. marginatus*, p. 179, pl. xii. fig. *c*, on *Larus spinicauda*; *bifasciatus*, p. 181, pl. xii. fig. *g*, on *Dromas ardeola*, *maximus*, p. 183, pl. xii. figs. *e* & *f*, on *Dendrocygnus arboreus* and *guttatus*, and on a *Plotus*.

Thysanoptera.

For notes on the damage caused to rye by *Thrips cerealium*, cf. G. Becker, SB. Ver. Rheinl. xxxiv. p. 168, and Kronicke, *l. c.* p. 330.

Aptinothrips fasciatus, sp. n., Butler, Ann. N. H. (4) xvii. p. 412, Rodriguez.

Termitidæ.

Hagen, H. A. Some Remarks on White Ants. P. Bost. Soc. xx. pp. 121–124.

Important notes on embryology, physiology, habits, &c. The author says that according to the observations of Mr. Hubbard, in Jamaica, the young are fed with prepared food, stored up in the form of hard masses of comminuted wood, and the sclerotia of fungi are also provided, apparently for the newly emerged larvæ.

Hubbard, H. G. Notes on the Tree Nests of Termites in Jamaica. P. Bost. Soc. xix. pp. 267–275.

Very important notes on the habits of several species of *Termitidæ*, with names supplied in foot-notes by Hagen, and an additional observation on *Eutermes ripperti* by Scudder.

On the habits of some species (given as "*destructor*, F. ?") in Antigua; T. A. Marshall, P. E. Soc. 1878, p. xxxiv.

Termes trinervius distils an acid liquid from the cephalic process, which latter has a duct through it; J. P. Mansel Weale, P. E. Soc. 1878, p. ix. *Cf.* McLachlan, *l. c.* p. xii. for reference to a similar recorded habit in *T. ripperti*.

A Spanish man-of-war, recently returned from the Philippines, completely destroyed by a species of this family in the port of Ferrol; Seoane, CR. Ent. Belg. xxi. p. ccxxv.

Termes contusus, sp. n., Scudder, P. Bost. Soc. xix. p. 300, fossil in the Carboniferous of Illinois.

Embidæ.

With reference to the discussion between Girard and Bolivar as to

Embia being indigenous in Europe (*cf.* Zool. Rec. xiv. *Ins.* p. 203), McLachlan states that there can be no doubt as to perhaps more than one species being actually native in that continent. Pet. Nouv. ii. p. 193.

Psocidæ.

Burgess, E. The Anatomy of the Head, and the Structure of the Maxilla, in the *Psocidæ*. P. Bost. Soc. xix. pp. 291–206, pl. viii.

A very valuable contribution to the anatomy of these insects.

Rostock, M. Die Ephemeriden und Psociden Sachsens. (See *Ephemeridæ*.)

Descriptions of 32 species in tabular form (*Elipsocus cyanops*, given as sp. n., was noticed in Zool. Rec. xiii. *Ins.* p. 204).

Spångberg, Jacob. Psocina Sueciæ et Fenniæ. Œfv. Ak. Förh. 1878, No. 2, pp. 5–29, pls. i. & ii.

A monograph of 18 described species. The plates are occupied by details of the neuration both generic and specific.

Ephemeridæ.

Joly, Émile. Nouvelles observations sur le genre *Prosopistoma*. Pet. Nouv. ii. p. 265.

Concerns the discovery of *P. punctifrons* in the Rhone. *Cf.* Bull. Soc. Ent. Fr. (5) viii. p. lix.

——. Les premiers états du genre *Oligoneuria* sont connus. Bull. Soc. Nîmes, vi. with plate.

A sketch of what has hitherto been written on the subject; the figures represent (in outline) the larvæ of *O. garumnica*, Joly. On the same subject, *cf.* Albert Müller, MT. schw. ent. Ges. pp. 384–386 (*O. rhenana*, with which Joly's species is identical).

Rostock, M. Die Ephemeriden und Psociden Sachsens. JB. Ver. Zwickau, 1877 (1878), pp. 76–100.

Contains descriptions, in a tabular form, of 48 species, mostly occurring in the Kingdom of Saxony. (Review by Schiller, SB. Ges. Isis, 1878, p. 178).

Potamanthus luteus again found in England; McLachlan, Ent. M. M. xv. p. 92.

New genus and species:—

Ametropus, g. n., Albarda, Ent. M. M. xv. p. 129. Allied to *Siphlurus* and *Heptagenia*; type, *A. fragilis*, sp. n., *id. ibid.*, Holland.

Heptagenia cærulans, p. 89, and *flava*, p. 90, Rostock, *l. c.* Saxony.

Centroptilum tenellum, Albarda, Ent. M. M. xv. p. 128, Holland.

Isonychia ferruginea, id. *ibid.*, Holland and France.

Odonata.

Buchecker, Heinrich. Systema Entomologiæ, sistens insectorum classes, genera, species. Pars i., *Odonata* (Fabric.) Europ.; xli. tabulæ photograph. floridisque coloribus distinctæ. München: 8vo, pp. 1–16, 42 plates [not 41, as stated in the title]. Also pp. i.–iv. occupied by an Index tabularum generum, specierum. [The title-page is dated "1876," the work appeared in parts, and it is doubtful if any were published until 1877 or 1878, and it was probably only completed in 1879. Reviewed, very severely, by Brauer, Ent. Nachr. v. pp. 24–26.]

This is an extraordinary work, apparently by a photographer, who has adapted his art to the production of plates of most of the European *Odonata*, the bodies, &c., having been subsequently coloured (and in some cases the plan has been more than fairly successful). The unscientific author divides the *Odonata* into three "sections," *Libellulidæ*, *Calopterygidæ*, and *Agrionidæ*. The *Libellulidæ* are further divided into *Monotoxophlebiæ* (including all the true *Libellulina* in which the sectors of the arculus are petiolate at the base), *Dytoxophlebiæ* (including *Libellula* as restricted by Brauer, and *Platethrum*), and *Dyanomiaphlebiæ* (further subdivided into *Epithecinæ*, *Cordulinæ*, *Gomphinæ*, *Cordulegastrinæ*, and *Æshnidæ*, sic!). The *Calopterygidæ* contain only one division (*Dyorthophlebiæ*). The *Agrionidæ* also only one (*Rhomboideæ*).

Goss, H. Note on a fossil wing of a Dragon Fly from the Bournemouth Leaf Beds. Ent. xi. pp. 193–195.

Concerns the well-preserved wing of a species of *Æschnidæ*, with woodcut.

Kolbe, H. Ueber die in der Umgegend von Münster gefundenen Libelluliden. JB. Ver. Rheinl. 1877–78.

Not seen by the Recorder; enumerates 43 species, with notes on habits.

Poletajeff, N. Notice sur les glandes salivaires des Odonates. Troudy Ent. Ross. x. pp. 99–101.

[In the Russian language, with translated title.]

Schoch, G. Analytische Tafeln zum Bestimmen der schweizerischen Libellen. MT. schw. ent. Ges. v. pp. 331–352.

A series of tables, preceded by extended notes on external anatomy, and followed by a list of species with measurements. The author recognizes (in his list) 65 species as Swiss, as follows:—20 *Libellulina*, 6 *Cordulina* (including *Epitheca bimaculata* wrongly placed in the first subfamily), 7 *Gomphina*, 9 *Æschnina*, 2 *Calopterygina*, and 21 *Agrionina*; but he holds that *Sympetrum vulgatum* and *striolatum* are not specifically distinct.

Selys-Longchamps, E. de. Odonates de la Région de la Nouvelle Guinée. MT. Mus. Dresd. iii. pp. 287–322.

The region comprises New Guinea, the Moluccas, and Celebes. The

paper commences with generalities, and a systematic list of species, followed by the descriptive portion.

Spagnolini, A. Di alcune Libellule raccolte nei dintorni di Constantinopoli. Bull. Ent. Ital. ix. pp. 302–310.

Enumerates 20 species.

Stefanelli, P. Sui Libellulini (Odonati) dei dintorni di Firenze. *Tom. cit.* pp. 249–251.

Enumerates 25 species.

——. Nuove indagini sulla Conservazione delle Libellule a colori fugaci. *L. c.* pp. 311–316.

Bruttan, SB. Ges. Dorpat, v. p. 114, has notes on the *Odonata* of Livland and Estland, noticing also the occurrence of *Æschna borealis*, Zett., and *Cordulia arctica*, Zett., as new to the fauna.

De Selys-Longchamps gives general notes on species from New Guinea. Bull. Soc. Ent. Fr. (5) viii. p. cx.

Libellulina.

Selys-Longchamps, E. de. Note sur deux Libellulines du genre *Urothemis*. CR. Ent. Belg. xxi. pp. lxiv.–lxvi.

The author describes a new species, also, p. lxv., the adult ♂ of *U. edwardsi*, De Selys, and states that *Libellula nigra*, Van der Linden, belongs to the genus.

Crocothemis erythræa taken on June 26th, 1879, at Longchamps-sur-Geer in Belgium, the second instance of the occurrence of that southern species in the country ; *id. l. c.* p. cxxxiii.

Scudder (Bull. U. S. Geol. Surv. iv. p. 775) indicates fossil fragments from Wyoming as representing part of the abdomen of some insect of this subfamily.

Scudder notices (and figures) a fossil from the Carboniferous of Cape Breton as possibly representing the abdomen of a Dragon-fly larva, and names it *Libellula carbonaria*, Canad. Nat. (2) viii. p. 89.

New genera :—

Orchithemis, Brauer, SB. Ak. Wien, lxvii. Abth. 1, p. 196. Allied to *Agrionoptera* ; type, *O. pulcherrima*, sp. n., p. 198, Malacca.

Calothemis, Selys, MT. Mus. Dresd. iii. p. 305. This "sub-genus" is identical with *Orchithemis* (as is noticed by the author in 1879), and includes *Libellula bivittata*, Rambur, and the following spp. nn. :—*C. bi-appendiculata*, p. 307, Borneo, *meyeri*, p. 308, New Guinea, Salwatty, and Waigiou, *pruinans*, ibid., Banca, *exsudans*, p. 309, Singapore and Java, *acigastra*, ibid., Thibet, *pachygastra*, p. 310, Shanghai, *priapea*, ibid., Malacca, *magnificata*, p. 311, Malacca.

Nannophlebia, subg. n., Selys, *l. c.* p. 315. Formed to include *Neophlebia lorquini*, Selys.

Hydronympha, Buchecker, *op. cit.* p. 8. This is equal to *Orthetrum*, Newm. (= *Libella*, Brauer), with the addition of *Crocothemis*, and *Tri-*

themis, Brauer; one sp. n. is given, viz., *H. helvetica*, p. 8, pls. v. & xv., Switzerland (= ? *Orthetrum cancellatum*, L.).

Cænotiata, id. *op. cit.* p. 10 (= *Leucorrhinia*, Brittinger). One sp. n. is given, *C. gonypennis*, ibid., pl. xii. Grisons (? = *L. rubicunda*, V. d. L.).

Pigiphila, id. *op. cit.* p. 11, = *Platetrum*, Newm. (= *Plathemis*, Hag.).

New species :—

Trámea eurybia, Selys, MT. Mus. Dresd. iii. p. 298, Celebes, *euryale*, ibid., Celebes and Java.

Rhyothemis snelleni and *amaryllis*, p. 299, Celebes, *pretiosa*, ibid., Moluccas, *vidua*, p. 300, Celebes, *resplendens*, ibid., New Guinea and Cape York.

Neurothemis unicolor, p. 301, Celebes.

Diplacina (?) *smaragdina*, p. 320, New Guinea.

Lepthemis divisa, p. 302, Celebes.

Brachydiplax maria, p. 303, Celebes and Borneo.

Microthemis gracilis, Brauer, SB. Ak. Wien, lxvii. Abth. 1, p. 195, Borneo.

Urothemis nigrilabris, Selys, *l. c.* p. 304, Celebes, *aliena*, p. 305, New Guinea, *advena*, id. CR. Ent. Belg. xxi. p. lxiv., Catalonia.

Agrionoptera mysis, id. MT. Dresd. iii. p. 311, Mysol, *interrogata*, p. 312, Kordo, *longitudinalis*, ibid., Gilolo.

Orthemis metallica, Brauer, *l. c.* p. 199, and *lineata*, p. 201, Malacca and Sumatra.

Libella clelia, Selys, MT. Mus. Dresd. iii. p. 313, Celebes and Philippines, *triangularis*, p. 314, N. India, *delesserti*, ibid., Nilgherries.

Trithemis proserpina, id. *ibid.*, Moluccas.

Tetrathemis platyptera, id. *l. c.* p. 316, Bengal; *T. oculata*, Brauer, *l. c.* p. 194, Borneo.

Sympetrum rhæticum, Buchecker, *op. cit.* p. 9, pl. vii. fig. 1, Grisons, *aurantiacum* (= *flaveolum*, L.), pl. viii. fig. 1, Zürich, *tenerrimum*, pl. ix. fig. 3, Zürich.

Diplax nigro-stigma, id. p. 9, pl. viii. fig. 2, and *flavo-stigma*, pl. viii. fig. 4, Zürich.

Libellula intermedia, Rudow, Z. ges. Naturw. (3) iii. p. 242, Germany.

Corduliina.

Selys-Longchamps, E. de. Secondes Additions au Synopsis des Cordulines. Bull. Ac. Belg. (2) xlv. pp. 183–222; also separately, Bruxelles: 1878, pp. 1–44.

After cancelling *Epitheca procera* as identical with *E. linearis*, 101 species were known to the author at the time of publication of these "Additions." Previously unknown sexes of described species are noticed, and several new species described, some of the descriptions being reproduced from Hagen's MSS. A new arrangement of the two Legions (*Cordulia* and *Macromia*) comprising the subfamily is adopted at the end, where the following not previously recorded subgenera are established:—

Somatochlora, [sep. copy] p. 26 (also indicated as a 'section' in 1871).

Neurocordulia, p. 28 (ditto).

Epicordulia, p. 29 (ditto).

Phyllomacromia, p. 34, includes *Macromia trifasciata*, *africana*, and a sp. n. (*vide infrà*).

The following new species are also described :—

Hemicordulia asiatica, p. 8, Khasia Hills.

Cordulia lintneri (Hagen), p. 9 (placed in *Somatochlora* at p. 40), New York, *spinosa* (Hagen), p. 10 (placed in *Tetragoneura* at p. 41), Georgia, ? *selysi* (Hagen), p. 11 (placed in *Neurocordulia* at p. 40), Georgia.

Epitheca (?) *jamaicarensis* (Hagen) [in error for *yamaskanensis*, Provancher: *cf.* Zool. Rec. xiv. p. 205; Selys, CR. Ent. Belg. xxi. p. lxxxvi.] (placed in *Neurocordulia* at p. 40), Canada, *heterodoxa*, p. 14 (placed in *Somatochlora*, at p. 39), Luzon, *franklini*, p. 17 (placed in *Somatochlora*, at p. 39), Hudson Bay.

Idionyx optata, p. 18, Khasia Hills.

Epophthalmia georgina [surely *georgiana*: Ed.], p. 19, Georgia.

Macromia tropicalis, p. 22 (= *africana*, pt., Selys; placed in *Phyllomacromia*, at p. 44), Zanzibar and S. Africa.

Æschnina.

Gynacantha plagiata, C. O. Waterhouse, fully described and figured; Waterhouse, Tr. E. Soc. 1878, pp. 119 & 120, pl. iv. *G. idæ*, Brauer, ♂ described; Brauer, SB. Ak. Wien, lxvii. Abth. 1, p. 203.

Anaciæschna, subg. n., Selys, MT. Mus. Dresd. iii. p. 317. Allied to *Gynacantha*, but having the membranula very large, the neuration less dense, the ♀ without spines on the tenth segment; type, *Æschna jaspidea*, Burm.

Gynacantha microstigma, sp. n., Selys, *l. c.* p. 316, Moluccas.

Æshna (sic) *landolti*, sp. n., Buchecker, *op. cit.* p. 14, pl. xxvii., Zürich and Munich (= *Æ. affinis*, V. d. L.).

Gomphina.

Selys-Longchamps, E. de. Quatrièmes Additions au Synopsis des Gomphines. Bull. Ac. Belg. (2) xlvi. pp. 408–471, 658–698; also separately, Bruxelles: 1878, pp. 1–106.

The number of known species is increased to 240, partly from descriptions furnished by Hagen in MS. Descriptions of 20 species previously characterized from one sex only are completed; notes on additional localities, &c., are furnished; many new species (and some new subgenera) are described; a synopsis of the subgenus *Macrogomphus* appears at the commencement; six previously described species are suppressed as synonyms; a new arrangement of the divisions including the Légions *Petalura*, *Chlorogomphus*, and *Cordulegaster*, is proposed; *Thecagaster* is suppressed as identical with *Cordulegaster*; and the subgenus *Allopetalia* is transferred to the *Æschnina*. The synonymic changes are as follows, *vide* p. 6 :—*Gomphus consobrinus*, Hag., = *externus*, Hag., differing only in maturity; *pilipes*, Hag., = *pallidus*, Rambur, ♂; *sordidus*, Hag., = *lividus*, Selys, ♀; *elongatus*, Selys, = *plagiatus*, Selys, ♀; *fluvialis*, Walsh.

= *notatus*, Rambur. *Progomphus borealis*, Selys, = *obscurus*, Rambur, immature.

New genera and subgenera :—

Leptogomphus, Selys, *l. c.* [sep. copy] p. 37. Between *Platygomphus* and *Austrogomphus*. Formed for three new species, viz., *L. semperi*, p. 38, Mindanao, *inclitus*, p. 39, Burma, ? *lansbergi*, p. 41, Java.

Davidius, p. 75, = *Hagenius*, Selys, pt. Includes *D.* ? *zallorensis* (Hagen), p. 75, Himalaya, *bicornutus*, p. 78, Pekin, *davidi*, p. 79, Thibet, ? *ater*, p. 80, Japan, spp. nn., and probably *Hagenius* ? *nanus* and *H. aberrans*, Selys.

Orogomphus, p. 89. Allied to *Chlorogomphus*; type, *O. atkinsoni*, p. 90, Nynea Tal.

Allogaster, p. 92. Allied to *Cordulegaster*; type, *A. latifrons*, ibid., Bengal.

Paradigma, Buchecker, *op. cit.* p. 12. A compound of *Onychogomphus* and *Ophiogomphus*, Selys. *P. buchheckeri* (Landolt), *id. l. c.* p. 13, pl. xix. fig. 2, Zürich (= *Ophiog. serpentinus*, Chp.).

New species :—

Macrogomphus quadratus, p. 10, Sumatra, *albardæ*, p. 11, Sumatra, *decemlineatus*, p. 13, Sumatra, *cochinchinensis*, p. 14, Cochin China, Selys, *l. c.*

Heterogomphus cochinchinensis, id. *l. c.* p. 14, Cochin China.

Onychogomphus biforceps, p. 15, Darjeeling, ? *inscriptus* (Hagen), p. 17, Java, *modestus*, p. 18, Bengal, *abyssinicus*, p. 21, Abyssinia, *frontalis*, p. 23, Burma, *id. l. c.*

Herpetogomphus severus (Hagen), *id. l. c.* p. 25, Colorado and New Mexico.

Ophiogomphus spinicornis, id. *l. c.* p. 32, Pekin.

Platygomphus ? *occultus*, id. *l. c.* p. 35, North China.

Gomphus prætorius, p. 42, Transvaal, ? *nietneri* (Hagen), p. 41, Ceylon, *m-flavum*, p. 46, Pekin, *crassus* (Hagen), p. 48, Kentucky, ? *ceylonicus* (Hagen), p. 50, Ceylon, *furcifer* (Hagen), p. 53, Massachusetts and Michigan, *albistylus* (Hagen), p. 55, Maine, *nævius* (Hagen), Pennsylvania, *brevis* (Hagen), *ibid.*, New York and Canada, *abbreviatus* (Hagen), p. 59, Massachusetts and Maine, *id. l. c.*

Epigomphus subobtusus, id. *l. c.* p. 62, Costa Rica and Guatemala.

Cyclogomphus minusculus, id. *l. c.* p. 63, Burma.

Neogomphus bidens, id. *l. c.* p. 65, Chili.

Progomphus integer (Hagen), p. 67, Cuba, *serenus* (Hagen), p. 69, Haiti, *id. l. c.*

Gomphoides bifasciata (Hagen), p. 71, Mexico, *ictinia*, p. 72, Pernambuco, *id. l. c.*

Cyclophylla argentina (Hagen), *id. l. c.* p. 73, Cordova.

Gomphidia kirschi, p. 81, Luzon, *confluens*, p. 83, China, *id. l. c.*

Cordulegaster erroneus (Hagen), p. 96, North Carolina and Kentucky, *luniferus*, p 99, Thibet, *id.* l. c.; *C. godmani*, McLachlan, Ent. M. M. xv. p. 35, Costa Rica.

Phyllopetalia apollo and *decorata*, Selys, *l. c.* p. 103, Chili.

Calopterygina.

McLachlan, Robert. *Calopterygina* collected by Mr. Buckley in Ecuador and Bolivia. Tr. E. Soc. 1878, pp. 85-94.

Descriptions of new species, with notes on others already described such as *Thore gigantea*, *procera*, *picta*, *æquatorialis*, *Cora inca*, &c.

New species :—

Lais imperatrix, McLachlan, *l. c.* p. 85, Ecuador.

Euthore mirabilis, id. *l. c.* p. 87, Ecuador.

Thore boliviana, id. *l. c.* p. 89, Bolivia.

Cora dualis, id. *l. c.* p. 90, and *munda*, p. 91, Ecuador, *terminalis*, p. 92, Bolivia, *C. semi-opaca*, De Selys, CR. Ent. Belg. xxi. p. xxi., Panama.

Hatærina fusco-guttata, id. *ibid.*, Panama.

Agrionina.

Podopteryx, Selys. The genus and species (*P. roseo-notata*, Selys) re-described from both sexes ; Selys, MT. Mus. Dresd., iii. pp. 318 & 319.

New genus and species :—

Dysagrion, g. n., Scudder, U. S. Geol. Surv. iv. p. 534. Légion *Podagrion* ; type, *D. frederici*, id. *l. c.* p. 536, fossil in Western N. America.

Lestes præmorsa, Selys, *l. c.* p. 317, Menado and Sulu ; *L. smaragdula*, Buchecker, *op. cit.* p. 16, pl. xli. fig. 6, Zurich.

Argiolestes postnodalis, Selys, *l. c.* p. 319, New Guinea, *pallidistyla*, p. 320, New Guinea, *ornata* and *obscura*, p. 321, New Guinea.

Idiocnemis bidentata and *inornata*, id. *l. c.* p. 321, New Guinea.

Onychargia ? rubro-punctata and *flavo-vittata*, id. *ibid.*, New Guinea.

Pseudagrion flavithorax, id. *l. c.* p. 322, New Guinea.

Telebasis eximia and *laglazei*, id. *ibid.*, New Guinea.

Platysticta bicornuta and *auriculata*, id. *ibid.*, New Guinea.

Podagrion abortivum, Scudder, Bull. U. S. Geol. Surv. iv. p. 775, Wyoming (fossil).

ORTHOPTERA.

BY

ROBERT MCLACHLAN, F.R.S., F.L.S., &c.

THE GENERAL SUBJECT.

BOLIVAR, IGNAÇIO. Orthoptères recueillis en Portugal et en Afrique par M. C. Van Volxem. Ann. Ent. Belg. xxi. pp. 66–72.

Enumerates 26 species, of which 4 are new.

——. Analecta Orthopterologica. An. Soc. Esp. vii. pp. 423–470, pls iv. & v.

Contains descriptions of new genera and species for the European Fauna, synoptical tables of some of the more difficult sub-families, &c.

——. Catalogus Orthopterorum Europæ et confinium. Madrid: 1878, 8vo, pp. 1–18 (a separate reprint from the "Analecta," of which it forms pp. 453–468).

——. Sinópsis de los Ortópteros de Espāna y Portugal. An. Soc. Esp. vii. pp. 63-118, pls. iii.–v.

Comprises the *Gryllidæ*, and completes the work, which ends with additions and corrections, a faunistic catalogue of species, list of bibliographic references, &c. The entire work is also published separately under the same title,—Madrid: 1878, 8vo, pp. 1–334, pls. i.–vii.

BUTLER, A. G. Preliminary notice of new species of *Orthoptera* and *Hemiptera* collected in the island of Rodriguez by the naturalists accompanying the Transit of Venus Expedition. Ann. N. H. (4) xvii. pp. 409–412.

DUBRONY, A. Crociera del "Violante." Risultati Zoologici. Catalogo degli Ortotteri. Ann. Mus. Genov. xi. pp. 327–333.

Enumerates 28 known species, collected on Capt. D'Albertis' voyage from Genoa to Constantinople.

——. Liste des Orthoptères recueillis jusqu' ici en Ligurie. *Op. cit.* xii. pp. 5–25.

Enumerates 86 known species, including 11 *Forficulidæ*, 6 *Blattidæ*, 5 *Mantidæ*, 2 *Phasmatidæ*, 26 *Acrydiidæ*, 24 *Locustidæ*, and 12 *Gryllidæ*, with localities and notes on habits.

[It would appear that "Dubrony" is a pseudonym, and that the author's real name is A. de Bormans; *cf.* Scudder, Psyche, iii. p. 59.]

KRAUSS, HERMANN. Die Orthopteren-Fauna Istriens. SB. Ak. Wien, lxxviii. Abth. 1 [for 1878, published in 1879], pp. 451–542, pls. i.–vi.

An important faunistic monograph. The introduction embodies extended notes on the species occurring in the different regions of the district. On the plates many described species are figured either wholly or in special details, chiefly in connection with the discrimination of allied forms.

PIERRAT, D. Catalogue des Orthoptères observés en Alsace et dans la chaine des Vosges. Bull. Soc. Colm. 1878.

Not seen by the Recorder.

SAUSSURE, H. DE. Mélanges Orthoptérologiques. Fasc. vi., Gryllides, 2me. partie. Genève, Bâle, et Lyon: 1878, pp. 509–836, pls. xvi.–xix. 4to. (Published also in Mém. Soc. Phys. Genèv. xxv. pp. 369–702.)

SCUDDER, S. H. Remarks on *Calliptenus* and *Melanoplus*, with a notice of the species found in New England. P. Bost. Soc. xix. pp. 281–286.

Contains tabular comparative sketch of the two genera, with notes, and a table of 6 species (of which 2 new) of *Melanoplus*.

——. Brief Notice of the American species of *Melanoplus* found west of the 117th meridian. P. Bost. Soc. xix. pp. 286–290.

A table (with geographical notes) of 7 species.

SEOANE, VICTOR LOPEZ. Ortópteros de la peninsula hispano-lusitana. S. E. Z. xxxix. pp. 366–376, Berichtigung, p. 486.

A list of genera and 220 species, with localities.

STÅL, C. Observations Orthoptérologiques. Sv. Ak. Handl., Bihang iv. No. 5, pp. 1–58 (1876).

A series of memoirs, here noticed under their especial subjects.

[Vol. iv. of the Bihang has not yet been received in England, and the Recorder has had to rely upon a separate copy of this paper received from a Continental source.]

THOMAS, CYRUS. On the *Orthoptera* collected by Dr. Elliott Coues, U.S.A., in Dakota and Montana during 1873–74. Bull. U. S. Geol. Surv. iv. pp. 481–502.

No absolutely new species are recorded. (Pp. 485–502 are devoted to *Caloptenus spretus*.)

A list of species from the Caucasus (two of which are described as new), by Brunner von Wattenwyl, appears in O. Schneider's Naturw. Beiträge zur Kenntniss der Kaukasusländer, p. 87.

A list of 20 species (some probably new) collected in Appalachicola (Florida) is given by S. H. Scudder, Psyche, ii. p. 154. [With reference to the remarks in Zool. Rec. xiv. *Ins.* p. 201, as to the dates of publication of Psyche, the Recorder had overlooked the fact that the actual date is printed at the end of each part. The part purporting (in the heading) to represent that for Jan. & Feb., 1878, was not issued until

June 14th, 1878, but the arrears had been overcome by the end of the year, so that the ante-dating of the headings has since been avoided.]

Lomnicki publishes a local list, with descriptions of some already known species in the vernacular, in Sprawozd. Kom. fizyiogr. xii. pt. ii. pp. (10)-(14).

Protective resemblances in some South African species, noticed by J. P. Mansel Weale, Tr. E. Soc. 1878, pp. 184 & 186.

T. A. Marshall publishes notes on the habits of various species found in the Island of Antigua; P. E. Soc. 1878, pp. xxx. & xxxi.

Forficulidæ.

Dubrony, A.* Essai sur le genre *Chelidura*. Ann. Mus. Genov. xii. pp. 433–450, with woodcuts.

A monograph of the genus, describing 8 species of which 1 (*C. bolivari*, p. 444, figs., Spain) is given as new. Figures of the following are given :—*C. sinuata*, Germ., and var. *dufouri*, Serv., *acanthopygia*, Géné, and *aptera*, Chp.

Blattidæ.

Panchlora maderæ, F., is common in Antigua, and at night makes a noise similar to that of a distant nightjar ; T. A. Marshall, P. E. Soc. 1878, p. xxxi.

Panesthia javanica is viviparous; J. Wood-Mason, P. E. Soc. 1878, p. li.

Aphlebia virgulata, sp. n., Bolivar, Ann. Ent. Belg. xxi. p. 67 ; *id.* An. Soc. Esp. vi. p. 423, pl. iv. figs. 2 & 2 *a*, Portugal.

Blattina sepulta, sp. n., Scudder, Canad. Nat. (2) viii. p. 89, fossil in the Carboniferous of Cape Breton.

Mantidæ.

Wood-Mason, James. On the difference in the form of the antennæ between the males of *Idolomorpha* and those of other genera of *Empusidæ*. Tr. E. Soc. 1878, pp. 259–262, woodcuts.

The author maintains that in *Idolomorpha* the antennæ are only unipectinate, as there is only one process to each joint, whereas in allied genera each joint has two processes.

——. On the presence of a stridulating apparatus in certain *Mantidæ*. L. c. pp. 263–267, woodcuts.

The stridulating organ, most noticeable in species of *Hierodula*, is a thickening of the principal nervure in the tegmina, which thickening is usually toothed.

——. On a saltatorial *Mantis*. L. c. pp. 268 & 269.

Concerns a species of *Ameles* from Portugal.

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* *Vide ante*, p. 259.

[Wood-Mason, James.] On the hatching-period of *Mantidæ* in Eastern Bengal. *L. c.* pp. 269 & 270.

——. On new or little-known *Mantidæ*. P. Z. S. 1878, pp. 580–587, pls. xxxv. & xxxvi.

The following already known species are figured:—*Deiphobe laticeps*, Wood-Mason, ♂ & ♀, pl. xxv. and *Hierodula* (*Rhombodera*) *taprobanæ*, Wood-Mason, pl. xxxvi.; there are notes on *Archimantis armata*, Wood-Mason, *Æthalocera ashmoliana*, Westw., *Hymenopus bicornis*, Stoll, and *Parablepharis kuhli*, De Haan, with descriptions of several new species.

——. Notes on new and little known *Mantidæ*. Ann. N. H. (5) i. pp. 143–147.

Contains notes on and descriptions of the following known species:—*Euchomena thoracica*, De Haan, p. 143, *Fischeria laticeps*, Wood-Mason, ♀, p. 144, *Hierodula notata*, Stoll, p. 145, *birivia*, Stoll, p. 146, *trimacula*, Saussure, p. 147.

Gongylus gongylodes, L., and *G. trachelophyllus*, Burm. Wood-Mason points out the distinctive characters of these allied flower-mimicking species, and gives notes on their respective geographical distribution. P. E. Soc. 1878, p. liii.

Mantis religiosa. Its distribution in France. V. Collin de Plancy, Feuil. Nat. viii. pp. 27–29; H. du Buysson, *l. c.* pp. 123 & 124 (a variety figured on pl. ii., *cf.* also E. André, *l. c.* p. 161).

New species:—

Hierodula (*Rhombodera*) *butleri*, Wood-Mason, P. Z. S. 1878, p. 58, pl. xxxvi. fig. 3, Assam, *fratricida*, p. 581, pl. xxxvi. fig. 5, Malabar, *atricoxis*, p. 582, pl. xxxvi. fig. 4, Australia, *pustulifera*, p. 583, pl. xxxvi. fig. 6, Torres Straits; *H. taprobanæ*, id. Ann. N. H. (5) i. p. 146, Ceylon.

Archimantis monstrosa (Bates), *id.* P. Z. S. 1878, p. 583, pl. xxxvi. fig. 1, N. Australia.

Creobrotes (W.-M., emend.) *pictipennis*, id. *l. c.* p. 585, pl. xxxvi. fig. 8, Ceylon.

H. transcaucasica, Brunner, in O. Schneider's Beit. Kauk. p. 88, Baku.

Phasmatidæ.

Brongniart, Charles. Note sur un nouveau genre d'Orthoptère fossile de la famille des Phasmiens, provenant des terrains supra-houilliers de Commentry (Allier). Ann. Sci. Nat. (6), Zool. vii. pl. vi.

——. Sur la découverte d'un Orthoptère coureur de la famille des Phasmiens dans les terrains supra-houilliers de Commentry (Allier). CR. Ent. Belg. xxi. pp. ii.–v.; *cf.* also Bull. Soc. Ent. Fr. (5) viii. p. lvii.

These notes refer to a fossil Orthopterous insect described and figured as *Protophasma dumasi*, g. & sp. nn.

Wood-Mason, James. Preliminary notice of a species of *Phasmidæ* apparently possessing all the structural arrangements needed both for aërial and aquatic respiration. Ann. N. H. (5) pp. 101 & 102.

Concerns an insect from Borneo with 5 pairs of apparently respiratory

plates along each side of the metathorax; it is noticed as *Cotylosoma dipneusticum*, g. & sp. nn.

The eggs of some species received from Batavia hatched in Belgium, but the young larvæ soon died; De Borre, CR. Ent. Belg. xxi. pp. lxxiii. & ccxxvii. (with woodcuts). They probably pertained to *Cyphocrania goliath*, G. R. Gray.

Bacillus gallicus and *B. rossii*. Anonymous observations on the deposition and hatching of the eggs, and their great vitality under adverse conditions; Pet. Nouv. ii. p. 281.

Eurycantha echinata, sp. n., Lucas, Bull. Soc. Ent. Fr. (5) viii. p. clxiii., New Guinea.

Bacillus hispanicus, Bolivar, An. Soc. Esp. vii. p. 423, pl. iv. figs. 2 & 2 *a*, Spain; *B. incommodus*, Butler, Ann. N. H. (4) xvii. p. 410, Rodriguez: spp. nn.

Gryllidæ.

Brunner von Wattenwyl, C. Dispositio Gryllodeorum. MT. schw. ent. Ges. iv. pp. 164–170. [December, 1873; omitted in previous Records.]

A tabular sketch, preceded by remarks from De Saussure, and ending with a "Diagnosis generum novorum." The author divides the family into *Œcanthidæ*, *Platydactylidæ*, *Trigonididæ*, *Gryllidæ*, *Gryllotalpidæ*, and *Mogoplistidæ*. The new genera (*Endacusta*, *Metrypa*, *Parametrypa*, *Cyrtoxipha*, *Apiotarsus*, *Cucoplistes*, *Pteroplistes*, and *Physoblemma*) are often founded on insects from certain localities, but they are not described specifically, or indicated by name. All have been treated on by Saussure in his subsequent 'Mélanges.'

Gryllotalpa vulgaris is carnivorous; W. J. Griffith, Feuil. Nat. viii. p. 127. Chaboz affirms that it lives chiefly on larvæ of *Carabidæ*, l. c. pp. 157–160.

Saussure completes the family in fasc. vi. of his 'Mélanges.' It contains numerous important supplementary generalities, especially on the structure of the 'tambour,' the armature of the posterior tibiæ, and the conditions of the anal parts, with a more concise tabular view of the tribes and numerous 'légions,' divided into eight divisions founded on varying points of anatomical structure. But the system remains practically the same as that noticed for fasc. v. The tribes *Œcanthiens*, *Trigonidiens*, and *Eneopteriens* are worked out. The *Œcanthiens* are subdivided into three légions—*Pentacentrites*, *Phalangopsites*, and *Œcanthites*; the *Trigonidiens* remain without other than generic subdivision; the *Eneopteriens* are formed of the légions *Eneopterites*, *Phormincterites*, and *Podoscirtites*.

Grylliens.

Nemobius tertiarius, Scudder, Bull. U. S. Geol. Surv. iv. p. 774, Fossil in Wyoming; *N. luteolus*, Butler, Ann. N. H. (4) xvii. p. 409, Rodriguez: spp. nn.

Œcanthiens.

Saussure, *l. c.*, characterizes the following new genera and species:—

Pentacentrus, p. 539 (Légion *Pentacentrites*). The only genus of the légion, formed for an aberrant insect characterized by the posterior tibiæ having only five spurs, by the form of the body, and especially by that of the head. Type, *P. pulchellus*, p. 541, fig. 1, Ceylon.

Agnotecous, p. 546 (Légion *Phalangopsites*). Allied to *Prosthacustes* and *Diplacustes*. Type, *A. tapinopus*, p. 547, fig. lxxxii., New Caledonia.

Ectecous, p. 554. Allied to *Heterogryllus*, but of more short depressed form, less slender legs, less contiguous ocelli, different armature of the tibiæ, &c. Type, *E. hedyphonus*, p. 555, Brazil.

Amusus, p. 558. Anterior tibiæ with a foramen on either side, rostrum trigonal, elytra corneous, without dorsal veins, both sexes winged. Type, *A. kirschianus*, p. 559, Venezuela.

Hemicophus, p. 572. Allied to *Paragryllus*, *Ectecous*, and *Heterogryllus*, by the mirror of the elytra of the ♂, which is divided by several nervures: differing by the coriaceous elytra, &c. Type, *H. paranæ*, p. 573, fig. lxxxi., Parana.

Endecous, p. 579. As in *Endacustes*, but the head more rounded, posterior tibiæ having the external superior and the internal superior spurs longer than the intermediate. Type, *E. arachnopis*, p. 579, Brazil.

Arachnopsis, p. 582. As in *Phalangopsis*, but the internal superior and the external spurs shorter than the intermediate. Type, *A. nietneri*, p. 582, Ceylon; *Phalangopsis pictipes*, Walker, perhaps belongs here.

Larandus rogenhoferi, p. 550, fig. xxxviii., Brazil.
Paragryllus temulentus, p. 553, Brazil.
Heterogryllus crassicornis, p. 557, Venezuela.
Homœogryllus venosus, p. 566, fig. i., Senegal and Gold Coast.
Amphiacustes aranea, p. 571, St. Domingo and Guadaloup.
Endacustes irroratus, p. 576, Queensland, *australis*, p. 577, Melbourne.
Phœophyllacris aranea, p. 584, fig. xl. 3, Zanzibar, *spectrum*, p. 586, Zanzibar, *abyssinica*, p. 587, fig. xlv., Abyssinia.
Œcanthus capensis, p. 596, Cape of Good Hope.

Trigonidiens.

Saussure, *l. c.*, characterizes the following new genus and species:—

Thamnoscirtus, p. 630. As in *Phylloscirtus*, but the head is vertical and trigonal, front between the antennæ narrowly rostrate; pronotum short, somewhat saddle-shaped. Types, *Phylloscirtus cicindeloides* and *P. vittatus*, Gerstäcker.

Trigonidium madecassum, p. 604, Madagascar, *capense*, ibid., Cape of Good Hope, *tahitense*, p. 605, Tahiti, *flavipes* (Brunner), p. 605, fig. xlvii., Fiji and Australia, *haani*, p. 606, Java.
Homœoxiphus histrio, p. 607, and *humbertianus*, p. 608, fig. xlviii. 1,

Ceylon, *scitulus* and *novarae*, p. 609, Java, *insularis*, p. 610, Fiji, Australia, and Java, *tacitus*, p. 611, Oceania, ? *guineensis*, p. 613, Fernando Po.

Cyrtoxiphus maritimus, p. 618, figs. xlix. 4 & lxxix. 3, Viti, Samoa, Tahiti, *musicus*, p. 620, Tahiti, *stramineus*, p. 622, Viti, *venustulus*, ibid., Java, *ritsemæ*, p 625, Java, *pusillus*, p. 626, Ceylon, *imitator*, p. 627, Cuba, *chichimecus*, p. 630, Mexico.

Phylloscirtus costatus, p. 639, Colombia and Brazil.

Eneopteriens.

Saussure, *l. c.*, characterizes the following new genera and species:—

Cardiodactylus, p. 657 (Légion *Eneopterites*). Differs from *Nisitrus* by the shorter form, broader rostrum, the ocelli arranged in an equilateral triangle, &c., &c. Types, *Platydactylus novæ-guineæ*, Haan, *P. gaimardi*, Serv., and *Cardiodactylus pictus*, p. 661, Moluccas, *canotus*, p. 662, King George's Sound, *haani*, p. 663, New Guinea, and *rufidulus*, ibid, New Holland. (*Platydactylus subnotatus* and *transversus*, Walker, probably belong to the genus.)

Piestodactylus, p. 666. Having great analogy with *Cardiodactylus*, but the inter-antennal area of the head is more prominent, the armature of the posterior tibiæ is different, and the ovipositor is larger. Includes *Platydactylus brevipennis*, Brunner, *Eurepa marginipennis*, Walker, *Gryllus nanus*, Walker, and *Piestodactylus siamensis*, p. 668, Siam, and *longicauda*, p. 669, West Australia.

Paraeneopterus, p. 673. Separated from *Eneopterus* by the rostrum being squarely truncate, the relative shortness of the tarsi, &c. Type, *P. bitæniatus*, p. 674, fig. lix., Philippines.

Ligypterus, p. 675.. Distinguished by the head being flattened behind, &c. Type, *L. heydeni*, Sauss.

Heterotrypus, p. 677 (Légion *Phormincterites*) = *Podoscirtus*, Brunner, *nec* Serville. Includes *Platydactylus buqueti*, Serv., and *Heterotrypus africanus*, p. 680, fig. xxxviii., Nubia, *simillimus*, p. 684, fig. li. 1, Amboyna, *modulator*, p. 685, Philippines, *longipes*, ibid., Amboyna, *funambulus*, p. 687, New Guinea, *tripartitus*, p. 688, Viti.

Phormincter, p. 689. Differs from *Heterotrypus* by a number of analytical characters. Type, *Gryllus* (*Phalangopsis*) *microcephalus*, Haan.

Stenogryllus, p. 694 (Légion *Podoscirtites*). Tibiæ not serrulate, but armed all their length by strong fixed spines. Type, *S. phthisicus*, p. 695, fig. liii., St. Domingo.

Cylindrogryllus, p. 696. Exceptionally narrow in form. Type, *C. brevipennis*, p. 697, Brazil.

Phyllogryllus, p. 698. Elytra simulating dead leaves, and distinguished by many other special characters. Type, *P. mortuifolia*, p. 699, fig. lxi., Cayenne.

Calyptotrypus, p. 703. In this genus are united a series of species differing from others in the form of the tambours of the anterior tibiæ, that of the pronotum, the tambour of the elytra, &c. Includes *Platy-*

dactylus helvolus, Serv., *Gryllus* (*Phalangopsis*) *marmoratus*, Haan, *G.* (*P.*) *pilosus*, Haan, *Platydactylus marginipennis*, Guérin, *P. quadratus*, Haan, *G.* (*P.*) *bicolor*, Haan, and *Calyptrotrypus hofmanni*, p. 709, Java, *forceps*, p. 711, Shanghai, *planiceps*, p. 712, Cape York, *grandidieri*, p. 713, Madagascar, *apertus*, p. 716, Rockhampton, *irroratus*, p. 717, Ceylon, *petersi*, p. 718, Sennaar, *tibialis*, p. 720, Moluccas, *madecassus*, p. 721, Madagascar, *steini*, p. 726, Guinea, *brunneriauus*, p. 729, Java, and *simodus*, p. 730, Philippines.

Amblyopus, p. 738. Allied to *Paræcanthus*, but differing in the form of the valves of the oviscapt, &c. Types, *A. brevipes*, p. 739, Colombia, *depressus*, p. 741, Colombia, *capitatus*, p. 742, locality unknown.

Tapinopus, p. 758. Allied to *Amblyopus*. Type, *T. platyceps*, p. 758, fig. lxviii., New Caledonia.

Hemiphonus, p. 760. An ally of *Calyptotrypus*, but differing by the large cubical head. Type, *H. vittatus* (Brunner), p. 761, fig. lxvii., New Holland and Viti.

Anisotrypus, p. 770. Differs from *Euscirtus* by the shorter form, by the very broad rostrum, the form of the oviscapt, &c. For *A. furcatus*, p. 772, fig. lxiii., Viti, and *indivisus*, p. 773, Borneo.

Paranaudus (subg. of *Anaudus*), p. 794. Type, *A.* (*P.*) *terebrans*, p. 795, fig. lxxii, Zanzibar.

Stenaphonus (subg. of *Aphonus*, p. 797). Type, *A.* (*S.*) *macilentus*, p. 806, Colombia and Panama.

Aphasius, p. 808. Differing from *Apithes* by the form of the palpi and rostrum, &c. Type, *A. ritsemæ*, p. 809, Timor.

Diatrypus sibilans, p. 702, Porto Rico, *castaneus*, p. 703, Brazil.

Paræcanthus toltecus, p. 735, fig. lxvi., Mexico, *foraminatus*, p. 736, Cuba.

Apithes (olim *Apithis*) *rolphi*, p. 745, Brazil, *acutus*, p. 746, Colombia, *costalis*, p. 747, Colombia, *krugi*, ibid., Cuba.

Orocharis canotus, p. 751, Cuba, *fulvescens*, p. 752, Argentine Republic, *domingensis*, p. 753, St. Domingo, *vaginalis*, p. 755, Cuba.

Euscirtus sigmoidalis, p 768, Luzon, *cephalotes*, p. 768, Sikkim, *crassiceps*, p. 769, Java.

Podoscirtus javanus, p. 777, Java, *bimaculatus*, p. 778, India ?, Java ?, *insularis*, p. 779, Viti, New Caledonia, *hirtellus*, p. 780, locality unknown, *amusus*, p. 781, Brazil, *americanus*, p. 782, Bahia, *maculipennis*, p. 783, Brazil, *asyrinx*, p. 785, Java, *cicur*, p. 787, Luzon, *rufidulus*, p. 788, New Caledonia, *priapus*, ibid., New Caledonia, *regulus*, p. 790, Amboyna, *tacitus*, p. 792, Guinea ?, Java ?.

Aphonus caledonicus, p. 798, New Caledonia, *ocellaris*, p. 799, Zanzibar, *taciturnus*, p. 801, locality unknown, *vitiensis*, ibid., Viti, *apiatus*, p. 804, New Guinea, *depressiusculus*, p. 805, Viti, *silens*, ibid., Brazil ?.

Metrypus virescens, p. 815, Java, *brasilianus*, p. 816, Brazil, *bahiensis*, ibid., Bahia, *crypsiphonus*, p. 817, Tropical America, *mutus*, p. 818, Tropical America, *bogotensis*, p. 819, Bogota.

Parametrypus aculeatus, p. 821, Brazil, *spiculatus*, p. 822, fig. lxxv., Natal.

Locustidæ.

Brunner von Wattenwyl, C. Monographie der Phaneropteriden. Wien: 1878, 8vo, pp. 1–401, pls. i.–viii.

One of the most important monographs that have ever appeared on a special group of Orthopterous insects: commencing with generalities; then follow a tabular sketch of the 7 tribes into which the *Locustidæ* are subdivided, and a lengthy table (pp. 12–32) of the 38 groups and 112 genera (very many new) that form the more minute subdivisions; ending with a complete bibliography. The 8 (folded) plates are crowded with illustrations, mostly in outline, and indicating structural differences. Any attempt to give an analysis of the characters of the multitudinous new genera would be useless without reproducing the table. It may be remarked that the *Phaneropteridæ* form the first of the tribes into which the *Locustidæ* are divided by the author (followed by *Meconemidæ*, *Prochilidæ*, *Mecopodidæ*, *Pseudophyllidæ*, *Conocephalidæ*, *Locustidæ*, *Decticidæ*, *Bradyporidæ*, *Heterodidæ*, *Ephippigeridæ*, *Sagidæ*, *Gryllacridæ*, and *Stenopelmatidæ*).

Stål, C. Sur *Anostostoma* et quelques genres voisins. (Forms pp. 47–53 of the author's "Observations"; *cf.* anteà, p. 259.)

The aim of the notes appears to be that of proving that the genera mentioned pertain to the *Gryllidæ* rather than to the *Locustidæ*.

Conocephalus mandibularis, Charp., with a rudimentary duplicate posterior tibia and tarsus arising from the apex of the femur; B. Malfatti, Resoconti Ent. Ital., Marzo 1878, p. 5, woodcut.

Pterochroza illustrata and *ocellata*, Serv., mimic leaves; C. Darwin, P. E. Soc. 1878, p. xxiv.

Locusta viridissima: notes on habits, with proof of carnivorous propensities; W. G. Tenant, Ent. xi. pp. 183–185, and P. Hodge, *l. c.* p. 274.

Phylloptera rotundifolia, Scudder, of a blood-red colour, from Pennsylvania; Scudder, Psyche, ii. p. 189.

New genera:—

Brunner, *l. c.*, characterizes the following:—

Isophya, p. 59. Includes *Odontura punctinervis*, Stål, *modesta*, Friv., *taurica*, Eversm., *Barbatistes camptoxypha*, Fieb., *O. speciosa*, Fieb., and the following spp. nn.: *I. brasiliensis*, p. 61, Brazil, *straubei*, p. 62, Smyrna, *paveli*, ibid., Brussa and Constantinople, *krausei*, p. 65, Suabia, *brevipennis*, p. 66, Siebenbürgen, *schneideri*, p. 67, Baku, *amplipennis* and *rectipennis*, p. 68, Asia Minor, *acuminata*, p. 69, Asia Minor, *savignyi*, p. 70, Beirut, *major*, ibid., Asia Minor.

Dichopetala, p. 77. Types, *D. mexicana*, p. 77, fig. 6, Mexico, *emarginata*, ibid., Texas, spp. nn.

Ectadia, p. 103. Type, *E. pilosa*, sp. n., *ibid.* fig. 11, Cashmere.

Hemielimæa, ibid. Type, *H. chinensis*, sp. n., p. 104, fig. 12, China.

Exora, p. 105. Type, *E. deflorita*, sp. n., *ibid.* fig. 13, Ceylon and Java.

Pseudophaneroptera, p. 107. Type, *P. turbida*, sp. n., p. 108, fig. 15, Ceylon.

Isotima, p. 112. Types, *I. rufo-marginata*, p. 113, fig. 17, Himalaya, and *chinensis*, ibid., China, spp. nn.

Himerta, p. 118. Type, *H. marginata*, sp. n., *ibid.* fig. 19, India.

Tetana, p. 119. Type, *T. grisea*, sp. n., p. 120, fig. 20, Chili.

Pseudoburgilis, p. 120. Type, *P. rosea*, sp. n., p. 121, fig. 20,* Brazil.

Coryphoda, p. 122. Type, *C. albicans*, sp. n., p. 123, fig. 22, Chili.

Aniara, p. 123. Types, *A. typica* and *punctulata* (fig. 23), p. 124, Brazil, spp. nn.

Hyperophora, p. 125. Types, *H. brasiliensis*, p. 126, Brazil, *major*, ibid., fig. 24, Buenos Aires, spp. nn.

Corymeta, p. 126. Type, *Phaneroptera amplectans*, Schaum, fig. 25.

Engonia, p. 127. Types, *Phaneroptera rectangula*, Burm., and *E. minor* (fig. 36), and *pistacina*, p. 129, Brazil, spp. nn.

Stenophyllia, p. 130. Type, *Gymnocera modesta*, Blanch., fig. 27.

Marenestha, p. 131. Type, *M. inconspicua*, sp. n., p. 132, fig. 28, Chili.

Pardalota, p. 133. Type, *P. versicolor*, sp. n., p. 134, fig. 30, Benguela.

Scambophyllum, p. 134. Type, *Phylloptera sanguinolenta*, Westw., fig. 31.

Eurypalpa, p. 141. Type, *Phylloptera perlaria*, Westw., fig. 34.

Trochalodera, p. 143. Type, *T. violascens*, sp. n., p. 144, fig. 36, Java.

Hammatofera, p. 146. Types, *Phylloptera nodicornis*, Burm., fig. 36, and *H. abacata*, sp. n., p. 147, Brazil.

Oxyprora, p. 149. Type, *O. misera*, sp. n., *ibid.*, Peru.

Machima, p. 149. Types, *Phylloptera phyllacantha*, Burm., fig. 39 *a*, *P. hystrix*, Westw., and *M. major*, sp. n., p. 150, fig. 39 *b*, Colombia.

Centrofera, p. 158. Type, *C. bimaculata*, sp. n., *ibid.*, fig. 41, Bahia.

Tapeina, p. 163. Type, *T. acutangula*, sp. n., *ibid.*, fig. 45, Assam.

Casigneta, ibid. Types, *C. cochleata*, p. 164, fig. 46, Moluccas, and *pellucida*, p. 165, Philippines, spp. nn.

Phaula, p. 167. Types, *P. rugulosa*, ibid., Philippines, *lævis*, p. 168, fig. 48, Philippines, *spinoso laminata*, ibid., Java, and *chlorotica*, p. 169, Singapore, spp. nn.

Liotrachela, p. 182. Types, *L. nitida* (fig. 51) and *philippina*, p. 183, Philippines, *minuta*, p. 184, Luzon, *amboinica*, ibid., Amboyna, spp. nn.

Sympæstria, p. 185. Types, *S. acute-lobata*, ibid., fig. 52, Borneo, and *truncato-lobata*, p. 186, China ?, spp. nn.

Poreumena, p. 187. Type, *P. africana*, sp. n., *ibid.* fig. 53, Gaboon.

Diastella, p. 198. Type, *D. latifolia*, sp. n., *ibid.*, p. 56, Moreton Bay.

Symmachis, p. 199. Type, *S. lacteipennis*, ibid. fig. 57, N. Australia.

Dictyota, ibid. Types, *D. viridissima*, p. 200, *costulata* and *pruinosa* (fig. 58), p. 201, Australia, spp. nn.

Tæniomena, p. 203. Types, *T. albo-signata* (fig. 60) and *soror*, p. 204, and *lobata*, p. 205, Australia, spp. nn.

Elephantodeta, p. 206. Types, *E. eburnata*, p. 207, fig. 61, Lord Howe's Island and Australia, and *farinosa*, ibid., Australia, spp. nn.

Dioncomena, p. 208. Type, *D. ornata*, sp. n., *ibid.*, fig. 62, Zanzibar.

Isopsera, p. 218. Types, *I. stylata*, p. 219, Calcutta, *pedunculata*, p. 220, fig. 65, Calcutta, Rangoon, Assam, *vaga*, ibid., Celebes, and *obtusa*, p. 221, India, spp. nn.

Allodapa, p. 221. Types, *A. aliena*, p. 222, fig. 66, Ceylon, and *rostrata*, ibid., Seychelles, spp. nn.

Diogena, p. 224. Type, *Phylloptera fausta*, Burm., fig. 68.

Symmetopleura, p. 245. Types, *S. modesta*, p. 246, Carolina, *lævicauda*, ibid. figs. 73 *a* & *b*, Bahia, and *africana*, ibid., fig. 73 *c*, Congo, spp. nn.

Amaura, p. 247. Types, *A. spinata*, p. 248, fig. 74, Buenos Aires, and *punctata*, ibid., Peru, spp. nn.

Ectemna, p. 251. Type, *E. carinata*, sp. n., *ibid.* fig. 76, Colombia.

Parableta, p. 253. Types, *P. phyllopteroides*, p. 254, Brazil, and *integricauda*, ibid., fig. 78, Ecuador and Surinam, spp. nn.

Anepsia, p. 269. Types, *Phylloptera tessellata* and *mexicana*., Sauss., and *A. conspersa*, p. 270, Chiriqui, and *ovata*, p. 271, Costa Rica, spp. nn.

Gramma [*to*] *dera*, p. 279. Types, *G. clara*, p. 298, fig. 86, Buenos Aires, and *albida*, ibid., Brazil, spp. nn.

Tomeophera, p. 299. Types, *T. gladiatrix* (fig. 87) and *pugiunculata*, spp. nn., p. 300, Peru.

Hyperphrona, p. 315. Type, *Plagioptera nitidipennis*, Stål, and *H. angusta* and *submaculata*, p. 317, Peru, *trimaculata*, p. 318, Quito, *striolata*, ibid., fig. 90, Peru and Bahia, *bidentata*, p. 319, Cayenne, spp. nn.

Cora, p. 319. Type, *C. puella*, sp. n., p. 320, fig. 91, locality uncertain.

Prosagoga, p. 320. Type, *P. nitidula*, sp. n., p. 321, Surinam.

Euthyrrhachis, p. 330. Type, *E. gracilis*, sp. n., p. 331, fig. 95, Paramaribo.

Apocerycta, p. 331. Type, *A. incommoda*, sp. n., p. 332, fig. 96, Mexico.

Ischyra, p. 343. Types, *I. punctinervis*, p. 344, figs. 99 *a* & *b*, Brazil, and *flaviceps*, p. 345, fig. 99 *c*, Jamaica, spp. nn.

Syntechna, p. 347. Types, *Phylloptera tarasca*, Sauss., and *S. olivaceoviridis*, sp. n., p. 348, fig. 101, Colombia, Venezuela, &c.

Apoballa, p. 349. Type, *A. errabunda*, sp. n., *ibid.* fig. 101*, Mexico.

Phœbolampta, p. 352. Type, *P. magnifica*, sp. n., *ibid.* fig. 103, St. Domingo.

Acra, p. 353. Type, *A. tectiformis*, sp. n., *ibid.* fig. 104, Quito.

Stibara, p. 354. Type, *S. cornea*, sp. n., *ibid.* fig. 105, Brazil.

Dysmorpha, p. 355. Type, *D. obesa*, sp. n., *ibid.* fig. 106, Malacca.

Xantia, p. 370. Type, *X. borneensis*, sp. n., p. 371, fig. 112, Borneo.

Onosandrus, Stål, Sv. Ak. Handl., Bihang iv. No. 5, p. 51, for *O. fasciatus* and *impictus*, ibid., S. Africa, spp. nn.

Mesomedes, id. *l. c.* p. 50, for *Stenopelmatus chilensis*, Sauss.

Arethæa, id. *l. c.* p. 55. For *Ephippitytha gracilipes*, Thomas.

Psyra, id. *ibid.* For *P. melanonota*, sp. n., p. 56, Malacca.

Elbenia, id. *ibid.* For *E. nigro-signata*, sp. n., p. 56, Malacca.

Arnobia, id. *l. c.* p. 56. For *Phaneroptera pilipes*, Haan.

Phygela, id. *ibid.* For *P. haani*, p. 57, Malacca.

Furnia, id. *l. c.* p. 57. For *F. malaya*, sp. n., Malacca.

Troglophilus, Krauss, SB. Ak. Wien, lxxviii. Abth. 1, p. 533. For *Locusta cavicola*, Kollar, and *T. neglectus*, Krauss (= *Rhaphidophora cavicola*, Fischer, *nec* Kollar); these two species are figured on pl. vi.

Lithymnetes, Scudder, Bull. U. S. Geol. Surv. iv. p. 532. Probably

near *Stirodon*. Type, *L. guttatus*, sp. n., *id. l. c.* p. 533, fossil in Western N. America.

Steropleurus (subg. of *Ephippiger*), Bolivar, An. Soc. Esp. vi. p. 449, for *E.* (*S.*) *ramburi*, id. p. 443, pl. iv. fig. 10, *martorellii* (pl. iv. fig. 12), and *castellanus* (pl. iv. fig. 11), p. 444, *pseudolus* and *flavo-vittatus*, spp. nn. all from Spain, and numerous known species.

Platystolus (subg. of *Ephippiger*), id. *l. c.* p. 450, for *E. surcularius* and *martinezi*, Bolivar.

Lamprogaster (subg. of *Ephippiger*), id. *l. c.* p. 451, for *E. bolivari*, Seoane, and *E. miegi*, Bolivar.

New species :—

Brunner, *l. c.*, describes the following :—

Pœcilimon sancti-pauli, p. 40, fig. 2, Ephesus, Smyrna, Rhodes, *hamatus*, p. 41, Rhodes, Smyrna, *unispinosus*, p. 42, Smyrna, Bosdagh, *bosphoricus*, p. 43, Bosphorus, *amissus*, p. 44, Bosdagh, *ampliatus*, p. 46, St. Peter am Karst.

Barbitistes constrictus, p. 54, Bukowina, Glogau, *yersini*, p. 55, fig. 3, Dalmatia, *frivaldskii*, p. 56, Mehadia, *nigro-vittatus*, p. 58, Macedonia.

Odontura transfuga, p. 72, Brazil, *algerica*, p. 75, Algeria.

Acrometopa syriaca, p. 87, Smyrna and Beirut.

Elimæa annulata, p. 92, figs. 10 *a–d*, India, *flavo-lineata*, p. 93, Ceylon, *securigera*, ibid., Simla, *carinata*, p. 94, Ceylon, *verrucosa*, p. 95, locality uncertain, *spinigera*, p. 96, Singapore, *marmorata*, p. 97, Sumatra, *femorata*, ibid, Borneo, *bidentata*, p. 98, Malabar, *signata*, p. 99, Singapore, *appendiculata*, p. 101, India, *rosea*, p. 102, Borneo.

Ducetia adspersa, p. 110, Manila, *ceylanica*, p. 111, Ceylon.

Pyrrhicia atomifera, p. 115. India, *connata*, p. 116, India, *inflata*, ibid., Ceylon, *nigro-vittata*, p. 117, fig. 18, India, *despecta*, ibid., China.

Arantia spinulosa, p. 137, fig. 32, Natal, *rectifolia*, ibid., Fernando Po.

Aphidnia verrucosa, p. 153, Brazil, *fuscifrons*, ibid., Mexico, *punctifrons*, p. 154, fig. 40, Minas Geraes, *elegans*, p. 155, Brazil, *decolor*, p. 156, Brazil, *simplicipes*, p. 157, Mexico.

Phygela marginata, p. 161, Borneo.

Elbenia tenera, p. 166, Borneo.

Psyra borneensis, p. 171, Borneo, *unicolor*, p. 172, locality uncertain, *tigrina*, p. 173, Borneo.

Holochlora albida, p. 176, Singapore, *tumescens*, p. 177, Malacca, *obtusa*, p. 178, Malacca, *brevifissa*, ibid., Ceylon, *celebica*, p. 179, Celebes, *javanica*, p. 180, Java, Sumatra, India, *emarginata*, ibid., Philippines, *japonica*, p. 181, Japan.

Cadicia marginata, p. 191, New Holland, *concisa*, p. 192, N. Australia, *longipennis*, ibid., fig. 55, Sydney and Queensland, *septentrionalis*, p. 193, Queensland, *major*, ibid., Cape York, *olivacea*, ibid., Sydney and Queensland, *inermis*, p. 194, N. and W. Australia, *scalaris*, p. 195, Sydney, *minor*, ibid., Port Denison, *hospes*, p. 196, Amboyna, *obtusifolia*, ibid., Cape York, *bispinulosa*, p. 197, Sydney.

Phaneroptera quadripunctata, p. 212, Europe and Asia Minor, *reticulata*, p. 213, Graham's Town, *minima*, p. 214, Egypt, *marginalis*, p. 214, Cape

of Good Hope, *nigro-antennatus*, p. 215, Japan, *indica*, ibid., Himalaya, *elongata*, p. 217, Java.

Tylopsis vittata, p. 229, Port Natal and Cape of Good Hope.

Hormilia gracillima, p. 231, fig. 70, Guatemala and Mexico, *intermedia*, p. 232, Guatemala and Mexico, *abbreviata*, p. 233, Mexico, *fasciata*, ibid., Brazil.

Arethæa multiramosa, p. 235, Georgia, *constricta*, p. 236, Texas.

Scudderia laticauda, p. 238, Georgia, *furcata*, p. 239, fig. 72 *a*, Maine, Texas, *furculata*, ibid., fig. 72 *b*, Mexico, Texas, *pistillata*, p. 240, New York, New Hampshire, *forcipata*, p. 242, Mexico, *minor*, ibid., Brazil, *dentata*, p. 243, Peru, *punctulata*, ibid., Rio Janeiro.

Theudoria pyrrhocnemis, p. 250, Bahia.

Scaphura fasciata, p. 260, Brazil, *conspurcata*, p. 261, Brazil, *infuscata*, p. 262, Brazil.

Phrixa sima, p. 264, Vera Cruz.

Eurycorypha proserpinæ, p. 274, fig. 83, Natal, *securifera*, p. 275, W. Africa.

Anaulacomera spinata, p. 280, fig. 85, Rio Janeiro, *concisa*, p. 282, Brazil, *intermedia*, p. 283, Brazil, *harpago*, p. 284, Venezuela, *inversa*, ibid., Brazil, *inconspicua*, p. 285, Brazil, *biloba*, p. 286, Ecuador, *exotica*, ibid., India, *furcata*, p. 287, Panama, *recta*, ibid., locality unknown, *maculata*, p. 288, Bogota, *lanceolata*, p. 289, Bogota, *securifera*, ibid., Peru, *sulcata*, ibid., Brazil and Peru, *dentata*, p. 290, Colombia, *cornu-cervi*, ibid., Peru, *laticauda*, p. 292, Mexico, *lativertex*, ibid., Bogota, *bituberculata*, p. 293, locality uncertain, *chelata*, ibid., Brazil, *brevicollis*, p. 294, Peru, *incerta*, p. 296, figs. 85 *d* & *e*, Tongatabu, *latifolia*, ibid., Bogota, *inermis*, p. 297, Colombia.

Ctenophlebia inversa, p. 302, Peru, *lobata*, p. 303, Peru, *brasiliensis*, p. 304, Brazil, *peruviana*, p. 305, Peru, *difformis*, p. 306, Peru, *multiramosa*, ibid., Bahia.

Phylloptera corrodita, p. 310, Rio Janeiro, *peruviana*, p. 312, Peru, *ancilla*, ibid., Surinam, *famula*, p. 313, Ecuador, *serva*, ibid., Peru, *dimidiata*, p. 314, Colombia, *spinulosa*, ibid., Brazil, *arata*, p. 315, Peru.

Plagioptera tuberculata, p. 324, Bahia.

Turpilia oblongo-oculata, p. 326, Mexico, Guatemala, *appendiculata*, ibid., Port-au-Prince, *mexicana*, p. 327, Mexico, *albo-lineata*, ibid., Madagascar, *rugulosa*, p. 328, Cuba, Mexico, *tenella*, p. 329, Mexico, *obtusangula*, ibid., Cuba, *opaca*, ibid., Mexico.

Microcentrum angustatum, p. 335, Brazil, *marginatum*, p. 336, Pernambuco, *lucidum*, ibid., Bahia, *securiferum*, p. 337, Chiriqui, *pallidum*, ibid., Martinique, Surinam, Cuba, *triangulatum*, p. 338, Guadelupe, St. Thomas, *concisum*, p. 340, Colombia, *colossum*, p. 341, New Granada, *elephas*, ibid., Paraguay.

Philophyllia latior and *venosa*, p. 351, Brazil.

Trigonocorypha abnormis, p. 357, India.

Stilpnochlora incisa, p. 360, Peru.

Peucestes striolatus, p. 366, Brazil, Peru, Panama, *cristatissimus*, p. 367, fig. 110, Cayenne.

Posodippus stali, p. 369, Brazil, *fastigiosus*, p. 370, Quito.

Barbitistes sanzii, Bolivar, An. Soc. Esp. vii. p. 439, Spain.

Nasidius truncatifrons, Stål, Sv. Ak. Handl., Bihang iv. No. 5, p. 52, South Africa.

Mimnermus prodigiosus, id. *ibid.*, Western South Africa.

Isophya schneideri, Brunner, Schneider's Beiträge zur Kenntniss Kaukasusländer, p. 88, Baku.

Paradrymadusa kraussi, Bolivar, *l. c.* pl. iv. fig. 7, Spain.

Ephippiger (*E.*) *saussurianus*, pl. iv. fig. 8, and *E.* (*E.*) *dilutus*, pl. iv. fig. 9, Bolivar, An. Soc. Esp. iv. p. 442, Spain; *E. bolivari*, Seoane, CR. Ent. Belg. xxi. p. lxxi., Ferrol (*E. seoanei*, Bolivar, is redescribed at p. lxx. for comparison, and differentiating woodcuts are given at p. lxxiii.); *E. sphacophila*, Krauss, SB. Ak. Wien, lxxviii. Abth. 1, p. 531, pl. v. fig. 2, Dalmatia.

Thamnotrizon dalmaticus, Krauss, *l. c.* pl. iv. fig. 1, Dalmatia and Herzegovina.

Odontura borrei, Bolivar, Ann. Ent. Belg. xxi. p. 71, Algeria.

Phylloptera segonoides, Butler, P. Z. S. 1878, p. 648, fig., Madagascar.

ACRYDIIDÆ.

RILEY, C. V., PACKARD, A. S., JR., & THOMAS, CYRUS. First Annual Report of the United States Entomological Commission for the year 1877, relating to the Rocky Mountain Locust, with Maps and Illustrations. U. S. Geol. Surv. Washington: 1878, 8vo, pp. 1–477, and Appendices, pp. 1–294, pls. i.–v.

Certainly by far the most important work on *Caloptenus spretus* that has hitherto appeared. Everything in connection with the subject is treated in minute detail from scientific, popular, and economic aspects, so that any brief analysis is impossible. The woodcuts are very numerous, but mostly not original. The five plates are occupied by: (1), *C. spretus*, (2) *C. femur-rubrum*, (3) *C. atlanis*, (4) the hypermetamorphoses of *Epicautia* and *Hornia*, (5) histology of the locust; they are beautifully executed. *Cf.* also notes by Thomas on the distribution of *C. spretus* in Dakota and Montana; Bull. U. S. Geol. Surv. iv. pp. 485–501.

SCHOCH, G. Die Feldheuschrecken der europäischen Fauna und das Studium der Orthopteren im Allgemeinen. MT. schw. ent. Ges. v. pp. 353–367.

General notes prefatory to a "Catalogus Acridioideorum Europæ synonymicus secundum C. Stål," compiled by the author, and occupying pp. 357–367.

STÅL, C. Les genres des Acridiodées de la Faune Européenne.

Forms pp. 1–35 of the author's "Observations," *cf.* ante, p. 259. A series of tables, prefaced by a disquisition on the value of characters used for generic differentiation.

——. Aperçu des genres des Acridioidées de l'Amérique du Nord.

Follows the last-mentioned paper up to p. 47.

[Stål, C.] Systema Acridiodeorum; essai d'une systématisation des Acridiodées. Sv. Ak. Handl., Bihang iv. No. 4, pp. 1–100.

Probably the last work published by the author. Consists of a short introduction in French, treating upon generalities, followed by an elaborate series of Latin tables of divisions and genera, extending to nearly 50 pages, concluding with descriptions of new species. The family is divided into 13 divisions, with a multitude of genera, of which very many are new. It appears to be impossible to characterize the genera without reproducing the tables; those of them that are new are here noticed only by name, with the indicated types. The author in no case pays the slightest attention to Walker's genera or species, and does not even allude to his catalogue.

Stein, J. P. E. F. Ueber *Pachytylus migratorius* und *cinerascens*, F. Deutsch. E. Z. 1878, pp. 233–236.

Notes on distribution, distinctive characters, &c., with cuts. The author maintains that *cinerascens* = *Gryllus danicus*, L., which name has priority.

On dimorphic *Acrydiidæ*, chiefly from the Mississippi Valley, affecting the development of the wings. In 10 or 12 species the short-winged forms have been placed in *Pezotettix*, the long in *Calliptenus*, although really not specifically distinct: Scudder, P. Bost. Soc. xix. p. 336. See also G. M. Dodge, Canad. Ent. x. pp. 103–108, who says that *Calliptenus volucris*, Dodge, is a long-winged form of *Pezotettix autumnalis*, Dodge; details are also given for the forms of *P. alba* and *junius*, Dodge, with measurements.

Clyhippus cærulescens. The blue wings rapidly turn red under the influence of phenic acid, thus becoming, in this condition, *C. germanicus*. Pet. Nouv. ii. p. 281 (anonymous).

Cuculligera hystrix, Germar. For extended notes on the stridulating apparatus, see Krauss, SB. Ak. Wien, lxxviii. Abth. 1, p. 491, pl. ii. figs. 1–10.

Acrydium peregrinum. Scudder, CR. Ent. Belg. xxi. pp. v. & vi., gives an account of multitudes of this insect that appeared on board a vessel in the Atlantic during a storm, and 1200 miles from land, and thinks the idea (held by De Selys-Longchamps) that the species may have been of American origin has some weight. De Selys-Longchamps follows (pp. vi.–viii.) by a sketch of his published notes on the species, which he believes is that referred to in the book of Exodus, chap. x. *Cf.* also Psyche, ii. p. 124.

New genera :—

Omocestus (subg. of *Gomphocerus*), Bolivar, An. Soc. Esp. vii. p. 427, for *G. minutissimus*, sp. n., *id. l. c.* p. 424, Spain, *G. uhagoni*, Bol., &c.

Pamphagodes, id. *l. c.* p. 429. Allied to *Goniæa*; for *P. riffensis*, sp. n., p. 430, pl. v. fig. 1, Morocco.

Prionosthenus (subg. of *Pamphagus*), id. *l. c.* p. 435, for *Pamphagus galericulatus*, Stål.

Eumigus (subg. n. of *Pamphagus*), id. *l. c.* p. 436, for *Pamphagus monticola*, Ramb.

Paracaloptenus (Brunner), Bolivar, An. Soc. Esp. vii. p. 92. Allied to *Caloptenus* and *Platyphyma*. Type, *P. typus* (Brunner), sp. n., *id. ibid.* Spain.

Stål, Sv. Ak. Handl., Bihang v. No. 4, characterizes the following :—

Alcamenes, p. 14. Includes *Tropinotus granulatus*, Stål, and *A. brevicollis*, sp. n., p. 54, Corrientes.

Anaua, p. 18. For *A. fissa*, sp. n., p. 54, Peru.

Prionacris, p. 19. For *P. compressa*, sp. n., p. 55, New Granada.

Antandrus, ibid. Type, *Podisma viridis*, Blanchard.

Antiphon, p. 20, = *Monachidium*, Stål, *nec* Serv.

Abila, p. 21. For *A. latipes*, sp. n., p. 56, Brazil.

Nuceria, p. 23. For *N. roseipennis*, sp. n., p. 61, Brazil.

Anthermus, p. 24. For *A. granosus*, sp. n., p. 68, Natal.

Aleuas, p. 25. For *A. vitticollis*, p. 69, San Leopoldo and Monte Video, *gracilis*, Brazil, and *lineatus*, Buenos Aires and Uruguay, p. 70, spp. nn.

Ecphantus, p. 26. For *E. quadrilobus*, sp. n., p. 71, Queensland.

Althamenes, p. 27. Type, *Acridium macula-lutea*, Haan.

Bibracte, ibid. Type, *Acridium hagenbachi*, Haan, and *B. cristulata*, sp. n., p. 71, Java.

Mesambria, p. 28 For *M. maculipes*, p. 72, Celebes, and *geniculata*, p. 29, Ceylon, spp. nn.

Gerenia, ibid. For *G. obliquinervis*, p. 73, India, and *ambulans*, p. 74, Cambodia, spp. nn.

Sedulia, ibid. Type, *Traulia specularia*, Stål.

Abisares, p. 29. Type, *Monachidium viridipenne*, Burm.

Demodocus, subg. of *Calliptenus*, p. 75. Type, *Pezotettix* (*Eupreprocnemis*) *capensis*, Thunberg.

Nicarchus, p. 34. For *N. erinaceus*, sp. n., p. 78, Panama.

Antiphanes, p. 35. Type, *Ommatolampis nodicollis*, Burm.

Demonax, ibid. For *D. cristulatus*, sp. n., p. 80, Peru.

Agesander, ibid. For *A. ruficornis*, sp. n., p. 81, Colombia.

Anniceris, p. 37. For *A. geniculatus*, p. 82, Peru, and *nigrinervis*, p. 83, New Granada, spp. nn.

Delia, ibid. For *D. insulana*, sp. n., p. 83, Cuba.

Adimantus, p. 38. Type, *Oxya ornatissima*, Burm.

Mastusia, p. 39. For *M. quadricarinata*, sp. n., p. 84, Peru.

Cranae, p. 41. For *C. patagiata*, sp. n., p. 85, Amboyna.

Lucretilis, ibid. For *L. taeniata*, sp. n., p. 85, Sumatra.

Phenomoe, ibid. For *P. rufo-vittata*, sp. n , p. 86, Amboyna.

Nautia, p. 42. For *N. flavo-signata*, sp. n., p. 87, Panama.

Mezentia, p. 43. For *M. gibbera*, sp. n., p. 88, Panama.

Hisychius, p. 44. For *H. nigrispinus*, sp. n., p. 89, Peru.

Dicæarchus, ibid. For *D. cribellatus*, sp. n., p. 89, Colombia.

Lentula, p. 45. For *L. obtusifrons*, sp. n., p. 90, Natal.

Gesonia, p. 47. Type, *Oxya punctifrons*, Stål.

Caryanda, ibid. Type, *Oxya spuria*, Stål.

Digentia, ibid. Type, *Oxya punctatissima*, Stål.

Bermius, p. 48. Includes *B. brachycerus*, *odontocerus*, and *infirmus*, p. 92, Australia, *acutus*, p. 93, Gayndah, spp. nn.

Tauchira, ibid. Types, *Oxya polychroa*, Stål, and *O. abbreviata*, Serv.

Racilia, ibid. For *R. femoralis*, sp. n., p. 94, Philippines.

Praxilla, p. 49. Includes *P. laminata*, New South Wales, and *latipennis*, Lord Howe's Island, p. 95, and *geniculata*, p. 96, North Australia, spp. nn.

Cercina, ibid. For *C. obtusa*, sp. n., p. 97, Ceylon.

Loryma, ibid. Type, *Platyphyma vittipennis*, Stål.

Metapa, p. 51. For *M. natalensis*, sp. n., p. 97, Natal.

Xenippa, p. 52. For *X. viridula*, sp. n., p. 98, Chartum.

Cervidia, p. 53. For *C. lobipes*, sp. n., p. 99, Cape York.

Carsula, ibid. For *C. sulcipes*, sp. n., p. 100, Philippines.

Egnatius, Stål, Bihang iv. No. 5, p. 25. For *Œdipoda apicalis*, Fieber.

Protomachus, p. 53. For *P. depressus*, sp. n., p. 54, Peru.

Aristia, p. 54. For *Phæoparia mordax*, Stål.

Mazæa, ibid. For *M. granulosa*, sp. n., West Africa.

The following were omitted in the notice of Stål's Recensio Orthopterorum, i. [*cf.* Zool. Rec. x. pp. 443–445]:—

Prionolopha, p. 27. For *Gryllus serratus*, L.

Oncolopha, p. 30. For *Gryllus guttatus*, Thbg.

Vilerna, p. 38. For *Acrydium æneo-oculatum*, De Geer.

Orbillus, p. 37. For *Gryllus cæruleus*, Drury.

Gonyacantha, p. 43. For *Opsomala gladiator*, Westw.

Osmilia (subg. of *Acridium*), p. 68. For *Acrydium flavo-lineatum*, De Geer, &c.

Stropis (subg. of *Acridium*), p. 69. For *Acrydium maculosum*, Stål.

Euryphymus (subg. of *Calliptenus*), p. 72. For *C.* (*E.*) *ferruginosus*, sp. n., locality unknown, *Gryllus hæmatopus*, L., and *G. erythropus*, Thbg.

Tylotropidius (subg. of *Pezotettix*), p. 74. For *Gryllus didymus*, Thbg.

New species:—

Antiphon gallus, Stål, Sv. Ak. Handl., Bihang v. No. 4, p. 55, Brazil.

Phæoparia rotundata, p. 57, Chiriqui, *maculipennis*, New Granada, and *obtusa*, Peru, p. 58, *emarginata*, p. 59, Venezuela, *id. l. c.*

Coryphistes nigrinervis, p. 59, Peak Downs, *nutans*, Rockhampton, and *validicornis*, Peak Downs, p. 60, *id. l. c.*

Vilerna rugulosa, id. *l. c.* p. 61, Peru and Rio Janeiro.

Gonixa maculicornis, p. 62, Queensland, *ensicornis*, Cape York, *carinata*, Gayndah, *limbata*, Queensland, p. 63, *fuscula*, Sydney, *plana*, Peak Downs, p. 64, *id. l. c.*

Stropis rufipes, Sydney, *pictipes*, Peak Downs, p. 65, *tricarinata*, North Australia, *bivittata*, Gayndah, *rugifrons*, Victoria, p. 66, *reticulata*, p. 67, North Australia, *limbatella*, Peak Downs, *vermiculata*, Rockhampton, *cristulata*, Gayndah, p. 68, *id. l. c.*

Traulia sanguinipes, id. *l. c.* p. 72, Borneo.

Calliptenus pedarius, id. *l. c.* p. 75, India; *C. calcaratus*, p. 13, Massaua, *brunneri*, p. 14, Brussa, *id.* Bihang iv. No. 5.

Rhytidochrota ensicornis, Panama, and *varicolor*, Colombia, p. 76, *pilosa*, p. 77, Peru, *lævifrons*, Amazons, and *brunneri*, Colombia, p. 78, *id. op. cit.* v. No. 4,

Ommatolampis palpata, id. *l. c.* p. 81, Peru.

Ophthalmolampis cinctipennis, id. *l. c.* p. 87, Peru.

Tæniophora pulchripes, id. *l. c.* p. 88, Santa Maria.

Euthymia brevifrons, id. *l. c.* p. 94, Silhet and China.

Hieroglyphus tarsalis, id. *ibid.*, Silhet and China.

Spathosternum venulosum, id. *l. c.* p. 97, India.

Euprepocnemis cærulescens, id. *op. cit.* iv. No. 5, p. 16, Massaua.

Platyphyma platycerca, Beiruth, *rugulosa*, Asia Minor, *id. l. c.* p. 18.

Eremobia gibbera, id. *l. c.* p. 27, Syria

Pyrgomorpha granosa, id. *l. c.* p. 35, Syria.

Amblycorypha uhleri, p. 57, and *parripennis*, p. 58, Texas, id. *l. c.*

Pamphagus (*Nocarodes*) *volxemi*, Bolivar, Ann. Ent. Belg. xxi. p. 69, and *longicornis*, p. 70, Algeria, *durieni*, id. An. Soc. Esp. vii. p. 452, Morocco; *P.* (*Acinipe*) *deceptorius*, id. An. Soc. Esp. vii. p. 431, pl. iv. fig. 5, Spain; *P* (*A.*) *mabillii*, id. *ibid.* pl. v. fig. 6, Spain; *P.* (*A.*) *mauritanicus*, id. *l. c.* p. 451, Morocco.

Stenobothrus nigro-geniculatus (Brunner, MS.), Krauss, SB. Ak. Wien, lxxviii. Abth. 1, p. 477, pl. i. fig. 4, Istria; *S. nigro-maculatus*, Herr.-Schäff., var. *istriana*, id. *l. c.* p. 479, pl. i. fig. 5, Istria.

Melanoplus collinus and *rectus*, Scudder, P. Bost. Soc. xix. p. 284, New England, *collaris*, p. 288, S. California, *devastator*, ibid., California, *cinereus*, ibid., California and Nevada, *kennicotti*, p. 289, Assiniboine.

Epachromia rodericensis, Butler, Ann. N. H. (4) xvii. p. 410, Rodriguez.

RHYNCHOTA.

BY

W. F. Kirby, M.E.S., &c.

Ferrari, D. P. M. Hemiptera Ligustica adjecta et emendata. Ann. Mus. Genov. xii. pp. 60–96.

A list of 386 species, followed by synonymy, tables of the species in the larger genera, and other information. Puton only enumerated 56 Italian species in 1875, a list of which is appended.

Horváth, G. v. Europäische Hemipteren in fremden Welttheilen. Ent. Nachr. iv. pp. 170–175.

——. Beitrag zur Hemipteren-Fauna Transcaucasiens. Nat. Beitr. Kaukasusländer, pp. 72–86.

255 species of *Heteroptera* and *Homoptera* enumerated, showing that the fauna is of a decidedly South European character.

——. Die Wasserlaüfer der ungarischen Hemipteren-Fauna. Term. füzetek, ii. pp. 183–190.

Jakovleff, V. E. Hémiptères de la Perse septentrionale. Troudy Ent. Ross. x. pp. 67–98.

61 species are enumerated, and several new genera and species are described in Russian, with German diagnoses.

Reuter, O. M. Remarks on some British *Hemiptera-Heteroptera*. Ent. M. M. xiv. pp. 242–245, xv. pp. 66 & 67.

Contains remarks on several species of *Pilophorus*, including a table of the European species. The remarks on synonymy are too numerous and intricate for extraction. (*Cf.* E. Saunders, *op. cit.* xiv. p. 277.)

Sahlberg, J. Bidrag till nordvestra Sibiriens Insecktfauna; *Hemiptera-Heteroptera* insamlade under Expeditionerna till Obi och Jenesej 1876 och 1877. Sv. Ak. Handl. xvi. No. 4, pp. 39.

186 species, some new. The paper is in Latin, with an introduction in Swedish relative to their geographical distribution. Varieties, sexes, &c., of several known species are also described.

Uhler, P. R. Notices of the *Hemiptera-Heteroptera* in the Collection of the late T. W. Harris, M.D. P. Bost. Soc. xix. pp. 365–446.

A great number of known species are remarked on or redescribed, and several new genera and species are also described.

[Uhler, P. R.] On the *Hemiptera* collected by E. Coues in Dakota and Montana, during 1873–74. Bull. U. S. Geol. Surv. iv. pp. 503–512.

59 species, including 2 new *Homoptera*.

Vollenhoven, S. C. Snellen Van. *Hemiptera-Heteroptera* Neerlandica: De inlandsche ware Hemipteren (Land- en Water-wantsen) beschreven en meerendeels ook afgebeeld. 's Gravenhage: 1878, 8vo, pp. xii. 368, pls. xxii.

This valuable work on the *Hemiptera* of Holland appeared in detached portions in the Tijdschr. Ent., and 100 copies have now been struck off as a separate publication.

——. De Inlandsche Hemipteren, beschreven en meerendeels ook afgebeeld. Tijdschr. Ent. xxi. pp. 49–80, pls. iii. & iv.

Contains additions to the author's previous articles on Dutch *Hemiptera-Heteroptera*.

White, F. B. Contributions to a knowledge of the Hemipterous Fauna of St. Helena, and speculations on its origin. P. Z. S. 1878, pp. 444–477, pl. xxxi.

Includes 30 species, of which 25 or 26 seem to be peculiar to the island. In the preliminary introduction, the author attempts to prove (1) that the first settlers arrived at a very early date, (2) the aboriginal fauna did not arrive all at once, but the colonization was spread over a lengthened period; (3) the road by which the colonists travelled was not a continuous land-surface; (4) the colonists came from the Palearctic Region.

——. List of the *Hemiptera* of New Zealand; Ent. M. M. xiv. pp. 274–277, xv. pp. 31–34, 73–76, 130–133, 159–161.

Dictyotus polystictieus, Butl., probably = *vilis*, Walk.; *Rhopalimorpha similis*, Mayr, probably = *obscura*, White, var.

——. Descriptions of new species of Heteropterous *Hemiptera*, collected in the Hawaiian Islands by the Rev. T. Blackburn. No. 2. Ann. N. H. (5) i. pp. 365–374.

Remarks on the habits and localities of 27 species, including several new genera and species.

On the collection and preparation of *Hemiptera*; G. v. Horváth, Ent. Nachr. iv. pp. 98–103.

C. W. Dale (History of Glanville's Wootton, pp. 293–316) enumerates 178 *Hemiptera* and *Homoptera* out of the 441 British species; and 16 species of *Anoplura* as occurring in his district. Two new species of *Homoptera* are described.

Captures of *Hemiptera* in Ireland; J. A. Power, Ent. xi. p. 8.

List of *Hemiptera* occurring in Gudbrandsdal and Dovrefjeld; W. M. Schøyen, Nyt. Mag. Vidensk. xxiv. pp. 219 & 220 (11 species).

Additions to the Fauna of Mecklenburg: *Hemiptera* and *Homoptera*; R. Rudow, Verh. Ver. Meckl. xxxi. pp. 115 & 116.

Local lists of *Hemiptera* captured in various parts of Italy; G. Cavanna, Bull. Ent. Ital. x. pp. 260–265.

Lists of *Hemiptera* occurring in various parts of Hungary; A. Mocsáry, Term. közlem. xiii. pp. 178–182, 371–377, xiv. pp. 70–79, xv. pp. 261 & 262.

List of *Hemiptera* captured on the expeditions to Western Yunnan; F. Moore, Anderson's Researches, pp. 920 & 921.

C. J. S. Bethune reprints the descriptions of *Hemiptera* from Kirby's "Fauna Boreali-Americana;" Canad. Ent. x. pp. 137–139, 213–216.

S. H. Scudder describes the following new fossil species from the Green River Shales: *Cyrtomenus concinnus* and *Æthus punctulatus*, p. 769, *Cydnus* (?) *mamillanus* and *Rhyparochromus* (?) *terreus*, p. 770, *Reduvius* (?) *guttatus*, *Acocephalus adæ*, *Fulgora granulosa*, p. 771, *Aphana rotundipennis*, *Lystra* (?) *richardsoni* and *Cixius* (?) *hesperidum*, p. 772, *Mnemosyne terrentula*, *Lithopsis* (g. n., near *Alcestis*), p. 773; type, *L. fimbriata*, p. 774. Bull. U. S. Geol. Surv. iv.

Captures of *Hemiptera* (chiefly *Heteroptera*) in Antigua and Martinique; T. A. Marshall, P. E. Soc. 1878, p. xxxv.

Notes on stridulating *Hemiptera*; A. H. Swinton, Ent. M. M. xv. pp. 117 & 118.

HEMIPTERA-HETEROPTERA.

According to A. Puton, *Orsillus maculatus*, Fieb., = *longirostris*, Muls. & Rey; *Ischnodemus genei*, Spin., = *championi*, Saund.; *Geocoris collaris*, Put., = *thoracicus*, Put., *nec* Fieb.; *Monanthia horvathi*, Put., = *flavipes*, Horv., *nec* Sign.; *Aradus flavicornis*, Dalm., = *flavo-maculatus*, Luc.; *Capsus*, Put., = *Allocotus*, Fieb., and Put., *nec* Mayr. Puton also notices new localities for various species; Bull. Soc. Ent. Fr. (5) viii. pp. xxxii. & xxxiii.

Pentatomidæ.

Coptosoma hilaris and *partita*, Walk., are identical; W. L. Distant, Ent. M. M. xiv. p. 246.

Stenozygum sculpticolle, Stål. Varieties from W. Africa described; *id. l. c.* pp. 245 & 246.

Aspongopus violaceus, Pal. de B., is distinct from *viduatus*, Fabr.; *id. l. c.* xv. pp. 10 & 11.

Odontoscelis. There are but two species, *O. fuliginosa*, L., and *dorsalis*, Fabr. The following are synonyms of the latter:—*plagiata* and *signata*, Fieb., *lineola*, Ramb., and *hispidula*, Jakowl. G. v. Horváth, Beitr. Kaukasusländer, p. 74.

Erthesina fullo eaten by the Nagas; W. L. Distant, P. E. Soc. 1878, p. lvii.

New genera and species:—

Sphenaspis, V. E. Jakovleff, Troudy Ent. Ross. x. p. 72. *Scutelleridæ*: affinities not stated. Type, *S. curculionides*, sp. n., *l. c.*, Shahrud.

Polyphyma, id. *l. c.* p. 73. Allied to *Peacasta*; type, *P. scrobiculata*, sp. n., *l. c.* p. 74, N. Persia.

Aulacostethus, P. R. Uhler, P. Bost. Soc. xix. p. 367. Allied to *Diolcus*, Mayr; type, *Tetyra marmorata*, Say.

Megarrhaphis, F. B. White, P. Z. S. 1878, p. 463. Allied to *Macrorhaphis*; differs in the comparative proportions of the joints of the rostrum, the narrow and unfurrowed keel of the mesosternum, and the absence of the two silky spots on the venter of the male. Type, *M. wollastoni*, sp. n., *ibid.*, St. Helena.

Gomphocranum, V. E. Jakovleff, *l. c.* p. 79. Allied to *Rubiconia*; type, *G. christophi*, sp. n., *l. c.* p. 81, Shahrud.

Pœcilocoris, id. *l. c.* Allied to *Eusarcoris*; type, *P. scitulus*, sp. n., *l. c.* p. 83, Shahrud.

Barbiger, id. *l. c.* p. 87. Affinities not stated; types, *B. furvus* and *saundersi*, spp. nn., *l. c.* pp. 88 & 89, N. Persia.

Lioderma, P. R. Uhler, *l. c.* p. 377. Next to *Œbalus*, Stål; types, *Pentatoma saucia* and *senilis*, Say.

Caridophthalmus sexspinosus, Assmann, Ber. Vers. Naturf. (50 : München), 1877, New Guinea [Bertkau, Bericht, &c., 1877–78, ii. p. 204].

Trigonosoma putoni, V. E. Jakovleff, Troudy Ent. Ross. x. p. 75, N. Persia.

Cantharodes rutherfordi, W. L. Distant, Ent. M. M. xiv. p. 246, Cameroons.

Aspongopus divergens, Cameroons and Isubu, *affinis* and *modestus*, Isubu, W. Africa, p. 11; *A. intermedius*, Madagascar, p. 99, and *farleyi*, Nyassa, p. 100, *id. l. c.* xv.

Chœrocydnus nigro-signatus, F. Buchanan White, Ent. M. M. xiv. p. 275, New Zealand.

Gnathoconus validus, V. E. Jakovleff, *l. c.* p. 76, N. Persia.

Menaccarus divaricatus, id. *l. c.*, Shahrud.

Mustha dentata, id. *l. c.* p. 78, N. Persia.

Eusarcoris putoni, id. *l. c.* ix. p. 216, Amoor.

Strachia putoni and *adusta*, id. *l. c.* x. pp. 84 & 86, N. Persia.

Bathycœlia distincta, W. L. Distant, *l. c.* p. 247, Isubu, W. Africa.

Stenocephalus albo-marginatus, V. E. Jakovleff, *l. c.* p. 90, Shahrud.

Clinocoris stali, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 16, n. 26, Siberia.

Phimodera fennica, id. Medd. Soc. Fenn. ii. p. 198, Central Finland (= *lapponica*, Sahlb., *nec* Zett.).

Coreidæ.

Corizus crassicornis, var. *pictus*, from Baku, described; G. v. Horváth, Beitr. Kaukasusländer, p. 76.

Centrocarenus volxemi, sp. n., A. Puton, Bull. Soc. Ent. Fr. (5) viii. p. cxxix., Caucasus.

Rhopalus (*Stictopleurus*) *pallidus*, sp. n., J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 17, n. 38, Siberia.

Berytidæ.

Neides wakefieldi, sp. n., F. B. White, Ent. M. M. xv. p. 31, Wellington, N. Zealand.

Lygæidæ.

Puton, A. Synopsis des Hémiptères-Hétéroptères de France. 1ère Partie: Lygæides. Paris: 1878, 8vo, pp. 82.

The system of dichotomous tables is carried out throughout the work; and all the species are fully described, those of Corsica included. Varieties of the following known species are described:—*Geocoris siculus*, var. *mediterraneus*, p. 25, *Ieus angularis*, var. *corsicus*, p. 43, *Ischnocerus hemipterus*, var. *nigricans*, p. 48, all from Corsica, *Pachymerus pedestris*, var. *funereus*, p. 65, from the Mediterranean coast, *Emblethis verbasci*, var. *bullans*, p. 67, and *Eremocoris alpinus*, var. *icaunensis*, p. 73, from France.

Emblethis arenarius, L., var. *denticollis*, from Baku, described; G. v. Horváth, Beitr. Kaukasusländer, p. 79.

Arocatus ruficollis, Walk., noticed; F. B. White, Ent. M. M. xv. p. 32.

Pyrrhocoris apterus. Note on a British specimen with the membrane of the left elytron developed; E. C. Rye, *op. cit.* p. 136.

New genera and species:—

Metagerra, F. B. White, Ent. M. M. xv. p. 34. Allied to *Rhyparochromus* and *Stygnocoris*; type, *M. obscura*, sp. n., *l. c.* p. 34, New Zealand.

Targarema, id. *l. c.* p. 73. Allied to *Peritrechus* and *Rhyparochromus*; type, *T. stali*, l. c., add *T. electa*, p. 74, spp. nn., both from New Zealand.

Margareta, id. *l. c.* xv. p. 74. Allied to *Pachymerus*; type, *M. dominica*, sp. n., *l. c.*, p. 75, New Zealand.

Reclada, id., Ann. N. H. (5) i. p. 370. Allied to *Clerada*; type, *R. mœsta*, sp. n., *l. c.* Hawaiian Islands.

Metrarga, id. *l. c.* Affinities uncertain; to contain *M. nuda* (type) and *villosa*, spp. nn., *l. c.*, p. 371, Hawaiian Islands.

Macro[*r*]*rhamphus*, V. E. Jakovleff, Troudy Ent. Ross. ix. p. 218. Allied to *Cænocoris*; type, *M. caucasicus*, sp. n., *l. c.* p. 220, Derbend.

Stenocarenus, id. *l. c.* p. 221. (*Megalonotidæ.*) Type, *S. vulsus*, sp. n., *l. c.* p. 223, Derbend.

Drymocoris, id. *l. c.* Affinities not stated; type, *D. gibbosus*, sp. n., *l. c.* p. 225, Government of St. Petersburg.

Bledionotus, O. M. Reuter, Ann. Soc. Ent. Fr. (5) viii. p. 144. Type, *B. systellonotoides*, sp. n., *l. c.*, Syria. (Reuter characterizes this genus as the type of a new subfamily of *Lygæidæ*; Bledionotina. The sculpture of the pronotum, which resembles that of *Bledius*, is very peculiar; in size and colour, the insect resembles the genus *Systellonotus*, which belongs to the *Capsidæ*.)

Nysius dallasi and *delectus*, p. 367, and *arboricola*, p. 368, F. B. White, Ann. N. H. (5) i., Hawaiian Islands. *N. sanctæ-helenæ*, id. P. Z. S. 1878, p. 464, St. Helena; *N. huttoni* and *anceps*, id. Ent. M. M. xv. pp. 32 & 33, New Zealand.

Orsillus reyi, A. Puton (= *planus*, Muls. & Rey), Syn. Hém.-Hét. Fr. p. 14, S. Europe, Algeria.

Engistus commendatorius (Perez, MS.); *id. l. c.* p. 23, Madrid.
Paronus calcaratus, id. *l. c.* p. 39, Vaucluse, Algeria, Egypt.
Rhyparochromus nitidicollis, id. *l. c.* p. 50, Corsica.
Peritrechus flavicornis, V. E. Jakovleff, Troudy Ent. Ross. x. p. 90, Shahrud.
Pachymerus luridus, id. *l. c.* p. 92, Shahrud; *P. crassus*, G. v. Horváth, Beitr. Kaukasusländer, p. 78, Baku.
Scolopostethus putoni, F. B. White, Ent. M. M. xv. p. 75, New Zealand.
Myrmedobia fuliginea, id. P. Z. S. 1878, p. 466, St. Helena.

Tingididæ.

List of *Tingididæ* and their food-plants; A. Puton, Pet. Nouv. ii. pp. 226 & 227.

New species:—

Tingis marmorata, P. R. Uhler, P. Bost. Soc. xix. p. 415, N. Carolina.
Dictyonota putoni, D. P. M. Ferrari, Ann. Mus. Genov. xii. pp. 66 & 85, Stazzano.
Monanthia (*Platychila*) *strictula*, Oran, pl. lxvi., *M.* (*Lasiacantha*) *histricula*, p. lxvii., Madrid, *M.* (*Lasiotropis*) *valida*, p. lxviii., Syria, A. Puton, Bull. Soc. Ent. Fr. (5) viii.; *M. ovatula*, V. E. Jakovleff, Troudy Ent. Ross. x. p. 92, Shahrud.

Aradidæ.

Aradus hieroglyphicus and *pulchellus*, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, pp. 22 & 23, Siberia; *A. diversicornis*, G. v. Horváth, Beitr. Kaukasusländer, p. 80, Lenkoran, spp. nn.
Aneurus simplex, sp. n., P. R. Uhler, P. Bost. Soc. xix. p. 421, New England.

Capsidæ.

Globiceps flavo-notatus, Boh., is a *Cyllocoris*, and = *C. flavo-quadrimaculatus*, De Geer; O. M. Reuter, Ent. M. M. xv. pp. 113–115.
Phytocoris populi with the right antenna abnormal; A. Buchan-Hepburn, Ent. M. M. xiv. p. 256.
Bothynotus, sp. from Stazzano described, but not named; D. P. M. Ferrari, Ann. Mus. Genov. xii. pp. 87.

New genera and species:—

Camelocapsus, O. M. Reuter, Bull. Soc. Ent. Fr. (5) viii. p. cv. Belongs to *Capsidæ*, but resembles some *Lygæidæ* of the subfamily *Oxycarenina* in size and colour. Type, *C. oxycarenoides*, sp. n., *ibid.*, Ætolia.
Actinocoris, id. Medd. Soc. Fenn. ii. p. 194. Allied to *Leptopterus*; type, *A. signatus*, sp. n., *l. c.* p. 195, S. Finland.
Agrametra, F. B. White, P. Z. S. 1878, p. 467. Allied to *Plagio-*

gnathus and *Sthenarus*; type, *A. æthiops*, sp. n., *l. c.* p. 468, pl. xxxi. fig. 2, St. Helena.

Morna, F. B. White, Ent. M. M. xv. p. 130. Allied to *Capsus* and *Deræocoris*; type, *M. capsoides*, add *M. scotti*, spp. nn., *l. c.* p. 131, New Zealand.

Reuda, id. *l. c.* p. 132. Allied to *Capsus*; type, *R. mayri*, sp. n., *l. c.*, New Zealand.

Coccobaphes, P. R. Uhler, P. Bost. Soc. xix. p. 401. Placed next to *Deræocoris*; type, *C. sanguinareus*, sp. n., *l. c.*, United States.

Tropidosteptes, id. *l. c.* p. 404. Allied to *Polymerus*, but head thick and blunt at tip, eyes smaller, and not so prominent, tylus less elongated, and more curved inwardly at tip, and lateral margin of the thorax straighter and more complete; type, *T. cardinalis* (Say, MS.), sp. n., *l. c.*, United States.

Lopidea, id. *l. c.* p. 405. Next to last; type, *Capsus medius*, Say.

Megalocerœa reuteriana, F. B. White, Ent. M. M. xv. p. 130, New Zealand.

Metacanthus concolor, id. P. Z. S. 1878, p. 464, St. Helena.

Allorrhinocoris flavus, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 24, Siberia.

Calocoris samojedorum and *nigriceps*, id. *l. c.* pp. 24 & 25, Siberia; *C.* (*Megacœlum*) *lustratus*, F. B. White, *l. c.* p. 466, St. Helena.

Orthops pilosulus, V. E. Jakovleff, Troudy Ent. Ross. x. p. 93, N. Persia.

Pilophorus pusillus, O. M. Reuter, Ent. M. M. xiv. p. 245, Greece.

Halticus consimilis, V. E. Jakovleff, *l. c.* p. 94, Astrabad.

Pachytoma sibirica (Jak., MS.), J. Sahlberg, *l. c.* p. 28, Siberia.

Orthotylus discolor and *artemisiæ*, id. *l. c.* p. 29, Siberia; *O. mutabilis*, F. B. White, *l. c.* p. 467, St. Helena.

Psallus flavo-sparsus and *lutosus*, p. 468, and *vinaceus*, p. 469, *id. l. c.* St. Helena.

Pœciloscytus intermedius, V. E. Jakovleff, *l. c.* ix. p. 226, Government of Saratov.

Agalliastes lucidus, id. *l. c.* p. 228, Kazumkend.

Resthenia confraterna, P. R. Uhler, P. Bost. Soc. xix. p. 399, Massachusetts.

Phytocoris inops, id. *l. c.* p. 402, United States.

Idolocoris famelicus, id. *l. c.* p. 413, New Hampshire.

Anthocoridæ.

New genera and species :—

Pamerocoris, P. R. Uhler, P. Bost. Soc. xix. p. 412. Allied to *Anthocoris*; type, *P. anthocoroides*, sp. n., *l. c.* p. 413, United States.

Hapa, F. B. White, P. Z. S. 1878, p. 465. Allied to *Piezostethus*; type, *H. contorta*, sp. n., *l. c.* p. 466, pl. xxxi. fig. 1, St. Helena.

Anthocoris aterrimus, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 31, Siberia.

Acompocoris angustulus, id. *ibid.*, Siberia.

Cardiastethus bicolor, F. B. White, P. Z. S. 1878, p. 466, St. Helena; *C. brounianus*, id. Ent. M. M. xv. p. 159, New Zealand; *C. sodalis*, id. Ann. N. H. (5) i. p. 372, Hawaiian Islands.

Tetraphleps pilosus, V. E. Jakovleff, Troudy Ent. Ross. x. p. 95, N. Persia.

Saldidæ.

Salda aberrans, F. B. White, P. Z. S. 1878, p. 470, pl. xxxi. fig. 4, St. Helena; *S. butleri* and *lælaps*, id. Ent. M. M. xv. p. 160, New Zealand; *S. exulans*, id. Ann. N. H. (5) i. p. 373, Hawaiian Islands; *S. halophila*, V. E. Jakovleff, Troudy Ent. Ross. ix. p. 229, Baku; *S. latifrons*, p. 32, *arctica* and *serior*, p. 33, *rivularia*, p. 34, and *trybomi*, p. 35, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, Siberia; *S. separata* and *coriacea*, P. R. Uhler, P. Bost. Soc. xix. pp. 432 & 433, Massachusetts, &c.

Nabidæ.

Nabidea, g. n., P. R. Uhler, P. Bost. Soc. xix. p. 397. Allied to *Nabis*; type, *N. coracina* (Say, MS.), sp. n., *l. c.* p. 198, New Hampshire.

Nabis nigro-vittatus, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 36, Siberia; *N. reuteri*, V. E. Jakovleff, Troudy Ent. Ross. ix. p. 230, Amoor; *N. saundersi*, F. B. White, Ent. M. M. xv. p. 159, New Zealand; *N. blackburni*, id. Ann. N. H. (5) i. p. 373, Hawaiian Islands: spp. nn.

Reduviidæ.

Centraspis imperialis, Westw., var. (?) or sp. n. (?), *bicolor*, from Cameroons, described by W. L. Distant, Ent. M. M. xiv. p. 208. He also (*l. c.* p. 209) notices varieties of *Tetroxia beauvoisi*, Fairm., and *Oncocephalus subspinosus*.

Vernonia, g. n., F. B. White, P. Z. S. 1878, p. 469. Allied to *Arbela*; type, *V. wollastoniana*, sp. n., *l. c.* p. 470, pl. xxxi. fig. 3, St. Helena.

New species :—

Harpactor persicus, p. 96, *pumilus* and *christophi*, p. 97, V. E. Jakovleff, Troudy Ent. Ross. x., N. Persia.

Platymeris confusa, W. L. Distant, Ent. M. M. xv. p. 100, Nyassa. (He adds a table of the 3 allied E. African species.)

Coriscus assimilis, P. R. Uhler, P. Bost. Soc. xix. p. 422, United States.

Emesodema simplicipes (Say, MS.), *id. l. c.* p. 430, Massachusetts.

Hebridæ.

Hebrus montanus, L.: characters noticed by G. v. Horváth, Beitr. Kaukasusländer, p. 83.

Microvelia vagans, sp. n., F. B. White, Ann. N. H. (5) i. p. 374, Hawaiian Islands.

Hydrometridæ.

Limnotrechus plebeius, sp. n., G. v. Horváth, Term. füzetek, ii. p. 188, Hungary.

Hygrotrechus conformis, sp. n., P. R. Uhler, P. Bost. Soc. xix. p. 435, United States.

Nepidæ.

Ranatra linearis attacking small fish; E. A. Ormerod, &c., Ent. xi. pp. 95, 119, & 120.

Notonectidæ.

Notonecta irrorata, sp. n., P. R. Uhler, P. Bost. Soc. xix. p. 443, Massachusetts.

Anisops wakefieldi and *assimilis*, F. B. White, Ent. M. M. xv. p. 161, New Zealand, spp. nn.

Corisidæ.

Corisa longipalpis, J. Sahlberg, Sv. Ak. Handl. xvi. No. 4, p. 38, Siberia; *C. caspica*, G. v. Horváth, Beitr. Kaukasusländer, p. 84, Baku; *C. arguta*, F. B. White, Ent. M. M. xv. p. 161, New Zealand; *C. harrisi*, P. R. Uhler, P. Bost. Soc. xix. p. 444, Massachusetts: spp. nn.

HEMIPTERA-HOMOPTERA.

Fieber, F. Les Cicadines d'Europe, d'ápres les originaux et les publications les plus recentes. 3me partie. Description des espèces. Traduit de l'Allemand par F. Reiber. R. Z. (3) vi. pp. 270–308.

Contains Fulgorida: *Asiraca*, *Araopus*, *Tropidocephala*, *Megamelus*, *Stenocranus*, *Kelisia*, *Delphacinus*, *Chloriona*, *Euides* [preoccupied, *Eueides*, = *Evides*, in *Lep.*], *Kormus*, *Eurysa*, and *Conomelus*.

Lethierry, L. Homoptères nouveaux d'Europe et des contrées voisines. Deuxième partie. CR. Ent. Belg. xxi. pp. xxv.–xxxi.

——. Note sur les Homoptères de la Faune Belge. CR. Ent. Belg. xxi. pp. xxxvi–xli. & lxvii.

A provisional list of the Belgian species.

Spångberg, J. *Homoptera* nova vel minus cognita. Œfv. Ak. Förh. xxxiv. No. 9, pp. 3–14.

The following known species of Stål's are redescribed in this paper: *Tartessus ferrugineus* and *malayus*, p. 7, and *fieberi*, p. 9, *Carystus viridicans*, p. 13, and *hyalinipennis*, p. 14.

Cicadidæ.

Mayer, P. Der Tonapparat der Cikaden. Z. wiss. Zool. xxviii. pp. 79–92, woodcuts.

The writer commences by noticing the observations of others on the drum of the *Cicada*, and then details his own observations and experiments. He sums up the results of his inquiries as follows:—

(1) The song of most species of *Cicada* is a quick repetition of the same short tone.

(2) The sound-apparatus consists of two drum-heads, and the accompanying muscles. It is only present in the male, and forms part of the first segment of the abdomen.

(3) The whole animal, except the head and the first two segments of the thorax, serves as a resonant apparatus, and the sound is especially strengthened by the inflated abdomen.

(4) The drums are protected by two folds, arched over them from the abdomen.

(5) The drum is formed of the skin lying between the two first segments of the abdomen. At the bottom is placed the first stigma, which produces the sound in the male.

(6) The sound apparatus differs considerably in various species, and requires to be studied to ascertain the course of its development.

Petrolystra, g. n., S. H. Scudder, Bull. U. S. Geol. Surv. iv. p. 530. A gigantic form of *Aphrophorina*; types, *P. gigantea* and *heros*, spp. nn., *l. c.* pp. 531 & 532, Tertiary shales of Florissant, Colorado.

New species:—

Platypleura andamana, W. L. Distant, Tr. E. Soc. 1878, p. 174, Andaman Isles.

Tosena albata, id. *l. c.* p. 175, N.W. Himalaya; *T. splendida*, id. Ent. M. M. xv. p. 76, Naga and Khasia Hill districts.

Cercopidæ.

Distant, W. L. Notes on some *Hemiptera-Homoptera*, with descriptions of new species. Tr. E. Soc. 1878, pp. 173–179.

He discusses the generic synonymy of the *Cercopina*, to show the uncertainty of drawing conclusions on geographical distribution from generic calculations alone.

New species:—

Tomaspis modesta, W. Africa, *monteironis*, Delagoa Bay, and *conspicua*, Nyassa, p. 176, *binotata*, W. Africa, and *nyassæ*, Nyassa, p. 177, *id.* Tr. E. Soc. 1878.

Sphenorrhina distincta, Irazu, *plagiata*, p. 178, and *septemnotata*, Costa Rica, *grandis*, New Granada, and *bogotana*, Bogota, p. 179, *id. l. c.*

Cosmoscarta andamana, p. 175, Andaman Isles, *borealis*, Khasia Hills,

W. Yunnan, and *moorei*, Sikkim, p. 321, *id. l. c.*; *C. masoni*, id. J. A. S. B. xlvii. pt. 2, p. 194, Tenasserim.

Phymatostetha insignis, Ceylon, *binotata*, Brahmaputra, *id.* Tr. E. Soc. 1878, p. 322.

Carystus reticulatus, *stali*, and *sororculus* [? *sororcula*], p. 12, and *mutabilis*, p. 13; J. Spångberg, Œfv. Ak. Förh. xxxiv. No. 9, Australia.

Membracidæ.

Butler, A. G. On various genera of the Homopterous family *Membracidæ*, with descriptions of new species, and a new genus in the collection of the British Museum. Cist. Ent. ii. pp. 337–361, pl. vii.

The following synonymic notes occur: *Darnis bifasciata*, Amyot & Serville, = *capistrata*, Burm., = *trifasciata*, Fabr.; *D. infixa*, Walk., = *prasina*, Fairm., *D. trifasciata*, Burm., = (*Ochrolomia*) *suturalis*, Germ., *D. elegantula*, Perty, is also referred to *Ochrolomia*; *D. transversalis*, Walk., = (*Stictopelta*) *affinis*, Guér.; *D. robusta*, Walk., = (*S.*) *squarus*, Fairm.; *D. limbata*, Burm., = (*Leptosticta*) *flaviceps*, Burm., var.; *Membracis flavicincta* and *atomaria*, Germ., = *convoluta*, Fabr.; *Hemiptycha sagata*, Germ., = *Triquetra valida*, Walk., = *Thelia obliqua*, Walk., = (*Hyphinoe*) *cametus*, Gray, but *Hem. viridissima*, Walk., is distinct; *H. globiceps* and *cuneata*, Fairm., are sexes; *Hemiptycha apriformis* and *pubescens*, Walk., are the sexes of (*Hyphinoe*) *asphaltina*, Fairm.; *Aconophora gracilicornis*, Stål, = *marginata*, Walk.; *A. surgens*, Walk., = *imbellis*, Fairm.; *A. nigra*, Stål, = *concolor*, Walk.; *A. hastata*, Stål, = *laticorne*, Walk.; *A. rubrivittata* and *porrecta*, Walk., = *quadrivittata*, Say; *A. guttifera*, Walk., = *viridescens*, Walk.; *Thelia gladiator*, Walk., = *A. lata*, Walk.; *A. nigrivittata*, Walk., = ? *hastata*, Fabr.; *A. interna*, Walk., = *A. griscescens*, Germ.; *Combophora carinata*, Guér., = (*Omolon*) *laportii*, Germ.; *O. tridens*, Walk., is redescribed, p. 354; *Scaphula alutacea*, Fairm., = (*Rhexia*) *pallescens*, Fabr.; *Heteronotus quinquenodosus*, Stål, = *quadrinodosus*, Fairm.; *Combophora vulnerans*, Burm., = *H. stipatus*, Walk., = (*H.*) *bicornis*, Less.; *H. nigricans*, De Laporte, = (*H.*) *glanduligera*, Less.; *Centrotus furcatus*, Gray, = *Combophora reticulata*, Burm., = *H. inermis*, De Laporte; *Comb. signata*, Burm., = *H. flavo-lineatus*, De Laporte; *H. delineatus*, Walk., is figured, pl. vii. fig. 9; *H. excisus*, Walk., = *H. fuscus*, De Laporte, = *bullifera*, Burm., = *Heniconotus horridus*, Fabr.; *H. flavo-lineatus*, Am. & Serv., = *spinosus*, De Laporte, and *H. nodosus*, Walk., is a local form of it, and the species renamed *confusus*, p. 360, and figured, pl. vii. fig. 10; *H. abscisus*, Walk., = *ornatus*, De Laporte, and *clavata*, Perty, is a local form; *H. leucotelus*, Walk. (List Homopt. Suppl. p. 339, *nec* p. 155), is renamed *parcinodis*, p. 361, and figured, pl. vii. fig. 12.

Dectonura, g. n., *id. l. c.* p. 342. Allied to *Hebetica*, but with a central longitudinal carina; type, *Darnis laticauda*, Fairm. (figured, *l. c.* pl. vii. fig. 21).

A. G. Butler also (*l. c.*) describes the following new species, some of which are figured on pl. vii.:—

Ochrolomia virescens, fig. 3, Rio Janeiro, and *zonifera*, fig. 2, Mexico, pp. 338 & 339.

Stictopelta polita, p. 339, fig. 1, Ega, and *fraterna*, p. 340, Mexico, Peru.

Hebetica cuneata, p. 341, Constancia.

Alcmeone cascoscalpris, p. 344, locality unknown.

Hyphinoe diabolica, p. 346, locality unknown.

Aconophora spathata, fig. 16, Brazil, p. 347, *æneo-sparsa*, fig. 14, Mexico, p. 348, *hadina*, fig. 18, Brazil, p. 349, *prunitia*, fig. 19, and *conifera*, fig. 17, Mexico, p. 350, *gigantea*, fig. 15, Ega, p. 352.

Thelia costigera, p. 353, fig. 20, British Guiana.

Rhexia varicosa, Ega, and *bifasciata*, St. Paulo, p. 356, figs. 5 & 6.

Heteronotus trinodosus (= *quadrinodosus*, Walk., *nec* Fairm.), p. 357, fig. 8, Mexico.

Heniconotus æthiops, fig. 7, Ecuador, *belliger*, fig. 13, p. 359, and *strigosus*, fig. 11, p. 361, St. Paulo.

Iassidæ.

Spångberg, J. Species Jassi generis Homopterorum. Œfv. Ak. Förh. xxxv. No. 8, pp. 3–40.

51 exotic species (some new) are described in this paper.

Vismara, F. Note Emitterologiche. Nota iii. (*Deltocephalus* and *Agallia*). Bull. Ent. Ital. x. pp. 34–42, pl. i. (details).

Includes descriptions of known and a few new species.

Agallia venosa, Germ., and var. *elegantus*, from Florence, described by F. Vismara, Bull. Ent. Ital. x. pp. 39 & 40.

Typhlocyba debilis, Douglas, redescribed by L. Lethierry, CR. Ent. Belg. xxi. p. xxx.

New genera and species:—

Stonasla, F. B. White, P. Z. S. 1878, p. 472. Allied to *Bythoscopus*; type, *S. undulata*, pl. xxxi. fig. 5, add *S. consors*, spp. nn., *l. c.*, St. Helena.

Nehela, id. *l. c.* p. 473. Allied to last; type, *N. vulturina*, sp. n., *l. c.* pl. xxxi. fig. 6, St. Helena.

Argaterma, id. *l. c.* p. 473. Allied to *Siva* and *Selenocephalus*; type, *A. alticola*, pl. xxxi. fig. 7; add *A. multisignata*, spp. nn., *l. c.* p. 474, St. Helena.

Sarpestus, J. Spångberg, Œfv. Ak. Förh. xxxiv. No. 9, p. 10. Allied to *Tartessus*; type, *S. specularis*, sp. n., *l. c.* p. 11, Mysol.

Deltocephalus amyoti, F. Vismara, Bull. Ent. Ital. x. p. 37, Italy; *D. configuratus*, P. R. Uhler, Bull. U. S. Geol. Surv. iv. p. 511, N. Montana.

Agallia fieberi, F. Vismara, *l. c.* p. 41, Florence.

Iassus. The following new species are described by J. Spångberg (*l. c.*):—*I. formosus*, p. 3, and *signoreti*, p. 4, Rio Janeiro, *elegans*, p. 6, Rio Negro, *mœstus*, p. 8, Bolivia, Bogota, *truncatus*, p. 9, Bogota, *angu-*

latus, p. 10, Brazil (St. Paul), *africanus*, p. 11, Island of "Prinsön," *flavicosta*, p. 13, Peru, *meditabundus*, Brazil, and *pallidiceps*, p. 15, *lugubris*, p. 16, Cayenne, *varicolor*, p. 17, Bogota, *pustulatus*, p. 18, Mexico, *melanotus*, p. 19, Georgia, *fuscipennis*, p. 20, Illinois and Wisconsin, *deplanatus* (? *indica* and *jactans*, Walk.), p. 23, E. Indies, *scrupulosus*, Java, and *fasciatipennis*, Mexico, p. 25, *stali*, p. 26, Bogota, *niger* (? = *atra*, Walk.), p. 27, Colombia, *trivittatus*, p. 28, Rio Negro, *maculipennis*, p. 29, *areatus*, p. 31, *patruelis*, p. 32, *sordidulus*, p. 34, and *vittipennis*, p. 35, Bogota, *paupercula*, Ceylon, p. 35, and *ochripes*, p. 37, New Guinea.

Iassus twiningi, P. R. Uhler, *l. c.* p. 511, Dakota; *I. wollastoni*, F. B. White, P. Z. S. 1878, p. 476, St. Helena.

Chlorita edithæ, id. *l. c.*, St. Helena.

Grypotes (?) *insularis*, id. *l. c.* p. 475, St. Helena.

Penthimia nitida, L. Lethierry, CR. Ent. Belg. xxi. p. xxviii., Ussuri.

Thamnotettix paryphanta (Fieb., MS.), Algeria, Spain, Portugal, Greece, and *apicata*, Kabylia, *id. l. c.* pp. xxviii. & xxix.; *T. sanctæ-helenæ*, F. B. White, *l. c.* p. 476, St. Helena.

Typhlocyba pandellæi, L. Lethierry, *l. c.* p. xxx., Pyrenees, Landes; *T. douglasi*, J. Edwards, Ent. M. M. xiv. p. 248, Norwich.

Zygina signoreti, L. Lethierry, *l. c.* p. xxxi., France.

Tartessus australicus, p. 3, and *flavipes*, p. 4, Australia, *plebeius*, Mysol, and *trivialis*, Mysol, New Guinea, p. 5, *uniformis*, Mysol, p. 6, *guttulatus*, p. 8, and *pulchellus*, p. 10, J. Spångberg, Œfv. Ak. Förh. xxxiv.

Pediopsis distinctissima [? = *fruticola*, Fall., var., *teste auct.*], C. W. Dale, "History of Glanville's Wootton," p. 306, Dorset.

Cicadula glanvillei [sic], Dale, *l. c.* p. 308, Dorset.

Fulgoridæ.

Ilburnia, F. B. White, P, Z. S. 1878, p. 471. Subgenus of *Liburnia*, with the first joint of the antennæ longer, and the hind tarsus shorter; type, *L.* (*I.*) *ignobilis*, sp. n., *l. c.*, St. Helena.

New species:—

Aphana novem-maculata, W. L. Distant, Tr. E. Soc. 1878, p. 323, W. Africa.

Polydictya maculata, id. *l. c.*, W. Africa.

Almana ussuriensis, L. Lethierry, CR. Ent. Belg. xxi. p. xxv. Ussuri.

Hysteropterum reiberi, Algeria, and *asiaticum*, Tashkend, *id. l. c.* p. xxvii.

Psyllidæ.

Löw, F. Zur Systematik der Psylloden. Verh. z.-b. Wien, xxviii. pp. 586–610, pl. ix.

Several new genera are characterized, with descriptions of the species belonging to them, and figures of the neuration of 11 genera, &c. The paper also contains a list of the species of *Psylla*, and a table of the subfamilies and genera of the *Psyllidæ*, which Löw arranges as follows:—

I. LIVIINÆ: *Livia*, Latr. (= *Diraphia*, Ill.)

II. APHALARINÆ: *Euphyllura*, *Rhinocola*, and *Aphalara*, Först., and *Psyllopsis*, Löw.

III. PSYLLINÆ: *Calophya*, Löw, and *Psylla* (auct.), Löw, restr., *Spanioneura*, Först., *Amblyrrhina* and *Diaphora*, Löw, *Livilla*, Curtis, *Arytæna*, Scott, *Floria* and *Allæonura*, Löw, and *Homotoma*, Guér. (= *Anisostropha*, Först.).

IV. TRIOZINÆ: *Trioza*, Först., and *Bactericera*, Put.

Arytæna, Scott, and *Psylla*, Linn. (Löw, restr.), are recharacterized and details figured, pp. 597 & 600, pl. ix. fig. 11 & 12, 16–20.

ORMEROD, E. A. Notes on leaf-galls on *Parinarium curatellifolium* Ent. M. M. xv. pp. 97–99.

Two species of galls on the leaves of this African tree, are described and figured, one belonging to the *Chalcididæ*, and another probably to the *Psyllidæ*.

C. G. Thomson's conclusions on various questions of synonymy and determination relative to Scandinavian *Psyllidæ* criticised; J. W. Douglas, Ent. M. M. xv. pp. 41 & 42.

New galls produced by *Psyllidæ* on *Achillæa moschata* and *Cardamine sylvatica* noticed; F. Thomas, Z. ges. Nat. li. p. 706.

Psylla rhamnicola. Nymph described; J. Scott, Ent. M. M. xv. pp. 67 & 68.

Psylla succincta. J. W. Douglas calls attention to this species as likely to occur in Britain, and quotes Heeger's account of its habits; *op. cit.* pp. 68 & 69.

Trioza centranthi, Vallot (= *neilreichi*, Frauenf.), described in all stages, with full notice of habits, parasites, &c.; E. André, Ann. Soc. Ent. Fr. (5) viii. pp. 77–86, pl. i.

Trioza galii of Förster and of Flor appear to be distinct; J. W. Douglas, *l. c.* pp. 92 & 93.

New genera and species:—

Psyllopsis, F. Löw, Verh. z.-b. Wien, xxviii. p. 587, pl. ix. figs. 1–5. Allied to *Aphalara*, head bent obliquely downwards, pronotum erected vertically above, and mesothorax very convex, giving them a compressed appearance; types, *Psylla fraxinicola*, Först., *fraxini*, Linn., and *discrepans*, Flor.

Floria, id. *l. c.* p. 590, pl. ix. figs. 6–8. Allied to *Arytæna*. Back smooth, frontal tubercle horizontally projecting, fore wings rather narrow, and antennæ long and very slender; types, *Psylla pyrenæa*, Mink, *spartiisuga*, Put., *vittipennella*, Reut., and *spectabilis*, Flor.

Allæoneura, id. *l. c.* p. 594, pl. ix. figs. 6, 7, & 10. Allied to *Floria*, but differs in the shape and neuration of the wings; type, *Arytæna radiata*, Förster.

Calophya, id. *l. c.* p. 598, pl. ix. figs. 13 & 14. Allied to *Psylla* (restr.), head much depressed, back convex, and first marginal cell extremely large; type, *Psylla rhois*, Löw.

Ambly[*r*]*rhina*, id. *l. c.* p. 599, pl. ix. fig. 15. Allied to *Spanioneura*.

body smooth above, with depressed punctures, fore-wings short, thick, and broadest at the base; type, *Psylla torifrons*, Flor.

Diaphora [preocc. Lep.], *id. l. c.* p. 603, pl. ix. figs. 22–25. Allied to *Amblyrrhina*, body granulated, and antennæ very short; type, *D. putoni*, sp. n., *l. c.* p. 605, Parnassus.

Psylla aphalaroides, A. Puton, Bull. Soc. Ent. Fr. (5) viii. p. clxv., Madrid; *P.* (*Arytæna*) *retamæ*, id. *l. c.* p. cxxxiv. Madrid.

Trioza ægopodii, p. 228, *dispar* and *unifasciata*, p. 229, Austria, the first also from Bavaria and Finland, F. Löw, Ent. M. M. xiv. [From Sweden, not Finland; see O. M. Reuter, *l. c.* p. 277.]

Aphididæ.

Lichtenstein, J. Inquiry about Plant-Lice. Ent. M. M. xiv. pp. 175 & 176.

He describes the habits of *Phylloxera quercus*, which takes a winged form twice a year. In the first, its progeniture is agamous, and it has a rostrum; in the second it is sexuated and without a rostrum: the first phenomenon is known as parthenogenesis, the second he calls anthogenesis. The forms alternate between *Quercus coccifera* and *Q. pubescens*. He remarks on various other species, and suggests that the gall-lice of poplars, elms, &c., may possibly be only the summer forms of the grass-root lice.

——. Some new considerations about Plant-Lice. *L. c.* pp. 223 & 224.

The Aphides are monœcious, a single egg being sufficient to produce a great quantity of males and females; thus both sexes must be included in the fecundated egg. Additional notes on various species are added. See also Bull Soc. Ent. Fr. (5) viii. pp. xii. & xiii.

The same author remarks on dimorphism, &c., in *Cynipidæ* and *Aphididæ*; Ent. M. M. xv. pp. 42 & 43, & MT. schw. ent. Ges. v. pp. 297–303. Alternation of generations in various *Aphididæ*; C. R. lxxxv. pp. 898 & 899, 1205 & 1206. Sexual forms; Pet. Nouv. ii. pp. 269 & 270. Migrations and metamorphoses; *l. c.* pp. 286 & 287. The asexual reproduction of Aphides, &c., is a true process of gemmation; CR. Ent. Belg. xxi. pp. lxii. & lxiii. Various stages of *Phylloxera*, and the cycle of generations in this and other Aphides and *Cynipidæ*, discussed; P. E. Soc. 1878, pp. xxiv.–xxvi., & S. E. Z. xxxix. pp. 395–398. List of *Pemphiginæ* of which the sexes are known; Ent. M. M. xv. p. 135. Dimorphism in *Schizoneura cerni* and *Pemphigus spirothecæ*; Pet. Nouv. ii. p. 203. Phases of the latter described; *l. c.* pp. 258 & 259, & C. R. lxxxvi. pp. 1278 & 1279. *Haploneura lentisci* and *radicum* are dimorphous forms; their various stages described: Ent. M. M. xv. p. 166, Bull. Soc. Ent. Fr. (5) viii. pp. xc. & xci., clxvii., CR. Ent. Belg. xxi. pp. ccxliv.–ccxlvii., & Verh. z.-b. Wien, xxviii. SB. pp. 52–54. *Haploneura lantanæ*: its various forms; An. Soc. Esp. vii. pp. 471–474. *Schizoneura lanigera*: sexuated forms; Ent. M. M. xv. p. 134. *Tetraneura ulmi*: its various stages; Bull. Soc. Ent. Fr. (5) viii. pp. clxxi. & clxxii.

On the preservation of Aphides and other soft-bodied insects for collections; J. W. Douglas, Ent. M. M. xv. p. 165.

Phylloxera vastatrix.

BASSET, N. La Vigne et le *Phylloxera*. Rev. Industr. Chim. et Agric. i. pp. 7–20.

The author comes to the conclusions that the *Phylloxera* is not the primary cause of the destruction of the vines, but merely an occasional symptom, and that it only attacks diseased vines. As far as this first portion of his paper goes, he seems inclined to attribute the destruction of the vines to deterioration of the vine itself, caused by the unnatural conditions under which it is cultivated.

GIRARD, A. Études sur le *Phylloxera vastatrix*. Paris : 1878.

Not seen by the Recorder.

Phylloxera. A great number of communications on this subject are scattered through C. R. and other French journals.

Phylloxera noticed as occurring in hothouses in England and Scotland; R. McLachlan, Ent. M. M. xv. p. 69.

COCCIDÆ.

Lecanium acericorticis, Fitch (= *acericola*, Walsh & Riley). Transformations fully described and figured, with full notices of habits, parasites, the mode in which the insect spreads, and the best means of destroying it; E. A. Smith, Am. Nat. vii. pp. 655–661, 808 & 809.

Lecanium tulipiferæ. Habits and transformations described and figured; A. J. Cook, Canad. Ent. xi. pp. 192–196, figs. 1–6.

Laboulbenia, g. n., J. Lichtenstein, MT. schw. ent. Ges. v. p. 299. Allied to *Westwoodia* and *Rupertsia*; type, *L. brachypodii*, sp. n., *l. c.*, Montpellier.

Rhizœcus, g. n., J. Künckel d'Herculais, Ann. Soc. Ent. Fr. (5) viii. p. 163. Type, *R. falcifer*, sp. n., *l. c.* p. 164, pl. vi. Parasitic on the roots of *Seaforthia elegans*, a palm introduced from New South Wales. The habits, &c., of the larva and female are fully discussed, pp. 161–163; the male is still unknown. The female is allied to *Dactylopius*; its tarsi are not furnished with capitate hairs; it is eyeless, and the last joint of its five-jointed antennæ is set with sickle-shaped hairs.

ALEURODIDÆ.

Aleurodes. J. W. Douglas gives an account of the natural history and a list of species of this genus, chiefly compiled from previous authors; Ent. M. M. xiv. pp. 230–232.

(ANOPLURA.)

PEDICULIDÆ.

Pediculus capitis with abnormally developed tracheæ; P. Bertkau, Verh. Ver. Rheinl. xxxiii. SB. p. 35.

VERMES.

BY

F. JEFFREY BELL, B.A., F.R.M.S., F.Z.S.

LINSTOW has published a 'Compendium der Helminthologie,' which will serve as a useful dictionary to all who are engaged in the study of the *Entozoa*.

GEDDES has investigated the function of the chlorophyll granules found in the *Planaria*. C. R. lxxxvii. p. 1095.

R. SCHMIDTLEIN gives (MT. zool. Stat. Neap. i. pp. 127–129) a list of the *Vermes* observed at Naples from Jan., 1875, to July, 1878, with the dates of the periods at which they deposited their ova.

PLATYHELMINTHES.

1. ASPER, G. Abnorm gebildete Geschlechtsorgane bei *Aulastoma gulo*. Zool. Anz. i. p. 297.
2. BRAUN, —. Zwei neue Bandwürmer. Arb. Inst. Würzb. 1878, pp. 297–305, pl. xvi.
3. DUPLESSIS, G. Notice anatomique sur les *Platyhelminthes*. Bull. Soc. Vaud. (2) xv. pp. 233–237.
4. GOETTE, A. Zur Entwickelungsgeschichte der Seeplanarien. Zool. Anz. i. pp. 75 & 76.
5. GRAFF, L. Kurze Berichte über fortgesetzte Turbellarienstudien. Z. wiss. Zool. xxx. (Suppl.) pp. 457–466.
6. KENNEL, J. Bemerkungen über einheimische Landplanarien. Zool. Anz. i. pp. 26–29.
7. ——. Beiträge zur Kenntniss der Nemertinen. Arb. Inst. Würzb. 1878, pp. 302–382, pls. xvii.–xix.
8. KERBERT, C. Zur Trematoden-kenntnis. Zool. Anz. i. p. 271.
9. KÜCHENMEISTER, — & ZURN, —. Die Parasiten des Menschen. I. Cestoden. Leipzig. 1878.
10. JENSEN, O. S. Turbellaria ad litora Norvegiæ occidentalia. Bergen: 1878, 4to. pp. 97, 8 pls.

11. Leuckart, R. *Archigetes sieboldi*, eine geschlechtsreife Cestodenamme. Mit Bemerkungen über die Entwicklungsgeschichte der Bandwürmer. Z. wiss. Zool. xxx. (Suppl.) pp. 593–607.

12. Linstow, —. Neue Beobachtungen an Helminthen. Arch. f. Nat. xliv. pp. 218–246, pls. vii.–ix.

13. Lorenz, L. Ueber die Organisation der Gattungen *Axine* und *Microcotyle*. Arb. z. Inst. Wien, iii. pp. 405–436, pls. xxxi.–xxxiii.

14. Metschnikoff, E. Ueber die Verdauungsorgane einiger Susswasserturbellarien. Zool. Anz. i. pp. 387–390.

15. Moniez, R. Contribution à l'étude anatomique et embryogenique des Tænias. Bull. Sc. Nord. x. pp. 220–226.

15 a. ——. Sur les Cysticerques. *Tom. cit.* pp. 284–294.

16. ——. Sur les Spermatozoïdes des Cestodes. C. R. lxxxvii. p. 112.

17. Perrier, E. Classification des Cestoïdes. C. R. lxxxvi. pp. 552–554; Rev. Int. i. p. 315.

18. Taschenberg, E. O. Ueber die Geschlechtsorgane ectoparasitischer mariner Trematoden. Zool. Anz. i. p. 176.

19. ——. Helminthologisches. Z. ges. Naturw. (2) li. pp. 562–577.

20. Ulicny, Jos. Helminthologische Beiträge. Arch. f. Nat. xliv. pp. 211–218, pl. vi.

21. Villot, A. Organisation et développement de quelques espèces de Trématodes endoparasites marins. Ann. Sc. Nat. (6) viii. art. No. 2, pls. v.–x.

22. ——. Migrations et métamorphoses des Ténias des Musaraignes. *Tom. cit.* art. No. 5, pl. xi.

23. Vogt, C. Ueber die Fortpflanzungsorgane einiger ectoparasitischer mariner Trematoden. Z. wiss. Zool. xxx. (suppl.) pp. 306–343, pls. xiv.–xvi. (Reviewed by Maupas; Arch. Z. expér. vi. 3, p. 363.)

New Genera and Species, &c.

Graff (5) describes *Stenostomum sieboldi*, sp. n. (Trieste, p. 459), *Stylochus tardus*, sp. n. (Trieste, p. 460), *Opistomum striatum*, sp. n. (Trieste, p. 462).

Kerbert (8) describes *Distoma westermani*, sp. n., from the lungs of the Tiger.

Lorenz (13) describes *Microcotyle mormyri*, sp. n., from *Pagellus mormyrus* (p. 427, pl. iii. fig. 1).

For Linstow, *vide* infrà, *Nematohelminthes*.

Braun (2) describes (p. 301) a new genus, *Polypocephalus*. *P. radiatus*, from the intestine of *Rhinobatus granulatus*, Cuv. (pl. xvi. 1–4). The other new form taken from the same animal is not named (pl. xvi. fig. 5).

Taschenberg (19) describes *Tristomum pelamydis*, p. 569; *Monocotyle myliobatis*, g. & sp. nn., p. 574; and redefines the genera *Pleurocotyle*, *Udonella*, and *Tristomum*; there are notes on some of the known species.

Ulicny (20) describes *Bucephalus intermedius*, sp. n., from *Anodonta cellensis*.

Bipalium kewense, sp. n., H. N. Moseley, Ann. N. H. (5) pp. 237–239.

Grobben records (Arb. z. Inst. Wien, i. p. 145) the presence of *Distomum megastomum* in the testicular tubes and vas deferens of *Portunus depurator*.

Jensen (10) describes the following new genera: *Byrsophlebs* (p. 33), "apertura oris ventralis in medio fere corpore. Pharynx ut in *Mesostomo*. Vesica seminalis unica lateralis, in ductum singularem longum per corpus transversum euntem continuata, cujus medio penis affixus est. Glandulæ accessoriæ granulosæ in organa mascula et in feminea quoque exeunt. Ovarium impar, cum receptaculo seminis in organum unum conjunctum. Receptaculum seminis cum bursa copulatrice haud dubie per ductum proprium communicat. Aperturæ genitales duæ (mascula ante femineam sita)." *B. graffi*, p. 34, pl. ii. figs. 8–12.

Proxenetes, g. n., p. 36, "apertura oris ventralis haud procul post medium corporis sita. Pharynx ut in *Mesostomo*. *Organa vitelligena* in ipsa ovaria simplicia sunt tota amplitudine continuata. Ovaria paria simplicia, sacciformia ut in Vortice. Bursa copulatrix receptaculumque seminis in saccum communem conjuncta. Glandulæ accessoriæ et in masculum apparatum genitalem et in femineum exeunt. Apertura genitalis ventralis communis," &c. *P. flabellifer*, sp. n., p. 36, pls. ii. 13–18.

Kylosphæra [*Cy-*], g. n., p. 44: "Apertura proboscidis in extremitate antica. Proboscis globosa, papillis nullis, ciliis brevibus, omnino in saccum proboscidis retractilis. Apertura oris ventralis, antica, transversa, rimæformis. Apparatus adhæsionis e corpusculis duris bacilliformibus, ut assolet, compositi, in regione oris siti. Truncus aquiferus semeter, in aperturam oris patens. Penis durus, spiralis apiculo recto. Bursa copulatrix receptaculumque seminis in organum unum conjuncta. Apertura genitalis unica. *K.* [*C.*] *armata*, sp. n., p. 45, pl. iii. figs. 14–22.

And the following new species: *Aphanostomum elegans* (p. 25, pl. i. figs. 9–11), *Convoluta flavibacillum* (p. 28, pl. ii. figs. 2–5), *Mecynostomum agile* (p. 31, pl. i. figs. 22–24), *Vortex angulatus* (p. 39, pl. iii. figs. 1–5), *V. affinis* (p. 43, pl. iii. figs. 11–13), *Gyrator danielsseni* (p. 48, pl. iv. figs. 1–9), *Plagiostomum koreni* (p. 56, pl. v. figs. 1–8), *Acmostomum sarsi* (p. 59, pl. v. figs. 9–13), *Enterostomum flavibacillum* (p. 64, pl. v. figs. 23–26), *Monocelis hamata* (p. 71, pl. viii. figs. 1–9); as also from 'manuscriptis Dr. M. Sarsi relictis,' *Stylochus roseus* (p. 75, pl. viii. figs. 1–3), *Thysanozoon papillosum* (p. 79, pl. viii. figs. 4–6), *Cosmocephala* (?) *cordiceps* (p. 82, pl. viii. figs. 13–16).

Giard, C. R. lxxxvii. p. 72, Ann. N. H. (5) ii. p. 197, describes *Avenardia priei*, g. & sp. nn., a large Nemertine from the west coast of France: it is one of the Anopla, and has its enteric cœca arranged alternately on either side, and forming secondary diverticula at their extremities, very much as in *Pelagonemertes rollestoni*, Moseley.

Duplessis's paper "On the Origin and Distribution of the Turbellaria of the deep Fauna of the Lake of Geneva" (Bibl. Univ., Oct. 15, 1877, Arch. sci. nat. p. 326), is translated in Ann. N. H. (5) p. 490.

Forel gives a list of the freshwater *Vermes* of Switzerland. Z. wiss. Zool. xxx. (suppl.), p. 386.

Marion (47) reports two Nemertines from Marseilles.

The Recorder has not seen the two following papers, which are written in Russian: Mereschkowsky, Ueber neue Turbellarien des Weissen Meeres (St. Petersburg: 1878, 20 pp., containing *Alauretta*, g. n., and 2 spp. nn. of *Prostomum* and 1 of *Mesostomum*); Metschnikoff, Untersuchungen über die Entwickelung der Planarien, in Notizen der neurussischen Ges. Naturf. (Odessa) v. i. Nor has he been able to see Eisen's treatise on the anatomy of *Oenerodrilus*, N. Act. Ups. x.; or Dounon's 'Description des parasites' (Toulon: 1878).

Anatomy, Development, &c.

Graff (5) finds new evidence to support the doctrine that the rod-shaped bodies found in the parenchyma and the urticating capsules are homologous structures; he states that the longitudinal bands of the dermo-muscular tube are separated by interspaces; that a certain number of forms have no differentiated digestive tract, and that various stages in the development of the cœlom may be made out in the *Turbellaria*.

Kennel (6) has observed *Fasciola terrestris*, O. F. M., and *Geodesmus bilineatus*, Metschnikoff, and was fortunate enough to obtain a specimen of the former, which produced young under his eyes, these were almost completely white; in the main his observations on the generative organs agree with those of Moseley (on *Rhynchodesmus*), but he regards the primitive vascular system of this author as forming the longitudinal nerve-trunks.

Metschnikoff (14) relates some experiments on species of *Mesostomum*, in which he found that nutrient particles were taken into the cells of the digestive tract, and he concludes that there are *Turbellaria* without any differentiated digestive system, or in which the primitive method of digestion is still retained; he is, however, careful to point out that there are other forms of the same group in which the ordinary mode is always found.

No digestive ferments were to be found in *T. serrata* (Fredericq, Bull. Ac. Belg. (2) xlvii. No. viii. pp. 221 & 222, Arch. Z. expér. vii. 3, p. 397); this is evidently because they live in media which are rich in them, but their own integument is able to resist the action of the ferments secreted by their host, as was shown by some experiments with *Ascaris marginata*.

In *Planaria neapolitana*, Goette (4) finds that two terminal vesicles are extruded from the egg previous to segmentation, and that the animal becomes very much like a *Pilidium*; and he concludes that the developmental history of the Nemertines may be referred to that of the *P. dendrocœla*.

Kennel (7) gives an elaborate account of the anatomy of *Malacobdella*, which he agrees with Semper & Hoffmann in regarding as one of the *Nemertinea*, among which it should form a new family, *Malacobdellidæ*, distinguished by having no armature to the spines, two layers in the muscular tube, no cephalic grooves or lateral organs, enteric canal simple, nerve trunks united by an anal commissure. *Geonemertes palensis*, Semper (not *peluensis* [Semper] nor *pelæensis* [Claus]) is also described in

detail; it is distinguished by the possession of an enlargement connected by a canal which opens to the exterior by a minute pore placed dorsally to the mouth, and which seems to be associated with its terrestrial habits.

Lorenz (13), in describing the organization of *Axine*, points out the characters of its asymmetry, which, of itself, would be sufficient to distinguish it from *Microcotyle* (the other distinguishing points are also clearly pointed out); the seizing organs are not suckers, though similar in function; the nerve-centre is represented by a curved band lying superiorly to the œsophagus; the nerves given off from it are soon lost in the parenchyma of the body; the enteron does not seem to have any proper body-wall. *Axine* appears to be distinguished from all other *Polystomeæ* by the possession of three ducts carrying the deutoplasm into the oviduct. *Microcotyle* has no penis, and the vaginal orifice is placed in the dorsal median line of the body; in many points it resembles *Axine*; the characters of its vagina are peculiar.

Vogt (23) describes the generative organs of *Phyllonella soleæ*, Van Beneden & Hesse (p. 306, pls. xiv. fig. 1, xv. figs. 1–4); *Diplectanum æquans*, Diering (p. 315, pls. xiv. fig. 2, xv. fig. 5, xvi. fig. 1); *Dactycotyle pollachii* (p. 322, pls. xv. figs. 6 & 7, xvi. figs. 2 & 3); *Microcotyle* (with which *Axine* ought to be united) (p. 327, pls. xv. figs. 8 & 9, xvi. figs. 4–6); *Udonella lupi*, Van Beneden & Hesse (p. 333, pl. xvi. figs. 7 & 8). He gives an account of the orifice of the ootyp, which, on account of its "swallowing movements," he proposes to call the "Schlucköffnung"; the germ-gland is always simple; and the remaining female organs do not vary very greatly; the male organs exhibit great variety, in some they are connected directly, and in others they have merely a common orifice with the female organs.

Moniez's (15) observations take largely the form of a revision of the statements of Sommer.

R. Blanchard gives (J. de l'Anat. Phys. 1878, pp. 562, 701–702) an account of what is known with regard to the processes of fecundation in the *Turbellaria*, *Trematoda*, and *Nemertinea*.

Ulicny's (20) observations are on some of the parasites of the *Lamellibranchiata*; the curious characters of the caudal region of the cercariæ of *Cyclas ricicola* are described in detail.

T. S. Cobbold has some remarks on *Bothriocephalus latus* (Veter. li. pp. 428–432) in which he demurs to the view of Fock that the cysticerci pass an independent existence in water.

Duchamp in a second note, "Sur les conditions de développement des Ligules," C. R. lxxxvi. p. 493, points out the influence of temperature. De Saint-Joseph has a supplementary note on *Ptychodes splendida* in Bull. Soc. Philom. (7) ii. p. 62.

NEMATOHELMINTHES.

24. Bugnion, E. Notes sur les globules sanguins du *Mermis aquatilis*, Duj., suivie de quelques remarques sur la structure anatomique de cette espèce. Actes Soc. Helv. 60th Sess. Bex, pp. 247–255.

25. Cobbold, T. S. The life history of *Filaria bancrofti*. J. L. S. xiv. pp. 356–371.

26. Galeb, O. Oxyurides parasites des Insectes. Rev. Int. ii. p. 432.

——. Organisation et développement des Oxyurides. Arch. Z. expér. pp. 283–384, pls. xvii.–xxvi.; also separately.

27. ——. Observations et experiences sur les migrations du *Filaria rytipleurites*, parasite des Blattes et des Rats. C. R. lxxxvii. p. 75; Ann. N. H. (5) ii. p. 199.

28 & 29. Krabbe, H. Sælernes og Tandhvalernes Spolorme. Overs. Dan. Selsk. 1878, pp. 43–51, pl. i.; also a French summary, 'Sur les Ascarides des Phoques et des Baleines à dents,' *tom. cit.* pp. 11 & 12; and Ann. N. H. (5) ii. pp. 430–432.

30. Lewis, T. R. Remarks regarding the *Hæmatozoa* found in the stomach of *Culex mosquito*. P. A. S. B. 1878, pp. 89–93.

31. Manson, P. On the development of *Filaria sanguinis-hominis*, and on the Mosquito considered as a nurse. J. L. S. xiv. pp. 304–311.

New Genera and Species, &c.

Linstow (12) describes the following new species: *Bothriocephalus osmeri* (peritoneum of *Osmerus eperlanus*) (p. 218, pl. vii. fig. 1); *B. lanceolatus* (in *Gadus cullaris*) (p. 218); *Tænia inermis* (intestine of *Arvicola campestris*) (p. 220, fig. 3). *Monostomum echinatum* (intestine of *Pandion heliaetos*) (p. 223, fig. 6). *Diplostomum lenticola* (lens of *Abramis vimba*), (p. 220, fig. 9). *Dactylogyrus alatus* (gills of *Blicca bjverkna*) (p. 227, fig. 10); *D. tuba* (gills of *Squalius leuciscus*) (p. 228, fig. 12); *D. cornu* (gills of *Abramis vimba*) (p. 228, fig. 13); *D. sphyrna* (ditto) (p. 229, pl. viii. fig. 14).

Trichosoma brevispiculum (intestine of *Lota vulgaris*) (p. 230).

Nematomys tenerrimus (intestine of *Anguilla vulgaris*) (p. 233, fig. 18).

Filaria papillifera (mesentery of *Sylvia palustris*) (p. 234, fig. 19); *F. muscicapæ* (mesentery of *Muscicapa atricapilla*) (p. 234); *F. echinata* (intestine of *Alburnus lucidus*) (p. 235, fig. 20).

And the following larval forms: *Ascaris eperlani* (= *Nematoideum salmonis-eperlani*, Rud., = *Agamonema bicolor*, Dies, pt.) (dorsal muscles of *Osmerus eperlanus*) (p. 237, pl. ix. fig. 24); *A. flesi* (intestine and liver of *Platessa flesus*) (p. 238, fig. 26), *A. piscicola* (walls of stomach of *Esox lucius*) (p. 239, fig. 27); *A. siluri* (walls of stomach and liver of *Silurus glanis*) (p. 239, fig. 28); *A. osmeri* (viscera of *Osmerus eperlanus*) (p. 240, fig. 29); *A. carpionis* (wall of intestine of *Cyprinus carpio* (p. 240); *A. acerinæ* (ditto of *Acerina cernua*) (p. 240, fig. 30).

Agamonema flesi (*Platessa flesus*) (p. 241); *A. acerinæ* (muscles of *Acerina cernua*) (p. 241, fig. 31).

Agamonematodum necrophori (body cavity of *Necrophorus vespillo*) (p. 241, fig. 32); *A. vespillonis* (ditto) (p. 242, fig. 33); *A. juli* (intestine of *Julus terrestris* (p. 242, fig. 34).

Observations are also made on *Sphærularia bombi* (p. 242, fig. 35), and a Nematode larva of very similar character is described; on the embryonal and larval forms of *Ascaris communis* (p. 238), and on various other species already known.

Chatin (Mém. Soc. Biol. 1877 [1879]) describes *Ascaris satyri*, sp. n., from the orang (not the same as *A. lumbricoides*, as is ordinarily supposed), pp. 384–387; and points out (*tom. cit.* p. 266) that *A. leptodera*, Rudolphi (from the lion) is distinct from *A. mystax* (from the domestic cat).

Filaria otariæ, sp. n., Chatin, *tom. cit.* p. 204 (from *Otaria stelleri*).

Dochmius balsami, sp. n., Parona & Grossi (Rend. Ist. Lomb. x. [1877] pp. 190–195).

Galeb (26) forms a new sub-genus *Helicothrix* (pp. 14–16 of separate copy), found in the *Hydrophilidæ*; and describes the following new species: found in the *Blattidæ*, *O. blatticola* (p. 11. pl. xx.), *O. kunckelli* (p. 12, pl. xxiii.), *O. ægyptiaca* (p. 12, pl. xxv. figs. 1 & 2), *O. panesthiæ* (p. 13, pl. xxvi. figs. 5–7), *O. heterogamiæ* (p. 13, pl. xxvi. fig. 9); in the *Hydrophilidæ*, *O. hydroi* (p. 15, pl. xxv. figs. 1–7), *O. hydrobii* (p. 15).

T. S. Cobbold points out (Veter. li. p. 85) that *Trichonema arcuatum* is the young of *Strongylus tetracanthus*.

Krabbe (29) describes *Ascaris decipiens*, sp. n. (p. 45) and *A. conocephalus*, sp. n. (p. 49).

Anatomy and Physiology.

Galeb's (26) observations illustrate the fact that different insects, though similar in habit, may be inhabited by different parasites; in the ova, which are very transparent, the germinal vesicle does not disappear at the time of segmentation, but elongates or divides, and that previous to the same phenomenon in the egg. The generative organs appear to be formed by the proliferation of a cell in the abdominal region, and not by the division of primitive cells into ovarian and investing cells. He believes that every intermediate stage may be made out between the *Polymarii* and *Meromyarii*. The eggs first laid give rise to males.

Trichinosis in Badgers; Veter. Journ. vii. p. 352.

Manson's paper from the Custom's Gazette on "Chinese *Hæmatozoa*," is reprinted in Veter. Journ. vi. pp. 115–121, 262–267; Da Silva Lima's paper on *Hæmatozoa* is translated in Veter. li. pp. 88–96.

Chatin (C. R. lxxxvi. p. 974; Ann. N. H. 5, ii. p. 108) describes in an *Agamonema* a rare form of hepatic organ, which is a differentiated gland instead of being merely a cellular layer or a collection of small cœca.

Cobbold (25) gives a very complete bibliographical list of papers, some of which were only published in 1878.

Chatin (Mém. Soc. Biol. 1877 [1879] p. 278) describes some simple muscle-cells, as found in a Nematoid of a new (unnamed) genus parasitic in *Callicthys*.

The second case recorded of the direct relation of a Nematoid parasite to an insect and a mammal is given by Galeb (27).

An abstract is given in J. de l'Anat. Phys. 1878, p. 548, of a paper by Mégnin in Bull. Soc. Cent. Vet. 1877, p. 646, on pneumonia produced by a Filarian Worm, which it is proposed to call *Strongylus minutissimus*; it was observed in the lungs of some African sheep, and development is said to be external to the host.

A review of what is known as to the processes of fecundation in the *Nematohelminthes*, is given by R. Blanchard; *tom. cit.* pp. 702–707 (*vide* PLATYHELMINTHES).

In Ann. Sci. Nat. vii. No. 1, art. 7, there is an abstract of Deschamp's experiments on the development of *Ligula*.

RODRIGUEZ, A. S., De las trichinas y de la trichinosis en España (Madrid); H. DUNKER, Anleitung zur microscopischen Fleischau (Berlin: 1878); R. LONG, Das Wissenswertheste über die Geschichte und den Lebensgang der *Trichina spiralis* (Breslau: 1878): have not been seen by the Recorder.

CHÆTOGNATHA.

32. LANGERHANS, —. Das Nervensystem der Chætognathen. MB. Ak. Berl. 1878, pp. 189–193.

Confirms Krohn's account, and points out that the nervous system of *Sagitta* seems to point to relationship with the *Mollusca*.

ACANTHOCEPHALI.

33. ANDRES, A. Ueber den weiblichen Geschlechtsapparat des *Echinorhynchus gigas*, Rud. Morph. JB. iv. pp. 584–591, pl. xxxi.

The author points out that the ligamentum suspensorium is connected with the other lamellæ, and that thus two sacs are formed; these occupy nearly the whole of the cœlom, and are in contact with the body-wall; he describes in detail the structure of the "bell-shaped organ," and states that the vagina consists of three parts; he confirms the statement made by Henle (on *E. acus*) of the presence of four large ganglia between this and the wall of the body.

ROTATORIA.

33 A. BALBIANI, —. Observations sur le Notommate de Werneck et sur son parasitisme dans les tubes des Vaucheries. Ann Sci. Nat. vii. No. 1, Art. 2, pl. iv.

The author was unable to observe any males.

GEPHYREA.

34. SELENKA, E. Das Männchen der *Bonellia*. Zool. Anz. i. pp. 120 & 121.

35. Vejdovsky, F. Ueber die Eibildung und die Männchen von *Bonellia viridis*, Rol. Z. wiss. Zool. xxx. pp. 487–500, pl. xxx.; reviewed, Rev. Int. i. pp. 722–727, Arch. Z. expér. vi. 3, p. xlvi.

Vejdovsky (35), in addition to treating of the characters of the ova, describes the structure of the Turbellarium-like male of *Bonellia*; he describes a cuticle, which according to Selenka (34) does not really exist; a mouth and an anus; and a pair of chitinous hooks connected with the genital aperture.

Selenka (34) gives some details as to the structure of the Turbellarium-like males of this genus; the integument consists of a layer of ciliated cells, the muscles are arranged in an external circular and an internal longitudinal layer; these are succeeded by parenchymatous connective tissue, which forms projecting dissepiments into the cœlom; there is no oral or anal orifice to the enteron; there are two infra-œsophageal ganglia and a large œsophageal ring; the right segmental organ is always the smaller; migratory cells, containing chlorophyll, may be observed in the cœlom and connective tissue. Four to twelve, and at times as many as twenty, males are to be found in each female.

Marion (47) notes four *Gephyrea* from Marseilles.

Phascolosoma japonicum, sp. n., Grube, JB. schl. Ges. liv. p. 73, Japan.

ANNULATA.

36. Eisig, H. Der Nebendarm der Capitelliden und seine Homologa. Zool. Anz. i. pp. 148–152.

37. ——. Die Segmentalorgane der Capitelliden. MT. zool. Stat. Neap. i. pp. 93–118, pl. iv.

38. ——. Die Seitenorgane und becherförmigen Organe der Capitelliden. *Tom. cit.* ii. pp. 278–342, pl. vii.

39. Grube, E. Annulata Semperiana. Beiträge zur Kenntniss der Anneliden-fauna der Philippinen nach den von Herrn Prof. Semper mitgebrachten Sammlungen. Mém. Petersb. (7) xxv. No. 88, pp. ix. & 300, pls. i.–xv.

40. Hansen, G. A.. Oversigt over de Norske Serpula-arter. Arch. Math. Naturv. iii. pp. 39–44, 3 pls.

41. ——. Anatomie von *Leanira tetragona*. Tom. cit. pp. 352–374, 10 pls.

42. Hatschek, B. Studien über Entwickelungsgeschichte der Anneliden. Arb. z. Inst. Wien, iii. pp. 277–404, pls. xxiii.–xxx.; and separately (Wien: 8 pls.).

43. Horst, R. Ueber eine Perichæta von Java. Niederl. Arch. Zool. iv. pp. 103–111, pl. viii.

44. Kleinenberg, N. Sullo sviluppo del *Lumbricus trapezoides*. Napoli: 1878, 8vo, 3 pls.

45. Lankester, E. Ray. The red vascular fluid of the Earth-worm a corpusculated fluid. Q. J. Micr. Sci. xviii. p. 68, pl. x.

46. [Lankester, E. R.] The vascular system of *Branchiobdella* and the blood-corpuscles of the Earth-worm. J. Anat. Phys. xii. pp. 591 & 592.

46 a. Löwe, L. Zur Anatomie der Serpulakieme. Z. wiss. Zool. xxii. pp. 158–188, pl. ix.

47. Marion, A. F. Dragnages au large de Marseille. Ann. Sc. Nat. vi.–viii. Art. No. 7, pls. xv.–xviii.

48. McIntosh, W. C. Beiträge zur Anatomie von *Magelona*. Z. wiss. Zool. xxxi. pp. 401–473, pls. xxix.–xxxviii.; J. Anat. Phys. xiii. (1879) pp. 331–346.

49. ——. On the *Annelida* obtained during the cruise of H.M.S. 'Valorous' to Davis' Strait in 1875. Tr. L. S. (n. s.) i., pp. 499–511, pl. lxv.

50. ——. On the Annelids of the British North-polar Expedition. J. L. S. xiv. pp. 126–134.

50 a. Mojsisovics, V. Kleine Beiträge zur Kenntniss der Anneliden. i. Die Lumbriciden-hypodermis. SB. Ak. Wien, lxxvi. Abth. i. pp. 7–21, 1 pl.

51. Power, D'Arcy. On the Endothelium of the Body-cavity and Blood-vessels of the common Earth-worm, as demonstrated by Silver-Staining. Q. J. Micr. Sci. xviii. pp. 158–161, pl. x.

52. Rolleston, G. The Blood-Corpuscles of the Annelides. J. Anat. Phys. xii. pp. 401–419.

53. Semper, C. Die Verwandtschaftsbeziehungen der gegliederten Thiere. Rev. Sci. 1878, pp. 871–880.

54. ——. Sind die Segmentalorgane der Anneliden homolog mit denen der Wirbelthiere? Morph. JB. iv. pp. 322–327.

55. Studer, T. Beiträge zur Naturgeschichte wirbelloser Thiere von Kerguelensland. Arch. f. Nat. xliv.; *Brada mamillata*, pp. 111–119, pl. v. figs. 1–10; *Ophryotrocha claparedii*, sp. n., pp. 119–121, pl. v. fig. 11.

56. Ulianin, —. Sur le genre *Sagitella*. Arch. Z. expér. vii. pp. 1–33, pls. i.–iv.

57. Vejdovsky, F. Beiträge zur Kenntniss der Tomopteriden. Z. wiss. Zool. xxxi. pp. 81–100, pls. vi. & vii.; J. Micr. Soc. ii. p. 155.

58. Whitman, C. O. On the Embryology of *Clepsine*. Q. J. Micr. Sci. xviii. pp. 215–315, pls. xii.–xv.; Zool. Anz. i. p. 51.

New Genera and Species, &c.

Grube (39) finds 142 species, which are new, and 4 new genera in the collection of Semper; a few of the species and 1 of the genera have been already described. Of the 166 *Chætopoda* brought from the Philippine Islands, 11 probably belong to the fauna of Singapore. The families *Alciopidæ*, *Nephthyidæ*, *Ariciidæ*, *Cirratulidæ*, and *Chætopteridæ* are absent; of the 166, 23 have been found in the Red Sea, the Indian Ocean or the Pacific. He describes the following new genera and species:—

Amphinomea. *Lenora*, g. n. (p. 2) ; *L. philippinensis*, sp. n. (p. 2, pl. i. fig. 1).

Amphinome brevis, sp. n. (p. 4, pl. i. fig. 2).

Aphroditea. *Polynoe austera*, p. 29, pl. i. fig. 6 ; *P. adspersa*, p. 30, pl. ii. fig. 7 ; *P. pilosella*, p. 31, pl. ii. fig. 8 ; *P. cryptocephalus*, p. 32, pl. iii. fig. 3 ; *P. fallax*, p. 34, pl. ii. fig. 2 ; *P. ampullifera*, p. 35, pl. iii. fig. 5 ; *P. rutilans*, p. 37, pl. ii. fig. 5 ; *P. subfumida*, p. 38 ; *P. ptycholepis*, p. 39, pl. ii. fig. 6 ; *P. fusco-limbata*, p. 40, pl. i. fig. 7 ; *P. boholensis*, p. 41, pl. iii. fig. 4 ; *P. venosa*, p. 43, pl. iii. fig. 6 ; *P. dictyophorus*, p. 44 (described from an elytron only).

Panthalis nigro-maculata, p. 50, pl. iv. fig. 2.

Lycoridea. *Nereis* (*Leptonereis*) *cebuensis*, p. 61, *N.* (*Leonnates*) *virgata*, p. 63, pl. vi. fig. 7 ; *N.* (*Ceratonereis*) *similesetis*, p. 64, pl. iv. fig. 4 ; *N. microcephala*, p. 65 ; *N. pectinifera*, p. 66, pl. iv. fig. 5, pl. v. fig. 5 ; *N. coracina*, p. 67, pl. vi. fig. 1 ; *N. lapinigensis*, p. 69 ; *N.* (*Platynereis*) *fusco-rubida*, p. 70 ; *N.* (*Lycoris*) *ehlersiana*, p. 71, pl. v. fig. 1 (only in the *Heteronereis* stage) ; *N. trifasciata*, p. 74 ; *N. masalacensis*, p. 75, pl. v. fig. 4 ; *N. badio-torquata*, p. 76 ; *N. semperiana*, p. 77, pl. iv. fig. 6 ; *N. verrilli*, p. 78, pl. v. fig. 2 ; *N. quatrefagesi*, p. 79 ; *N. crucifera*, p. 80, pl. v. fig. 6 ; *N.* (*Perinereis*) *halleri*, p. 81 ; *N. singaporiensis*, p. 84 ; *N. striolata*, p. 85, pl. iv. fig. 9 ; *N. obfuscata*, p. 86 ; *N. camiguina*, ? sp. n. or *Perinereis aberrans*, Kinberg, p. 87, pl. iv. fig. 8 ; *N. aibuhitensis*, p. 89, pl. v. fig. 3 ; *N. perspicillata*, p. 90, pl. iv. fig. 10 ; *Dendronereis pinnaticirris*, p. 92, pl. iv. fig. 3.

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Hesionea. *Hesione intertexta*, p. 102, pl. vi. fig. 5 ; *Leocrates iris*, p. 105 ; [*Lamprophaes*, Grube, apparently = *Leocrates*, Kbg.].

Irma, g. n., close to *Ophiodromus*, Sars, p. 107 ; *I. angustifrons*, sp. n., p. 108, pls. vi. fig. 7, xv. fig. 12 ; *I. latifrons*, p. 109, pls. vi. fig. 6, xv. fig. 11.

Syllidea. *S. uncinigera*, p. 113 ; *S. singulisetis*, p. 114, pl. vii. fig. 4 ; *S. violaceo-flava*, p. 115, pl. vii. fig. 3 ; *S. lycochætus*, p. 117, pl. vii. fig. 2 ; *S. flaccida*, p. 118, pl. vii. fig. 6 ; *S. cernia*, p. 119 ; *S. solida*, p. 120, pl. vii. fig. 7 ; *S. erythropis*, p. 121, pl. vii. fig. 5 ; *S. umbricolor*, p. 123 ; *S. nigrescens*, p. 124.

Odontosyllis arenicolor, p. 126 ; *O. rubro-fasciata*, p. 128, pl. viii. fig. 1 ; *O. hyalina*, p. 129, pl. vii. fig. 1.

Autolytus (*Polybostrichus*) *triangulifer*, p. 132, pl. vii. fig. 8.

Platysyllis, g. n., p. 134 ; *P. semperiana*, p. 134, pl. viii. fig. 2.

Eunicea. *Diopatra luzonensis*, p. 138, pl. ix. figs. 10, 10 *a*, & 11 ; *D. claparedii*, p. 140, pl. ix. figs. 11 *a* & 11 *b*.

Hyalinoecia camiguina, p. 142, pl. x. fig. 1.

Eunice badia, p. 148, pl. ix. fig. 4 ; *E. savignii*, p. 150 ; *E. coccinea*, p. 153, pl. ix. fig. 1 ; *E. flavo-fasciata*, p. 155, pl. ix. fig. 2 ; *E. megalodus*, p. 156, pl. ix. fig. 5 ; *E. impexa*, p. 159, pl. ix. fig. 6 ; *E. paupera*, p. 160 ; *E. stragulum*, p. 163.

Lysidice boholensis, p. 167.

Lumbriconereis. L. ocellata, p. 169, pl. viii. fig. 6; *L. debilis*, p. 170, pl. viii. fig. 5.

Arabella planiceps, p. 174, pl. viii. fig. 4.

Aracoda mœbiana, p. 176, pl. viii. fig. 7.

Staurocephalus filicornis, p. 177, pl. x. fig. 2; *S. brevipinnis*, p. 179, pl. vii. figs. 9 & 10.

Glycerea. Glycera saccibranchis, p. 181, pl. viii. fig. 10; *G. longipinnis*, p. 182, pl. viii. fig. 9; *G. subanwa*, p. 184, pl. viii. fig. 8.

Goniada paucidens, p. 185.

Spiodea. Polydora fulva, p. 187, pl. viii. fig. 3.

Capitellacea. Dasybranchus umbrinus, p. 189; *D. lumbricoides*, p. 190, pl. x. fig. 4.

Opheliacea. Ophelina leptocirris, p. 194.

Chlorhæmina. Stylarioides parmatus, p. 199, pl. xi. fig. 1.

Maldaniæ. Maldane marsupialis, p. 202, pl. x. fig. 5.

Ammocharidea. Ammochares orientalis, p. 204, pl. x. fig. 6.

Ampharetea. Sabellides angustifolia, p. 206, pl. xii. fig. 1. *Amphicteis philippinarum*, p. 207, pl. xi. fig. 7.

Amphictenea. Pectinaria brevispinis (? var. *Amphictene capensis*, Sav.), p. 210, pl. xi. fig. 2; *P. clava*, p. 212, pl. xi. fig. 3; *P. conchilega*, p. 213, pl. xi. fig. 4; *P. parvibranchis*, p. 216, pl. xi. fig. 5; *P. longispinis*, p. 216, pl. xi. fig. 6.

Hermellacea. Sabellaria (*Paliaria*) *sex-hamata*, p. 219, pl. xiv. fig. 1.

Terebellacea. Terebella sarsi, p. 223, pl. xii. fig. 5; *T. montagui*, p. 224, pl. xii. fig. 3; *T. crassifilis*, p. 226, pl. xii. fig. 2; *T. ingens*, p. 228, pl. xiii. fig. 1; *T. gracilibranchis*, p. 230, pl. xii. fig. 6; *T. claparedii*, p. 231; *T.* (*Pista*) *typha*, p. 232, pl. xii. fig. 4.

Phenacia robusta, p. 235, pl. xii. fig. 8; *P. exilis*, p. 236; *P. parca*, p. 237, pl. xii. fig. 7; *P. leptoplocamus*, p. 238, pl. xiii. fig. 5; *P. paucibranchis*, p. 240, pl. xiii. fig. 4.

Terebellides [*h*]*ypsilon*, p. 241, pl. xiii. fig. 6.

Polycirrus boholensis, p. 242, pl. xiii. fig. 7.

Serpulacea. Sabella (*Potamilla*) *tenuitorques*, p. 246, pl. xiv. fig. 2; *S.* (*P.*) *polyophthalmos*[*-mus*], p. 247, pl. xv. fig. 2; *S.* (*P.*) *oligophthalmos* [*-mus*], p. 248; *S. pyrrhogaster*, p. 250, pl. xv. fig. 1; *S. porifera*, p. 252, pl. xiv. fig. 5; *S. spectabilis*, p. 253, pl. xiv. fig. 4; *S. manicata*, p. 255, pl. xiv. fig. 3; *S. notata*, p. 256: *S. acrophthalmos* [*-mus*], p. 258; *S.* (*Dasychone boholensis*, p. 261; *S.* (*D.*) *serratibranchis*, p. 262, pl. xiv. fig. 7. *Myxicola ommatophora*, p. 264, pl. xv. fig. 3. *Serpula furcifera*, p. 268, pl. xv. fig. 4; *S. minax*, p. 269, pl. xv. fig. 5; *S. tricornigera*, p. 273, pl. xv. fig. 7; *S. quadricornis*, p. 275, pl. xv. fig. 6; *S. chrysogyrus*, p. 276, pl. xv. fig. 8. *Ditrypa gracillima*, p. 279.

Grube (JB. schl. Ges. liv. [1877]) describes *Polynoe* (*Lepidonotus*) *helotypus*, *P. phœophyllus*, *P. nebulosa* (p. 49), *Lumbriconereis lucida*, *Aracoda renieri*, *Glycera macintoshi*, *Cirratulus chefooensis* (p. 50), *Notomastus sinuosus* (p. 51), all new species. Also (*op. cit.* lv. p. 104) new species from Japan: *Serpula diplochone*, *Sabella* (*Potamilla*) *suavis*, *S. fullo*, *S. tricolor*, *Samytha oculata*, *Aricia* (*Scoloplus*) *fuscibranchis*, *Eteone ornata*.

McIntosh (49) describes the following new species, obtained by the

'Valorous':—*Eusthenelais abyssicola*, p. 501; *Ancistrosyllis groenlandica*, p. 502, *Aricia groenlandica*, p. 504, pl. lxv. figs. 5–9; *Tachytrypane jeffreysi*, p. 505, fig. 10; *Ammotrypanella arctica*, p. 505; *Travisia glandulosa*, p. 506, figs. 15 & 16; *Scolecolepis jeffreysi*, p. 506. He points out that of the species collected 13 are new to the Greenlandic area, and 9 to science; in all, 68 marine *Polychæta* were found. In (50) he gives a list of the Annelids collected by the "Arctic Expedition," with information regarding the bottom temperature, the depth, and the nature of the bottom: he compares results with the Austro-Hungarian Expedition.

F. W. Hutton describes (Tr. N. Z. Inst. ix. pp. 350–353) *Lumbricus uliginosus*, *L. campestris*, *L. lævis*, *L. annulatus*, *Megasolex sylvestris*, and *M. lineatus*—all new species.

The new species, *Eunice borneensis*, *E. martensi*, *E. æquabilis*, *E. fusci-cirris*, *E. jagora*, and *E. leucosticta*, are described by Grube (JB. schl. Ges. lv. pp. 102 & 103).

Studer (55) describes *Ophryotrocha claparedii*, sp. n. (Kerguelen's Land).

Ulianin (56) describes *S. barbata*, sp. n. (Mediterranean), and *S. præcox* (Naples) (p. 28).

Marion (47) describes as new *Psygmobranchus intermedius*, p. 28, fig. 6, *Spirorbis beneti*, p. 29, fig. 8; gives an account of some other species and a list of the *Chætopoda*.

Giard describes, C. R. lxxxvii. p. 1147, Ann. N. H. (5) ii. p. 109, a new genus, *Wartelia* (= *Terebella nebulosa*, juv., Mont.); it is probably allied to *Lumara*, Stimps. *W. gonotheca*, sp. n. (*cf.*, Pop. Sci. Rev. 1878, p. 335).

Ulianin points out (Zool. Anz. i. p. 342) that *Acicularia virchowi*, Langerhans, = *Sagitella kowalevskii*, N. Wagner, in answer to H. Eisig's note (*tom. cit.* p. 126).

Hansen (40) gives some details as to *Serpula vermicularis*, *Hydroides norvegica*, Gunn., *Pomatoceros triqueter*, *Placostegus tridentatus*, *Ditrypa arietina*. In N. Mag. Naturv. (xxiv.) he describes *Polynoe arctica* (p. 267) and *Aricia arctica* (p. 269), both new species.

R. Horst has (2de Jaarverslag omtrent het zoologisch Station der Niederl. Dierk. Ver., in Tijdschr. Nederl. Dierk. Ver. iii.) notes on some North Sea Annelids (*Nephthys longisetosa*, *Ammotrypane limacina*, *Nereis pelagica*, *N. fucata*, *Glycera goesi*, and *Trophonia plumosa*).

For a revision of the *Chlorhæmina*, see Grube (JB. schl. Ges. liv. pp. 60–72); of the *Eunicea*, id. (*op. cit.* lv. pp. 79–104).

For a few observations on *Vermes* of Norway, see De Rougemont's 'Notes Zoologiques sur la Norvège' (Bull. Soc. Neuch. xi. 2, pp. 232–250).

In N. Mag. Naturv. xxiv. pp. 1–13 & 269, Hansen gives lists of Annelids from the North Sea Expeditions of 1876 and 1877.

Eisen (Œfv. Ak. Förh. 1878, No. 3, pp. 63–79) describes new Arctic *Oligochæta*: *Mesenchytræus*, g. n., *M. primævus*, *M. mirabilis*, *M. falciformis*, *Archienchytræus*, g. n., *A. levenseni*, *A. tenellus*, *A. lampas*, *A. dixsoni*, *A. gemmatus*, *A. ochraceus*, *A. nasutus*, *A. affinis*, *A. nervosus*, *A. profusus*, *Neoenchytræus*, g. n., *N. fenestratus*, *N. vejdovskii*, *N. stuxbergi*, *N. hyalinus*, *N. callosus*, *N. durus*.

On *Spirorbis carbonarius* (pl. i. figs. 1 & 2) and *Serpulites carbonarius* (pl. i. fig. 3), see R. Etheridge, J. G. Soc. xxxiv. p. 9.

Anatomy, Development, &c.

Hatschek's essay (42) may be divided into two parts, one of which deals with the development of *Criodrilus* and *Polygordius*. The ova of the former are contained in cocoons of large size for the *Oligochæta*; the mesoderm is first represented by two large cells, which, though undergoing division, long remain at the posterior ends of the "mesodermal stripes"; the name "embryonic stripe" is proposed for that of "germ-stripe," which has been very variously used; segmentation commences in the mesoderm, and in the anterior region; the cavity of the head is always primary, and is not formed by the cleavage of the mesoderm; the setæ are shown to be of mesodermal origin, and the history of the "segmental organs" is carefully entered into; these are not permanently represented in the first segment of the trunk, but a collection of cells was observed in it which appear to represent their rudiments. The larva of *Polygordius* is regarded as being the famous "Lovenian" larva, and six stages of its development are described; the cuticle is shown to be greatly thickened in the region of the ciliated circlets, and to be traversed by pore-canals; the segments are developed in the mesoderm, and never appear in the other parts; the development of the "head-kidney" is described, and the mid-gut alone of the portions of the enteric tract is of endodermal origin. The history of the generative organs is not given, but in the sixth stage there was observed a mass of rounded indifferent cells, which appear to be the rudiments of their products.

Hatschek agrees with Ulianin in regarding *Polygordius* as an Annelid, and he looks upon *Saccocirrus* as standing between it and the more highly developed forms: the whole division is thus arranged:—

I. Order. *Polygordiidæ* (*Archiannelides*).
II. „ *Chætopodes*.
1st Suborder. *Saccocirridæ* (*Archichætopodes*).
2nd „ *Polychætæ*.
3rd „ *Oligochætæ*.
III. „ *Hirudinea*.
IV. „ *Gephyrei*.

In opposition to Semper the head is regarded as consisting of a single segment, characterized by the primary cœlom, œsophagus, and supra-œsophageal ganglia, and by the absence of the generative organs; the question whether the Annelid form is colonial or consists typically of a head and a trunk segment which undergoes gemmation, is left undecided. The name of *Trochophore* is proposed for the larva of *Polygordius*, and the appearance of this as adult in the *Rotatoria* and as larval in the *Mollusca* is insisted upon; and he regards all the *Bilateria* as having a relationship to a hypothetical *Trochozoon* of a somewhat similar character; the *Nemertinea* are regarded as indicating their descent by the characters of the *Pilidium* larva, and the *Gasterotricha*, Nematodes (*Vermes archicœlomati*), and Platodes (degenerate, *V. acœlomati*) are considered to

belong to the series. The relations of the *Annelides* to the *Vertebrata* are discussed in detail.

Ulianin's notes on *Sagitella* (56) comprise an account of the tegumentary system; cuticle absent from the anterior part of the buccal segment and the elytra; of the nervous system—the cerebral ganglionic mass of Ulianin is stated to be the glandular portion of an organ which lies above the œsophagus, and a true ganglionic chain is asserted to exist; small rod-like bodies, apparently sensory, are connected with the elytra; of the digestive system—the anus is dorsal, an elongated organ, which probably secretes an offensive liquid, is connected with the œsophagus; in the walls of the intestine there are enormous epithelium-cells, such as are found in the same region in some larval Annelids; of the segmental organs—these are found in all but the buccal segment, those of the fifth segment serve as efferent ducts for the generative products; of the reproductive organs—the *Sagitellidæ* are hermaphrodite, and the ova remain for a time in connection with the parent, under cover of the elytra of the 4th and 5th segments; apparently no metamorphosis. Their zoological position is discussed, and they are placed as a distinct group of the *Oligochæta* under the name of *Typhloscolecidæ*, which family is defined, as are also the two contained genera, *Typhloscolex*, Busch (1851), and *Sagitella*, N. Wagner (1872).

Studer (55) gives an account of the anatomy of *Brada mammillata*, Grube, in which he indicates the points of similarity between this and other *Pheruscidæ*, with which group he would place it; the tentacles and branchiæ are however absent, and the tubercular glands, the secretion of which makes a compact mass out of particles of sand to serve as an investment for the animal, are stated to be peculiar to this form. He also enters on the characters of *Ophryotrocha claparedii*, sp. n., and compares it with *O. puerilis*, from which it differs in possessing only one circlet of cilia on the head, in the great simplicity of the labrum, and in size.

Löwe's (47) observations are based on the gill of *Spirorbis*, the histology of which is described in detail; there are some ingenious speculations on the homology between the cephalic structures, and especially the ear of Vertebrates, with apparently corresponding parts in the Annelid.

Vejdovsky (57) deals principally with the structure of *Tomopteris citrina*; the nervous system is described; the "rosette-like organ" is shown to be a paropodial eye; the origin of the sexual products as groups of cells on the membranes which project into the parapodia are described, and the paper concludes with a critical revision of the species of the genus.

McIntosh's observations on *Magelona* (48), now published in full, deal very fully with the structure of this animal, described as *Maea mirabilis* by Johnston; it is very common at St. Andrew's; it exhibits affinity to *Prionospio* and *Heterospio*, on the one hand, and to *Spiochætopterus* on the other, while the proboscis, cephalic lobes, and circulatory organs are arranged in a special manner. The physiological relations of its organs are insisted on, as is the existence of corpuscles in the blood; the cœlom

is shown to be narrow anteriorly, and to be divided posteriorly by a median ligament; the appendages of the ninth segment are very peculiar, and are shown to be homologous with similar appendages on other segments in other Annelids; the integument presents a high degree of development in its anterior region, and the hypodermis is exceedingly well developed; the anterior region of the enteron is regarded as having a close homology to the œsophagus of the *Nemertinea*.

The researches of Whitman (58) lead to the following conclusions: the ovarian cord consists of a central portion, which is homologous with the rachis of the *Nematodes*, and which consists of nucleated protoplasm, whence arise the primitive ovarian cells, and a peripheral portion; the germinal vesicle gives rise to two "directive vesicles" and the female pronucleus, which unites with that of the male to form the first cleavage nucleus; it contains two nucleoli. The larger of the first two cleavage-spheres contains a large part of the ectoderm, the whole of the mesoderm, and about a third of the endoderm; the inferior pole of the largest of the first four blastomeres is converted into two mesoblasts, and the superior pole into eight neuroblasts; from these two sets of cells the germinal stripes are produced. The ectoderm is developed from the superior pole of the ovum; the endoderm, which arises from free nuclei, encloses the deutoplasm; the mouth, anus, and pharyngeal atrium are formed by the invagination of the ectoderm; the ganglionic chain is formed of 8 neuroblasts; the testes appear to be formed from a single pair of cells in each metamere; and, finally, the circulatory system consists of a closed vascular, and of a lacunar system.

V. Mojsisovics (50 A) points out the presence of two distinct forms of glands in the clitellum, and notes the presence of gustatory organs in the præstomium.

Hertwig continues his essay on the earlier characters of the egg. Dealing with those of the *Vermes* (Morph. JB. iv. p. 188), he points out that in *Sagitta* there are a number of smaller nucleoli in the place of one germinal spot, and that the germinal vesicle disappears. There are also a few words on the ova of *Alciope*.

R. Blanchard gives an account of the process of fecundation in *Annulata*; J. de l'Anat. Phys. 1878, pp. 710–717.

Semper (54) deals with some of the statements made by Furbringer in his essay on the excretory organs of the *Vertebrata* (Morph. JB. iv. p. 1); Furbringer retorts (*tom. cit.* pp. 663–679).

Fredericq (Bull. Ac. Belg. 2, xlvii. No. 8) gives an account of the digestive ferment of *Lumbricus terrestris* (pp. 217–220), *Nereis pelagica* (p. 220), *Hæmopis vorax* (p. 221); also in Arch. Z. expér. vii. 3, pp. 394–396.

Krukenberg's researches (Unters. physiol. Inst. Heidelb. ii. p. 3) are reviewed in Arch. Z. expér. vii. 3, pp. xxxi. & xxxii.; the ferment in *Vermes* (isothrypsin) is not identical with that of *Vertebrata*; in *Aphrodite aculeata* the digestive secretion is formed in glandular cells of the hepatic follicles.

Lankester (45) describes the blood corpuscles of the Earthworm as flattened, fusiform, colourless bodies, the majority $\frac{1}{3000}$ inch in long dia-

meter; Rolleston (52) gives a full history of earlier observations on this subject, and of his own.

SOLENOGASTRES.

59. Ihering, H. Bemerkungen über *Neomenia* und über die Amphineuren im allgemeinen. Morph. JB. iv. pp. 147–155.

Ihering makes some remarks on the late papers of Tullberg [Zool. Rec. xii. p. 544], Koren & Daniellsen [*op. cit.* xiv. *Vermes*, p. 20], and Graff [tom. cit. *Vermes*, p. 20]; and points out that Sars's name *Solenopus* was published without any description; *Neomenia* appears to have been known to Koren for the last thirty years.

ECHINODERMATA.

BY

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1. AGASSIZ, A., POURTALES, L. F. DE, & LYMAN, T. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico, by the United States Coast Survey steamer, 'Blake,' Lieutenant-Commander C. D. Sigsbee, U.S.N., commanding. II. Reports on the *Echini* by A. Agassiz; Crinoids, and Corals, by L. F. de Pourtales; and Ophiurans, by Theodore Lyman. Preceded by a bibliographical notice on the publications relating to the deep-sea investigations carried on by the United States Coast Survey. Bull. Mus. C. Z. v. 9, pp. 181–238. pls. i.–v., i. & ii., i.–iii.

2. CARPENTER, P. H.* On the oral and apical systems of the Echinoderms. Q. J. Micr. Sc. xviii. pp. 351–383.

3. DUNCAN, P. M. (A) On *Lütkenia*, a new genus of *Ophiuridæ* from Discovery Bay; Ann. N. H. (5) ii. pp. 188–193. (B) On the identity of the Ophiuran genera *Ophiopleura*, Dan. & Kor., and *Lütkenia*, Duncan, with notes on the species; *ibid.* pp. 266–268. (C) And SLADEN, W. P., *Echinodermata*, in Nares's Narrative of a Voyage to the Polar Sea during 1875–76, in H.M. Ships 'Alert' and 'Discovery,' with notes on the natural history, edited by H. W. Feilden (London: 1878, 8vo, 2 vols.), vol. ii. pp. 260–282.

4. ——. On the *Salenidæ*, Wright. III. On a third form of recent *Saleniæ* and on the *Saleniæ* from the Tertiary deposits. Ann. N. H. (5) ii. pp. 56–67.

5. FOL, H. (A) Sur la fécondation et le premier développement de l'œuf; Act. Soc. Helv. 60th sess. pp. 165–172. (B) Recherches sur la fécondation et le commencement de l'hénogénie chez divers animaux; Mém. Soc. phys. Genèv. xxvi. pp. 90–397, pls. i.–x.

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* A note by the same author "On *Comatula* (*Antedon*) *rosacea* and the family *Comatulidæ*," Nature, xv. 1877, pp. 197 & 198, was overlooked during the compiling of the Zool. Rec. for 1877, with other notes on *Antedon*, the name, localities of *A. rosaceus*, &c., *l. c.* pp. 7, 58, 158, 159, & 366, by various contributors.

6. Giard, A. Particularités de reproduction de certains Echinodermes en rapport avec l'éthologie de ces animaux. Bull. Sci. Nord (2) i. pp. 296–304.

Notes the habits of *Asterina gibbosa* in a natural state, particularly with reference to an apparent act of incubation performed by it. The creature is apparently an 'ethological variety' of *A. cephea*. The so-called viviparous Echinoderms are more numerous than is generally supposed, and hermaphroditism in them is suggested.

Giard's note on some monstrosities of *Asterias rubens* is translated; Ann. N. H. (5) i. pp. 259 & 260.

7. Heckel, E. Die Kometenform der Seesterne und der Generationswechsel der Echinodermen. Z. wiss. Zool. xxx. Suppl. pp. 424–445, pl. xx. [Abstract, Jen. Z. Nat. xii. Suppl. pp. vi. & vii.; Kosmos, ii. pp. 358–362; Arch. Z. expér. vi. pp. xxxiii.–xxxvii.; *cf.* also the author's paper "Ueber die Individualität des Thierkörpers," Jen. Z. Nat. xii. pp. 1–20.]

8. Hertwig, O. Beiträge zur Kenntniss der Bildung, Befruchtung und Theilung des thierischen Eies. Morph. JB. iv. pp. 156–175, 177–213, pls. vi.–xi.; Arch. Z. expér. vii. pp. i.–vii.

9. Jullien, J. Description d'un nouveau genre de Stellérides de la famille des Astériadées. Bull. Soc. Z. Fr. iii. pp. 141–143.

10. Ludwig, H. (A) *Trichaster elegans*; Z. wiss. Zool. xxxi. pp. 59–67, pl. v. [an additional note in Zool. Anz. ii. pp. 19 & 20]. (B) Zur Kenntniss der Gattung *Brisinga*; ibid. pp. 216–234, pl. xv. (Arch. Z. expér. vii. pp. xx. & xxi.). (C) Beiträge zur Anatomie der Ophiuren; *ibid.* pp. 346–394, pls. xxiv.–xxvii. (D) Ueber die Genitalorgane der *Asterina gibbosa*; ibid. pp. 395–400, pl. xxviii. (E) Die Bursæ der Ophiuren und deren Homologon bei den Pentremiten; Nachr. Ges. Götting. 1878, pp. 215–220.

11. Lyman, T. (A) *Ophiuridæ* and *Astrophytidæ* of the 'Challenger' expedition, i. Bull. Mus. C. Z. v. pp. 65–163, pls. i.–x. (B) Report on the Ophiurans, &c.; *suprà*, No. 1.

12. Mackintosh, H. W. Report on the Acanthology of the *Desmosticha*, Hæckel; I. On the Acanthological relations of the *Desmosticha*. Tr. R. Irish Ac. xxvi. pp. 475–490, pls. ix.–xi.

13. Perrier, E. Étude sur la répartition géographique des Astérides. N. Arch. Mus. (2) i. pp. 1–108.

14. Rathbun, R. Additions to the Echinoid Fauna of Brazil. Am. J. Sci. (3) xv. pp. 82–84.

15. Selenka, E. von. Zoologische Studien. I. Befruchtung des Eies von *Toxopneustes variegatus*. Ein Beitrag zur Lehre von der Befruchtung und Eifurchung. Leipzig: 1878, 38 pp. 3 pls.

16. Sladen, W. P. On *Astrophiura permira*, an Echinoderm form inter-

mediate between *Ophiuridæ* and *Asteroidæ*. (Abstract) P. R. S. xxvii. pp. 456 & 457.

[A full account of this strange Ophiurid type having been published in 1879, the record of this genus is deferred.]

17. Smith, E. A. (A) Description of a new species of *Spatangidæ*; Ann. N. H. (5) i. pp. 67–70. (B) Description of a remarkable new form of *Ophiuridæ* from Ceylon; *ibid.* pp. 463–465.

18. Stewart, C. On certain organs of the *Cidaridæ*. Zool. ii. pp. 32 & 33.

[The paper having been published in full in 1879, the record is deferred.]

19. Stuxberg, A. Echinodermer från Novaja Zemljashaf samlade under Nordenskiöldska expeditionerna, 1875 och 1876. Œfv. Vet. Ak. 1878, 3, pp. 27–40, pl. vi.

20. Viguier, C. Classification des Stellérides. C. R. lxxxvi. pp. 681–683, Ann. N. H. (5) ii. pp. 103–105.

[The paper having lately been published in full, the record is deferred.]

Faunistical Notes on Echinodermata and other inferior Animals.

A. Agassiz, Letters No. 1 & 2 on the dredging operations of the U.S. Coast Survey steamer 'Blake,' Bull. Mus. C. Z. v. 1, 6. H. Lenz, Die wirbellosen Thiere der Travemünder Bucht, i. Anhang zum Jahresbericht der Commission zur wissenschaftlichen Untersuchung der deutschen Meere in Kiel, iv.–vi.; Berlin: 1878, 24 pp. 2 pls. E. L. Moss, Preliminary notice on the surface-fauna of the Arctic Seas; J. L. S. xiv. pp. 122–126. R. Schmidtlein, Beobachtungen über Trächtigkeits- und Eiablage-Perioden verschiedener Seethiere: MT. zool. Stat. Neap. i. pp. 124–136 [*Cœlenterata, Echinodermata*, &c.]. T. Studer, Beiträge zur Naturgeschichte wirbelloser Thiere von Kerguelens Land; Arch. f. Nat. xliv. pp. 102–121. A. E. Verrill, Notice of recent additions to the marine fauna of the eastern coast of North America; Am. J. Sci. (3) xvi. pp. 207–215 & 371–378. E. Coues & H. C. Yarrow, Notes on the natural history of Fort Macon, N. C., and vicinity; P. Ac. Philad. 1878, pp. 21–28 & 297–315 (*Echinodermata, Cœlenterata*).

Anatomy, Morphology, &c.

Ludwig (10 D) demonstrates the existence of ventral genital pores—two in each inter-radial space—in *Asterina gibbosa*; in *A. cepheus* and *pentagona*, they are dorsal as in other Starfishes. He further (10 B) adduces evidence of the existence in *Brisinga* of a system of blood-vessels, completely agreeing as to its arrangement with that of the other starfishes; and exposes the manner in which the circum-oral skeleton of *Brisinga* can completely be interpreted after the fashion of the ordinary framework of the *Asteridæ*. The dorsal pore is really a vent and not an excretory

orifice only. In *Trichaster* (10 A), the existence of a single water-pore in each interbrachial space was adduced; in the distal portion of the arms of this species and of *Asterophyton asperum* each pair of ambulacral papillæ is transformed into a sort of pedicellaria, whose two mobile hooks are however, though divergent, not opposed against each other. Of Ludwig's third paper (10 C), the first portion is devoted to a detailed description of the skeletal parts of the arms and mouth in *Ophiuridæ*, to the reduction of the oral parts to the brachial ambulacral, ad-ambulacral, and sub-ambulacral plates and ossicles, and to the homologies between those of the Starfish and the Brittlestar. The most essential points in Ludwig's theory are the interpretation of the "mouth-shield" in *Ophiuridæ* as first inter-ambulacral, the "lateral mouth-shields" as second ad-ambulacrals, the "mouth-frames" as first ad-ambulacrals and second ambulacrals (suturally connected), and the "peristomial plates" of Müller as first ambulacrals. While the first two pairs of tentacles derive their vessels separately from the radial ambulacral vessel in *Asteridæ*, they are in *Ophiuridæ* derived from the annular peristomial vessel through a common bifurcating branch. [Ludwig's theory leaves unexplained that his "first ambulacral ossicle" has none of the oral tentacles, and his "second ambulacral" two in the place of one; and therefore can hardly be accepted as completely satisfactory]. The second portion of this paper illustrates the important observation that the so-termed genital slits of the *Ophiuridæ* do not lead into the body-cavity, but into separate closed pouches in which the young of the viviparous *Ophiuridæ* are nursed, and into which the genital organs open through minute orifices. These pouches, which probably also are subservient to respiratory functions, are further homologous with certain organs (the "hydrospiræ") in the *Blastoidea*.

Hæckel (7) records his observations on the "cometoid" spontaneous division and regeneration in species of *Ophidiaster* (*Linckia*), viz., the casting off of the arms and the reproduction of 4–5 new arms, disc, mouth, madreporites, &c., from the basis of the rejected arms; with the Recorder (1872) and others, he regards the phenomenon in the light of "alternation of generation" (metagenesis). It is also regarded as giving great strength to the idea of the composite nature of the Echinoderms or "*Astrocormus*," in opposition to the solitary nature of the "*Astrotithene*," viz., the "larva," or "*Echinopædium*," as it is termed by others. In relation to the more or less advanced "centralization," the Echinoderms are — 1, *Protestrellæ* (*Asteriæ*); 2, *Anthestrellæ* (2, *Ophiuræ*, 3, *Crinoida*); or 3, *Thecestrellæ* (4, *Blastoida*, 5 *Echinidæ*, 6, *Holothuriæ*). The oldest, most primitive type, from which the others are derived, are the Starfishes (*Protestrellæ*). As a type perhaps closely allied to the hypothetic "*Archestrella*," the Lower Silurian *Helminthaster rutheni* is cited, while the Silurian "*Phractelmintha*" (*Crossopodia, Phyllodocites*) are cited as the probable not coalesced ancestors of the oldest Starfishes, having the greatest likeness to isolated skeletons of "*Astrolenæ*" (viz., arms of starfishes, &c.).

Hæckel's "*Astrocormus*"-theory is criticised in the final remarks of Carpenter's critical review (2) of the more recent attempts of various authors to homologize the parts of the basal (apical, ab-actinal) system of

Echinoderms. While adopting these theories generally in homologizing the genital plates in Sea-urchins with the five primitive "inter-brachials" of Starfishes, and the five "basals" in Crinoids (pentacrinoid larva of *Antedon*, e.g.), and the "ocular" plates in Urchins and young Starfishes (at a later time at the extremity of the arms) with the "radials" of Sea-lilies, he regards the lower basals in *Encrinus*, certain *Pentacrini*, *Marsupites*, and *Palæocrinidæ* as additional elements, which are unrepresented in the other Echinoderms. He further regards all the annular segments of the crinoidal stem in the same light, and believes that the central (sur-anal) plate of the apical system of other Echinoderms is represented in the Crinoids not by the uppermost stem-joint or centro-dorsal piece, but by the discoidal plate, that forms the distal plate at the extremity of the stem, or the basal expansion of *Holopus*. In *Marsupites* also the centro-basal plate is perhaps the true one, corresponding with the sur-anal of *Salenia*, &c.

ECHINIDÆ.

From the microscopical characters of the spines (12) the regular Sea Urchins may be divided into *Acanthocælata* (spines, for the most part, hollow, with the central cavity surrounded by a solid ring, from which pass off solid wedges, making up the greater part of the spine, viz., *Diadematidæ*) and *Acanthodictyota* (spines, for the most part, with the axis occupied by a calcareous reticulation), which are subdivided into *Acanthostraca* (*Cidaridæ* and *Saleniidæ*: the periphery bounded by a crust, which differs in structure from the rest of the spine) and *Acanthosphenota* (periphery bounded by a single ring, or by several cycles of solid wedges, separated more or less widely by reticular tissue); these are again monocyclic (*Arbacia*, *Salenia*, *Temnopleurus*, *Mespilia*) or polycyclic (*Salmacis*, *Amblypneustes*, *Echinus*, *Strongylocentrus*, *Hipponoe*, *Toxopneustes*, *Stomopneustes*, *Echinometra*, *Echinostrephus*).

Dorocidaris blakei, sp. n., Agassiz (1), p. 185, pl. iv. (a few, 2–3, fan-shaped *Rhabdocidaris*-like spines mingled with the normal ones), Mexican Gulf, 158–450 fath.

Salenia pattersoni, sp. n., *id. l. c.* p. 187, pl. v., Mexican Gulf, 175–242 fath. The "*S. varispina*" figured in the "Atlantic," p. 144, is regarded by DUNCAN (4, p. 59) as probably a distinct species, suggestive in certain respects of *Acrosalenia*. Agassiz (*l. c.* p. 186) maintains that the true *S. varispina* is only a *Peltastes*, as suggested by DUNCAN (Zool. Rec. xiv. *Ech.* 6).

Conoclypus sigsbe [*e*] *i*, sp. n., Agassiz (1), p. 190, pls. i. & ii., Mexican Gulf, 95–450 fath. To this species the young specimens figured in "Revision of the Echini," pl. xvi. figs. 1–3, 8–10, as "*Echinolampas depressa*" are now referred.

Eupatagus (?) *longispinus*, sp. n., *id. l. c.* p. 191, off Havana, 242 fath. (known from fragments only).

Rhinobrissus micrasteroides, sp. n., *id. l. c.* p. 192, off Havana, 175 fath.

Schizaster (*Periaster*) *limicola*, sp. n., *id. l. c.* p. 193, pl. iii., Mexican Gulf, 118 fath.

Linthia rostrata, sp. n., Smith (17 A), Pacific.

Asteridæ.

Asterias panopla, sp. n., Stuxberg (19), p. 32, Novaja Zemlyan Sea, 18–80 fath.

Solaster tumidus, sp. n., *id. l. c.* p. 31, pl. vi., Karian Sea, 50–125 fath. (a 5-armed species with short arms, densely covered with delicate paxillæ). [Can hardly remain placed in the genus *Solaster*.] *S. furcifer*, D. K., is made the type of a new genus, *Lophaster*, Verr.; Am. J. Sci. (3) xvi. p. 214.

Porania [*Asteropsis*] *grandis*, sp. n., Verrill, Am. J. Sci. (3) xvi. p. 371, George's Bank, 220 fath.

Asterina borealis, p. 213, 110 fath., and *pygmæa*, p. 372, Gulf of Maine, 52–90 fath., spp. nn., *id. l. c.*

Archaster florø, sp. n., *id. l. c.* p. 372, Sea off Halifax, 100 fath.

Marthasterias, g. n., Jullien (9). Allied to *Asterias* (*glacialis*), differing by the marginal plates being bordered by a membrane, in which the marginal spines are immersed. *M. foliacea*, sp. n., Adriatic (?).

Ophiuridæ.

Ophiopeza petersi, sp. n., Lyman (11 B), p. 217, Gulf of Mexico, 177 fath.

Ophioglypha ferruginea, sp. n., *id.* (11 A), p. 68, pl. iii. fig. 76, Bass Straits, Port Jackson, &c., 2–38 fath.; *flagellata*, sp. n., *id. ibid.* p. 69, pl. ii. figs. 44–51, Eastern Seas, 340 fath.; *palliata*, sp. n., *id. ibid.* pl. iv. figs. 98–100, Eastern Seas, 400–1200 fath.; *lepida*, sp. n., *id. ibid.* p. 70, pl. iii. figs. 71–73, off Bermuda and W. Atlantic, 420–1350 fath.; *ljungmanni*, sp. n., *id. ibid.* pl. iii. fig. 77, Atlantic, 350 fath.; *æqualis*, sp. n., *id. ibid.* p. 72, pl. iii. figs. 74 & 75, Eastern Seas, 1070 fath.; *imbecilis*, id. *ibid.* p. 73, pl. iii. figs. 63 & 64, off Enosima, 340 fath.; *irrorata*, sp. n., *id. ibid.* pl. iv. figs. 106–108, Southern (and Eastern ?) Seas, 400–1900 fath.; *orbiculata*, sp. n., *id. ibid.* p. 74, pl. iv. figs. 103–105, 1875 fath., and *undulata*, sp n., *id. ibid.* p. 75, pl. iii. figs. 61 & 62, 1850 fath., Eastern Seas; *costata*, sp. n., *id. ibid.* p. 76, pl. iv. figs. 92–94, Southern Seas, 98–150 fath.; *albata*, sp. n., *id. ibid.* p. 77, pl. iv. figs. 95–97, Eastern Seas, 775 fath.; *jejuna*, id. *ibid.* p. 78, pl. ii. figs. 55 & 56, Southern and Eastern Seas, 410–500 fath.; *brevispina*, Smith ?, *ibid.* pl. ii. figs. 44–46, 20–120 fath., and *ambigua*, sp. n., *id. l. c.* p. 79, pl. ii. figs. 47 & 48, 25–120 fath., Kerguelen Island; *loveni*, sp. n., *id. ibid.* p. 80, pl. iv. figs. 109–111, 1375–2600 fath., and *fraterna*, sp. n., *id. ibid.* p. 81, pl. iv. fig. 112, 1950 fath., Southern Seas; *elevata*, sp. n., *id. ibid.* p. 82, pl. iv. figs. 87–89; *bullata*, W. Th., *ibid.* p. 83, pl. iii. figs. 85 & 86, Western Atlantic, 1240–2850 fath.; *convexa*, sp. n., *id. l. c.* p. 84, pl. iii. figs. 83 & 84, Northern Pacific and Atlantic, 2050–2350 fath.; *sculptilis*, sp. n., *id. ibid.* pl. iv. figs. 115 & 116, Eastern Seas, 1875 fath.; *variabilis*, sp. n., *id. ibid.* p. 85, pl. iii. figs. 70, 78, & 79, West Indian (?) and Eastern Seas, 390–1425 fath., and (11 B) p. 217, Gulf of Mexico, 785–955 fath.; *ornata*, sp. n., *id.* (11 A), p. 86, pl. iv. figs. 113 & 114, Eastern Seas, 2000 fath.; *lacazei*, sp. n.,

id. ibid. p. 87, pl. iii. figs. 58–60, Southern Seas, 2600 fath.; *lienosa*, sp. n., *id. ibid.* p. 88, pl. iii. figs. 80–82, Southern Seas, 1950 fath.; *radiata*, sp. n., *id. ibid.* p. 89, pl. iii. figs. 65 & 66, 1050 fath., *undata*, sp. n., *id. ibid.* p. 90, pl. iv. figs. 101 & 102, 1450 fath., *lapidaria*, sp. n., *id. ibid.* pl. iii. figs. 67–69, 565 fath., *solida*, sp. n., *id. ibid.* p. 91, pl. v. figs. 120–122, 129 fath., *rugosa*, sp. n., *id. ibid.* p 92, pl. iv. figs. 90 & 91, 700 fath., and *ponderosa*, sp. n., *id. ibid.* p. 93, pl. ii. figs. 52–54, 340 fath., Eastern Seas; *minuta*, sp. n., *id. ibid.* p. 94, pl. v. figs. 117–119, Southern Seas, 1800 fath.; *inermis*, sp. n., *id. ibid.* p. 95, pl. v. figs. 123–125, off Tristan d'Acunha, 500 fath. (stands on the limits of *Ophioglypha*, lacking the arm-comb, and having only a trace of the papillæ along the genital scale below); *deshayesi*, sp. n., *id. ibid.* p. 96, pl. ii. figs. 35–37, Kerguelen Island, &c., 28–150 fath.; *inornata*, sp. n., *id. ibid.* p. 97, pl. ii. figs. 26 & 27, Atlantic, 1850 fath.; *confragrosa*, sp. n., *id. ibid.* pl. ii. figs. 38 & 39–57, Southern Atlantic, 600 fath.; *intorta*, sp. n., *id. ibid.* p. 98, pl. ii. figs. 41–43, off Marion Islands, 50–75 fath. A synoptical table of the species of *Ophioglypha* described (11 A) is given, pp. 66–67.

Ophiocten amitinum, sp. n., Lyman (11 A), p. 100, pl. v. figs. 129 & 130, Kerguelen and Prince Edward's Islands, &c., 85–1260 fath.; *umbraticum*, sp. n., *id. ibid.* p. 101, pl. v. figs. 131–132, Atlantic, 2650 fath.; *pallidum*, sp. n., *id. ibid.* p. 102, pl. v. figs. 126–128, Southern Seas, 1975–2600 fath.; *sericeum* (Forbes), *ibid.* [= *Ophioglypha gracilis*, Sars, as pointed out by the Recorder], off Marion Island, 50–75 fath.; *hastatum*, sp. n., *id. l. c.* p. 103, pl. v. figs. 133 & 134, Atlantic, Southern and Eastern Seas, 1000–1375 fath.

Ophiomastus, g. n., Lyman. "Disk arched, extremely high, covered with a few large thick plates, among which the primaries are conspicuous for superior size; arms short, with large thick side arm-plates, the first under arm-plate similar to and nearly as large as those beyond; mouth-papillæ arranged in a narrow close-set line; teeth rather slender; no tooth-papillæ; small smooth arm-spines arranged along outer edge of side arm-plates; two narrow genital openings." *O. tegulitius*, sp. n., *id.* (11 A), p. 104, pl. vi. figs. 167–169, Eastern Seas, 275–2600 fath. *O. secundus*, sp. n., *id.* (11 B), p. 218, pl. ii. figs. 16–18, Gulf of Mexico, 339 fath.

Ophioplinthus, g. n., Lyman (allied to *Ophioglypha* and *Ophiomusium*). "Disk smooth, covered by a thin skin bearing irregular delicate scales and radial shields; genital scales wide, divided in several pieces; small, blunt, close-set mouth-papillæ; no tooth-papillæ, short angular teeth; very minute peg-like arm-spines on the outer edges of side arm-plates; second pair of mouth-tentacles and first two pairs of arm-tentacles rising from round pores near the inner end of the under arm-plates; those beyond are smaller, and stand close to the under arm-spine; arms narrow, cylindrical, gradually tapering; two genital openings, running only a part of the way toward the margin; mouth-frames (seen from above) long, and rising in a ridge; arm-bones long and cylindrical, with only a faint upper furrow; genital scales long, slender, and cylindrical." *O. medusa*, sp. n., *id.* (11 A), p. 105, pl. ii. figs. 30, 31, & 40, 1975 fath., and *grisea*, sp. n., p. 106, pl. ii. figs. 33 & 34, Southern Seas.

Ophiomusium serratum, sp. n., Lyman (11 A), p. 109, pl. i. figs. 23–25, Atlantic, 450 fath.; *armigerum*, sp. n., *id. ibid.*, pl. i. figs. 21 & 22, Atlantic and Pacific, 1650–2200 fath.; *corticorum*, sp. n., *id. ibid.* p. 110, pl. i. figs. 19 & 20, Eastern Seas, 1850 fath.; *cancellatum*, sp. n., *id. ibid.* p. 111, pl. i. figs. 17 & 18, Atlantic (?) and Eastern Seas, 300–470 fath.; *archaster*, W. Th., *id. ibid.* p. 112, pl. ii. figs. 28, 29, & 32, Atlantic, 1900 fath.; *laqueatum*, sp. n., *id. ibid.* p. 113, pl. i. figs. 14–16, Eastern Seas, 129 fath.; *luetkeni*, sp. n., *id. ibid.* p. 114, pl. v. figs. 138–140, *ibid.* 129 fath.; *validum*, Ljgm., *id. ibid.* pl. i. figs. 7–9, West Indies, 390–450 fath.; *simplex*, sp. n., *id. ibid.* p. 115, pl. i. figs. 10 & 11, Amboyna, 100 fath.; *lunare*, sp. n., *id. ibid.* p. 116, pl. i. figs. 4–6, 150 fath., *scalare*, ibid. p. 117, pl. i. figs. 1–3, 600 fath., and *granosum*, sp. n., *id. ibid.* p. 118, pl. i. figs. 12 & 13, 875 fath., Eastern Seas; *pulchellum*, W. Th., *id. ibid.* pl. v. figs. 144 & 145 ("aberrant species; by its curious flaring under arm-plates, and its short rapidly-tapering arms, it gets a fanciful resemblance to some starfishes"), Atlantic, 150–1675 fath; *flabellum*, sp. n., *id. ibid.* p. 120, pl. v. figs. 141–143, off Port Jackson, 30–35 fath.; *planum*, sp. n., *id.* (11 B) p. 218, pl. iii. figs. 46–48, Gulf of Mexico, 955 fath. A synoptical table of the species of *Ophiomusium* (excepting *O. planum*) is given (11 A), p. 108.

Ophiopyrgus, g. n., Lyman (allied to *Ophioglypha* and *Ophiomusium*). "Disk high, dome-shaped, covered with thick swollen plates, surmounted by a central primary cone-like plate; arms slender, smooth, side-arm-plates very large, upper and under arm-plates small; basal tentacle-pores very large, those beyond small, near sides of arm; an arm-comb; arm-spines minute, on outer edge of side arm-plate; two long genital openings." "The most singular looking genus yet found among *Ophiuridæ*." *O. wyville-thomsoni*, sp. n. (11 A), p. 121, pl. v. figs. 135–137, Tongatabu, 240 (18 ?) fath.

Ophiolipus, g. n., Lyman (allied to *Ophiomusium*). "Skin thick, smooth, obscuring more or less the underlying plates (*Ophiomyxa*-fashion); mouth-papillæ; teeth; no tooth-papillæ; tentacle-pores only at the basal under arm-plates; upper arm-plates rudimentary, scarcely calcified. *O. agassizi*, sp. n., *id.* (11 B), p. 220, pl. iii. figs. 52–54, Gulf of Mexico, 118 fath.

Ophiernus, g. n., Lyman (allied to *Ophioglypha*). "Central portion of disk covered by a thick skin; a broad marginal band of scaling, interrupted only by the naked radial shields, covering also the lower interbrachial space, the whole more or less hidden by the skin; teeth; mouth-papillæ small, numerous, close set; first under-arm-plate rather large, bearing some of the scales of the second pair of mouth-tentacles; upper arm-plates covering the whole width of arms; small smooth arm-spines, arranged along outer edge of side arm-plate; two large long genital openings." *O. vallincola*, sp. n., *id.* (11 A), p. 122, pl. vi. figs. 170–172, Atlantic and South Seas, 1000–1975 fath.

Ophioconis miliaria, sp. n., Lyman (11 B), p. 221, pl. iii. figs. 49–51, off Havana, 243–450 fath.

Ophiochæta (?) *mixta* (differing from the typical species through the long and more movable arm-spines, and the shape of the under plates), sp. n., Lyman (11 B), p. 222, pl. ii. figs. 40–42, off Havana, 160–292 fath.

Ophioceramis (?) *clausa*, sp. n., Lyman (11 A), p. 124, pl. vi. figs. 161–163, 630 fath., and ? *obstricta*, sp. n., *id. ibid.* pl. vi. figs. 164–166, 129 fath., Eastern Seas.

Ophiozona stellata, sp. n., Lyman (11 A), p. 125, pl. vi. figs. 147 & 148, Eastern Seas, 700–1100 fath.; *insularia*, sp. n., *id. ibid.* p. 126, pl. vi. figs. 149–151, Fiji Islands, 310 fath.; *antillarum*, sp. n., *id. ibid.* p. 127, pl. vi. figs. 152 & 154, West Indies, 450 fath.; *depressa*, sp. n., *id. ibid.* p. 128, pl. vi. figs. 155–157, Eastern Seas, 500 fath.; *tessellata*, sp. n., *id.* (10 B), p. 223, pl. iii. figs. 43–45, 242 fath., and ? *dubia*, sp. n., *id. ibid.* p. 224, pl. ii. figs. 19–21, 539 fath., Gulf of Mexico.

Amphiura tumida, sp. n., Lyman (11 B), p. 225, pl. ii. figs. 28–30, 321 fath., *cuneata*, sp. n., *id. ibid.* pl. ii. figs. 34–36, *ibid.* 339 fath., and *lunaris*, sp. n., *id. ibid.* p. 226, pl. ii. figs. 31–33, 955 fath., Gulf of Mexico.

Ophiocnida abnormis, sp. n., Lyman (11 B), p. 227, pl. ii. figs. 37–39, Gulf of Mexico, 101 fath.

Ophiotrochus, g. n., Lyman. "Disk flat, covered with thin more or less granulated scales and naked radial shields; arms slender, each joint constricted at its base; side-arm-plates meeting widely above and below; upper arm-plates rudimentary; scale of second pair of mouth-tentacles lying between side-mouth-shield and outer mouth-papillæ; teeth; mouth-papillæ; no tooth-papillæ; smooth arm-spines on outer edges of side-arm-plates." *O. paniculus*, sp. n., *id.* (11 A), p. 129, pl. vi. figs. 158–160, Eastern Seas, 1070 fath.

Ophiophyllum, g. n., Lyman. "Disk extremely thin, flat, covered with scales and large radial shields, bordered by a row of movable plates, attached by their inner margins; mouth-papillæ in a close row; teeth; no tooth-papillæ; arm-spines thin and broad, on outer edge of side arm-plate." *O. petilum*, sp. n., *id.* (11 A), p. 130, pl. vii. figs. 179–181, Eastern Seas, 270–600 fath.

Ophiobyrsa, g. n., Lyman. "Skin thick, hiding the underlying plates, beset on the disk with spines; arms nearly cylindrical; side arm-plates projecting as short flap-like spine-ridges, bearing slightly rough spines on their outer edge; tentacles, large, simple; few or no mouth-papillæ; teeth and tooth-papillæ represented by a clump of little spines." *O. rudis*, sp. n., *id.* (11 A), p. 131, pl. viii. figs. 198–200, Southern Seas, 38 fath.

Ophiochiton, g. n., Lyman (allied to *Ophiarachna*). "Disk covered with fine imbricated scales and small radial shields; numerous sharp mouth-papillæ; teeth; no tooth papillæ; upper and under arm-plates about as broad as long, separating the side-arm plates, which project slightly and are rather small; under arm-plates with a median longitudinal ridge; arm-spines slender and smooth, on the sides of the side-arm-plates, near the outer edge; genital openings long." *O. fastigiatus*, sp. n., *id.* (11 A), p. 132, pl. vii. figs. 182 & 183, Eastern Seas, 340 fath.

Ophiopyren, g. n., Lyman (allied to *Pectinura*). "Disk granulated; teeth; no tooth-papillæ; numerous close-set mouth-papillæ; mouth-frames long and conspicuous; side-mouth-shields small, widely separated by the mouth-shield; under arm-plates divided in two parts; arm-spines on outer edge of side-arm-plates." *O. brevispinus*, sp. n., *id.* (11 A), p. 133,

pl. vii. figs. 173–175, Fiji, 300 fath.; *longispinus*, sp. n., *id. ibid.* p. 134, pl. vii. figs. 176–178, Atlantic, 300–390 fath.

Ophiopsila fulva, sp. n., Lyman (11 A), p. 227, pl. ii. figs. 25–27, off Havana, 175 fath.

Of the genera *Ophiacantha*, *Ophiothamnus*, and *Ophiomitra*, new diagnoses are given by Lyman (11 A), p. 135; a synoptical table of species of *Ophiacantha*, ibid. p. 136.

Ophiacantha tuberculosa, sp. n., Lyman (11 A), p. 137 ("one of the most aberrant species in the genus"), Eastern Seas, 375 fath.; *vepratica*, sp. n., *id. ibid.* pl. x. figs. 245–247, Eastern Seas, 600 fath., Mexican Gulf, 860 fath.; *granulosa*, sp. n., *id. l. c.* p. 138, pl. viii. figs. 206–208, E. Seas, 80–102 fath.; *rosea*, sp. n., *id. ibid.* p. 139, pl. x. figs. 267 & 268, Southern and Eastern Seas, 175–775 fath.; *imago*, sp. n., *id. ibid.* pl. x. figs. 275 & 276, (viviparous!), Kerguelen Island, &c., 25–150 fath.; *setosa*, sp. n., *id. ibid.* p. 140, pl. ix. figs. 229–232, Pacific, 2225 fath.; *stimulea*, sp. n., *id. ibid.* p. 141, pl. ix. figs. 225–228, Eastern Seas, 950 fath.; *segesta*, sp. n., *id ibid.* pl. x. fig. 271, Atlantic, 1075 fath.; *trescheti*, sp. n., *id. ibid.* p. 142, pl. ix. figs. 222–224, off Bermudas, Mexican Gulf, 101–300 fath; *cuspidata*, sp. n., *id. ibid.* p. 143, pl. x. figs. 248–250, Atlantic, 430 fath.; *longidens*, sp. n., *id. ibid.* p. 144, pl. x. fig. 274, Cebu, 100 fath.; *nodosa*, sp. n., *id. ibid.* pl. x. figs. 258–261, Atlantic, 1530 fath.; *cornuta*, sp. n., *id. ibid.* p. 145, pl. x. fig. 266, Fiji Islands, &c., 520–600 fath.; *cosmica*, sp. n., *id. ibid.* p. 146, pl. x. figs. 251–254, 262–265, 269 & 270, all Southern Seas from Brazil to New Guinea, and between Juan Fernandez and South America, 350–2225 fath. [an allied species, from St. George's Bank, 200 fath., is mentioned; Am. J. Sci. (3) xvi. p. 373]; *levispina*, sp. n., *id. ibid.* p. 147, pl. x. fig. 277, 500 fath., and *serrata*, sp. n., *id. ibid.* p. 148, pl. x. figs. 272 & 273, 152 fath., Eastern Seas; *aspera*, sp. n., *id.* (11 B), p. 228, pl. i. figs. 10–12, off Havana, 175 fath.; *scutata*, sp. n., *id. ibid.* p. 229, pl. i. figs. 1–3, 290 fath., and *echinulata*, sp. n., *id. ibid.* pl. i. figs. 7–9, 955 fath., Mexican Gulf.

Ophiothamnus remotus, sp. n., Lyman (11 A), p. 149, pl. viii. figs. 201–203, Agulhas Bank, 150 fath.

Ophiomitra exigua, sp. n., Lyman (11 B), p. 231, pl. i. figs. 4–6, off Havana, 240 fath.; *plicata*, sp. n., *id.* (11 A), p. 150, pl. viii. figs. 209–212, pl. ix. figs. 233–235, Eastern Seas, 500–1050 fath.; *sarsi*, sp. n., *id. ibid.* p. 151, pl. viii. figs. 216–217, Southern Seas, 1375 faths.; *chelys* (W. Th.), *id. ibid.* p. 152, pl. ix. figs. 239–241, Atlantic, 300–1530 fath., 480–860 fath., *carduus*, sp. n., *id. ibid.* p. 154, pl. ix. figs. 236–238, 1675 fath., and *dipsacos*, sp. n., *id. ibid.* p. 155, pl. viii. figs. 213–215, 390 fath., Mexican Gulf. Table of species of *Ophiomitra* (11 A), p. 150.

Ophiocamax, g. n., Lyman (allied to *Ophiacantha*). "Disk covered with scales or irregular plates, and large radial shields, but beset with thorny spines or stumps; teeth, tooth-papillæ and numerous mouth-papillæ, all spine-shaped, arranged in tufts on the mouth-frame and jaw-plate; spiniform mouth-tentacle-scales on the edge of a little supplementary plate; numerous thorny translucent arm-spines along the sides of the prominent side-arm-plates, which meet nearly or quite above and below; genital openings beginning close outside the mouth-shield." *O. vitrea*, sp. n., *id.* (11 A), p. 156, pl. viii. figs. 218–221, pl. ix. figs. 242–244, Eastern Seas,

100–152 fath.; *histrix*, sp. n., *id.* (11 B), p. 232, pl. i. figs. 13–15, off Havana, 175 fath.

Ophiothela holdsworthi, sp. n., Smith (17 B), Ceylon (of large size, compared with the other species of the genus).

Ophioscolex dentatus, sp. n., Lyman (11 A), p. 157, pl. vii. figs. 184–186, Agulhas Bank, 150 fath.; ? *tropicus*, sp. n., *id. ibid.* pl. vii. figs. 190–192, off St. Thomas, 390 fath.

Ophiolebes, g. n., Lyman (including *Ophiactis clavigera*, Ljgm.). "Disk and arms stout, covered by a thick skin, bearing grains or stumps, and hiding more or less the underlying plates; arm-spines short, blunt, thorny, covered by thick skin, on the sides of the slightly projecting side-arm-plates; teeth; no tooth-papillæ; long, stout, mouth-papillæ; jaw-covers large and wide, connected into a circle; arm-plates rather small, nearly as in *Ophiacantha*." *O. scorteus*, sp. n., *id.* (11 A), p. 158, pl. vii. figs. 196 & 197, Southern Seas, 310 fath.; *vestitus*, sp. n., *id. ibid.* p. 159, pl. x. figs. 255–257, Southern Atlantic, 140–400 fath.

Ophiosciasma, g. n., Lyman (allied to *Ophioscolex*). "Skin of the disk thick, soft, finely granulated, arms very slender, lower and side-plates imperfectly calcified; no upper plates; a bunch of mouth-spines, or thorns, at apex of jaws, representing teeth- and mouth-papillæ; arm-spines on sides of side-arm-plates; genital openings large." *O. attenuatum*, sp. n., *id.* (11 A), p. 160, pl. vii. figs. 193–195, Atlantic, 350 fath.

Ophiogeron, g. n., Lyman (allied to *Ophiomyxa* and *Ophioscolex*). "Skin of disk naked; mouth angles naked, except a few small teeth on the jaws; under arm-plates small; tentacle-pores large; side-arm-plates somewhat flaring, carrying thorny arm-spines covered with skin; upper arm-plates, none." *O. edentulus*, sp. n., *id.* (11 A), p. 161, pl. vii. figs. 178–180, Eastern Seas, 1350 fath.

Luetkenia,* g. n., Duncan (3 A) = *Ophiopleura*, Kor. Dan., but the typical species, *O. arctica*, sp. n. (Discovery Bay), is probably different from *O borealis*, K. D.

Sigsbe[e]ia, g. n., Lyman (allied to *Hemieuryale*). "Disk small, covered with heavy plates or scales, and passing insensibly into the stout arms, capable of being rolled in vertically; teeth; mouth-papillæ; no tooth papillæ; arms with the usual plates and a large supplementary plate, extending downwards from the upper arm-plate; genital openings extending to margin of disk." *S. murrhina*, sp. n., *id.* (11 B), p. 234, pl. iii. figs. 55–58, off Havana, 175 fath. (arms rolled round *Stylaster filogranus*, which is mimicked by its porcelain surface).

Astroschema intectum, sp. n., Lyman (11 B), p. 235, pl. iii. figs. 59–61, off Havana, 175 fath.; *arenosum*, sp. n., *id. ibid.* pl. iii. figs. 62–64, Mexican Gulf, 804 fath.

Astrochele, g. n., Verrill. "Disk covered with small scales, above and below; radial ribs well developed; genital openings small, oblique, close to base of arms, at each end of a depression in edge of disk; teeth and tooth-papillæ spiniform; mouth-papillæ irregular, small or rudimentary,

* Name preoccupied twice: for a genus of *Crustacea* (Claus), and for a genus of *Fishes* (Steindachner).

few or solitary; arm-spines thorny and claw-like; arms annulated, granulated, long, slender, undivided." *A. lymani*, sp. n., *id.* Am. J. Sci. (3) xvi. p. 374, on *Acanella normani*, Le Have Bank, 200 fath.

Trichaster elegans, sp. n., Ludwig (9 A), Bay of Bengal.

Crinoids.

A young *Holopus* is described and figured by Pourtales (1, p. 213, pl. ii.); a truncated, somewhat depressed cone, with irregular basal contours of attachment; basal portion undivided; a lower series of pentagonal [basals ?], an upper of triangular [oral ?] plates, concealing the arms entirely [or these are still undeveloped ?].

Antedon cubensis, sp. n., Pourtales (1), p. 214, Gulf of Mexico, 339–450 fath.; *alata*, sp. n., *id. ibid.*, p. 215, Barbados, 100 fath.; *granulifera*, sp. n., *id. ibid.*, Mexican Gulf, 101 fath.; *pulchella*, sp. n., *id. ibid.* p. 216, Mexican Gulf.

Fossil Echinodermata.

G. Cotteau, Observations sur les fossiles des terrains tertiaires moyens de la Corse et notamment sur les Échinides, Bull. Soc. Géol. (3) vi. pp. 70–76; *id.* Considérations générales sur les *Cidaris* du terrain jurassique de Normandie, Ass. Fr. 1877 (3 pp.); *id.*, Échinides nouveaux ou peu connus, Nos. 111–120, R. Z. (3) vi. pp. 202–217, pls. xxix. & xxx.; *id.*, Péron & Gauthier, Échinides fossiles de l'Algérie, 4me fasc. 144 pp. 8 pls. W. Keeping, On *Pelanechinus*, a new genus of sea-urchins from the coral-rag, Q. J. Geol. Soc. xxxiv. pp. 924–930, pl. xxxiv.; Ann. N. H. (5) ii. pp. 344 & 345; the type of the genus is *Hemipedina corallina*, but it differs from *Hemipedina* through trigeminate pores and overlapping peristomial plates, approaching *Asthenosoma* by this character. Loriol's paper on the fossil Echinoderms of the Crimea (see Favre, Zool. Rec. xiv. *Ech.* p. 11) is in Mém. Soc. phys. Genèv. xxvi. pp. 73–83, pl. iv. A. Manzoni, Gli Echinodermi fossili dello Schlier delle collina di Bologna, Denk. Ak. Wien, xxxix. pp. 149–164, pls. i.–iv.; *id.* & G. Mazzetti, Echinodermi nuovi della molassa miocenica di Montese nella provincia di Modena, Atti Soc. Tosc. iii. pp. 350–356 (*Heterobrissus*, g. n.). The new genera *Ilarionia* and *Oticlypeus* of Dames should be added to the note on the "Echiniden der vicentinischen und veronesischen Tertiär-ablagerungen," &c. (Zool. Rec. xiv. *Ech.* p. 11). P. M. Duncan, On tertiary *Saleniæ*, vide *suprà* (4). T. Wright, Monograph of the British fossil *Echinodermata* from the Cretaceous formations, i. 8 (*Spatangidæ* and *Echinocoridæ*) (pp. 265–300, pls. lxii.*a*–lxix.); *id.* Monograph, &c., of the Oolitic formations, i. (*Echinoidea*) (pp. 469–481) (Pal. Soc. xxxii.). H. Pohlig, *Aspidura*, ein mesozoisches Ophiuriden-Genus; Z. wiss. Zool. xxxi. pp. 235–261, new subgenera, *Hemiglypha* (*loricata*) and *Amphiglypha* (*prisca*). P. de Loriol, Notice sur le *Pentacrinus* de Sennecey le Grand, Chalons (26 pp. 3 pls.); *id.*, Monographie des Crinoides fossiles de la Suisse, ii. (Mém. Soc. pal. Suisse, v. pp. 53–124, pls. ix.–xiv.; in this and the first part are described and figured species of *Encrinus*, *Apiocrinus*, *Millericrinus*,

Cyclocrinus, *Carnocrinus*, and *Pentacrinus*). SCHÜLTE, R., Ueber einige astylide Crinoideen; Z. geol. Ges. xxx. pp. 28–66, pls. i.–iii. (7 species of *Antedon* are known from jurassic, 16 from cretaceous, and 5 from tertiary formations; an eocene *Cyathidium*; *Uintacrinus westphalicus*, sp. n., a cretaceous tessellate Crinoid, without stem). C. WACHSMUTH & F. SPRINGER, Transition-forms in Crinoids and description of 5 new species; P. Ac. Philad. 1878, pp. 224–266. Wachsmuth's notes on the structure of palæozoic Crinoids are reprinted, Ann. N. H. (5) i. pp. 379–392 & 453–463. C. A. WHITE, Descriptions of a new species of invertebrate fossils from the carboniferous and upper silurian rocks of Indiana and Illinois; P. Ac. Philad. 1878, pp. 29–37. N. P. ANGELIN, Iconographia Crinoideorum in stratis Sueciæ siluricis fossilium; Holmiæ, 68 pp. 29 pls. The genera are distributed in 4 groups—*Trimera*, *Tetramera*, *Pentamera*, and *Polymera*—after the number of the basal plates. New genera established:—*Briarocrinus*, *Patelliocrinus*, *Leptocrinus*, *Cordylocrinus*, *Pionocrinus*, *Desmidocrinus*, *Barrandeocrinus*, *Gissocrinus*, *Homalocrinus*, *Clidochirus*, *Calpiocrinus*, *Anisocrinus*, *Pycnosaccus*, *Corymbocrinus*, *Abacocrinus*, *Cyrtidocrinus*, *Stelidiocrinus*, *Harmocrinus*, *Sicyocrinus*, *Euspirocrinus*, *Ophiocrinus*, *Botryocrinus*, *Eucrinus*, *Polypeltes*, and *Eucystis*. The names of the Cystidean genera are changed:—*Echinosphæra*, *Caryocystis*, *Megacystis*, *Sphæronis*, *Glytosphæra*, *Gomphocystis*, *Glyptocystis*.

CŒLENTERATA.

BY

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ANTHOZOA.

1. Brüggemann, F. (A) Ueber einige Steinkorallen aus Singapore; Abh. Ver. Brem. v. pp. 539–549. (B) Zur Nomenklatur der Trachyphyllien ; *ibid.* p. 550.

2. ——. Fossile recente Korallen. Kosmos, i. p. 394.

[Unknown to the Recorder; enumeration of fossil species discovered in the living state during deep-sea researches.]

3. Duncan, P. M. A description of the *Madreporaria* dredged up during the expeditions of H.M.S. 'Porcupine,' in 1869 and 1870. Tr. Z. S. x. pp. 235–249, pls. xliii.–xlv.

4. King, O. Muskelepithelien bei Anthozoen. Vorläufige Mittheilung. Morph. JB. iv. p. 327.

5. Koch, G. v. (A) Mittheilungen über Cœlenteraten. Zur Phylogenie der *Antipatharia* ; Morph. JB. iv. Suppl. pp. 74–86, pl. v. (B) Anatomie von *Isis neapolitana*, sp. n. ; *ibid.* pp. 112–127, pl. iv. (C) Mittheilungen über *Gorgonia verrucosa*, Pall. ; *ibid.* pp. 269–278, pl. xv. (D) Das Skelet der Alcyonarien ; *ibid.* pp. 447–473, pls. xxii. & xxiii.

6. ——. Notiz über die Zooide von *Pennatula*. Zool. Anz. i. pp. 103 & 104.

7. Lacaze-Duthiers, H. de. Observations sur la déglutation et la vitalité des Caryophyllies de Smith et Balanophyllie royale. Arch. Z. expér. vi. pp. 377–384.

8. Pourtales, L. F. de. Report on Corals. Cf. *Echinodermata*, No. 1.

9. Studer, T. (A) Zweite Abtheilung der *Anthozoa polyactinia*, welche während der Reise S.M. Corvette 'Gazelle' um die Erde gesammelt wurden; MB. Ak. Berl. 1878, pp. 524–550, pls. i.–v. (B) Uebersicht der *Anthozoa alcyonaria*, welche während, &c.; *ibid.* pp. 632–688, pls. i.–v.

Faunistical, &c.

Bonnafont, Excursion et pêche du corail à La Calle, 1837; Bull. Soc. Acclim. 1877, pp. 715–728. R. Rathbun, Notes on the coral reefs of the Island of Itaparica, Bahia, and of Parahyba do Norte; P. Bost. Soc. xx. [not published until 1879] pp. 39–41. On atoll-like reefs in areas of elevation (Yucatan Bank), see Agassiz's letters, Bull. Mus. C. Z. v. 1 & 6, pp. 2 & 56.

The new species and those figured or partly described by Brüggemann (1), Duncan (3), and Studer (9) are enumerated below.

Anatomy and Physiology, &c.

G. v. Koch (5) has studied the anatomy and histology of *Isis elongata* (*neapolitana*) and *Gorgonia verrucosa*. In the cœnenchyma (mesoderm) of the former there is a double circle of small and large nutritive vessels, confluent into a lacunar system only at the bases of the polypites, where they communicate with their gastral cavities. Spicula are found in the mesoderm of the polypites, of the tentacula, and pinnulæ, not in the cœnenchyma, except at the base of the polypites. An axial canal traverses the whole stem and the branches, but there is no communication between that of the branches and of the stem. In both genera, the axial skeleton is invested with and secreted by an epithelial (ectodermal ?) layer. From investigations of the skeletal elements in other *Alcyonaria*, this epithelial layer is shown to be present in all true *Gorgoniidæ*, and *Isidæ* (*Axifera*, K.), and in the *Pennatulidæ* and *Antipatharia*; the axis or stem therefore is explained, in accordance with the views of Milne-Edwards, in all these forms, as a horny or more or less completely calcified basal secretion or exoskeleton. On the other hand it is a mesoskeleton, formed of the spicula of the cœnenchyma, in the *Pseudaxonia* : *Corallium*, *Sclerogorgia*, *Melitodes*, and parts of *Briaraceæ*, the spicula being more or less fused together, or connected by a horny tissue, &c. The mesoskeleton may be found alone, as in *Tubiporida*, *Pseudaxonia*, and *Alcyonida*, or combined with an exoskeleton, as in *Gorgoniida* and *Pennatulida*. The *Alcyonaria* are accordingly distributed into eight families: *Axifera* (viz., *Gorgoniidæ*), *Pennatulida*, *Pseudaxonia*, *Alcyonida*, containing also *Siphonogorgia* and part of the *Briaracea* Köll.), *Helioporida* (mesoskeleton calcified, no spicula), *Cornulariida*, *Tubiporida*, and *Haimeida* (single, the other compound). A few instances in which some of the rudimentary "zooids" of *Pennatula* were replaced by normally developed polypites, are noticed by Koch (8).

Lacaze-Duthiers's (7) experiments with *Balanophylliæ* and *Caryophylliæ*, which had been preserved living and fasting in the dark for a long time, without change of water, confirm his opinion that the so-called "stomach" is only an œsophagus, the digestion going on deeper down. A *Caryophyllia*, preserved for several years without feeding, gradually withdrew its soft body from the polyparium and at last left it altogether. *Caryophylliæ* left in the dark in the same manner were discoloured; the same effect resulting when deep-sea specimens were

exposed to the light. *Corynactis*, subjected to a long fast, were at last reduced to the size of a pin's head, &c.

In *Antipathes larix*, Koch (5 A) describes the structure of the polypes: six conical tentacula, two large septa with filaments and ovaria, the other rudimentary, the spinous horny axis (the axial canal of which is, as in *Isis*, not continued to those of the branches), surrounded by an ectodermal (?) epithelium.

Genera and Species.

Actinaria (Polyactinia).

(*Actiniidæ*). Under the name of *Gephyra dohrni*, g. & sp. nn., and as the phylogenetic starting-point of the *Antipatharia*, G. v. Koch (5 A) describes a small *Actinia* from the Mediterranean (Naples), with about 80 conical tentacles, growing socially on *Isis*-stems, enveloping these, coalescing with its apposed margins (also with its neighbours), and secreting a corneous layer from its investing base around the enclosed foreign polypary. [*Cf.* the account given in Zool. Rec. xiv. *Cœl.*, p. 4, of similar deep-sea forms attached to *Mopseæ* and *Gorgoniidæ*: *Actinia abyssicola* and *gelatinosa*].

Corynactis carnea, sp. n., Studer (9 A), p. 542, pl. iv. fig. 13, on *Tubularia*-tubes, 38° 10′ lat., 56° 26′ long. W., 30 fath.

Cereus brevicornis, sp. n., *id. ibid.* pl. iv. fig. 14, West Coast of Africa, 150 fath.

Calliactis marmorata, sp. n., *id. ibid.* p. 543, pl. iv. fig. 15, Mermaid Strait, N.W. Australia.

Bunodes kerguelensis, sp. n., *id. ibid.* pl. iv. fig. 16, Kerguelen.

Bolocera kerguelensis, sp. n., *id. ibid.* p. 544, pl. iv. fig. 17, Kerguelen, 120 fath.

Actinopsis rosea, sp. n., *id. ibid.* pl. iv. fig. 18, Kerguelen.

Paractis alba, sp. n., *id. ibid.* p. 545, pl. v. fig. 19, East Coast of Patagonia, 60 fath.

Halcampa purpurea, sp. n., *id. ibid.* pl. v. fig. 20, Kerguelen, 6–100 fath.

Edwardsia kerguelensis, sp. n., *id. ibid.* p. 546, pl. v. fig. 21, Kerguelen, 5–6 fath.

Remarks on *Sphenopus marsupialis* (Gmel.), *ibid.*, on *Epizoanthus cancrisocius*, Mart., Kerguelen, p. 547.

(*Turbinoliidæ*). *Caryophyllia carpenteri*, sp. n., Duncan (3), p. 237, pl. xliii. figs. 28–31, and *simplex*, sp. n., *id. ibid.* pl. xliii. figs. 32–34, Atlantic, West of the British Channel, 539 fath.; *pourtalesi*, id. *ibid.* p. 238, pl. xliii. figs. 1–7, 11–14 (identical with *C. corniformis*, according to Pourtales, 8, p. 198); *inskipi*, id. *ibid.* pl. xliii. figs. 8–10; *calveri*, id. *ibid.* p. 239, pl. xliii. figs. 15–27; *polypora*, sp. n., Pourtales (8), p. 198, Gulf of Mexico, 860 fath.

Bathycyathus minor, sp. n., Duncan (3), p. 239, pl. xlv. figs. 1–4, 7–9, Atlantic, 1095 fath.; *atlanticus*, id. pl. xlv. figs. 5 & 6.

Trochocyathus rawsoni, Pourt., is not *Deltocyathus agassizi*, Pourt.; Pourtales (8), p. 200.

Paracyathus flos, sp. n., *id.* (8), p. 201, off Havana, 100 fath.;

insignis, sp. n., Duncan (3), p. 239, pl. xliv. figs. 1–3, Mediterranean, 248 fath.; *striatus*, sp. n. (*confertus*, Pourt.), *id. l. c.* p. 240, pl. xliv. figs. 4–10, Mediterranean and Gulf of Mexico, 50–100 fath.; *monilis*, sp. n., *id. l. c.* p. 241, pl. xliv. figs. 11–13, and *inornatus*, sp. n., *id. ibid.* pl. xliv. figs. 14–16, Mediterranean, 60 fath.; *humilis*, sp. n., *id. ibid.* p. 242, pl. xliv. figs. 17–19, ibid.; *africanus*, sp. n., *id. ibid.* pl. xliv. figs. 20–22, coast of Tunis, 40 fath.; *costatus*, sp. n., *id. ibid.* pl. xliv. figs. 23–26, Mediterranean, Coral Zone.

Leptocyathus stimpsoni, Pourt. [= *Stephanophyllia* or *Paracyathus folliculus*, P.], Pourtales (8), p. 201.

Thecocyathus recurvatus, sp. n., *id.* (8), p. 202, off Havana, 175 fath.

Conotrochus typus, Seg.; *id. ibid.*

Ceratotrochus hispidus, sp. n., *id. ibid.* pl. i. figs. 19 & 20, Gulf of Mexico, 310 fath.

Desmophyllum reflexum and *D. riisei* = *D. cristagalli*, E. H.; *id. l. c.* p. 203.

Turbinolia corbicula, sp. n., *id. l. c.* p. 203, pl. i. figs. 12 & 13 (fossil ?), Gulf of Mexico, 100–200 fath.

Flabellum minus, sp. n., Duncan (3), p. 243, pl. xlv. figs. 10–13, 996 fath.; *F. goodei*, sp. n., Verrill, Am. J. Sci. (3) xvi. p. 377, George's Bank, Massachusetts' Coast, 220 fath.

Gemmulatrochus, g. n., Duncan. Budding *Turbinoliidæ* without pali. "Corallum compound, conico-cylindrical, fixed by a broadish base; wall thick, epitheca well marked; costæ rarely visible; calix deep; columella rudimentary; septa stout. Budding takes place from the wall, high up; the buds do not fall off, as in *Blastotrochus*, but remain attached to the side of the parent corallum, and grow; they frequently join by their walls to others of different corallites, so as to constitute a bush-shaped corallum." *G. simplex*, sp. n., Duncan (3), p. 243, pl. xlv. figs. 18–20, Mediterranean.

(*Eusmiliidæ*). *Blastosmilia*, g. n., Duncan, = *Anomocora*, Studer (Zool. Rec. xiv. *Cœl.* p. 6). *B. pourtalesi*, sp. n., *id.* (3), p. 244, pl. xlv. pp. 14–17, Mediterranean, Red-Coral Zone. *Cœlosmilia fecunda* and *C. arbuscula*, Pourt., which belong to this genus, are recorded as *Parasmiliæ* by Pourtales, *l. c.* p. 206.

Solenosmilia variabilis, Dunc.; Pourtales (8), pl. i. figs. 1–3.

Trochosmilia elongata, sp. n., Studer (9 A), p. 675, Congo, 98 fath.

(*Mussaceæ*). *Montlivaultia poculum*, sp. n., Pourtales (8), p. 205, pl. i. figs. 21 & 22, off West Coast of Florida ? (fossil ?).

Anthemiphyllia, g. n., Pourtales. "Corallum free or pedicellate, with rudimentary epitheca; no columella; septa thick, and having the edge beset with transversely flattened processes." *A. patera*, sp. n., *id.* (8), p. 205, pl. l. figs. 14 & 15, off Havana, 292 fath.

(*Astrangiaceæ*). *Colangia simplex*, sp. n., *id.* (8), p. 206, pl. i. fig. 18, off Havana, 80 fath.

Cylicia inflata, sp. n., *id.* (8), p. 207, pl. i. figs. 10 & 11, off Havana, 100–242 fath.

(*Oculinidæ*). *Amphihelia rostrata*, sp. n., *id.* (8), p. 204, pl. i. figs. 4 & 5, off Havana, 805 fath.

(*Echinoporidæ*). Remarks on *Echinopora horrida* and *Oxypora lacera*; Brüggemann (1), pp. 541–544. The genus *Acanthopora*, Verr., cannot be maintained.

(*Astræaceæ*). *Orbicella aucta*, sp. n., Brüggemann, *l. c.* p. 540, Singapore.

(*Dendrophylliidæ*). *Balanophyllia palifera*, sp. n., Pourtales (8), p. 207, Mexican Gulf and off Havana, 36–458 fath.

"*Diplohelia*" *profunda* is now referred to *Dendrophyllia*; id. *l. c.* p. 208, pl. i. figs. 6–8.

Trochopsammia, g. n., Pourtales. *Balanophylliæ* with non-coalescent septa and rudimentary or absent columella. *T. infundibulum*, sp. n., *id. l. c.* p. 208, pl. i. figs. 16 & 17, Gulf of Mexico, and off Havana, 635–805 fath.

(*Fungiidæ*). Brüggemann, remarks on *Leptoseris venusta*, l. c. p. 544.

(*Poritidæ*). *Porites saccharata*, sp. n., and *Goniopora malaccensis*, sp. n., Brüggemann, *l. c.* pp. 545 & 548, Singapore, with remarks on *Rhodaræa lagrenæi* and *Porites conglomerata*. Cf. also Studer on species of *Porites*, *Synaræa*, *Goniopora*, and *Montipora*, (9 A), pp. 536–539.

(*Madreporidæ*). On *Madrepora laxa*, Lmk., Brüggemann, *l. c.* pp. 544 & 545; *M. patella*, sp. n., Studer, *l. c.* p. 526, pl. i. fig. 1, Salomon Islands; *sclago*, sp. n., *id. ibid.* p. 527, pl. i. fig. 2, New Hanover, Galewo Straits; *candelabrum*, sp. n., *id. ibid.* p. 528, pl. ii. fig. 3, *rubra*, sp. n., *id. ibid.* p. 529, pl. ii. fig. 4, New Ireland; *tubulosa*, Ehrb., *ibid.* p. 532, pl. ii. fig. 4, Galewo Straits, New Guinea; *nana*, sp. n., Studer, *l. c.* p. 533, pl. ii. fig. 6, Fiji Islands; *formosa*, Dana, *id. ibid.* pl. ii. figs. 7 & 8.

Isopora, subg. n., Studer. Coral leaf-shaped or lobate, calicles equally prominent, distributed over the whole polypary; no specially differentiated terminal calicle. (*I. labrosa*, *securis*, Dana).

(*Seriatoporidæ*). *Seriatopora jeschkei*, sp. n., Studer, *l. c.* p. 540, pl. iii. fig. 9, Galewo Straits; *ocellata*, Ehbg., *ibid.* pl. iii. fig. 10; *compressa*, sp. n., *id. ibid.* p. 541, pl. iii. fig. 11, *contorta*, sp. n., *id. ibid.* pl. iii. fig. 12, Salomon Islands.

(*Antipathidæ*). On *Antipathes desbonnii*, D. M., and *columnaris*, D., *cf.* Pourtales (8), p. 209.

Alcyonaria (Octactinia).

(*Alcyoniidæ*). *Xenia samoensis*, Köll.; Studer (9 B), p. 632.

Clavularia: emendated generic diagnosis, Studer, *l. c.* p. 633. *C. rosea*, sp. n., *id. l. c.* pl. i. fig. 1, Kerguelen, 120 fath.; *magelhaenica*, sp. n., *id. ibid.* pl. i. fig. 2, Magellan Straits, 42 fath.

Anthelia capensis, sp. n., *id. l. c.* pl. i. fig. 3, Cape, 50 fath.

Sklerantheliа [*Scle-*], g. n., Studer. (Intermediate between *Clavularia* and *Telesto*). Polypites rising irregularly from a common incrusting base; new ones budding from near the base of the older, sometimes simulating a slight branching; tentacles and anterior part of polypites entirely retractile; body-wall crowded with broad polygonal calcareous plates,

warted on the outside. *S. musiva*, sp. n., Studer, *l. c.* p. 634, pl. i. fig. 4, Atlantic, 115 fath.

Nidalia atlantica, sp. n., Studer, *l. c.* p. 635, pl. i. fig. 5, Atlantic.

Spongodes spinosa, Gr., *id. ibid.* p. 636.

Siphonogorgia squarrosa, sp. n. (Köll.), *id. ibid.* p. 637, pl. i. fig. 6, off N.W. Australia, 50 fath.

Anthomastus, g. n., Verrill. A rounded polypiferous mass, raised on a short, stout, barren peduncle; polypes few, large, spiculose, entirely retractile into 8-rayed cells; rudimentary zooids numerous, minute, scattered between the polypes: cœnenchyma abundant, firm, finely spiculose. *A. grandiflorus*, sp. n., *id.*, Am. J. Sci. (3) xvi. p. 376, off Nova Scotia, 250 fath.

(GORGONIIDÆ). Characters of "*Primnoidæ*" and "*Primnoadæ*" revised, Studer, *l. c.* p. 642; also of the genera *Primnoa* (incl. *Hookerella*, Gr.), *Calyptrophora*, *Myura*, *Narella* (incl. *Stenella*, Gr.), *Primnoella*, *Calligorgia* (incl. *Xiphocella*, *Callicella*, and *Fanellia*, Gr.), and *Thouarella*, ibid. pp. 643–649.

Calyptrophora japonica, Gr., Studer, *l. c.* p. 642.

Narella modesta, sp. n., Studer, *l. c.* p. 643, pl. i. fig. 7, Pacific, 597 fath.; *divaricata*, sp. n., *id. ibid.* pl. i. fig. 8, East Coast of Argentine States, 30 fath.

Primnoella distans, sp. n., Studer, *l. c.* p. 644, pl. i. fig. 9, Pacific, 550 fath.; *magelhaenica*, sp. n., *id. ibid.* pl. ii. fig. 10, Straits of Magellan, 42 fath.; *flagellum*, sp. n., *id. ibid.* p. 645, pl. ii. fig. 11, South Atlantic, 60 fath.

Calligorgia flabellum, Ehrb., Studer, *l. c.* p. 646, pl. ii. fig. 13; *compressa*, Verr., *id. ibid.* p. 647, pl. ii. fig. 14; *ventilabrum*, sp. n., *id. ibid.* pl. ii. fig. 12, N. off New Zealand, 90 fath.

Plumarella hilgendorfi, sp. n., Studer, *l. c.* p. 648, pl. ii. fig. 15, Japan, 300 fath.

Characters of *Muriceidæ*, Studer, *l. c.* p. 649, of *Anthogorgia* and *Acanthogorgia*, pp. 651 & 652.

Muricea umbraticoides, sp. n., *id. ibid.* p. 650, pl. iii. fig. 16, West Australia, 45 fath.

Echinogorgia sasappo, var. *pinnata*, Studer, *l. c.* p. 651, Mauritius, 25 fath.; *intermedia*, sp. n., *id. ibid.* pl. iii. fig. 17, N.W. Australia.

Acanthogorgia johnsoni, sp. n., Studer, *l. c.* p. 652, pl. iii. fig. 18, Atlantic, 115 fath.; *armata*, sp. n., Verrill, Am. J. Sci. (3) xvi. p. 376, off Nova Scotia and George's Bank, 220–300 fath.

Paramuricea cancellata (Dana), Studer, *l. c.* p. 653; *gracilis*, sp. n., *id. ibid.* pl. iii. fig. 16, Salomon Islands, 48 fath.; *borealis*, sp. n., Am. J. Sci. (3) xvi. p. 213, Newfoundland Bank.

Psammogorgia (?) *geniculata*, sp. n., Studer, *l. c.* p. 654, pl. iii. fig. 20, off N. New Zealand, 90 fath.

Leptogorgia divergens, sp. n., Studer, *l. c.* p. 655, pl. iv. fig. 21, N.W. Australia, 50 fath.

Eunicella furcata, sp. n., Studer, *l. c.* pl. iv. fig. 22, *filiformis*, sp. n., *id. ibid.* pl. iv. fig. 23, W. Africa, 115 fath.

Phenilia (Gr.) = *Gorgonella*, cf. Studer, *l. c.* p. 656; *G. verriculata*,

E. H. ?, Studer, l. c.; *miniacea*, sp. n., *id. ibid.* p. 657, pl. iv. fig. 24, West Australia, 60 fath.; *distans*, sp. n., *id. ibid.* pl. iv. fig. 25, N. West Australia, 50 fath.

Characters of *Juncella*, *Ellisella*, and *Scirpearia* (incl. *Nicella*, *Raynerella*, *Viminella*), Studer, *l. c.* pp. 658–660.

Juncella juncea, Pall., Studer, *l. c.* p. 659; *flexilis*, sp. n., *id. ibid.* pl. iv. fig. 26, Mauritius, 25 fath.

Ellisella maculata, sp. n., Studer, *l. c.* pl. iv. fig. 27, *calamus*, sp. n., *id. ibid.* pl. v. fig. 28, N.W. Australia, 50 fath.

Scirpearia flagellum, Johns., Studer, *l. c.* pl. v. fig. 30; *mirabilis*, Pall., *ibid.* pl. v. fig. 29.

(*Isidæ*). *Isis antarctica*, sp. n., Studer, *l. c.* p. 661, pl. v. fig. 32, off N.W. Kerguelen, 60 fath.; *I. neapolitana*, sp. n., = *elongata*, Esper., Koch (5 n).

Sclerisis, g. n., Studer. Erect, branched, calcareous joints very long, delicately striated, the horny ones short, disk-shaped; branches from the calcareous joints; crust thin, without spicula; calicles bell-shaped, with restricted base, covered with large, arched, thorny, fusiform spicules, crowded and decussating in the sclerenchyme, but forming an eight-valved operculum around the orifice of the calicle. *S. pulchella*, sp. n., Studer, *l. c.* p. 662, pl. v. fig. 33, Pacific, 597 fath. (A Eunicid Annulate worm lives in the stem, as in certain *Stylasteridæ* and *Oculinidæ*.)

Ceratoisis grandiflora, sp. n., Studer, *l. c.* pl. v. fig. 34, Fiji, 975 fath.; *japonica*, sp. n., *id. ibid.* p. 663, Japan, 300 fath.; *siemensi*, sp. n., *id. ibid.* pl. v. fig. 35, Atlantic, 1780 fath.; *ornata*, sp. n., Verrill, Am. J. Sci. (3) xvi. pp. 212 & 376, Nova Scotia, 250 fath.

Acanella normanni, Verr., *id. ibid.* (= *Mopsea arbuscula*, Norm.)

Isidella capensis, sp. n., Studer, *l. c.* p. 665, pl. v. fig. 36, Cape of Good Hope, 50 fath.

(*Briareidæ*). *Suberia*, g. n., Studer. Stem simple or branched, erect; axis formed of bacilliform, not confluent spicula, enveloped in a horny substance; no nutritive axial canals; a thick crust containing fusiform muricate spicula; polypiferous warts large, vertical in relation to the stem; terminal orifice octo-radiate; polypites with delicate fusiform spicula, from the base to the tentacles; around the axis a circle of longitudinal vessels. *S. kœllikeri*, sp. n., Studer, *l. c.* p. 667, pl. v. fig. 37, N. off New Zealand, 90 fath.; *clavaria*, sp. n., *id. ibid.* pl. v. fig. 38, East Coast of South America.

Sclerogorgia mexicana, Koch (5), p. 448.

Characters of *Solenocaulon* (incl. *Solenogorgia*, Genth.), Studer, *l. c.* p. 669. *S. tortuosum*, Gr., *l. c.* pl. v. fig. 39; *grayi*, sp. n., Studer, *l. c.* p. 671, pl. v. fig. 40, N.W. Australia, 50 fath.

(*Pennatulidæ*). *Pavonaria africana*, sp. n., Studer, *l. c.* p. 672, pl. v. fig. 41, W. Africa, 360 fath.

Veretillum cynomorium, Pall., var. *astyla*, Köll.; Studer, *l. c.* p. 674.

Cavernularia madeirensis, sp. n., Studer, *l. c.* pl. v. fig. 42.

Renilla muelleri, Sch.; *id. ibid.* fig. 43.

Fossil Corals.

For Carter, Dawson, Nicholson, and others on *Stromatoporidæ*, see *Hydrozoa* (*infrâ*). R. Etheridge, Palæontology of the coasts of the Arctic lands visited by the late British expedition; J. G. Soc. xxxiv. pp. 568–636. *Id.* & H. A. Nicholson, On the genus *Palæacis* and the species occurring in British carboniferous rocks; Ann. N. H. (5) i. pp. 206–227, pl. xii. (*Palæacis* no true coral, perhaps a Protozoon or Sponge). S. W. Ford, Descriptions of two new primordial fossils; Am. J. Sci. (3) xv. pp. 124–127 (*Protocyathus rarus*, g. & sp. nn.). B. Gastaldi, Su alcuni fossili paleozoici delle Alpi marittime e dell' Apennino ligure studiati da G. Michelotti; Atti Acc. Rom. (3) i. pp. 113–128, pls. i. & ii. H. A. Nicholson, On the minute structure of the corals of the genera *Heliophyllum* and *Crepidophyllum*; Ann. N. H. (5) i. pp. 44–54. K. von Fritsch, Fossile Korallen der Nummulitenschichten von Borneo; Palæontographica, suppl. iii. pp. 93–135, pls. (*Ceratophyllia*, *Polyaræa*, g. n.) R. F. Tomes, On the stratigraphical position of the Corals of the Lias of the Midland and Western Counties of England and of South Wales; J. G. Soc. xxxiv. pp. 179–195, pl. ix. (*Tricycloseris*, g. n.).

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[Unknown to the Recorder.]

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Distribution, Biology, &c.

List of White Sea *Hydrozoa* : Mereschkowsky (17A), p. 323 ; it is

a special department of an arctic circumpolar fauna. R. SCHMIDTLEIN, "Beobachtungen über Trächtigkeit- und Eiablage Perioden verschiedener Seethiere," MT. zool. Stat. Neap. i. pp. 124–126 (*Anthozoa*, *Acalephæ*, *Siphonophora*, *Ctenophora*, &c.)

Morphology, Anatomy, and Physiology, &c.

The circular arrangement of the tentacula in certain *Hydrozoa* is, according to MERESCHKOWSKY (17 A), a case of "metamerism," of incomplete transversal division [!]. The *Hydrozoa* of this type are designed as the "articulate" type; they are almost always provided with capitate tentacula, the form best adapted to the function of defence, the only one remaining to them, when their position has become too distant from the mouth. Capitate tentacula are very rarely found in "non-articulate" gymnoblastic Hydroids, whose scattered tentacles are always filiform, long, and very supple, never in *Thecaphora*. A hydranth is, according to the author, properly speaking, not an individual, but a polymorphic colony of "*Protohydræ*" and "*Archydræ*," each tentacle being like the body of the hydranth a monaxonic Archydra, but mouthless and produced by gemmation—with further speculations of the like nature. The development of the *Medusa* of *Obelia flabellata* is described, with the repeated division of the nucleus and nucleolinus in the ova of *Obelia* before fertilization, the observations being interpreted as indicating that the Hydroid *Obelia* under certain conditions is able to propagate by spontaneous fission, by a sort of cyst, after the fashion of *Schizocladium*. Red pigment spots in the tips of the arms of *Oorrhiza* are regarded as first indications of organs of sight. The same author (17 C) has studied the law of appearance of the tentacles of *Hydra*: the first two tentacles appear at the same time, and are arranged opposite to each other, the others also appear in pairs, and are arranged opposite one another; but the second tentacle of each pair always appears later than the first, and this retardation is greater in the third pair than in the second, and still greater in the fourth.

ENGELMANN (10) has repeated Trembley's celebrated experiments on the inversion of *Hydra*. The result was always negative: if the animal did not succeed in speedily retaking its natural position, the *Hydra* was decomposed and rapidly died away, sometimes with the exception of the distal portion with the tentacula, which then reproduced a new body. Trembley must therefore have deceived himself. Under the same circumstances small fragments of tentacles were apt to regenerate whole 5-armed polypi, individuals divided longitudinally coalesced, &c.

On the histology of *Siphonophora*, vide below, p. 16.

From his researches on the evolution of the generative products in *Tubularia* and *Eudendrium*, CIAMICIAN (5) concludes that in the last genus the spermatozoa are derived from the endoderm, the eggs from the ectoderm; in the former, both from the latter. The formation of the spermatozoa in the ectodermal cells of *Hydra* is confirmed by BERGH (3), who, in the second part of his paper, gives his observations on the identity of the ciliary and amœboid protoplasmatic motions

in the endodermal cells of *Hydra* and *Clava*; the third part contains histological observations on *Clava squamata*.

The knowledge of the general intimate structure of *Medusæ*, the craspedote especially, has been largely increased by the work of the HERTWIGS (14). All parts and tissues belong—with the partial exceptions referred to below—either to the ectoderm or the endoderm. The ectoderm is sometimes differentiated into the epithelium proper and the subepithelial (interstitial) tissue; in such cases the epithelium is often connected with the basement membrane through delicate fibrillar elements; the urticating cells, the nervous system, and the sense organs (chiefly), the muscles and the generative organs all belong to the ectoderm; the authors, at least, have not found muscular fibres inside the basement membrane, and another interpretation is given to a part of those described in this place by others. It is also evident that in most, at least, of the instances adduced by the authors, the organs of reproduction are truly portions of the ectoderm; and it must be confessed that in cases where the evidence is less convincing, they are very naturally interpreted as properly belonging to the ectoderm. The circular muscles of the sub-umbella and velum, moving rhythmically, are transversely striated; the radial and stomachal muscles are smooth; those of the tentacula may belong to either kind; but there are no dorsal muscles. The endoderm not only forms the epithelial investment of the gastro-vascular cavities, but also a delicate lamella, uniting the radial and circular canals and separating the jelly of the umbella from the hyaline membrane; important morphological deductions are based upon the universal existence of this layer, the primitively double endodermal investment of the gastral cavity of the *Medusa*, of which cavity the stomach and radial and circular canals of the developed *Medusa* are the sole remnants. To the endoderm also belongs the internal epithelium of the tentacular cavity, transformed into a single series of axial cells in *Medusæ* with solid, not hollow tentacles, modified for feeling, useless for prehension. The jelly of the disk is regarded chiefly as a layer secreted by the endoderm. When containing cells (immigrated from the endoderm ?) and therefore endowed with independent growth, as in *Aurelia*, it may assume the character of a mesoderm, and the same may be said of the axial tissue in the tentacles of those *Medusæ* in which the original communication between the tentacle and the gastro-vascular system is finally interrupted; and of the sub-umbellular sub-epithelial muscular layer in its highest development, when separated from the ectodermal epithelium through a secondary basement-membrane (in *Æquorea*). The general histological and morphological results attained by these observers agree well with those of CLAUS (7), but disaccord with those of BÖHM (4), who for instance regards the *Medusæ* generally as "*Triblasteria*" (while the Hydroids are "*Diblasteria*"), refers the ovaria to the endoderm, the "endodermal lamella" of Hertwig ("vascular plate" of Claus) to the ectoderm, and denies the existence of a basement membrane in the tentacles, in the walls of the stomach, and in the sub-umbella. These statements are controverted by the Hertwigs, and explained by the imperfect method employed, the sectional method

especially not having been made use of. It is impossible here to give a fuller review of the light thrown by these investigations upon the modifications of the different organs and tissues, according to their degree of evolution or differentiation.

The larger work of the two HERTWIGS (13) is devoted to the histological analysis of the nervous tissue and sense organs, and to the discussion of the conclusions respecting the genesis of these organs in the animal kingdom, which may be deduced from the observations. It is based upon the examination of seventeen genera of Mediterranean *Medusæ*. In the craspedote *Medusæ* there exists a continuous central nervous system, consisting of a double marginal ring, divided by the basement membrane of the velum; both consist of delicate fibrils and ganglionic cells, the superior is chiefly, but not exclusively, a sensorial centre, the inferior, in like manner, chiefly a motorial; the ciliated epithelial cells protecting the superior nerve ring, and communicating with it through their basal filaments are a special modification of the ectoderm (sense-cells); the auditory cells, and the cells of vision connected with or forming the special sense-organs are again specially modified sense-cells. Ganglionic cells are found scattered or forming a plexus, representing a ganglionic nervous system, on the sub-umbella; special nerves are rarely found, for instance the auditory nerve in *Geryonia*. Peculiar organs of touch are shown in the extremities of the inter-radial tentacles in *Rhopalonema* and the marginal combs in this genus and in *Aglaura*. Eyes occur in the "*Ocellata*" (*Anthomedusæ*, Häckel, viz., in those *Medusæ* which are nursed by Tubularian Hydroids, and have the organs of generation placed in the walls of the stomach), always in the base of the tentacles, sometimes consisting of a pigment-spot (sense-cells enveloped by pigment-cells) alone, sometimes provided with a lens (a cuticular development). Ocelli may occur also in some other craspedote *Medusæ* (*Tiaropsis*, for instance), but auditory organs never occur in the Tubularian *Medusæ*. In those again, which are nursed by Campanularian Hydroids, viz., the "*Vesiculatæ*" (or *Leptomedusæ*, Häck., whose organs of generation are placed along the radial canals), the auditory organs (cells containing calcareous concretions, "otoliths," supported by auditory cells), are connected with the inferior nerve-ring and placed in hollows or in closed cysts, according to the genera. Auditory organs are only rarely connected with the tentacles; their position is chiefly marginal, and they are found in many different modifications and degrees of development. In the *Æginidæ*, they are naked "ear-clubs," modified rudimentary tentacula, containing one or more otoliths in their axial cells, placed on special cushions and surrounded by specially developed auditory cilia; in the young *Rhopalonema*, they have the same character, but during the growth of the animal they are transformed into cysts, in which the stalked "ear-clubs" are inclosed, held in place by means of their auditory cilia. In the *Geryonidæ*, the similarly constructed auditory organs are sunk in the jelly and provided with two auditory nerves. In the *Acraspedæ*, the central nervous system is interrupted, being confined to the bases of the marginal "sense-bodies," which may be regarded as modified tentacula, but with less definite physiological action. In some (*Pelagia*), they only contain

concretions analogous to those of the "ears" in the *Craspedota*; in others (*Aurelia*), one or more eye-spots are also present, sometimes with lenses (*Charybdea*, *Nausithoe*). It is not possible to give here more than a passing allusion to Claus's paper on *Charybdea* (8), of which type no species was examined by the Hertwigs. Böhm's already cited paper (4) is especially noteworthy for its chapter on the gemmation in the *Medusæ*.

Hæckel's system (11) dividing the *Medusæ* into two groups, *Craspedotæ* (*Cryptocarpa*, *Gymnophthalma*) and *Acraspedæ* (*Phanerocarpæ*, *Steganophthalmæ*) and 8 "Orders"—*Anthomedusæ*, *Leptomedusæ*, *Trachymedusæ*, *Narcomedusæ*, *Scyphomedusæ*, *Conomedusæ*, *Peromedusæ*, and *Discomedusæ*—into the characters of which the differences recorded above, and offered by the nervous system, sense organs, and organs of generation, and the relation to the two orders of *Hydrozoa*, enter largely—is the forerunner of a forthcoming systematic work on the *Medusæ*. The special record of Hæckel's system may therefore more conveniently be postponed until next year.

The continued observations of Romanes (22) show that *Medusæ* are very favourable objects for physiological experiments on, and investigations of, the nervous system, and that they show in the phenomena observed a remarkable agreement with higher animals. The genera experimented on are *Aurelia*, *Sarsia*, *Staurophora*, and *Tiaropsis*. The differences exhibited by the craspedote and acraspedote *Medusæ* in the mode of action of the nervous system, &c., are in excellent accordance with the anatomical facts brought forward by the researches of late years. It is impossible here to give a statement of the multiplied and ingenious experiments (section, segmentation, heat, cold, light, gases, poisons, electricity, &c.), to which the author subjected his animals; a few facts most intimately connected with their natural conditions of life may however be mentioned. The "necto-calyces" of *Craspedota* are paralysed by removing the margin, the umbellæ of *Acraspeda* partly, by removing the marginal sense-bodies (the lithocysts), which are the exclusive seats of spontaneity, so far as the primary movements are concerned. Water below 20° Fahr. suspends irritability and spontaneity, while a temperature above 70° permanently makes the rhythm slower, after having temporarily quickened it; after having been frozen solid, *Aurelia* will recover on being thawed. Oxygen accelerates the rhythm, while carbonic acid retards it and in strong doses destroys both spontaneity and irritability. Deficient aeration of the water will ultimately suspend spontaneity, but on restoring the animals to fresh sea-water their recovery is surprisingly sudden. Light acts as a powerful stimulus on *Sarsia*; but after removal of its marginal bodies it no longer responds to a luminous stimulant. Poisons act on the *Medusæ* in a manner strongly analogous to their actions in higher animals, with the exception that life is not destroyed till long after all signs of irritability are lost. The same is true of fresh water, which acts as a deadly poison, not however through the difference of density, as has been supposed; naked-eyed species usually cease their movements the instant they touch the fresh water, but the covered-eyed species are slightly more tolerant of its influence. *Sarsia* never survives a stay of fifteen minutes

in fresh water, but will recover entirely, more or less speedily, when restored to sea water after having been exposed 5–10 minutes to fresh water. Brine acts as an anæsthetic, &c.

Hydrozoa and Craspedote Medusæ.

Hydractinia arborescens, sp. n., Carter, Ann. N. H. (5) i. p. 298, pl. xvii. figs. 1–4, on shells, Polynesia?, Philippines? (also Palæontographica, xxv. 3, p. 109, pl. xii. figs. 1 & 2).

Oo[r]rhiza, g. n., Mereschkowsky [Zool. Rec. xiv., *Cal.* p. 15]. "Hydrorhiza a continuous layer, consisting of a mass of anastomosing tubes, covering the shells of Gastropods; from its surface rise spines and sexual and nutritive individuals; trophosome cylindrical, with a single whorl of filiform tentacles; the sporosacs rise directly from the hydrorhiza, without the intervention of blastostyles." *O. borealis*, sp. n., *id.* (17 A), p. 327, pl. xv. figs. 7–11, on shells of *Fusus* and *Buccinum*, White Sea, 10 fath.

Blastothela, g. n., Verrill (allied to *Myriothela* and *Acaulis*). "Body elongated, sessile, attached at base by slender, simple, root-like processes; a circle of slender tentacles near the base; above these are many stout, single processes (blastostyles), which bear the small sexual zooids (gonophores) on their sides; upper portion of body elongated, covered with small capitate tentacles." *B. rosea*, sp. n., *id.* Am. J. Sci. (3) xvi. p. 374, New England, 7–20 fath.

The craspedote *Medusæ* from Heligoland described and figured by Böhm (4) are: *Clytia johnstoni*, Ald., p. 167, pl. ii. figs. 1–9; *Campanulina acuminata*, Ald., p. 171, pl. ii. figs. 10–14; *Obelia geniculata*, L. ?, p. 174, pl. iii. figs. 1–34; *Tima pellucida*, Will., p. 181; *T. sp.*, p. 182, pl. iii. figs. 35 & 36; *Tiaropsis scotica*, Allm. ?, p. 183, pl. ii. figs. 15–30; *Lizzia octo-punctata*, Sars, p. 186, pls. iv. v. & vi. figs. 1–4; *L. blondina*, Forb., p. 168, pl. vi. fig. 5; *Bougainvillia ramosa*, van Ben., p. 189, pl. vi. fig. 6; *Syncoryne* (*Sarsia*) *eximia*, Allm., p. 191, pl. vi. figs. 7–26, pl. vii. figs. 1–6; *Tiara pileata*, Forsk., p. 194; *Hybocodon prolifer*, Ag., p. 195, pl. vii. figs. 7–9; *Ectopleura dumortieri*, p. 198, pl. vii. figs. 10–13. An elaborate synonymy is given in each instance.

(*Incertæ sedis.*) Claus (9) has examined the structure of *Tetrapteron* (*Tetraplatia*) *volitans*, a curious, minute, quadrilateral Cœlenterate organism, swimming about by means of four small lateral lobes, which are retractile into niches, and are provided with two otolithigerous sense-organs on their lower surface. Its organization proves it to belong to the hydrozoon rather than to the anthozoon type; though it has been hitherto observed only in the immature state, Claus is not inclined to regard it as a larval form. In certain respects, its arctitectonic suggests the *Charybdeidæ*. Observed at Messina.

Leptoscyphus grigoriewi, sp. n., Mereschkowsky (17 A), p. 239, pl. xiv. figs. 1 & 2, upon *Ascidiæ*, White Sea, 5 fath; medusa of *Obelia flabellata*, ibid. p. 253, pl. xiii. fig. 7.

Sertularia compressa, sp. n., *id.* (17 D), p. 446, pl. xvii. figs. 17–19, North Pacific.

Sertularella gigantea, sp. n., *id.* (= *S. polyzonias*, var. *gigantea*, Hincks), (17 A) p. 330, pl. xiv. figs. 6 & 7, White Sea, on *Balani*, *Flustra*, &c., 35 fath.; *S. albimaris*, sp. n., *id.* p. 331, pl. xiv. figs. 3–5, White Sea, 20 fath. (Hydrorhiza-formation analogous to that of *Hydractinia*); *clarkii*, sp. n., *id.* (17 D), p. 447, pl. xvii. figs. 20–22, Unalaska; *pinnata*, Clarke, *ibid.* p. 450, pl. xvii. fig. 23.

According to NORMAN (20) and MERESCHKOWSKY (17 A, pp. 333–336), *Polyserias hincksi*, M. [Zool. Rec. xiv. *Cœl.* p. 17] = *Diphasia mirabilis*, Verr.; Norman further identifies it with the genus *Selaginopsis*, Allm., the known species of which are *S. mirabilis* (Verr.), *S. fusca* (Johnst.), and *S. allmanni* (Norm.) (= *S. fusca*, Allm.); a fourth is *P. hincksi*, sp. n., Mereschkowsky (*glacialis*, M.), *l. c.* p. 337, pl. xv. figs. 1–4. In a later communication (17 D), are described: *Selaginopsis triserialis*, sp. n., *id.*, p. 435, pl. xvi. figs. 1 & 2, Kamtschatka; *pinnata*, sp. n., *id. ibid.* p. 436, pl. xvi. figs. 3 & 4, *pacifica*, sp. n., *id. ibid.* p. 438, pl. xvi. figs. 5–7, and *thuia*, sp. n., *id. ibid.* p. 439, pl. xvi. figs. 8–10, North Pacific; *ochotensis*, sp. n., *id. ibid.* p. 440, pl. xvi. figs. 11 & 12, Sea of Ochotsk; *decem-serialis*, sp. n., *id. ibid.* p. 442, pl. xvii. figs. 13–16, North Pacific. Mereschkowsky further refers to this genus *Thuiaria cylindrica*, Clarke, and *Pericladium bidentatum*, Allm., and gives a synoptical table of the known 11 species of the genus.

Ptychogastria, g. n., Allman. Umbella hemispherical, with lobed margin and filiform tentacles; lithocysts ?; velum broad; manubrium short and wide, carrying a wide mouth, with quadrangular lips; inner walls of manubrium thrown into eight longitudinal folds, along the free edge of which runs a thick convoluted gland-like chord; eight radiating canals; reproductive sacs oval, large, developed near the middle point of each radiating canal. *P. polaris*, sp. n., Allman (1), p. 290, with figures, Discovery Bay.

FOSSIL HYDROZOA, GRAPTOLITHIDÆ, AND STROMATOPORIDÆ.

CARTER, H. J. On new species of *Hydractinidæ*, recent and fossil, and on the identity in structure of *Millepora alcicornis*, with *Stromatopora*; Ann. N. H. (5) i. pp. 298–311. *Id.*, Large fossil hydrozoic coralla from the chalk; *ibid.* pp. 412–419. *Id.*, On *Stromatopora*; *op. cit.* ii. pp. 85 & 86. *Id.*, On the probable nature of the animal which produced the *Stromatoporidæ* traced through *Hydractinia*, *Millepora alcicornis*, and *Caunopora* to *Stromatopora*; ibid. pp. 304–324.

DAWSON, J. W. *Stromatopora* as distinguished from *Millepora*. Ann. N. H. (5) ii. pp. 28–30.

NICHOLSON, A. H., & MURIE, J. On the Minute Structure of *Stromatopora* and its Allies. J. L. S. xiv. pp. 187–245, pls. i.–iv.

New genera: *Clathrodictyon*, *Stylodictyon*, *Pachystroma*.

HAUPT, K. Die Fauna des Graptolithengesteins. Neues Lausitz. Mag. liv. 85 pp. 5 pls.

[Unknown to the Recorder.]

STEINMANN, G. Ueber fossile Hydrozoen aus der Familie der Coryniden. Palæontographica, xxv. pp. 101–124, pls. xii.–xiv.

New genera: *Sphæractinia*, *Thalaminia*, *Ellipsactinia*, *Porosphæra*, and *Cylindrohyphasma*.

The literature on *Stromatopora* is mentioned here, because CARTER in several papers defends its hydrocorallian nature and analogy with *Millepora*; while DAWSON upholds its belonging to the *Foraminifera*; and NICHOLSON & MURIE, from negative evidence, place it among *Calcispongiæ*, as a peculiar aspiculose type, "with a continuous skeleton composed of non-spicular granular calcareous matter." Their argument is chiefly based on the negative evidence that an alliance with Millepores, Foraminifers, Hexactinellid Sponges, *Polyzoa*, and Corals is impossible; as respects their hydrozoal connection, the authors express themselves with greater reticence, admitting the possibility that evidence of such affinity may still be adduced. In STEINMANN'S paper, *Stromatopora*, *Loftusia*, *Parkeria*, and *Labechia* are considered as *Hydrozoa*, with several new generic forms, named above.

SIPHONOPHORA.

STUDER (24) describes two new species of *Rhizophysa*, *conifera* and *inermis*, brought to the surface in the Atlantic and Indian Oceans by means of the sounding line, from depths probably between 800 and 2000 fath.; their histological anatomy is also worked out; in *R. conifera* the polypites are provided each with a tentacle, without any cnidophorous filament, in *R. inermis* this organ is wanting. An account is also given of a new genus and species, *Bathyphysa abyssorum*, which is, however, only incompletely known. Though good reasons are given for the abyssal character of these *Siphonophora*, it must be noted that so experienced an observer as A. Agassiz doubts its validity; Bull. Mus. C. Z. v. 14, pp. 290 & 291.

CLAUS (7) gives an exhaustive account of the microscopical structure of *Halistemma tergestinum*, with comparative observations on that of other *Siphonophora*. The polymorphic character of the order is also discussed. Among the more general results of this investigation, the following may be cited. The longitudinal muscular fibrils in the stem and in its different appendicular elements are all placed on the outside of the hyaline basement membrane and its radial lamelliform productions, and belong to the ectoderm; a delicate layer of circular fibrils is often developed on its inside, and belongs, in like manner, to the cells of the endoderm; it is a hitherto overlooked fact that the portion of the stem bearing the swimming bells is torn spirally into a direction opposite to that of the inferior portion, which carries the polypes, tentacles, gonophores, &c., probably in all *Siphonophora*; likewise, partly, the peculiar angular tabulation of the periphery of the sac-like dilatation of the axial stem in *Physophora*, and the histological details in relation with this differentiation of the basement membrane, its muscular annexes, &c. It is further shown that the locomotive bells are developed in the same manner as other medusoid bodies, the radial vessels (for instance) being formed

as residua of the original cavity, when the rest is filled up by the inward growth of the ectoderm, pushing before it the hyaline membrane and the endoderm—a fact which, in certain senses, modifies the morphological conception of the homology between "polype" and "medusa." The development of the air-sac is analogous; that of the protecting scales, however, is different, without invagination, &c. That the gonophores are never placed directly on the stem, always on the so-termed tentacles [blastostyles], is also a rather important observation.

Physophora borealis, Sars, Fauna littor. Norv. iii., is identical with *P. hydrostatica*, of the Mediterranean; under *Agalmopsis elegans*, Sars (*op. cit.* i.), two forms are confounded: *Halistemma elegans*, Sars, and *Agalmopsis sarsi*, Köll. (Claus, *l. c.*).

Hydrocorallia.

Moseley's brilliant discoveries in the natural history of the *Stylasteridæ* are now published in an elaborate monograph (19) discussing the anatomy of the species examined in every histological detail, and giving a full account of the generic characters. As these cannot be given here fully, the author's "tabular synopsis" is reproduced, with addition of the genera added in the postscript and indication of the number of known species, of the new ones here (or elsewhere) now first described, and the fossil species referred to each genus.

Hydrocorallinæ; Hydroids forming a corallum with two kinds of zooids, gastrozooids (with mouth) and dactylozooids (without mouth).

(A.) Milleporidæ: Dactylozooids, with numerous tentacles; ampullæ absent (reproduction unknown).

1. *Millepora*.

(B.) Stylasteridæ: Dactylozooids devoid of tentacles and tentacle-shaped; gonangia contained "in ampullæ."

(a.) Pores sporadic, not in cyclo-systems; gastropores [pores of gastrozooids] with styles [*columellæ*]; dactylopores [pores of dactylozooids] without them.

(*a*.) Dactylopores of one kind only.

2. *Sporadopora*, g. n., Moseley (*Polypora*, Mos., *olim.*): Pores of both kinds simple; gastro-zooids with 4 tentacles. *S. dichotoma* (Mos.) (*Polypora*, olim.), p. 429, pl. xxxiv. figs. 3 & 4, pl. xxxvi., off La Plata, 600 fath.
3. *Pliobothrus*, Pourt.: Dactylopores at the tips of tubular projections; gastrozooids without tentacles. Two species known. *P. symmetricus*, Pourt., p. 440, pl. xli. figs. 2 & 3.
4. *Errina*, Gr.: Gastropores sometimes covered with a projecting scale; dactylopores within nariform projections; gastrozooids with 4 tentacles. Seven species known, including the *Lepidoporæ* of Pourtales. *E. labiata*, sp. n., Moseley, p. 443, pl. xxxiv. fig. 6 pl. xxxvii. With *Sporadopora dichotoma*, &c.
5. *Distichopora*, Lmck.: Pores simple, in a triple linear row at the lateral edges of the branches of the flabellum, rarely on its faces, gastrozooids with 4 tentacles. Nine living species and one fossil

(tertiary). *D. contorta*, sp. n., Pourtales, Bull. Mus. C. Z. v. 9, p. 210, pl. i. fig. 9, off Havana, 175 fath.

(*b.*) Dactylopores of two kinds, larger and smaller.

6. *Labiopora*, g. n., Moseley: Larger dactylopores within nariform projections arranged in regular rows; smaller dactylopores at the sides of these (soft parts unknown). *L. antarctica* (Gr.) (described as a Bryozoon, *Porella*, allied to *P. cercicornis*), pl. ii. fig. 5.

7. *Spinopora*, g. n., Moseley [*Acanthopora* previously]: Larger dactylopores within long spinelike projections; smaller dactylopores in simple cavities at their bases; gastrozooids with 6 tentacles. *S. echinata*, sp. n., *id.* p. 447, pls. xxxiv. fig. 2, xxxv. fig. 4, & xxxviii.; with *Sporadopora*, *Errina labiata*, &c.

(*b.*) Pores occurring in regular cyclosystems only.

(*c.*) Both kind of pores with styles.

8. *Allopora*: Cyclosystems budding from one another somewhat irregularly; gastrozooids with 12 tentacles. Ten species and two fossil (tertiary described as species of *Madracis*). *A. profunda*, sp. n., Moseley, p. 455, pl. xxxiv. fig. 7, & pl. xxxix. With *Sporadopora*, &c.

9. *Stylaster*, Gr.: Corallum increasing by regular alternate gemmation of the cyclosystems from one another: gastrozooids with 8 tentacles. Twenty species known [when the new species of Studer (Zool. Rec. xiv. *Col.* p. 14) are added to those enumerated by Moseley]. *S. densicaulis*, sp. n., Moseley, p. 449, pl. xxxiv. fig. 5, xl. With *Sporadopora*, &c.

10. *Stenohelia*, Kent. Branching flabelliform; dactylopores without a columella, or with a very rudimentary one. Two species known. *S. profunda*, sp. n., Moseley, p. 503, 450 fath., off St. Thomas (no description) (*S. complanata*, Kent, is referred to *Stylaster*).

(*d.*) Styles absent in both kinds of pores; gastropores with two chambers; gastrozooids without tentacles.

11. *Cryptohelia*, Edw. & Haime: Summits of cyclosystems covered by a lid (= *Endohelia*, E. & H.?). *C. pudica*, p. 462, pl. xlii. Three species known [when *C. virginis*, Lindstr., Zool. Rec. xiv. *l. c.* is added].

12. *Astylus*, g. n., Moseley: Cyclosystems without a lid. *A. subviridis*, sp. n., *id.* p. 457, pls. xxxiv. fig. 4, & xli. fig. 1, off Meangis Island, 500 fath.

13. *Conopora*, g. n., *id.* (= *Cyclopora*, Verr.?): Differs from the two preceding genera in having no lid or tongue-like process, and in not forming a regular flabellum. *C. tenuis*, sp. n., *id.*, p. 503, off Kermadec Island, 650 fath. *Cyclopora bella* (Dana) perhaps also belongs to this genus.

Certain fossil species described as *Thalamipora* (*Foraminifera*) and *Heteroporella* (*Bryozoa*) also possibly belong to the *Stylasteridæ*. As the chief points in the anatomy of the *Stylasteridæ* have been briefly alluded to,

after Moseley's researches, in Zool. Rec. xiv. *Cœl.* p. 10, it is only necessary here to add that the detailed investigation has only revealed points of structure closely analogous to those of *Millepora* and of *Hydrozoa* generally. The calcareous substance of the "hydrocorallum" fills up the interstices of and is secreted by a dense anastomosing network of branching cœnosarcal tubes, radiating from and communicating with the bases of the zooids; only in the older parts of the corallum the tubular system may be abortive and obliterated by the deposition of calcareous matter. Like others of the soft parts, the cœnosarcal tubes are formed by an endodermal and ectodermal layer, and a separating basement membrane. The pigment-cells, to which the special colour of the coral is due, belong to the endoderm; the nematocysts, which are especially abundant on the dactylozooids and on the tentacles (if present) of the gastrozooids, or collected in groups or "nematophores" on the surface of the corallum or its projections, belong to the ectoderm; those peculiar modifications of the endoderm, the gastric cells, are only found in the gastral cavities of the "gastrozooids." Both sets of zooids are placed deeply in cavities with more or less narrow orifices. Muscles are found outside the basement membrane (in the ectoderm, accordingly) in the basal portion of the zooids, and continued down into the adjoining part of the cœnosarcal tubes. The number 4 recurs in the cruciform mouth of many gastrozooids, and in the number of main tubes radiating from the periphery of the base of the zooids; the flabellate type of growth through budding, so common in *Sertulariidæ*, &c., is also evident enough in many *Stylasteridæ*. The gonangia are placed in closed cavities (ampullæ), more or less profoundly, or in some instances prominently; the gonophores are single, or few in number, in each gonangium; the male gonophores contain a spadix and a sac with spermatozoa or spermoblasts; the female a spadix and a single ovum. Sometimes the planulæ or spermatozoa are set free through slits in the wall of the ampullæ; in other instances, probably, through its reabsorption. A special chapter is devoted to the genealogy; of the known genera, *Sporadopora* is the most primitive, the nearest approximation to *Millepora*, &c.

CTENOPHORA.

1. Buekers, P. G. Bijdragen tot de Kennis der Anatomie van *Cestum veneris*, Les.; 66 pp. 1 pl. (Inaugural Dissertation).

2. Chun, C. Die Greifzellen der Rippenquallen. Zool. Anz. i. pp. 50–52.

3. ——. Das Nervensystem und die Musculatur den Rippenquallen. Abh. senck. Ges. xi. pp. 181–230, pls. i. & ii.

4. ——. Die im Golf von Neapel erscheinenden Rippenquallen. MT. z. Stat. Neap. i. pp. 180–218, pl. vi.

Chun (4) distributes the *Ctenophora* in the following manner:—

(A.) *Tentaculata.*

1. Two long tentacles, simple or provided with lateral filaments. All

vessels with blind terminations. *Cydippidæ* (*Pleurobrachiidæ*, *Mertensiidæ*).

2. Clusters of numerous filaments, placed on each side in a furrow running alongside the oral orifice and provided with a suspension apparatus, consisting of cilia; primary tentacula present or wanting; vessels communicating with each other. The juvenile stages are *Cydippæ*.

A. Two oral lobes. *Lobatæ* (*Lesueria*, *Eurrhamphæa*, *Bolina*, *Eucharis*, &c.).

B. Body band-shaped. *Cestidæ*.

(B.) *Nuda*.

Without tentacles; vessels ramified in all directions. *Beroidæ*.

Seventeen species were observed in the Bay of Naples; six are new, viz., *Pleurobrachia rhodopis*, *Euplocamis* (g. n.) *stationis*, *Lampetia* (g. n.) *pancerina* (*Pancerina singularis*, id. [3]) (pl. vi. fig. 4), *Charistephane* (g. n.) *fugiens*, *Bolina hydatina*, *Thoe* (g. n.) *paradoxa*, *Deiopea* (g. n.) *kaloktenota* (pl. vi. figs. 1–3). Of these, however, *Thoe* is probably a larval form of *Lampetia* or *Pleurobrachia*. Short notes on synonymy, evolution, &c., are added under the heads of the different species. The observation is recorded that *Ctenophora* (and *Medusæ*) during the warmest season sink to the bottom and do not appear on the surface, either by day or night. In the young *Cydippe*-shaped *Cestum*, the short axis of the body is that which afterwards is extraordinarily prolonged. Many species and genera of *Ctenophora* are only based upon slight variations or upon juvenile or mutilated specimens. Probably almost all the described species of *Beroe* (*Idya*) ought to be reduced to the two cosmopolitan species, also existing in the Mediterranean, viz., *B. ovata* and *forskali*. In this genus the tentacula, which in others act as prehensile organs, as means of catching the prey, are wanting, but the animal darts rapidly through the water and swallows a prey, for instance a *Eucharis*, of superior size [3]. *Lampetia* is capable of creeping, by the aid of its dilated mouth, along the surface of the water or the walls of the aquarium. The juvenile *Cydippe*-shaped stage of *Eucharis multicornis* may be found sexually mature, though that is not the case with any of the intermediate stages leading to the adult sexually-mature *Eucharis*. [The suggestion that two similar forms, a true *Cydippe* and the larval *Eucharis*, might here have been confounded, is not supported by the details adduced.] In *Eucharis*, the tentacles of the Cydippoid larval form are entirely reabsorbed to give place for a totally new formation of the tentacular apparatus characteristic of the adult form. Certain *Ctenophora* (*Eucharis*, for instance) attain a considerable size, such as the height of a metre. Just as CHUN's shorter paper (4) may be regarded as a prodromus for a Ctenophorian fauna of the Mediterranean, his larger one (3) is the anatomico-physiological forerunner of an elaborate monograph, of which certain chapters are here published in anticipation. The results of his researches are much at variance with those of others, especially of Eimer. In *Beroe*, *Cydippe*, and the Cydippoid larvæ of *Eucharis* and *Cestum*, locomotion is exclusively performed by the combs of the ribs; in the "*lobatæ*" it is

furthered by the flapping of the body-lobes; in *Cestum*, it is chiefly, if not entirely, due to the strong muscles developed superficially in a direction parallel to that of the longitudinal diameter of the body. The central portion of the nervous system is the sense-body at the ab-oral pole; its radial portions eight bands of modified ectodermal cells, which are continued into the ciliated furrows and the cells supporting the combs (coalesced cilia) of the ribs; the nervous elements themselves forming, in this manner, the chief locomotory organs [!]. The auditory organ, a group of lithocysts, constantly growing through addition of new material, is suspended on four springs, continuations of the ciliary rows; it regulates the locomotory play of the combs. With the auditory organ, two or four eye-specks are probably at least sometimes associated, as in acraspedote *Medusæ*. On the other hand, the nervous elements of Eimer are utterly rejected as such; they belong to the connective tissue or are immigrated, ramified, muscular cells, to which the soft, jelly-like body owes its contractility and elasticity. The ordinary character of the muscles in *Ctenophora* is therefore very different from that of the true *Medusæ*, when a stronger muscular force is not needed, as in *Cestum*. This genus is also endowed with a peculiar play of colours, taking, when irritated, an intense blue colour, which resides in peculiar cells of the ectoderm, that in the state of repose are yellowish; this faculty of changing colour is diminished by repeated irritation in the same manner as the faculty of phosphorescence. The observation is also important, that the *Ctenophora* are—with a single doubtful exception—not cnidophorous; the so-termed "lasso cells" are organs *sui generis*, "prehensile cells," (2) not cnidæ.

Buekers has studied the integument, the gastro-vascular apparatus, and the general histology of *Cestum* (1). He also rejects Eimer's interpretation of the fibrillar and cellular elements of the jelly, which are regarded only as elements of connective tissue, and distinguished rather sharply from the muscular. The fibrillar and ganglionic elements observed below the ribs and below the dorsal groups of sense-cells—apparently not observed by Chun—are perhaps (rather than a part of those described as such by the last-named observer) the true nervous elements. The ab-oral orifices of the funnel vessels serve, according to the hypothesis of the author, to furnish the water necessary for the erection of the tentacles, and—by admitting water or giving exit to a part of the gastro-vascular fluid—to enable the animal to rise or sink in the water, but in a reverse manner to Eimer's interpretation. Buekers also was unable to detect urticating cells.

SPONGIIDA.

BY

STUART O. RIDLEY, B.A., F.L.S.

CHIEF PAPERS ON RECENT SPONGES.

1. CARTER, H. J. Position of the Sponge-spicule in the *Spongida*, and postscript on the identity of *Squamulina scopula* with the Sponges. Ann. N. H. (5) i. p. 170.

2. ——. On *Teichonia*, a New Family of Calcareous Sponges, with Descriptions of two species. *Op. cit.* ii. p. 35, pl. ii.

3. ——. Parasites of the *Spongida*. Tom. cit. p. 157.

4. COUES, E., & YARROW, H. C. In 'Notes on the Natural History of Fort Macon, N.C., and vicinity.' P. Ac. Philad. 1878, p. 297.

5. CZERNIAVSKY, V. Littoral Sponges of the Black and Caspian Seas: an introductory investigation [in Russian]. Bull. Mosc. liii. p. 375, pls. v.–viii.

Enumerates the species, giving names and sometimes figures of new species, with general remarks (*vide* infrà).

6. DAWSON, G. M. On some Canadian Species of *Spongilla*. Canad. Nat. (n.s.) viii. p. 1, plate.

7. DYBOWSKY, W. Mittheilungen über Spongien. I., II. Zool. Anz. i. pp. 30 & 53.

8. GANIN, M. Zur Entwickelung der *Spongilla fluviatilis*. Zool. Anz. i. p. 195.

9. KELLER, C. Ueber den Bau von *Reniera semitubulosa*, O. S. Ein Beitrag zur Anatomie der Kieselschwämme. Z. wiss. Zool. xxx. pp. 563–586, pls. xxxvi. & xxxvii.

10. KENT, W. S. A New Field for the Microscope. Pop. Sci. Rev. (n.s.) ii. p. 113, pls. iii. & iv.

11. ——. Notes on the Embryology of Sponges. Ann. N. H. (5) ii. p. 139, pls. vi. & vii.

12. MARENZELLER, E. VON. Die Cœlenteraten, Echinodermen, und

Würmer der k. k. Oesterreichisch-ungarischen Nordpol-Expedition. Denk. Ak. Wien, xxxv. p. 357, pls. i.–iv.

13. Mereschkowsky, C. On *Wagnerella*, a New Genus of Sponge, nearly allied to the *Physemaria* of Ernst Häckel. Ann. N. H. (5) i. p. 70, pl. v.; and (fuller account) Mém. Pétersb. (7) xxvi. No. 7, p. 15, pl. ii. figs. 1–5 [the pages refer to Ann. N. H. where not otherwise stated].

14. ——. Études sur les Éponges de la Mer Blanche. Mém. Pétersb. (7) xxvi. No. 7, p. 1, pls. i.–iii. (A preliminary report appeared in Russian, published separately.)

15. Norman, A. M. On the Genus *Haliphysema*, with description of several forms apparently allied to it. Ann. N. H. (5) ii. p. 264, pl. xvi. (note correcting the numbers of the figures, p. 425).

16. Schultze, F. E. Untersuchungen über den Bau und die Entwicklung der Spongien. Vierte Mittheilung. Die Familie der *Aplysinidæ*. Z. wiss. Zool. xxx. pp. 379–420, pls. xxi.–xxiv.

17. ——. Untersuchungen, etc. Fünfte Mittheilung. Die Metamorphose von *Sycandra raphanus*. Op. cit. xxxi. p. 261, pls. xviii. & xix.

18. ——. Untersuchungen, etc. Sechste Mittheilung. Die Gattung *Spongelia*. Op. cit. xxxii. p. 117, pls. v.–viii.

19. Sollas, W. J. On Two New and Remarkable Species of *Cliona*. Ann. N. H. (5) i. p. 54, pls. i. & ii.

20. Thomson, C. W. Voyage of the 'Challenger.' The Atlantic. London: 1877, 2 vols., plates and woodcuts.

21. Waller, J. G. On variation in *Spongilla fluviatilis*. J. Quek. Club, No. 37, p. 53, pl. v.

The following has not been seen by the Recorder :—

E. Metschnikoff, Untersuchungen über Spongien ; Mém. Soc. Nouv. Russ. iv. [in Russian]. *Cf.* JB. Anat. Physiol. vii. ii.

Studer, in SB. nat. Fr. 1878, p. 135 *et seq.*, mentions the dredging of *Renieridæ*, *Suberitidinæ*, *Lithistidæ*, in 115–150 fathoms off the W. coast of Africa, by the 'Gazelle.'

Note.—The name of the author of paper (6) of *Spongiida* in Zool. Rec. xiv. 1877, should have been Grimm, not Gremma.

Classification.

O. Bütschli, in note, Z. wiss. Zool. xxx. p. 221, regards the Sponges, on the ground of the latest embryological results, as clearly and widely distinct from the *Cœlenterata*, and to be placed beside them as an independent group of equal value.

H. A. Nicholson ('Ancient Life History of the Earth.' Edinburgh and London : 1877) makes the *Spongiida* an order of *Protozoa*.

L. K. Schmarda (in his "Zoologie," 2nd edn., vol. i., Wien: 1877) classifies Sponges mainly on the same outlines as in his first edition, his system being still chiefly an admixture of Gray's with Schmidt's earlier classifications. He now unites the Fam. *Dysideida* with the Fam. *Spongiida*, and revives Schultze's term *Lophospongiæ* for a family of *Hexactinellida*, to include *Hyalonema* and *Asconema*. He keeps the Sponges with the *Protozoa*, as a fifth class.

G. C. Wallich, Pop. Sci. Rev. (n. s.) ii. pp. 374-378, derives Sponges from the *Dictyochidæ*, of division *Protodermata* of *Protozoa*.

R. R. Wright, Canad. J. Sci. (n. s.) xv. p. 417, considers the Sponges as *Metazoa*, though they have diverged at an early period from the rest of the group. They are most nearly allied to the *Cœlenterata* by their canal system, characters of histological and reproductive elements, and position of the latter in the body.

A. K. Zittel (Zur Stammesgeschichte der Spongien. Festschrift, etc. Cited from JB. Anat. Phys. vii. ii., & JB. f. Mineral. 1878, p. 885) divides the group as follows:—

Order 1. *Myxospongiæ*.
2. *Ceraospongiæ*.
3. *Monactinellidæ*.
4. *Tetractinellidæ*.
5. *Lithistidæ*.
6. *Hexactinellidæ*.
7. *Calcispongiæ*.

Lithistids and Hexactinellids are distinct in Silurian rocks, and all the chief groups which can be fossilized are there represented. *Aulocopium* is the ancestral form of the *Lithistidæ*. It is improbable that the *Ascones* are the ancestral forms of all Sponges; they are not known as fossils. Tables showing distribution of the groups in recent and past time are given in JB. f. Mineral. 1878, pp. 886 & 887.

C. von Hayek (Handbuch der Zoologie, i. Wien: 1877) places Sponges under *Protozoa*, as Class IV. See *Protozoa*.

M. Ganin (8), p. 199, regards the Sponges as a distinct group of the *Cœlenterata*.

W. Saville Kent, Ann. N. H. (5) i. p. 1, considers the Sponges as forming, with the collar-bearing Monads, a distinct group (*Discostomata*) of *Protozoa*, among which *Haliphysema* must be placed. They should be divided into *Polytremata* (ordinary Sponges) and *Monotremata* (the *Physemaria*).

Faunæ.

Czerniavsky's paper (5) gives 44 species, including 21 new, for the Black and Caspian Seas; the new are in some cases figured, often only mentioned by name. Numerous varieties and "formæ" are given, together with the localities, finders' names, and depths in metres, in tabulated form, at p. 392. For details, *vide infrà*, under the different Orders.

Holorrhaphidota of Siberia and the Caspian enumerated; (7) pp. 30, 53 & 54.

The Fauna of the White Sea includes (14), besides other Sponges mentioned or described below, *Suberites*, *Myxilla*, *Esperia*, *Reniera*, *Amorphina*, *Scopalina*, *Spongilla*, *Ascetta*, *Ascortis*, *Ascandra*.

Distribution of Sponges in Atlantic; (20) ii. pp. 332–338, 343.

Table showing occurrence of Sponges, among other animals, at depths of more than 2000 fathoms, *i.e.*, at 52 stations, during the 'Challenger' voyage; (20) ii. p. 382.

H. LENZ in Anhang i. zum Jahresbericht der Commission zur wissenschaftlichen Untersuchung der Deutschen Meere in Kiel, iv.–vi. (Berlin: 1878), mentions *Halisarca dujardini*, *Pellina bibula*, and *Chalinula ovulum*, as identified from the Travemünde Bay, Baltic.

GENERA, SPECIES, &c., REFERRED TO.

CARNOSA (Carter).

Halisarca dujardini (Johnston) and *lobularis* (Schmidt), cited for the fauna of the Black and Caspian Seas (5).

Halisarca lobularis (11), pl. vi. figs. 19 & 20, pl. vii. figs. 1–8. Development and cells figured; its ciliated chamber is produced by fission from a single amœboid cell.

CERATINA and PSAMMONEMATA (Carter).

Aplysinidæ (10) taken to include *Aplysina*, *Verongia*, *Dendrospongia*, *Darwinella*, *Janthella*.

Aplysina aerophoba, Nardo, (18) p. 386, pls. xxi. & xxii. Minutely described. Agrees with *Chondrosia* and *Chondrilla* in arrangement of its canal system. Possesses numbers of pigment masses in mesoderm, which are the colouring agents in the Sponge. Skeleton fibres more or less round, their central substance traversed by radiating fibrils.

Aplysina carnosa, Schmidt, (15) p. 404.

Darwinellidæ, new family, (14) p. 44, to include *Aplysilla* and *Darwinella*, as possessing a skeleton of mutually distinct fibres.

Euspongia (18), development as in *Spongelia pallescens*.

Spongelia. F. E. SCHULZE (18) describes, with diagnoses, the following species and varieties, which are all connected by transition forms:—

Spongelia avara, Schmidt: minute description of structure; pl. v. fig. 1, pl. vi. figs. 1, 4, pl. vii. fig. 7, pl. viii. figs. 1–3, 5–7, 13 & 14. The connective tissue surrounding the ciliated chambers consists of a hyaline substance, and distinguishes *Spongelia* from the other *Ceraospongiæ*. In the cavities of this tissue, ova were observed.

Spongelia fistularis, *S. perforata*, *S. nitella*, Sdt., and probably also *S. putrescens*, Nardo, = *S. pallescens*, Sdt., pls. v. vi. vii. & viii. figs. The soft structures and reproductions agree with those of *S. avara*. Dicœcious.

Subspecies of *Spongelia pallescens*: i., *fragilis*, p. 149, pl. v. figs. 2 & 3, with form-varieties *incrustans*, *tubulosa*, *ramosa*, is probably Lieberkühn's "horny sponge, No. 3"; ii., *elastica*, p. 150, pl. v. fig. 1, &c., with var. *massa* = *S. nitella*, Sdt., and with var. *ramosa* = *S. fistularis* and *perforata*, Sdt.

Spongelia elegans, Nardo, (18) p. 151, Naples and Venice.

Spongelia cactos, Selenka, (16) referred to *Aplysilla*, F. E. Sch., g. n.

Spongelia elegans, Nardo, *pallescens*, Schmidt, (5) a "*forma*" *pontica* mentioned for each.

Filifera, Lieberkühn. O. Schmidt remarks, Z. wiss. Zool. xxx. p. 661, that the fibrils have been isolated, and are independent of the large skeleton fibres; nature still uncertain.

Hircinia campana, Nardo; *Spongia vermiculata*, var. *vermiculatiformis*, Hyatt; *Spongia dubia*, var. *foraminosa*, Hy.; *Spongelia spinosa*, Hy.; *Dysidea fragilis*, Johnston ?, from North Carolina: (4) p. 313.

Rhaphidonemata (Carter).

Chalina arbuscula, Verrill, (4) p. 314, from North Carolina.

Cacochalina digitata, Schmidt, (5) a var. *pontica*, fig. 16, p. 395.

Pachychalina compressa, O. Schmidt, = *Veluspa polymorpha*, Miklucho-Maclay, White Sea (14).

Echinonemata (Carter).

Microciona bihamigera, Waller, J. Quek. Club, No. 36, p. 1, pls. i. & ii. described as new [*cf.* Zool. Rec. for 1877].

Microciona prolifera, Verrill, (4) p. 312, from North Carolina.

Microciona ambigua, Bowerbank, (12) p. 370, pl. i. fig. 3, pl. ii. fig. 3, the anchorate spicula are tri- and not bi-dentate.

Holorrhaphidota (Carter).

Varieties or "*formæ*" are mentioned, (5) pp. 392–397, and in some cases figured [*vide infrà*] of the following Sponges from this fauna:—*Amorphina grossa*, Schmidt; *Reniera flava*, Grimm; *Pellina semitubulosa*, Schmidt; *Reniera alba*, *aquæ-ductus*, *informis*, Schmidt, *palmata*, Ell. & Solander; *Esperia contarenii*, Martens, *foraminosa*, Schmidt, *Cliona typica*, Nardo.

Reniera, Schmidt and auctt. divided, (7) p. 53, with two subgenera: 1, with smooth spindle or staff-shaped spicula, united merely at their ends, e.g., *R. alba*, *cratera*; 2, with the spicula arranged in a rectangular network, and wholly covered by sarcode, *R. fortior* and unnamed sp. n.

Reniera palmata, (5) forma *transitans*, with varr. *taurica*, *dioscurica*, *horrhippiana*, figs. 2, 1, 3, 4.

Reniera informis, Schmidt, var. *taurica*, (5) fig. 5.

Reniera flava, Grimm, = *Protoschmidtia grimmi*, Czerniavsky (5), p. 343.

Reniera flava, (7) p. 54, = *Metschnikowia*.

Reniera semitubulosa, Sdt., (9) p. 565, pls. xxxvi. & xxxvii. fig. 1. A meshwork of lines covers the dermal surface and cavities on treatment with silver nitrate. Has but two body layers, the skeletogenous tissue representing the exoderm of Calcisponges. A spicule-sheath present. *R. aquæ-ductus*, Kölliker, = this species.

Reniera, sp. (7) described without name from Black Sea.

Metschnikowia, (7) p. 54, recharacterized.

Metschnikowia intermedia, Grimm, (5) shows important affinities with *Spongilla erinaceus*, Ehrenberg; the *Metschnikowinæ*, new family, are thus shown to be related to the Spongillas of Europe and India, p. 387.

Isodictya mirabilis, Bowerbank, (3) p. 159, = *Thalysias subtriangularis*, Duch. & Michellotti.

Cladorrhiza abyssicola, Sars (12) p. 371, off Novaia Zemlia.

Cliona celata, Grant, (19) shows a variety with filiform acerates, instead of the short spined flesh spicules; = var. *linearis*, Sollas, p. 65, woodcut.

Cliona sulphurea, Verrill, (4) p. 312, from North Carolina. Also observed burrowing in and breaking up Italian marble, Long Island; A. E. Verrill, Am. J. Sci. (3) xvi. p. 406.

Suberites glasenapii, (14) p. 14. Contraction of oscula effected only by touching them or exposing to the air.

Rinalda, O. Schmidt, (14) p. 8. Cortical fibres not muscular.

Stylocordyla longissima, Sars (12). *Polymastia stipitata*, Carter, is probably this species. *Thecophora semisuberites*, Schmidt; *Rinalda uberrima*, Schmidt, pl. ii. fig. 1, described, *Halicnemia* (*Trichostemma*) *hemisphærica*, Sars, all off Novaia Zemlia, (12) pp. 365–371.

The spinular spicules of *Rhaphidotheca marshall-halli*, Kent, (1) whose heads lie outwards, probably were taken from a variety of *Cliona abyssorum*, Carter.

The name *Tethea muricata*, Bowerbank, has priority over all other names for the sponge, which has its closest affinities with *Stelletta*, Schmidt; *Normania crassa*, Bowk., and *Hymeniacidon placentula*, Bowk., are sessile varieties of the same sponge; H. J. Carter, Ann. N. H. (5) ii. p. 174.

Wyvillethomsonia wallichi, (15) p. 283, note; a true Corticate Sponge.

Zittel (23, vide *Fossil Sponges*) gives full characters of all species of *Lithistidæ*, with tables of distribution, &c., of the recent species; also *Corallistes*, Schmidt, pp. 103 & 120, is emended. *C. polydiscus*, Sdt., = *Rhacodiscula asteroides*, Carter; *C. borealis*, Carter, = *Azorica*. *Dactylocalyx*, p. 103; *D. masoni*, Bowerbank, = *Corallistes*; *D. heteroformis*, Bowk., = *Heterophymia*; *D. pratti*, Bowk., = *Theonella*; *D. polydiscus*, Bowk., = *Discodermia*. *Corallistes noli-tangere*, Sdt., *micro-tuberculatus*, Sdt., *Arabescula parasitica*, Cart., *Azorica pfeifferæ*, Cart., *Liodermatium lynceus*, Sdt., *Theonella ferruginea*, Hæckel, *pratti*, Bowerbank, *Kaliapsis cidaris*, Bowk., *Discodermia polydiscus*, Bocage, *Lyidium torquilla*, Sdt., pp. 120–122, 132, 151 & 152, pl. i.

Canal system of *Lithistidæ* shows six modifications; the uni-axial surface-spicules in Lithistids are probably immature quadri-radiates; *id. l. c.* p. 67.

Spongilla. Small specimens on Caddis-tubes were found almost always to contain follicles of spermatozoa, or mother-cells, in May and June. C. Keller, Zool. Anz. i. p. 314.

Spongilla lacustris, (14) p. 43, varies from yellow to green. Contains starch-cells, (9) p. 574, pl. xxxvi. fig. 2.

Spongilla lacustris and *S. fluviatilis* taken in the Saima, in Finland; *S. muelleri*, also in Finland. A. H. Brotherus, in Medd. Soc. Fenn. iii. pp. 168 & 174.

Spongilla lacustris, *muelleri*, *Ephydatia fluviatilis*, (7) p. 53, = *Trachyspongilla*, g. n.

Spongilla fluviatilis, (21) p. 53. Bowerbank's diagnosis in Monograph of British Spongiadæ revised. Varieties from the Thames at various localities are adduced as showing a spiculated dermis, mixture of spined with non-spined skeleton spicules (figured), and almost entire super-

sedence of the smooth by the spined spicules. Therefore *Spongilla parfitti* and *meyeni*, Bk., are shown to be merely varieties of *S. fluviatilis* (and here named *S. fluviatilis* var. *spinosa*, or *spinifera*). Varieties in the size of the birotulates are also pointed out and figured.

"Gemmule" resembling that of marine *Silicea* found in specimen from pond in Essex, (21) pl. v. fig. 7.

Spongilla baileyi, Bowerbank, (6) p. 4, from Lake of the Woods.

Spongilla coralloides, Bowerbank, P. Liverp. Soc. xxxii. p. 56. Specimen from Uruguay River, deep water, described by T. Higgins: perhaps it is descended from a marine form.

Haliphysema echinoides, Häckel, (1) p. 173: its extraneous spicule tufts not comparable with the anchoring spicules truly secreted by *Wyville-thomsonia wallichi*.

Haliphysema tubulatum, Bowerbank, (15) p. 266, is no *Haliphysema*, but referred to *Aulospongus*, g.n.

Haliphysema tumanowiczi from the Dee; J. D. Siddall, P. Chester Soc. No. 2, p. 47. According to W. S. Kent, Ann. N. H. (5) i. p. 71, pls. iv. & v., it shows anastomosing fibres between the spicules, with nuclear and vacuolar bodies in the granular circulating protoplasm; prehension and digestion observed. Varieties figured, also apparently young forms. Its Foraminiferal nature is considered proved. E. Parfitt, *op. cit.* (5), iii. p. 88, thinks that perhaps its structure is for movement of the pedicel. Pores described.

Haliphysema tumanowiczi, Bk., (15) p. 274, = *H. primordiale*, Häck., = *Gastrophysema dithalamium*, Häck., = *G. scopula*, Häck. *H. ramulosum*, Bk., *l. c.* p. 275, distinct from preceding species. *H. echinoides*, Häck., *l. c.* p. 276, has a merely isomorphic resemblance to *Wyvillethomsonii wallichi*, Wright, = *Tisiphonia agariciformis*, Thomson. *H. globigerina*, Häck., *l. c.* p. 278.

Haliphysema echinoides, (13) p. 76, = *Wyvillethomsonia wallichi*, = *Dorvillia agariciformis*.

Haliphysema confertum, Norman (15), p. 279, pl. xvi. figs. 1 & 2.

Squamulina scapula, Carter, (15) pp. 269–282, is not polythalamous at its base, and is no *Squamulina*, and should be *Haliphysema tumanowiczii*, Bk., and referred back to Sponges as forming part of the new order PSAMMOTEICHINA, between *Ceratina* and *Psammonemata*, Carter.

Gastrophysema, Häckel (15), p. 273, only a much developed *Haliphysema*.

Gastrophysema primordiale. The so-called gland cells are only encysted Monads; W. S. Kent, Pop. Sci. Rev. (n. s.) ii. p. 127.

HEXACTINELLIDA.

Euplectella aspergillum, Owen, fig. 160, and *Hyalonema sieboldi*, Gray, fig. 160, figured by L. K. Schmarda, Zoologie, 2nd ed. i. (Wien: 1877).

Euplectella aspergillum, Owen, (20) i. fig. 28.

Hyalonema mirabile, a popular account of the history, &c., of; T. C. Maggs, Rep. & Tr. Plym. Inst. ii. p. 21, and Rep. Dorset. N. H. Club, ii. p. 21, where it and *Euplectella aspergillum* are figured.

Poliopogon amadou, Thomson, and *Hyalonema toxeres*, id., *Leporella* (? *Lefroyella*), fragments of, *Euplectella*, sp., dredged between Tortugas

and East side of Yucatan Bank (p. 4) ; of the two latter, the one also off Cuba, the other off Bahia Honda : A. Agassiz, in Bull. Mus. C. Z. v. p. 1.

CALCAREA.

Teichonellidæ, Carter, (2) new family to include *Teichonella*, g. n., characterized by vallate arrangement of body.

Grantia compressa, (11), pl. vi. figs. 1–13, 15, & 18. Development figured.

Grantia compressa, (10), pl. iii. figs. 29–31 ; shows pseudopodia and Acinetoid stage. *Sycon ciliatum*, id., pl. iii. figs. 27 & 28, free gemmule showing exterior collar cells.

Leucosolenia botryoides, (10), pl. iii. fig. 34, shows "sporocyst" and free spores.

Leucosolenia botryoides, (11), pl. vii, figs. 19–21. Development of interspicular groups of collar-cells from internally-produced spores is inferred.

Ascetta coriacea, Mont., *Sycaltis glacialis*, Häck., *Sycandra utriculus*, Schmidt, (12) pp. 371 & 372, off Novaia Zemlia.

NEW GENERA AND SPECIES.

CARNOSA.

Halisarca frantzschultzei, also cited as *schultzei*, Mereschkowsky (14), p. 27, pl. i. figs. 1–6, pl. ii. figs. 9–14, pl. iii. fig. 40, White Sea.

CERATINA and PSAMMONEMATA.

Aplysilla, F. E. Schultze (16), p. 404. Ocular tubes smooth, short, and generally single ; fibres branch, but form no network ; dicecious. Agrees with *Aplysina* generally in other respects. *A. sulfurea*, F. E. Sch., *l. c.* p. 405, pl. xxiii. figs. 15, 18–27, pl. xxiv. ; *A. rosea*, F. E. Sch., *l. c.* p. 416, pl. xxiii. figs. 16 & 17.

Aplysina capensis, Carter (3), p. 171. Previously mentioned in Ann. N. H. (4) xvi. p. 192, Algoa Bay.

Aplysina pedicellata, Hyatt, P. Ac. Philad. 1878, p. 163, pl. i., probably from West Indies.

Simplicella (= *Aplysilla*) *glacialis*, Mereschkowsky (14), p. 43, White Sea.

Cacospongia schmidti, Marenzeller (12), p. 362, pl. i. fig. 1, Novaia Zemlia. Described by O. Schmidt in Die zweite deutsch. Nordpol-fahrt, ii. p. 430, without name.

Spongelia spinifera, F. E. Schultze (18), p. 152, pl. vi. figs. 8 & 9, Lesina.

NOTE.—The second reference to *Ceratella labyrinthica*, Hyatt, Mem. Bost. Soc. ii. p. 551, pl. xvii. fig. 30, Mauritius, was omitted from the Zool. Rec. for 1877 by a mechanical error.

RHAPHIDONEMATA.

Chalinula cavernosa, Marenzeller (12), p. 364, pl. ii. fig. 1, Novaia Zemlia.

Cacochalina irregularis, Czerniavsky (5), p. 395, not described, Black and Caspian Sea fauna.

HOLORHAPHIDOTA.

Reniera litoralis, Keller (9), p. 579, Ligurian coast.

Reniera nigricans, Czerniavsky (5), p. 394, Black or Caspian Sea.

Reniera arctica, Mereschkowsky (14), p. 44, White Sea.

Protoschmidtia, Czerniavsky (5), pp. 380 & 392. Its surface is set over with tubes. *P. simplex, transitans, foraminosa, grimmi* = *Reniera flava*, Grimm, *id. l. c.* pp. 392 & 393, mostly with "formæ" or "subformæ;" *P. foraminosa*, forma *aurantiaca*, figs. 6 & 7, Black or Caspian Sea.

Schmidtia intermedia, Czerniavsky (5), p. 393, with 4 varr., Black or Caspian Sea.

Pellinula, Czerniavsky (5), p. 394. *P. cribrosa, schmidti*, id. *l. c.* figs. 8–10, Black or Caspian Sea.

Pellina flava, Mereschkowsky (14), p. 42, White Sea, var. *arbuscula*, var. *rinaldina*, var. *massa*, id. *ibid.*

Pellina longispicula, with 3 formæ; *P. foraminosa*, Czerniavsky (5), pp. 393 & 394, Black or Caspian Sea.

Amorphina dubia, Czerniavsky (5), p. 392, *A. protochalina*, id. *l. c.* p. 392, fig. 14, Black or Caspian Sea.

Myxilla gigas, Mereschkowsky (14), p. 44, White Sea.

Tedaniella, Czerniavsky (5), p. 394, *T. cylindrifera*, id. *l. c.* fig. 11, Black or Caspian Sea.

Protoesperia, Czerniavsky (5), p. 396. *P. lobimana, simplex*, id. *l. c.* figs. 12 & 13, Black or Caspian Sea.

Esperia stolonifera, Mereschkowsky (14), p. 22, pl. ii. figs. 13 & 14, pl. iii. figs. 4, 5, 12–19, 23–29, White Sea. Sends out a network of roots, perhaps connected with reproduction, from its base.

Esperia stepanovii, muscoides, Czerniavsky (5), p. 396, figs. 20 & 21; *E. irregularis, dubia*, id. *l. c.*, Black or Caspian Sea.

Cliona mucronata, Sollas (19), p. 54, pl. i. figs. 1–10, 14–17, pl. ii. figs. 1–9. In skeleton of *Isis* and *Melobesia*. Hab.?

Cliona ensifera, Sollas (19), p. 61, pl. i. figs. 11–13, 18, pl. ii. figs. 10–25. Locality as preceding. Hab.? These two species are connected by occasional spicule-varieties.

Cliona subulata, Sollas (19), p. 65, pl. ii. figs. 26–28. In *Melobesia*. Hab.?

Cliona (*Archæocliona*) *pontica*, Czerniavsky (5), p. 396, fig. 17, Black or Caspian Sea.

Thecophora elongata, Marenzeller (12), p. 368, pl. ii. fig. 4, Novaia Zemlia.

Clathroscula, Mereschkowsky (14), p. 43, preliminary notice of, White Sea. Belongs to the *Suberitidinæ*; carries a long tube with reticulated walls, and aperture at summit; two sizes of spinular spicules; crust of short spicules.

Rinalda arctica, Mereschkowsky (14), p. 4, pl. i. figs. 7–12, pl. ii. figs. 6–8, pl. iii. figs. 1–3, 6–10, 20–22, 30–39, North of Norway, White Sea.

Pomelia, Zittel (23, *infrà*), p. 126. Belongs to *Rhizomorina* group of *Lithistidæ*. Separate vertical tubes in interior; radial canals simple; summit arched; recent; also fossil in Miocene. *P. schmidti*, id. *l. c.* pl. i. fig. 4, Florida.

Rhacodiscula, Zittel (23, *infrà*), p. 151, pl. i. fig. 8. Belongs to the *Tetracladina* group of *Lithistidæ*. Surface set with lobate short-stalked

discs; represented by *Corallistes polydiscus*, Schmidt, in recent time; also in chalk.

Rhacodiscula sp. n., (23), pl. i. fig. 8, mentioned by Carter, Ann. N. H. 1876, p. 466, Philippines.

Geodia stellosa, Czerniavsky (5), p. 397, pl. viii., Black or Caspian Sea.

Spongilla stagnalis, Dawson (6), p. 3, figs. 3 & 5, Lake of the Woods, River St. Lawrence; *S. asperrima*, id., *S. flexispina*, id., p. 4, figs. 2 & 4, River St. Lawrence; *S. ottawaensis*, id. p. 5, fig. 6.

Spongilla lieberkuehni, Brotherus, Medd. Soc. Fenn. iii. p. 174. Not described; said to have been described by Lieberkühn without name.

Lubomirskia, Dybowsky (7), p. 31. Based on *Spongia baicalensis*, Pallas, of which varieties are indicated; differs from the *Spongillidæ* in absence of gemmules, and by its stellate or dimple-like clusters of oscula, by its more marine manner of growth; spicula bacillar in some cases. *L. intermedia, bacillifera, papiracea* [*papyr-*], with several unnamed varieties, Dybowsky, *l. c.*, Lake Baikal.

Trachyspongilla, Dybowsky (7), p. 53. Includes the *Spongillæ* with spined spicules. *T. sibirica*, Dybowsky, *l. c.*, Pachabicha, lake near Lake Baikal.

Technitella, Norman (15), p. 279. Differs from *Haliphysema* in the sponge-spicules being generally enclosed entirely in the body-wall, in its being unattached, and in having a tubular mouth-opening. *T. legumen*, Norman, p. 279, pl. xvi. figs. 3 & 4. Foraminiferous sand, 112 fath., west of Valentia. *T. melo*, Norman (*l. c.*), p. 280, pl. xvi. figs. 5 & 6, from 1215 fath., sixty miles south of Rockall.

Marsipella, Norman (15), p. 281. Differs from preceding apparently only by the externally projecting, anterior, spicules. *M. elongata*, Norman, *l. c.* pl. xvi. fig. 7, Atlantic, west of Orkney, 767 fath.

[According to the author, these are to be regarded as genera incertæ sedis, but as nearest to *Haliphysema*.]

Aulospongus, Norman (15), p. 266, note. Founded for *Haliphysema tubulatum*, Bowerbank. Formed of tubuli, devoid of pores or oscula, their surface beset with small spicula.

HEXACTINELLIDA.

Hyalonema toxeres, Thomson (20), i. p. 273, figs. 66–69, Bermudas. [See Zool. Rec. 1873.]

Poliopogon, Thomson (20), i. p. 174. Differs from *Hyalonema* in being laterally compressed, and fan-like in shape, and fringed above. It is anchored below by spicula ending in two-hooked grapnels. *P. amadou*, id. *l. c.* fig. 38, off Isle of Ferro. [See Zool. Rec. 1873.]

Euplectella suberea, Thomson (20), i. p. 138, fig. 29, Atlantic, Cape St. Vincent, and Brazil.

Lefroyella, Thomson (20), i. p. 401. Tubular, open at distal end, externally ridged, of anastomosing fibres. *L. decora*, id. *l. c.* fig. 403, off Bermudas.

CALCAREA.

Teichonella, Carter (2), p. 35. Vallate or foliate, cloacal openings confined to edge or one side of the lamina. *T. prolifera*, ibid. figs. 1–5, and *T. labyrinthica*, p. 37, figs. 6–9, pl. ii. Fremantle, Australia. In

spiculation and structure they respectively resemble *Leuconia johnstonia* and *Grantia compressa*.

Wagnerella. Mereschkowsky (13), p. 76, p. 15 of the St. Petersburg Memoir. An Asconidean Calcisponge, consisting of peduncle containing short acerates, and of head echinated by fine acerates as well. *W. borealis*, Mereschkowsky (13), p. 76, pl. vi.; p. 22, pl. ii. figs. 1–5 of the St. Petersburg Memoir, in White Sea. No oscula or pores discovered, the basal cone (similar exteriorly to that of *Haliphysema*) is probably the oldest part, the head is formed by the swelling of the peduncle.

Anatomy and Physiology.

"Individual" in Sponges is limited, (14) p. 37, to a single gastral cavity with a bipolar axis. Thus the Sycones are entirely colonial forms, and so is *Halisarca*.

Three tissue-layers distinguished in Sponges (18), viz., (i.) outer cell layer, (ii.) connective tissue, (iii.) collar-cell layer; not to be ranked with certainty as separate embryonic layers. Outer layer consists of flat polygonal cells in *Spongelia avara*.

Hinder pole of embryo ciliated in *Spongelia pallescens* and *Euspongia* (18).

Halisarcæ seen to have three body-layers and cellular dermal epithelium (9).

Epidermis of a *Halisarca* (14), p. 33, formed of flask-shaped glandular cells.

Long spindle-shaped cells surround the excretory passages of *Aplysina aerophoba* (15), and are perhaps muscular in function.

Amœboid wandering-cells apparently found in mesoderm of *Aplysina* (15), certainly in *Aplysilla*.

Pigment cells of *Aplysina* (15) considered as reserves of nutritious matter.

Spindle-shaped cells of *Reniera semitubulosa*, &c., probably not muscular; the same sponge possesses nutritive wandering cells (9).

A muscular sphincter described, (14) p. 31, in a *Halisarca*. Cf. (10) figs. 35 & 37, for sponge-cells and spores. Acinetoid stage of sponge-cell (10) in *Grantia compressa*. In support of the Protozoan theory of the origin of Sponges (10), the transparent subdermal intercellular substance is supposed to be mere exudation from the collar cells, and the cells contained in it to be their transitional stages; a further intermediate stage being a simple flagellate form as shown in *Halichondria panicea*, pl. iii. fig. 32.

Pointed spicules may have the non-pointed end projecting from the surface of the sponge (*e.g.*, many anchoring spicules) (1).

Sudden narrowing of pointed end of some spinulate spicules in *Rinalda arctica*, sp. n., among other variations (14).

Diaphragms of spinular spicules with heads outwards occur in burrows of *Cliona*, 2 spp. nn. (19); and a mucronately pointed spinular spicule, a new form, in *Cliona mucronata* (19).

Size, as a fundamental point in spicules, not considered binding as a

specific character (20), as in the case of the skeleton spicules of the above varieties of *Spongilla* mentioned (*l. c.*).

Form of spicule, as constant for one species, also thrown in doubt (20).

Canal system of *Calcarea* (9) homologous with gastral cavities of *Cœlenterata*.

Projecting spicule-points used to detain food matter, (14) p. 8.

Nourishment of parts of Sponges by absorption of matter dissolved in the water, (14) pp. 12, 26, probable in some cases.

Starch detected in cells in seven species of *Silicea* (9), but in no Calcisponge, *Halisarca*, or Gumminean.

Spongilla (8), p. 196. The egg undergoes an equal, total segmentation, producing a solid Morula, the ectoderm enclosing the endoderm by its rapidity of growth. A closed cavity formed within the darker endoderm cells converts it into a Planogastrula. The primitive endoderm separates into endoderm and mesoderm. A body-cavity space is formed between the latter and the ectoderm. Ciliated chambers formed by evagination of endoderm after fixation of larva Mouth opening made by the falling apart of the upper mesoderm and endoderm cells.

The developmental stage in *S. raphanus* (16), which follows that of the flattened form with narrow cavity and upper division of small cells and lower one and ring of large ones, shows an enlargement of the cavity at the expense of the cells. A partial invagination of the granular cells may occur. The ciliated cells are then pressed inwards, and form the lining of a gastrular sac, which attaches itself by the cells surrounding the mouth to some surface ; then the mouth closes ; a hyaline layer is seen between the two other cell-layers. An opening into the cavity appears at the free end, and the pores appear. The radial tubes are formed by evagination from the central cavity. Sometimes several larvæ unite. The conclusion is that the Sponges are trilaminar, but have only two essential body layers.

Time and place, &c., of reproductive processes as observed in 3 Calcisponges and 4 Siliceous Sponges, given in tables, &c. ; MT. zool. Stat. Neap. i. p. 124, by R. Schmidtlein.

Hermaphroditism observed in *Spongelia cactos*, Selenka (15).

Surface mammæ (14), p. 9, produce spiculated embryoes by budding, and ultimately develope oscula.

W. S. Kent, Ann. N. H. (5) i. p. 1, considers the ciliated larvæ of Sponges to be merely the results of fission.

"E. R. L.," Nature, xviii. pp. 307 & 308, commenting on Keller's paper (9), notices the granular condition under which chlorophyll occurs in *Spongilla* ; and the difficulty of tracing the sponge embryo from the stage with two hemispheres of differently-sized cells to the bilaminate sac.

(11). The Protozoan, *i.e.* Flagellate-Infusorian, theory of the affinity of Sponges is argued by detailed comparison of different stages and parts of different Sponges, with stages of various Flagellata. The ovum is a metamorphosed collar-cell. The embryo is not bilamellar, and its cells do not constitute a tissue.

As parasites of Sponges are enumerated (3)—Amphipod Crustaceans ; Balanoid *Cirrhipedia* ; sessile *Actinozoa*, 4 kinds, found on the surface ;

Hydroid polyps, in interior as well; Algoid forms, viz., a *Thamnoclonium*, a blue *Oscillatoria*, a *Scytonema*, a *Palmella*; Saprolegnious forms (?), viz., *Spongiophaga communis*, Cart. (woodcut), in *Hircinia* chiefly, and the origin of Lieberkühn's *Filifera*, and Bowerbank's *Stemmatumenia*; a mycelium, the *Auliskia* of Bowerbank; and an unnamed red Alga.

Skeleton of *Spongelia pallescens* (18) infested by the parasitic Alga *Callithamnion*; the soft parts, and even the embryo, by *Oscillatoria*.

T. R. R. Stebbing, Ann. N. H. (5) ii. p. 427, has a note supplementing Carter's paper on Parasites of Sponges (3), adding names of various Amphipod *Crustacea* to the list there given.

Fossil Sponges.

22. Carter, H. J. Mr. James Thomson's Fossil Sponges from the Carboniferous System of the South-West of Scotland. Ann. N. H. (5) i. p. 128, pls. ix. & x.

23. Zittel, A. K. Studien über Fossilen Spongien. II. *Lithistidæ*. Abh. bayer. Ak. ii. Cl. xiii. p. 67, pls. i.–x. (to which the references below refer); in part in JB. f. Mineral. 1878, p. 561, pls. vii.–x.; translated Ann. N. H. (5) ii. pp. 112, 235, 324, 385, 467, pl. viii.

New Genera and Species, and Classification.

Dysidea antiqua, Carter (22), p. 139, pl. x. figs. 7–9, lower carboniferous limestone, Scotland.

Biopalla, S. W. Wallace, Am. J. Sci. (3) xv. p. 369. No mineral skeleton; subglobular, no indication of attachment, indications of—apparently—oscula (8 spp. provisionally made). Keokuk subcarboniferous formation, round Iowa.

Catagma, Sollas, Ann. N. H. (5) ii. p. 353, pl. xiv. Skeleton characterized as consisting of fibres constructed of long undulating uni-axial, and of tri- and quadri-radiate spicules, one ray of the latter group echinating the fibres. It is placed in a new subfamily *Catagmida*, of family *Axinellida*, Carter.

Rhaphidistia, g. n., Carter (22), *cf.* Ann. N. H. (5) iii. p. 301, for description. *R. vermiculata*, Carter, p. 140, pl. ix. figs. 15–19. Locality as preceding species.

Pulvillus thomsoni, Carter (22), p. 137, pl. x. figs. 1–6. A cup-shaped Holorrhaphidote composed of simple Acerates; very near *Halichondria panicea*, Johnston. Lower carboniferous limestone, Scotland.

Spongilla purbeckensis, J. I. Young, Geol. Mag. (n.s.) v. p. 220, woodcut. Spicules microspined Acerate. Chert, Lulworth.

Microspongia, S. A. Miller & C. B. Dyer, Cincinn. J. Sci. i. p. 37. Calcareous, "no epitheca," minutely porous. Spicules (?) minute, needle-shaped. *M. gregaria*, iid. *ibid.* pl. ii. fig. 2. Upper part of Cincinnati group.

Silurispongia, K. Martin, Niederländische und nordwestliche Sedimentärgeschiebe, &c. Leiden: 1878, cited from Zool. Anz. i., and some new species, *id. ibid.*

ZITTEL (23) classifies the *Lithistidæ*, fossil and recent, as follows: the new genera alone are mentioned; for the new recent genera, *vide suprà*. The system has been revised by attention to hitherto unobserved microscopic characters.

Fam. 1.—*Rhizomorina*, Zitt. Skeleton corpuscles (*i.e.*, spicula) irregularly branched, with root-like or knotty processes, central canal simple or branched. Superficial elements often resemble the skeleton-corpuscles, consist also of uni-axials and forked anchors.

(A.) Skeleton corpuscles moderately branched: a short simple canal in the chief ray; loosely intertwined. *Cnemidiastrum*, p. 109, pl. ii. fig. 8, pl. iii. figs. 1, 2, & 3, *Corallidium*, p. 110, *Pyrgochonia* and *Discostroma*, p. 112, *Leiodorella* [*Lio-*], pl. ii. fig. 5, pl. iii. fig. 11, and *Epistomella*, pl. ii. fig. 3, pl. iii. fig. 12, p. 113, *Hyalotragos*[*-gus*], pl. iii. figs. 4 & 5, and *Platychonia*, pl. iii. figs. 8–10, p. 114; all Upper Jura.

(B.) Skeleton corpuscles strongly branched, with fairly-wide branched canal, frequently knit into fibres. *Bolidium*, p. 114, pl. iv. fig. 8, *Astrobolia*, p. 115, *Chonella*, p. 116, pl. iii. figs. 6 & 7, *Seliscothon*[*-um*], p. 117, pl. iv. figs. 2–4 & 7, *Verruculina*, p. 122, pl. iv. fig. 1, *Amphethelion*[*-um*], p. 123, pl. iii. fig. 15, *Jereica*, p. 126, pl. iv. figs. 11 & 12, pl. v. fig. 1, *Cœlocorypha*, p. 128, pl. ii. fig. 4, pl. iv. figs. 9 & 10, *Scytalia*, p. 128, pl. v. figs. 3 & 4, *Pachynion*[*-um*], p. 130, pl. v. fig. 2, all from Chalk; *Stachyspongia*, p. 129, pl. v. fig. 5.

Fam. 2.—*Megamorina*, Zitt. Skeleton elements large, elongated, smooth, curved, forked, or irregularly branched, with simple axial canal, loosely knit together; sometimes some smaller Rhizomorine types among them; surface spicules, uni-axials, or forked anchors. *Megalithista*, p. 130, pl. vi. fig. 4, Jura, *Doryderma*, p. 131, pl. vii. fig. 1, *Carterella*, p. 132, pl. ii. fig. 7, pl. vii. fig. 2, Chalk and Greensand, *Isoraphinia* [*Isorrh-*], p. 133, pl. vii. fig. 3, pl. v. fig. 8, Chalk, *Heterostinia*, p. 133, pl. vi. fig. 3, Chalk.

Fam. 4.—*Tetracladina*, Zitt. Skeleton elements 4-rayed, rays terminally branched or thickened, with four axial canals meeting at angles of 120°; abundant surface spicules of various shapes. *Phymatella*, p. 137, pl. ii. fig. 1, pl. viii. figs. 2 & 3, *Aulaxinia* [*Aulac-*], p. 138, pl. viii. fig. 4, *Callopegma*, p. 139, pl. ii. fig. 6, pl. viii. fig. 5, pl. ix. fig. 1, *Trachysycon*, p. 140, pl. ix. fig. 4, *Astrocladia*, p. 147, pl. ix. fig. 9, *Calymmatina*, p. 149, pl. ii. fig. 2, pl. ix. fig. 8, *Thecosiphonia*, p. 148, pl. x. fig. 3, *Rhacodiscula*, [*cf.* under recent genera], *Ragadinia* [*Rha-*], p. 152, pl. x. fig. 2, *Plinthosella*, p. 153, pl. x. fig. 5, *Spongodiscus*, p. 153, pl. ii. fig. 9, pl. x. fig. 6: all from Chalk.

Remarks on spp. of *Siphonia*, *Lymnoria*, *Retispongia*, with sp. n. of *Spongia*, L., with pl.; apparently from the Palæontological Fauna of neighbourhood of Cracow, made by S. ZARECZNAGA; Sprawozd. Komfissyogr. ii. p. 244, pl. iv.

Palæacis, Milne-Edwards, generally considered a perforate Coral, is perhaps a Calcisponge; *cf.* pl. xii. for microscopic, &c., structure. H. A. NICHOLSON & R. ETHERIDGE, Ann. N. H. (5) iii. p. 206.

For remarks on Sponge remains in the Middle Secondary Rocks of Yorkshire, *cf.* W. H. HUDLESTON, in P. Geol. Ass. v. pp. 443, 494.

QUENSTEDT, F. A. Petrefactenkunde Deutschlands. v. pt. 1. Die Schwämme. Leipzig: 1878, with Atlas of 28 folio plates.

A number of fossil species are described. The plates give the outward form, with much of the anatomy, and often the microscopical structure, of a great number of these.

PROTOZOA.

BY

STUART O. RIDLEY, B.A., F.L.S.

THE GENERAL SUBJECT.

L. K. SCHMARDA, in his "Zoologie" (2nd. edn., vol. i., Wien: 1877), classifies *Protozoa* on the following outlines:—

Class i. RHIZOPODA.
- Order 1. *Athalamia* or *R. nuda* (Fams. *Amœbida*, *Acinetida*).
- Order 2. *Rhizopoda imperforata* (Fams. *Psammamœbida*, *Gromiida*, *Cornuspirida*, *Arcellida*, *Miliolida*).
- Order 3. *Foraminifera* (Fam. *Orbulinida*, &c.).

Class ii. POLYCISTINA.
- Order 1. *Radiolaria monozoa* (Fams. *Thalassicollida*, *Actinophryida*, &c.
- Order 2. *Radiolaria polyzoa* (Fams. *Sphærozoida*, *Collosphærida*).

Class iii. GREGARINOIDEA (Fams. *Monocystida*, *Gregarinida*, *Didymophyida*, *Acanthophora*).

Class. iv. INFUSORIA.
- Order 1. *Cymozoida* (Fam. *Vibrionida*).
- Order 2. *Mastigophora* (Fams. *Volvocida*, *Astasiida*, *Dinobryida*, *Phacida*, *Monadina*, *Cryptomonadina*, *Peridiniida*, *Noctilucida*).
- Order 3. *Peritricha* (Fams. *Vorticellida*, *Trichodinida*, *Ophrydiida*, *Ophryoscolecida*).
- Order 4. *Holotricha* (Fams. *Cyclidina*, *Enchelyida*, *Colepida*, *Trachelida*, *Ophryocercida*, *Colpodida*).
- Order 5. *Heterotricha* (Fams. *Bursariida*, *Stentorida*, *Tintinnida*).
- Order 6. *Hypotricha* (Fams. *Oxytrichida*, *Euplotida*, *Aspidiscida*).

G. VON HAYEK, "Handbuch der Zoologie," (vol. i. Wien: 1877), classifies *Protozoa* as follows:—

I. Animals living colonially round a skeleton of horn, silica, or carbonate of lime traversed by canals opening on the surface.—Class iv. *Spongidæ*.

II. Animals living singly or united after a fashion differing from the above.

1. Possessing the power of extending pseudopodia.—Class iii. *Rhizopoda.*

2. Power of extending pseudopodia absent.

i. Locomotor organs in form of cilia or contractile threads.—Class ii. *Infusoria.*

ii. Locomotor organs entirely wanting.—Class i. *Gregarinidæ.*

Abundant woodcuts are given, illustrating the chief types which have been referred to the sub-kingdom, with their anatomy in many cases, *e.g.*, especially, *Spongia adriatica*, Schmidt.

In a Classification of the Animal Kingdom, at p. 375 of "The Ancient Life History of the Earth" (Edinburgh and London : 1877), the sub-kingdom *Protozoa* is divided by H. A. Nicholson into—

Class I. *Gregarinidæ.*
Class II. *Rhizopoda.*
Order 1. *Monera.*
„ 2. *Amœbea.*
„ 3. *Foraminifera.*
„ 4. *Radiolaria.*
„ 5. *Spongida.*
Class III. *Infusoria.*

W. S. Kent, Ann. N. H. (5) i. p. 1, classifies *Protozoa* as

I. *Holostomata* (*Rhizopoda*, &c.).

II. *Polystomata* (*Acinetina*).

III. *Discostomata.*

(1) *Discostomata gymnozoida* (Collar-bearing Monads), (2) *Discostomata sarcocrypta* (Sponges).

IV. *Mono-* or *Eu-stomata* (Ciliate and flagellate stomatode *Infusoria*).

C. von Mereschkowsky claims (4), p. 223 *et seq.*, to have disproved the instability of Protozoan types and the belief that Protozoan faunæ diverge but slightly. The marine *Protozoa* of different districts diverge more than the freshwater forms, which he attributes to the distribution of the dried encysted forms of the latter by wind.

E. Haeckel, "Das Protistenreich," Kosmos, iii. pp. 10, 105, & 215, with woodcuts, gives a full account of the kingdom *Protista*, and describes and figures some of the principal species of the *Catallacta*, *Monera*, and *Rhizopoda.*

E. L. Moss has a preliminary notice of the surface fauna of the Arctic Seas in J. L. S. xiv. p. 122, relating to *Protozoa.*

Note.—The name of the author of paper (10) of *Protozoa* in the Zool. Rc. for 877, should have been Grimm, not Gremma.

INFUSORIA.

Chief Works relating to :—

1. Engelmann, T. W. I. Zur Physiologie der contractilen Vacuolen der Infusionthiere. Zool. Anz. i. p. 121.

2. Fraipont, T. Recherches sur les Acinétiniens de la côte d'Ostende. Bull. Ac. Belg. (2) xliv. p. 770, pls. i. & ii., xlv. pp. 247, 287, & 475 pls. iii., iv., v., & vi.

3. Grimm, O. A. Sur Lehre von den einfachsten Thieren. (St. Petersburg, Russian). Cited from JB. Anat. Physiol. vii. ii. p. 8.

4. Mereschkowsky, C. von. Studien über Protozoen des nördlichen Russland. Arch. mikr. Anat. xvi. p. 153, pls. x. & xi.

A list of the marine *Infusoria* of Northern Russia given, at p. 216, also tables of comparison with the *Rhizopoda* and Monads, and with the freshwater and marine *Infusoria* of Norway.

Genera, Species, &c., referred to.

Vorticella microstoma and *V. campanula*, an *Endosphæra* and an unknown form parasitic in the two respectively, are described, by J. van Rees, Z. wiss. Zool. xxxi. p. 474.

Cothurnia nodosa, Clap. & Lachm., (4) p. 154, pl. x. figs. 1–5, is widely distributed in the White Sea. The specimens have the swelling placed inside the shell. Varieties figured; var. *longipes*, Meresch., among them.

Tintinnus inquilinus, (4) pl. x. fig. 12, White Sea.

Oxytricha fallax, its parasite and its development described and figured by Van Rees, Z. wiss. Zool. xxxi. p. 475.

Stylonychia mytilus, (4) pl. x. fig. 7, White Sea.

Epidinthes auricularis, Clap. & Lachm., (4) p. 164, pl. x. fig. 16, redescribed, White Sea. *Urostyla weissei*, Stein, var. n., p. 166, White Sea.

Stentor cæruleus, Zool. Anz. i. p. 390. Is provided with small amœboid processes at the posterior end when it is about to settle on any object, according to A. Gruber.

Polycricus schwartzii, Bütschli (3), is a Turbellarian.

Coleps antice-nudus and *C. postice-nudus* = *C. hirtus*, and are the products of fission (16). The shield is formed in the ectoplasma.

Nassula and *Bursaria* (3). The "cells" of His are merely organisms taken in as food.

Acinetinæ, (2) p. 475, must all have a skeletal membrane. The structures and functions of the group are discussed one by one. The 8 genera of Claparède & Lachmann should be raised to the rank of families and *Urnula* added as a 9th family. According to a tree of affinity, the *Trichophryidæ*, Fraipont, should be at the bottom, the *Urnulidæ*, Fraipont, and *Acinetidæ*, Fraipont, at the top of the scale. The group probably has sprung from the *Infusoria ciliata*.

Acineta mystacina, Ehrb., var. n. *longipes*, (4) p. 177, pl. x. fig. 26, St. Petersburg and Weliky-Ustjug.

Podophrya cylindrica, Perty. (4) p. 172, pl. xi. fig. 16, described; St. Petersburg.

New Species.

Peritricha.

Vorticella pyrum, Mereschkowsky (4), p. 156, pl. x. figs. 31 & 32, Solowetzky Is.

Tintinnus ussowi, id. *l. c.* p. 150, pl. x. fig. 40, Solowetzky Is.

Epistylis balanorum, id. *l. c.* p. 159, pl. xi. fig. 17, pl. x. fig. 37, Solowetzky Is.

Zoothamnium marinum, id. *l. c.* p. 157, pl. x. fig. 36, White Sea.

Cothurnia arcuata, id. *l. c.* p. 155, pl. x. figs. 8 & 8 *a*, Solowetzky Is.

Cothurnia furcifer, Hutton, J. R. Micr. Soc. i. p. 49, woodcut, New Zealand. Has an operculum.

Dinophysis arctica, Mereschkowsky (4), p. 177, pl. xi. fig. 19, White Sea.

HYPOTRICHA.

Oxytricha wrzesniowskii, Mereschkowsky (4), p. 162, pl. x. fig. 33, and *O. oculata*, id. (4), p. 163, pl. x. figs. 9 & 10, Solowetzky Is.

Chilodon propellans, Engelmann (1), p. 122, Utrecht.

HETEROTRICHA.

Aspidisca andrewi, Mereschkowsky (4), p. 166, pl. x. fig. 42, Solowetzky Is.

Balantidium (?) *medusarum*, Mereschkowsky (4), p. 168, pl. x. fig. 11, in *Medusæ* and Worms, White Sea.

HOLOTRICHA.

Holophrya kessleri, Mereschkowsky (4), p. 171, pl. x. figs. 29 & 30, Wologda and Lake Onega.

Glaucoma wrzesniowskii, Mereschkowsky (4), p. 169, pl. x. figs. 27 & 27 *b*, Northern Dwina and Lake Onega.

SUCTORIA.

Acineta crenata, Fraipont (2), p. 287, pl. vi. figs. 1–11, Belgian coast. *A. vorticelloides*, id. (2), p. 290, pl. vi. figs. 12–17, Ostend. *A. divisa*, id. (2), p. 792, pl. ii., Belgian coast; development by budding beneath the surface.

Ophryodendrium belgicum, Fraipont (2), p. 775, pl. i. Belgian coast; development given.

Podophrya truncata, Fraipont (2), p. 293, pl. vi. figs. 20–26, becomes encysted. *P. benedeni*, id. (2), p. 264, pls. iv. & v., Ostend.

Podophrya conipes, Mereschkowsky (4), p. 173, pl. x. fig. 39, pl. xi. fig. 15, White Sea. Apparently derived by descent from *P. lyngbyi*.

Sphærophrya hydrostatica, Engelmann, Zool. Anz. i. p. 152, Utrecht, surface of water. Besides the numerous small contractile vacuoles, an immense air-bladder, of about one-fourth the volume of the body, underlay the cuticle in an observed example, and slowly disappeared, causing the body-walls to shrink in.

ANATOMY AND PHYSIOLOGY.

The liquid contained in the contractile vacuole must be expelled outwards, as the body moves suddenly forwards at the moment of contraction, without a corresponding movement of the cilia, and because part of the body collapses without any increase in the volume of the rest of it, in the species observed; (1), p. 121.

The trichocysts of *Infusoria* (3) are solid, and without membrane, and not homologous with the Cœlenterate thread cells. Polynuclear conditions of *Infusoria* are merely transitory.

RHIZOPODA.

Chief Works relating to:—

5. Brady, H. On the Reticularian and Radiolarian Rhizopoda (*Foraminifera* and *Polycystina*) of the North-Polar Expedition of 1875–6. Ann. N. H. (5) ii. p. 425, pls. xx. & xxi., to which the pages refer; and shorter account in "Narrative of a Voyage to the Polar Sea during 1875–6, in H. M. Ships 'Alert' and 'Discovery,'" London: 1878, vol. ii. p. 295.

6. Leidy, J. Species of *Euglypha*, *Trinema*, *Pamphagus*, and *Cyphoderia*, with synonyma and descriptions of new forms. P. Ac. Philad. 1878, p. 17.

. ——. On *Amœba*. *Tom. cit.* p. 99.

7. Mereschkowsky, C. von. Studien über Protozoen des nördlichen Russland. Arch. mikr. Anat. xvi. p. 153, pls. x. & xi.

8. Mivart, St. G. Notes touching recent Researches on the Radiolaria. J. L. S. xiv. p. 136.

9. Schneider, A. Beiträge zur Kenntniss der Protozoen. Z. wiss. Zool. xxx. suppl. p. 446, pl. xxi.

10. Siddall, J. D. The *Foraminifera* of the River Dee. P. Chester Soc. No. 2, p. 42.

11. Thomson, C. Wyville. Voyage of the 'Challenger.' The Atlantic. London: 1877, 2 vols. pls. & figs.

12. Wallich, G. C. On the *Radiolaria* as an Order of the *Protozoa*. Pop. Sci. Rev. (n.s.) ii. pp. 267 & 368, pl. vi.

Faunæ, &c.

Of *Foraminifera*, 9 species, one being new, are enumerated from the North Russian Fauna,' p. 214 (7). A list of marine *Rhizopoda* of this fauna given; *ibid.* p. 216.

G. R. Vine, Sci. Goss. xiv. p. 51, enumerates from the Shetland Islands 15 *Foraminifera* by name, 13 being figured. The *Globigerinæ* are dwarfed.

Localities and distribution of *Foraminifera*, mainly at mouth of Dee, given (10). Also a tabulated list, of species of 5 families, showing relative rarity.

J. Wright, in P. Belf. Soc. 1878, p. 22, sums up the main researches into the recent and fossil *Foraminifera* of Ireland, referring to a paper in Rep. Belf. Club, Appendix, 1876–77, not seen by Recorder, for list of species taken lately in the neighbourhood of Strangford Lough, of which 3 are new to the British fauna.

Tables of the localities for the 53 species of *Foraminifera* taken, are given, with details as to the nature of the various soundings (5), p. 426, and remarks on some of the species, p. 433. Notes on the results of the

'Valorous' expedition in *Foraminifera* taken in Davis Strait also given. Milioline forms were almost entirely absent.

Of *Radiolaria*, were taken in the Arctic and neighbouring seas (5), p. 438, species of *Spongodiscus*, *Spongotrochus*, *Haliomma*, *Tetrapyle*, *Heliodiscus*, *Spongaster*, *Euchitonia*, *Trematodiscus*, *Dictyopodium*, *Actinomma*.

Marine distribution of *Radiolaria* (11), ii. p. 340.

Van der Broeck's paper on *Foraminifera* of Côte de la Gard, in Bull. Soc. Nîmes, 1878, has not been seen by Recorder.

Classification.

Rhizopoda classified (12), p. 373, by Wallich as—

I. *Herpnemata*. No definite nucleus, no contractile vesicle.
  1. *Foraminifera* (including *Lieberkuehnia*). Shell never siliceous.
  2. *Polycystina*. Skeleton always siliceous.

II. *Protodermata*. Definite nucleus, no contractile vesicle.
  1. Forms with solid skeleton—*Plagiacanthida*, *Acanthometrina*, *Thalassicollina* ?.
  2. Forms with tubular skeleton—*Dictyochidæ*, leading to Spongiida, &c.

III. *Proteina*. Definite nucleus, contractile vesicle.
  1. *Actinophryna*. Pseudopodia monomorphous—*Actinophrys*, *Gromia*, *Lagynis*, *Euglypha*, *Cadium*, *Protocystis*, *Plagiophrys* ?.
  2. *Amœbina*. Pseudopodia polymorphous—*Amœba*, *Difflugia*, *Arcella*, *Pseudochlamys*.

The *Proteina* lead up to Infusoria.

Mivart (8) proposes to classify the *Radiolaria* as follows :—

Section I.—*Discida*, including *Spongodiscida*, Häck., *Discida*, Häck., and *Stylospongia*.
  Subsection 1—*Coccodiscida*.
  2—*Trematodiscida*.
  3—*Discospirida*.
  4—*Lithelida*.
  5—*Spongida*.

Section II.—*Flagellifera*. Flagellum, no nuclear vesicle; includes *Spongocyclia*, *Spongoastericus*, *Euchitonia*.

III.—*Entosphærida*. With intracapsular spheroidal shell, not traversed by radii. No nuclear vesicle.
  Subsection 1—*Ommatida*. Subdivisions—(i.) *Haliommatida*; (ii.) *Actinommatida*.
  2—*Spongosphærida*. Subdivisions—(i.) *Cladococcida*; (ii.) *Cœlodendrida*.

Section IV.—*Acanthometrida*.
  Subsection 1—*Typica*. Subdivisions — (i.) *Acanthostaurida*; (ii.) *Astrolithida*; (iii.) *Litholophida*; (iv.) *Acanthochiasmida*.
  2—*Diploconida*.
  3—*Cataphracta*.

Section V.—*Polycystina.*
Subsection 1—*Cyrtida.* Subdivisions—(i.) *Monocyrtida*; (ii.) *Zygocyrtida*; (iii.) *Dicyrtida*; (iv.) *Stichocyrtida*; (v.) *Polycyrtida.*
2—*Ethmosphærida.*
3—*Acanthodesmida.*
Section VI.—*Collozoa.* Simple or compound; if single, with skeleton as circumferential detached spicula only. No nuclear vesicle.
Subsection 1—*Polycollida.* (Compound Radiolarians.) Subdivisions—(i.) *Sphærozoida*; (ii.) *Collosphærida.*
Section VII.—*Vesiculata.* With a nuclear vesicle.
Subsection 1—*Collida.*
2—*Sphæroidea.*
3—*Aulosphærida.*
4—*Brachiata.*

Polycystina classified and defined by WALLICH, (12), p. 375:—
Division I.—*Cyclodina.* Omphalostype symmetrical, omphalic chamber spherical.
1—*Sphærodina.* Type, *Haliomma.*
2—*Dichodina.* Type, *Amphidiscus.*
II.—*Monodina.* Neither omphalostype nor omphalic chamber symmetrical, the latter generally somewhat pyramidal.
1—*Actinodina.* Type, *Astromma.*
2—*Monodina.* Type, *Podocyrtis.*

Challengeri[i]da, Thomson (11), ii. p. 341, figs. 58 & 59. New order, approaching *Radiolaria*, based on *Challengeria*, g. n., and other forms.

Heliozoa are equivalent to and independent of *Radiolaria*; Brandt (Halle: 1877), cited from JB. Anat. Phys. vii. ii. p. 12.

GENERA, SPECIES, &C., REFERRED TO.

Actinosphærium eichhorni. Structure and development described by K. BRANDT, *l. c.* suprà. The contractile vacuoles open to the exterior; nuclei saccular; union of several individuals takes place only under artificial conditions; the true pseudopodia are replaced by amœboid processes just before encystation; then the alveoli disappear, the nuclei decrease in numbers, increase in size; the body breaks up into generally 3–9 pieces; these divide into halves, again uniting and becoming encysted; before leaving the cyst the nuclei multiply; it is infested by two parasitic *Flagellata.*

Actinosphærium eichhorni (9), p. 446. Must be divided into four species. One of these is distinguished by a single siliceous shell, etc., another by a double shell; two other species show disappearance of the nuclei and fresh formation during fission, and have a thinner shell, but one alone shows a fusion of two fission-products.

Rhaphidiophrys pallida, described by E. R. LANKESTER in J. Micr. Soc. i. p. 393, from Britain for the first time.

Acanthometra (12). The species are ribbed, but not tubular.

Globigerina bulloides (4) p. 210, fig. 46. Living at surface; shell bears spines.

Globigerina bulloides, D'Orbigny, var. (5), p. 435, pl. xxi. fig. 10. Small, compressed, with chambers opening into each other.

Lagena striato-punctata, Reuss, *Polymorphina acuminata*, D'Orb., *P. rotundata*, Bornemann, *Uvigerina pygmæa*, D'Orb., var. (starved form), *Bulimina elegantissima*, D'Orb., *Textularia biformis*, Parker & Jones, *Verneuilina polystropha*, Reuss; (5) pl. xx. figs. 3, 5–9, & 12, from Arctic Seas. *Pulvinulina kersteni*, R. (ubiquitous here), *Polystomella arctica*, P. & J., var., pl. xxi. figs. 11 & 13.

Gromia oviformis, *dujardini*, *Quinqueloculina tenuis*, *Trochammina charoides*, *Lagena aspera*, *trigonomarginata*, *ornata*, *lucida*, *Polymorphina thouni*, *spinosa*, *Sphæroidina bulloides*, *Pulleina sphæroides*, *Discorbina biconcava*, *Bulimulina squamifera*, *Spirillina tuberculata*: (10), from Dee.

Orbulina universa, D'Orb.; (11), p. 215, fig. 47.

Pulvinulina menardi, D'Orb.; (11), p. 218, fig. 48. *P. micheliana*, p. 219.

J. Leidy, P. Ac. Philad. 1878, pp. 292 & 336, mentions finding immense quantities of *Nonionina* in sand between tide-marks, New Jersey coast, from 19,000 to 38,000 to the ounce of sand. Greater variety and quantity on New England coast.

Miliola (9), p. 448, figs. 1–10. Development:—(1) Species from Föhr. Had nuclei; divides into nucleated balls with one or more nucleoli (the smallest, which are naked, he regards as spermatozoa, the larger as ova); in other shells were found "germ-bodies," with double-contoured walls and a seam; these become young, free *Miliolæ* which develope shells. (2) Species from Heligoland. Firmer shell; showed stages with cysts, containing apparently ova and spermatozoa, and afterwards embryoes.

Haliphysema, *Gastrophysema*. Cf. under Spongiida.

Squamulina scopula, Ann. N. H. (5) i. p. 173, considered by Carter not to be made out to be identical with *Gastrophysema*. Also *cf.* under Spongiida.

Pamphagus mutabilis, Bailey (5), p. 172, = *Corycia*, Duj., = *Plagiophrys scutiformis*, Hertwig & Lesser.

Cyphoderia ampulla (5), p. 173, = *Difflugia ampulla* and four other species, Ehrb., = *Cyphoderia margaritacea*, Schlumberger, etc., = *Euglypha curvata*, Perty, = *Lagynis baltica*, Schulze, = *Euglypha* and *Difflugia margaritacea*, and *E. baltica*, Wallich.

Placopus, F. E. Sch. (7), p. 195, should be united with *Hyalodiscus*.

Amœba verrucosa, Ehrb.? (7). Gemmation observed.

Podostoma filigerum, Clap. & Lachm. (15), p. 271. Probably = *Amœba radiosa*, Ehrb.

Euceeryphalus schultzii, &c. (12), p. 281. The projecting lobes of sarcode are not supported by membranous structures.

Euglypha alveolata, Dujardin (5), p. 171. Synonyms—*E. tuberculata*, Duj., *E. lævis*, *E. setigera*, Perty, *E. ampullacea*, Hertwig & Lesser, *Difflugia*, 14 species.

Euglypha ciliata (5), p. 172, = *Difflugia* (*Setigerella*) *ciliata*, *D. pilosa*, Ehrb., = *E. compressa*, Carter.

Euglypha seminulum (5), p. 172, = *Difflugia seminulum*, *D. semen*, *Assulina semen*, Ehrb., = *E. brunnea*, Leidy, *E. tincta*, Archer.

Euglypha strigosa (5), p. 172, = *Difflugia*, Ehrb. New Jersey swamps.

Trinema enchelys (5), p. 172, = *Difflugia enchelys*, *Arcella hyalina*, Ehrb. (5), = *Trinema acinus*, Duj., &c., = *Arcella constricta* and ten other species, Ehrb., = *Euglypha enchelys*, Wallich, *E. pleurostoma*, Carter.

Difflugia spiralis, Ehrb. (7), p. 193, pl. x. fig. 15. A variety without coating of sand, Onega. *D. proteiformis*, var. *lageniformis*, Wall., *l. c.*, should form a distinct species.

Difflugia vinosa, Archer, described ; Q. J. Micr. Sci. xviii. p. 212.

According to LEIDY (6), p. 99, and Am. Nat. xii. p. 235, *Amœba princeps*, Ehrb., = *Proteus*, Rösel, = *Volvox chaos* and *Chaos protheus*, Linné, = *Volvox protheus*, Pallas, = *Proteus diffluens*, Müller, = *Amiba diffluens*, Bory, should be *Amœba chaos* or *A. proteus*.

Amœba radiosa ?, Zool. Anz. i. p. 152, &c., from surface of water, exhibited an air-bladder of one-third its diameter, which disappeared in three minutes.

Amœba terricola and *Arcella arenaria* and ten unnamed species observed by SCHNEIDER, C. R. lxxxvi. p. 1557. Structure given ; under unfavourable circumstances they become temporarily encysted ; conjugation observed in four species, resulting in formation of cysts.

NEW GENERA AND SPECIES.

RADIOLARIA.

Clathrulina cienkowskii, Mereschkowsky (7), p. 191, pl. x. fig. 34, Lake Onega.

Dictyopodium, *Xiphacantha*, *Haliomma*, spp. nn., (11) i. figs. 52–54 ; no names given.

Challengeria, Thomson (11), ii. p. 341, fig. 58. A genus of a new order, *Challenger*[*i*]*ida*, near the *Radiolaria* in position. Consists of a single superficially pitted siliceous chamber, with a single strongly-labiate opening ; contains granular sarcode, with one or more nuclei and several dark, rounded granular masses. Atlantic, below surface.

FORAMINIFERA.

Miliola schultzii, Czerniavsky, Bull. Mosc. liii. pl. vi. fig. A, Black or Caspian Sea.

Lituola glomerata, Brady (5), p. 433, pl. xx. fig. 1, Arctic, &c., seas.

Hyperammina, id. (5), p. 433. Arenaceous, almost straight tapering tube, open at narrow end. *H. elongata*, id. *ibid.* pl. xx. fig. 2, Arctic seas, North Atlantic, &c.

Trochammina shoneana, Siddall (10), p 46, figs. 1 & 2, Hilbre and Holywell, Estuary of Dee.

Lagena feildeniana, Brady (5), p. 434, pl. xx. fig. 4, off Cape Frazer.

Spirillina hyalina, Mereschkowsky (7), p. 214, Northern Russia.

Hyalodiscus korotnewi, id. (7), p. 194, pl. xi. figs. 20–26. Sometimes

extends a sail-like protoplasmic film from its edges, forming a disc. White Sea.

Pleurophrys angulata, id. (7), p. 192, pl. x. figs. 14 & 14 *a*, Lake Onega.

Difflugia solowetzkii, id. (7), p. 194, pl. x. fig. 17.

Cellepora hemisphærica, Parfitt (10), p. 50, = *Tinoporus*. W. coast of Ireland, Scotland, Dee Estuary; to be called *T. lucidus*.

Calcaromma calcarea [*-reum*], Thomson (11), i. p. 233, fig. 51. Contains echinated calcareous spheres. Pacific.

Euglypha mucronata and *E. brachiata*, Leidy (5), p. 172, New Jersey swamps.

Trichosphærium, Schneider (9), p. 452. *T. sieboldi*, id. *ibid.* figs. 14–17. In seawater from Ostend. Body of changeable shape; no shell, but firm cutis, perforated by tubes, emitting protoplasmic processes, and set with bristles soluble in weak fluids; protoplasm granular, with some hyaline particles; in spring globular, with continuous mammillated shell (like *Polyzoa* gemmules), which are soon found empty. Apparently Foraminiferous, between *Lieberkuehnia* and the typical forms.

Amœba blattæ, Bütschli (15), p. 273, fig. 26, exhibits fibres in its protoplasm, also plurality of nuclei, and encystation.

Amœba papillata, Mereschkowsky (7), p. 203, pl. xi. figs. 31 & 32, Northern Dwina.

Amœba angulata and *A. jelaginia*, id. (7), pp. 203 & 204, pl. xi. figs. 3, 29, & 30, St. Petersburg.

Amœba emittens, id. (7), p. 205, pl. xi. figs. 6–11. Vacuole disappears entirely on contraction. Archangelsk and St. Petersburg.

Amœba alveolata and *A. filifera*, id. (7), pp. 207 & 209, pl. xi. figs. 40–42, White Sea. The former contains numerous large vacuoles.

Amœba solidula, Grimm (16). Nucleus consists of a homogeneous and a granular part. Found in an aquarium.

Hastigerina, Thomson (11), ii. p. 291.

Hastigerina murrayi, id. *l. c.* figs. 51 & 52, Atlantic, Pacific.

INCERTÆ SEDIS.

Pyrocystis, Murray (11), ii. p. 88. A thin apparently siliceous cell wall containing clear liquid; protoplasm showing cyclosis: a nucleus. *P. noctiluca*, *fusiformis*, Murray, *l. c.* figs. 21 & 22, Equatorial Atlantic. [Possibly belongs to DIATOMACEÆ.]

ANATOMY AND PHYSIOLOGY.

Actinosphærium, Brandt, SB. nat. Fr. 1878, p. 171. The axial fibres of the pseudopodia consist first of pure vitellin, overlaid by another organic substance; the pseudopodia are contractile; the superficial body substance assists in the movements.

Material, modes of building, and colour of tests of deep-sea Arenaceous *Foraminifera*, e. g., *Lituolæ*, *Cyclammina* sp., *Marsipella*, *Pilulina*, *Astrorrhiza*, *Trochammina*, &c., pointed out by A. M. NORMAN, Ann. N. H. (5) i. p. 284.

Tables showing comparatively the characters of protoplasm and pseudo-

podia in 21 *Rhizopoda* and 2 *Monera* given, as bearing on their relationship to *Infusoria* (7).

The so-called nucleus of the sarcoblasts of *Radiolaria* originates the skeleton, (12) p. 277, pl. vi. fig. 2; their granules are probably connected with reproduction. The sarcoblasts themselves probably represent the nucleus.

The omphalostype originates all the future skeleton; the omphalic chamber represents the primordial chamber of *Foraminifera*: (12) p. 378.

Mivart (8) reviews the structures of the group *Radiolaria* in their different parts and with reference to their functions, as already determined. He considers their organization to be the result, not of natural selection, but of some form of organic crystallization.

W. Archer, Q. J. Micr. Sci. xviii. p. 205, regards the nature of pseudopodia of an adult *Rhizopod* as being constant for and characteristic of it.

Two *Euglypha* tests were fused at right angles to each other's axis in a case observed by W. Archer, Q. J. Micr. Sci. xviii. p. 105.

Brandt gives in SB. nat. Fr. 1878, p. 199, the results of his paper in Verh. phys. Ges. Berl., Dec. 1878, showing the absence of nuclei in *Protamœba*, and the presence of a viscous carbo-hydrate resembling cellulose, in the granular central mass of all the *Protozoa* examined for it.

Constituents of *Globigerina* ooze and bottom generally (11) i. p. 119, pl. iv., pp. 186, 187, 206–210, 228–239, 359, 361, & 375, ii. 254–271, 291, & 369–380. Rhabdospheres and coccoliths, pp. 220–222, figs. 49 & 50.

Fossil Rhizopoda.

Chief Papers relating to :—

13. Möller, V. von Die spiral-gewundenen Foraminiferen des Russischen Kohlenkalks. Mém. Petersb. xxv. No. 9, pp. 147, pls. i.–xv.

14. Nicholson, H. A., & Murie, J. On the minute structure of *Stromatopora* and its allies. J. L. S. xiv. p. 187, pls. i.–iv.

New Genera, &c.

Clathrodictyon, Nicholson & Murie, (14) p. 220, pl. ii. figs. 6–14. Differs from *Stromatopora* in the frequent inflection of the concentric laminæ, forming quasi-cells; no radial pillars; horizontal section simply reticulate. 2 spp. nn. Upper Silurian and Devonian.

Stylodictyon, iid. (14) p. 221, pls. ii. fig. 14, iii. figs. 1–8. Differs from *Stromatopora* in the laminæ being grouped around vertical columns. Based on *Syringostroma columnare*, Nicholson, sp. n. Hamilton formation, Ontario.

Pachystroma, iid., (14) p. 223, pl. iv. figs. 1–7. As *Stromatopora*, but laminæ very thick, no radial pillars, laminæ of irregularly reticulate tissue, 1 sp. n., Upper Silurian of Canada, Devonian of Ohio.

Syringosphæra, P. M. Duncan, Ann. N. H. (5) ii. p. 298. Composed of radiating masses of tubes passing to the surface, the masses divided by inter-radial inosculating tubes, many of which open on surface; forms subspherical calcareous balls.

Stoliczkaria, id. *tom. cit.* p. 299. As preceding, but with very fine surface pores, or none at all, and close internal tubulation.

Stromatocerium, Hall, emended, (14) p. 222.

Bradyina, Von Möller, (13) p. 78, pls. iii. figs. 3 & 4, x. figs. 2 & 3. Based on *Nonionina rotula*, Eichwald, &c. Shell unsymmetrical; differs from *Hemifusulina*, V. Möll., in the distinct and entire canals of the septa. Carboniferous limestone of Russia, &c.

Cribrospira, Von Möller (13) p. 86, pls. iv. fig. 1, x. fig. 1. Shell asymmetrical, septa small, unilamellar, chambers simple; otherwise agrees mainly with *Bradyina*. Contains one sp. n. from lower carboniferous limestone, Russia.

A special family, *Fusulinidæ*, established (13, p. 120) to include *Nummulina, Fusulina, Schwagerina, Hemifusulina.*

The *Stromatoporidæ* were (14) originally calcareous. No "canal system," like that of the *Foraminifera*, exists in the walls, which are, however, traversed by "water canals" (radiate and vertical); apparently should be placed among the Calcisponges.

Stromatopora, Goldfuss, spp., (14) p. 217, and *Caunopora*, Phillips, figured.

Flagellata, Monads.

Chief Papers relating to, besides those already mentioned.

15. Bütschli, O. Beiträge zur Kenntniss der Flagellaten und einiger verwandten Organismen. Z. wiss. Zool. xxx. p. 205, pls. xi.–xv.

16. Grimm, O. A. Zur Lehre von den einfachsten Thieren. St. Petersburg 1877 [in Russian].

Only known to Recorder from report in JB. Anat. Phys. vii. ii. p. 8.

17. Kent, W. Saville. Notes on the Embryology of Sponges. Ann. N. H. (5) ii. p. 139, pls. vi. & vii.

18. ——. A New Field for the Microscope. Pop. Sc. Rev. (n.s.) ii. p. 113, pls. iii. & iv.

19. Stein, F. von. Der Organismus der Infusionsthiere, &c. III. Abth. Die Naturgeschichte der Flagellaten oder Geissel-Infusorien. I. Häfte (with 24 pls.). Leipzig: 1878.

Classifications.

Stein (19) classifies the *Flagellata* as follows:—

Group I.

Fam. 1. *Monadina.* Genera: *Cercomonas, Monas, Goniomonas, Bodo, Phyllomitus, Tetramitus, Trepomonas, Trichomonas, Hexamita, Lophomonas. Platytheca* is connected with the family.

2. *Dendromonadina.* Genera: *Dendromonas, Cephalothamnium, Anthophysa.*

3. *Spongomonadina.* Genera: *Cladomonas, Rhipidodendron* [*-um*], *Spongomonas, Phalansterium.*

4. *Craspedomonadina.* Genera: *Codonosiga, Codonocladium, Codonodesmus, Salpingœca.*
5. *Bikœcida* [*Bic-*]. Genera: *Bik* [*Bic-*]*œca, Poteriodendron* [*-um*].
6. *Dinobryina.* Genera: *Epipyxis, Dinobryon* [*-um*].
7. *Chrysomonadina.* Genera: *Cælomonas, Rhaphidomonas* [*Rh-*], *Microglena, Chrysomonas, Uroglena, Syncrypta, Synura, Hymenomonas, Stylochrysalis, Chrysopyxis.*
8. *Chlamydomonadina.* Genera: *Polytoma, Chlamydomonas, Chlamydococcus, Phacotus, Coccomonas, Tetraselmis, Gonium.*
9. *Volvocina.* Genera: *Eudorina, Pandorina, Stephanosphæra, Volvox.*
10. *Hydromorina.* Genera: *Chlorogonium, Chlorangium, Pyramidomonas, Chloraster, Spondylomorum.*
11. *Cryptomonadina.* Genera: *Chilomonas, Cryptomonas, Nephroselmis.*
12. *Chloropeltidea.* Genera: *Cryptoglena, Chloropeltis, Phacus.*
13. *Euglenida.* Genera: *Euglena, Colacium, Ascoglena, Trachelomonas.*
14. *Astasiœa.* Genera: *Eutreptia, Astasia, Heteronema, Zygoselmis, Peranema.*
15. *Scytomonadina.* Genera: *Scytomonas, Petalomonas, Menoidium, Atractonema, Phialonema, Sphenomonas, Tropidocyphus, Anisonema, Colponema, Entosiphon.*

Group II. *Cilioflagellatæ.*

He discusses in 154 pp. the work of previous observers in this field.

Fam. *Vellina*, Mereschkowsky (7), p. 178. Formed to contain colonial, generally free-swimming Monads not chitinously encapsuled, consisting of groups of spheroids.

Genera, Species, &c., referred to.

Noctiluca miliaris. No cilia. A granular mass reaching from nucleus to the striped tissue of the flagellum probably acts as a nerve, as curare inhibits the action of the flagellum: electricity tetanizes it. Phosphorence increased by warmth and mechanical means, unaffected by electricity. Flagellum probably used to obtain food, not for motion. W. Vignal, Arch. Phys. (2) v. p. 415, pls.; cited from JB. Anat. Physiol. vii. ii. p. 20.

C. Robin, C. R. lxxxvi. p. 1482, on *Noctiluca*, states that disappearance of the flagellum, &c., in *N. miliaris* is a constant phenomenon, due to atrophy; the nucleus takes part in the segmentation of the body, which occurs by dichotomous fission; it becomes elongated and longitudinally striated, the two ends become globose, and the thin connecting band is then broken. At the same time the peripheral protoplasmic threads aggregate into a layer, which becomes constricted and pushed inwards, so as to fuse with the perinuclear protoplasm which has segmented, thus

forming a "gemma." The gemma develops a flagellum of from six to seven times its own length, and one or two contractile vacuoles. The tentacle begins as a process of the yellow body-substance.

Stein (19) figures 91 species of *Flagellata* already known to science, with notes on the synonymy.

Magosphæra planula, Häckel (17), p. 144, compared with the various stages and forms of the cells of the Sponges.

Polytoma uvella, Ehrb. (17), p. 144, the acorn-Monad of Dallinger & Drysdale.

Salpingœca amphoridium, Clark, metamorphoses by budding encystation and formation of spores (18), pl. iv. figs. 2–7; *S. gracilis*, Clark, *S. marina*, Clark, *l. c.* pl. iv. figs. 17, 20, 35, & 36.

Salpingœca gracilis, Clark (15), p. 227, fig. 4. *S amphoridium*, Clark? (*l. c.*), p. 228, fig. 3.

Codosiga, Clark, *C. botrytis*, Ehrb. (15), p. 222. fig. 1, = *C. pulcherrima*, Clark. The "collar" seems homologous with the lip process of some other Monads. Prehension of food effected by a contractile vacuole lying outside the collar. Distinct nucleus: a non-contractile vacuole. Sometimes develops a mucous coat, beset with foreign bodies.

Codosiga pulcherrima, Clark (18), p. 115, pl. iii. figs. 9–12; multiplication by longitudinal fission. General structure and functions of the collar-bearing flagellate Monads described (p. 116).

Bicosœca [*Bicœ-*], Clark, *B. lacustris*, Clark? (15), p. 231, fig. 6; forms colonies.

Bicosœca lacustris, Clark, *B. gracilipes*, Clark (18), pl. iv. figs. 45–49 & 53.

Codonœca costata, Clark, (18) pl. iv. fig. 50.

Dinobryon [*-um*] *sertularia*, Ehrb. (15), p. 233, fig. 11. An accessory cilium and two contractile vacuoles present. Apparently buds and encysts.

Dinobryon sertularia, Ehrenberg, *D. petiolatum*, Dujardin (18), pl. iv. figs. 54–56.

Autophysa, Bory de Vincent, *A.* (*Volox*) *vegetans*, O. F. Müller (15), pp. 216 & 217, pl. xii. fig. 8.

Trepomonas agilis, Dujard. (15), p. 235, fig. 16. Exhibits protoplasm-streaming. A nucleus.

Hexamitus inflatus, Dujard. (15), p. 238, fig. 20. Nucleus.

Pyramimonas descissa, Perty (15), p. 240, fig. 21, and *Chilomonas paramœcium*, Ehrb. fig. 15.

Astasia (15): *A. trichophora*, Ehrb., p. 248, fig. 19.

Anisonema (15): *A. acinus*, Duj., p. 253, fig. 17; *A. sulcatum*, Duj., fig. 18; during fission the nucleus becomes striated, and divides with the body. *Lophomonas blattarum*, Stein (15), fig. 24.

Polytoma uvella, Ehrb. (7), p. 182, pl. x. figs. 18–25. Development; passes through Morula stage.

Astasia deformis, Fromentel (7), p. 185, pl. x. fig. 33. Protrudes amœboid processes.

Euglena viridis, Müll. (7), p. 186, pl. xi. figs. 38 & 39. Development by encystation, &c. *E. pyrum*, Ehrb. pl. x. fig. 38.

A list of the marine Monads of the fauna of Northern Russia given (7), p. 216.

Bütschli (15) describes the following, indicating the names which he considers must be reduced to merely synonymic rank:—*Spumella*, Cienkowski (p. 208); *S. termo*, Clark, p. 208, pl. xii. fig. 7; has a vacuolated lip like that of *S. vulgaris*, Clark, serving as a mouth; nucleus in front end of the body; development by fission alone observed; *S. vulgaris*, Cienkowski, p. 212; probably has but one accessory ilium. *S.* ? (*Monas*) *truncata*, Fresenius, p. 213, pl. xiii. fig. 14; has a dark stripe near the front edge, perhaps analogous to the "eye-spots" of other *Flagellata*. *Chromulina*, Cienkowski, *C.* (*Monas*) *ochracea*, Ehrb., ?, p. 214, pl. xii. fig. 10, identity doubtful.

Flagellate form (15), p. 216, pl. xi. fig. 9, in colonies, parasitic in a Nematode.

Vacuoles in *Spumella termo* (15) are the first receptacles of the food, which is afterwards left in the protoplasm.

Chlamydomonas pulvisculus, Ehrb.; (9) p. 453, figs. 20-25. Nucleus and contractile-vacuole lie in the chlorophyll-less space. Development: conjugation by contact at clear spaces; a canal is formed through the two integuments, the two cells fuse, the cilia are lost, a new cuticle is acquired, and the joint cell re-divides into two.

Ciliophrys infusionum, Cien., (15) fig. 22.

"Cilium-bearing rhizopod," (15) p. 269, fig. 23, resembles *Ciliophrys infusionum*, Cienkowski, but has cilium and pseudopodia coexisting.

New Genera and Species.

Salpingœca inquillita, *S. ampulla*, (formation of tube by mucous excretion), *S. tuba*, *S. cornuta*, *S. longipes*, *S. teres*, *S. fusiformis*, *S. minuta*, *S. curvipes*, *S. ringens*, *S. urceolata*, *S. pyxidium*, *S. amphora*, *S. tintinnabulum*, *S. napiformis*, *S. petiolata*, *S. carteri*, *S. wallichi*, Kent; (18), pl. iv. figs. 8–19, 21–34, 37–41, & 43.

Salpingœca fusiformis, Kent, *suprà* (17), p. 145, pl. vi., = *S. clarkii*, Bütschli.

Salpingœca clarkii, Bütschli (15), p. 229, pl. xi. 2, and an unnamed species attached to this genus, p. 230, pl. xi. fig. 5; no nucleus.

Bicœca socialis, *B. bulla*, Kent; (18) pl. iv. figs. 44 & 52.

Codosiga cymosa, *C. alloides*, *C. umbellata*, *C. furcata*, *C. grossulariata*, *C. pyriformis*, *C. candelabrum*, Kent; (18), pl. iii. figs. 1–5, 13, 14, 17, 24, & 26.

Monosiga angustata, Kent; (17) p. 143, pl. vi. fig. 14.

Monosiga angustata, Kent, *M. brevipes*, Kent, *M. globularis*, Kent, *M. gracilis*, Kent, *M. consociatum*, Kent; (18), pl. iii. figs. 8, 15, 16, 18, 19, 21, & 22.

Astrosiga disjuncta, Kent; (18) pl. iii. fig. 20.

Dinobryon [*-um*] *epistyloides*, Kent; (18) pl. iv. fig. 51.

Desmarella moniliformis, Kent; (17) p. 147, pl. vii. fig. 9, in salt water.

Heteromita uncinata, Kent; (17) pl. vi. figs. 27–33. The "hooked Monad" of Dallinger and Drysdale.

Heteromita sulcata, Mereschkowsky (7) p. 189, pl. xi. figs. 12–14, var. *truncata*, White Sea coast, var. *ovalis*, id. *l. c.*, Northern Dwina.

Heteromita cylindrica and *adunca*, Mereschkowsky (7), p. 190, pl. xi. figs. 18 & 4, White Sea.

Lagenella cuspidata, Kent (18), pl. iv. fig. 42.

Stein (19) figures (indicating the different organs and, in many cases, the transformations of) the following species described or to be described by himself :—*Cercomonas ramulosa, obesa, Bodo globosus, gracilis, Phyllomitus undulans, Tetramitus sulcatus, Hexamita rostrata, Lophomonas blattarum, Rhipidodendrum splendidum, Cephalothamnium cyclopum, Cladomonas fruticulosa, Spongomonas uvella, discus, Phalansterium digitatum, Platytheca micropora, Codonosiga botrytis, Codonodesmus phalanx, Salpingœca convallaria, vaginicola, oblonga, clarki, Poteriodendrum petiolatum, Dinobryum stipitatum, Chrysopyxis bipes, Hymenomonas roseola, Stylochrysalis parasitica, Chlamydomonas albo-viridis, operculata, metastigma, grandis, Chlamydococcus alatus, fluviatilis, Volvox minor, Nephroselmis olivacea, Colacium calvum, arbuscula, Ascoglena vaginicola, Trachelomonas rugulosa, lagenella, eurystoma, bulla, Astasia proteus, Scytomonas pusilla, Petalomonas medio-canellata, sinuata, ervilia, Atractonema teres, Phialonema cyclostomum, Sphenomonas quadrangularis, Tropidocyphus octo-costatus, Anisonema truncatum, Colponema loxodes, Coccomonas orbicularis.*

Astasia guttula, Mereschkowsky (7), p. 184, = *Astasia inflata*, Fromentel, *nec* Duj. No contractile vacuole seen. Wologda, St. Petersburg, Lake Onega.

Lophomonas striata, Bütschli (15), sp. n. ?, p. 261, fig. 25, in rectum of *Blatta orientalis*.

Chilomonas curvata, Strasburger, Jen. Z. Nat. xii. p. 562, stream near Jena, Germany.

Gloidium, Sorokin, Morph. JB. iv. p. 399. A non-nucleated amœboid form with single slowly-acting vacuole; reproduces by fission into four parts; shows encystation. *G. quadrifidum*, Sorokin, *l. c.* pl. xx., fresh water, Kasan ?

Monobia confluens, Schneider, Arch. Z. expér. vii. p. 585, pl. xxxi. No nucleus or contractile vacuole; the protean body sends out fine pseudopodia; reproduction by fission, which may produce a continuous colony. In fresh water.

Protomyxa viridana, Grimm (16), Baltic. Many contractile vacuoles; reproduction by fission, encystation, and conjugation; the embryoes from the cysts possess no flagella.

Hæckelina, Mereschkowsky (7), p. 211. Differs from other *Monera* in having a pedicel; body clad with free pseudopodia. *H. borealis*, id., pl. xi. fig. 5, White Sea.

Merotricha, Mereschkowsky (7), p. 186. Green, with a lateral cilium springing from a depression; radiating rods (trichocysts ?) pass to surface above contractile vacuole. *M. bacillata*, id. pl. x. fig. 41, Lake Onega.

Urceolus, Mereschkowsky (7), p. 188. A flask-shaped Monad, narrow above and below; a mouth with cilium springing from its floor. *U. alenizini*, id. pl. xi. figs. 1 & 2, White Sea.

Parcella, Grimm (16). *P. lamprosa*, Grimm, *l. c.* Differs from single individuals of *Magosphæra planula* by possessing one flagellum instead of the cilia. Forms colonies of 3 to 40 individuals, which lose the flagellum and assume an amœboid form on dispersion of colony; these encyst and break up internally by imperfect fission, forming a morula, each segment acquiring a flagellum and vacuole; fission proceeds to production of 100 segments after loss of cyst.

Synura volvox, Grimm (16), = *Parcella ocellata*, Grimm, sp. n. [!]

Protamœba grimmi, Mereschkowsky (7), p. 214, pl. xi. figs. 36 & 37, White Sea.

Anatomy and Physiology.

Uvellina, Meresch. (7), p. 178, to be regarded as a living *Morula*, or transition from uni- to poly-cellular organisms. But segmentation of *Monera* differs essentially from that of an ovum in its being carried out at one stroke.

Division *Cylicomastiges* (15), p. 220, compared with the Sponges in the possession of "collars" to the ciliated cells.

Structure of collar-bearing Monads reviewed by W. S. Kent, Ann. N. H. (5) i. p. 1; the collar shows circulating protoplasmic streams which bring food into the calyx.

A Flagellate Infusorian described and figured from the blood of the tree-frog, *Hyla*, by J. D. Schmidt; J. R. Micr. Soc. i. p. 108, pl. i. fig. 58.

GREGARINIDA.

Gabriel, J. B. schles. Ges. lv. p. 68, states that isolated pseudo-navicella-cysts from Lumbricine Worms when observed for some time showed a gradual thinning of their coats, and eventually burst. The pseudo-navicellæ exhibit minute viscous drops at both poles. Isolated ones show contraction of their protoplasm to a globular and then an oval form; in the latter case it is enveloped by a clear layer.

Generalities, Cell Theory, Phylogeny, &c.

The following may be specially noted:—

Forel, D. A. Faunistische Studien in der Süsswasserseen der Schweiz. Z. wiss. Zool. xxx. suppl. p. 384.

Distinguishes a (i.) *littoral*, (ii.) *pelagic*, and (iii.) *deep* region in these lakes.

(i.) 10–15 mètres deep. Fauna well known.

(ii.) From littoral zone to the middle, and almost to the bottom.

(iii.) The bottom and the layer immediately above it; depth from 15 mètres near edge to 334 at deepest part.

Most freshwater types represented, except *Naiades* and *Spongiida*. Of *Protozoa* in Lake of Geneva, *Epistylis*, *Vorticella*, *Acineta*, *Rhizopoda*, *Amœboidea*.

(Lists also given of the chief forms of other groups and of the flora,

and interesting details as to temperature, light, &c.) He considers that the fauna was exterminated by ice at the end of Tertiary epoch, and the present fauna has immigrated since then, and therefore its facies is Quaternary. Points out the origin of the peculiar characters of the various regions, and the fact of all the lakes having a practically identical fauna.

MACALISTER, A. Zoology af the Invertebrate Animals. London Science Class-books, 1878.

An elementary text-book. The Sponges are constituted a distinct subkingdom—POLYSTOMATA; the *Amœbidæ* and *Heliozoa* are placed together as class PROTOPLASTA.

BRANDT, A. Ueber das Ei und seine Bildungstätte. Leipzig: 1878, 4 pls.

A well illustrated work of 200 pp., giving an elaborate account of the insect ovary, genital organs, and egg; a chapter is devoted to the comparative anatomy of the egg, referring to examples from the sub-kingdoms *Vermes* and *Vertebrata*, and from other classes of the *Arthropoda*.

VOGELPOEL, P. G. J. Over kern- en celdeeling. Leiden: 1878, 58 pp., 1 pl. (An Inaugural Dissertation; reported in Niederl. Arch. Zool. v.)

Experiments on epithelial and cartilage cells show a disappearance of the nucleolus, and an increase in the number of the nuclear granules, which ultimately become aggregated, generally into rods.

BÜTSCHLI, O. Ueber die neueren Resultate in der Erforschung der Befruchtungsvorgänge. Ber. senck. Ges. 1877–8, p. 145.

WATTENWYL, B. VON. Principien der Systematik. Verh. z.-b. Wien, xxvii. p. 10.

Address on the principles of systematic zoology. He contrasts the purely expediential object of Linné in classification with the present attempts hereby to trace out the past history of organisms. Lays weight on the non-essential organs and parts of organs as bases for the formation of good specific characters.

OWEN, R. On the influence of the Advent of a higher Form of Life in modifying the structure of an older and lower Form. J. Geol. Soc. xxxiv. p. 421.

COPE, E. D. The Relation of Animal Motion to Animal Evolution. Am. Nat. xii. p. 40.

INDEX TO

GENERA AND SUBGENERA RECORDED AS NEW IN THIS VOLUME.

INCLUDING NAMES PROPOSED FOR GENERA ALREADY CHARACTERIZED.*

The symbol ‖ indicates that the name to which it is affixed has been used before in Zoology.]

Abacocrinus, *Angelin*, Ech. 13.
Abacomorphus, *Chaudoir*, Ins. 35.
Abatocera, *J. Thomson*, Ins. 111.
Abila, *Stal*, Ins. 273.
Abisares, *Stal*, Ins. 273.
Acanthocnemes, *Chambers*, Ins. 230 [-mis, *Hawle & Corda*, Crust. 1847. *Blanchard*, 1852, and *Signoret*, 1865, Ins.; -mus, *Perris*, Ins. 1866].
Acanthonus, *Günther*, Pisc. 24.
Acanthoperca, *Castelnau*, Pisc. 15.
Acanthopus ‖, *Vernet*, Crust. 42 [*Klug*, 1807, and *Megerle*, 1821, Insecta; *De Haan*, Crustacea, 1835].
Acanthotribola, *Czerniavsky*, Crust. 16.
Achatinelloides, *Nevill*, Moll. 69.
Acidoproctus, *Piaget*, Ins. 250.
Acra, *Brunner*, Ins. 268.
Acrochordonodes, *Bigot*, Ins. 242.
Acroclisis, *Förster*, Ins. 148.
Acropsilus, *Mik*, Ins. 242.
Actinocoris, *Reuter*, Ins. 281.
Actinus, *Fauvel*, Ins. 45.
Actoniscus, *Harger*, Crust. 36.
Acureuta, *Zeller*, Ins. 230.
Adelodemus, *Haag*, Ins. 88.
Adimantus, *Stal*, Ins. 273.
Æchmoptila, *Coues*, Aves, 53.
Aedis, *Grote*, Ins. 223.
Ægœonichthys, *Clarke*, Pisc. 19.
Ægopina, *Kobelt*, Moll. 64.
Agenigobio, *Sauvage*, Pisc. 32.
Agesander, *Stal*, Ins. 273.
Aglaostola, *J. Thomson*, Ins. 66.
Aguotecous, *Saussure*, Ins. 265.
Agrametra, *White*, Ins. 281.
Agriorrhynchus, *Power*, Ins. 106.
Alampetis, *J. Thomson*, Ins. 68.
Alauretta, *Mereschkowsky*, Verm. 4.
Alcamenes, *Stal*, Ins. 273.
Aleuas, *Stal*, Ins. 273.
Allodapa, *Brunner*, Ins. 268 [-pe, *Lepelletier & Serville*, Ins. 1825].
Allœoneura, *F. Löw*, Ins. 289 [Allon-, *Rondani*, 1856, *Selys*, 1860, Ins.].
Allœoneurus, *Mik*, Ins. 242.
Allogaster ‖, *Selys*, Ins. 256 [*J. Thomson*, Ins. 1864].
Allophyton, *J. Thomson*, Ins. 108.
Althæmenes, *Stal*, Ins. 273.
Amaura ‖, *Brunner*, Ins. 268 [*Möller*, Moll. 1842].
Amblyodus, *Westwood*, Ins. 61 [-don, *Agassiz* (amending *Jourdan*, Mamm., and *Rafinesque*, Pisc.), 1848].

* The total number of new genera recorded, with none in the Arachnida, is 1157, as against the 878 of Zool. Rec. xiv. (1877), which included that group. These are divided as follows:—Mammalia, 15; Aves, 20; Reptilia, 10; Pisces, 53; Mollusca and Molluscoida, 50; Crustacea, 63; Myriopoda 1; Insecta, 774; Vermes, 13; Echinodermata, 57; Cœlenterata, 29; Spongiida, 56; and Protozoa, 16.

Amblyopus ‖, *Saussure*, Ins. 265 [*Valenciennes*, Pisc. 1837; *Chevrolat*, Ins. 1842].
Ambly [r] rhina, *F. Löw*, Ins. 289 [-nus, *Schönherr*, Ins. 1826].
Amblysterna, *J. Thomson*, Ins. 65.
Ametropus, *Albarda*, Ins. 251.
Amithao, *J. Thomson*, Ins. 62.
Amphidozotherium, *Filhol*, Mamm. 12.
Amphiglypha, *Pohlig*, Ech. 12.
Amphisbeta, *J. Thomson*, Ins. 65.
Ampthethelion [-lium], *Zittel*, Spong. 14.
Amusus, *Saussure*, Ins. 263.
Amyia, *J. Thomson*, Ins. 66.
Anaciæschna, *Selys*, Ins. 255.
Anaua, *Stal*, Ins. 273.
Anchirithra, *Butler*, Ins. 205.
Anchonocerus, *Eichhoff*, Ins. 103.
Anchylonyx, *Streets*, Crust. 33 [rectius Ancylonyx; -nycha, *Dejean*, Ins. 1833].
Anepsia, *Brunner*, Ins. 268 [-sius, *Le Conte*, 1851, *Löw*, 1857, *Candèze*, 1860, and *Puton*, 1869, Ins.].
Angarina, *Bayle*, Moll. 52.
Aniara ‖, *Brunner*, Ins. 267 [*Dejean*, 1833, *Hope*, 1838, Ins.].
Anisocrinus, *Angelin*, Ech. 13.
Anisotrypus, *Saussure*, Ins. 265.
Anniceris, *Stal*, Ins. 273.
Anoglyphis, *Förster*, Ins. 150.
Anomacaulus, *Fairmaire*, Ins. 62.
Antandrus, *Stal*, Ins. 273.
Anthemiphyllia, *Pourtales*, Cœl. 4.
Anthermus, *Stal*, Ins. 273.
Anthocroca, *Butler*, Ins. 208.
Anthomastus, *Verrill*, Cœl. 6.
Anthraxantha, *Fairmaire*, Ins. 119.
Antimerus, *Fauvel*, Ins. 45.
Antiphanes, *Stal*, Ins. 273.
Antiphon, *Stal*, Ins. 273.
Aphasius, *Saussure*, Ins 265.
Aphyonus, *Günther*, Pisc. 25.
Aplax ‖, *J. Thomson*, Ins. 68 [*Meyer*, Rept. 1843].
Aplectoides, *Butler*, Ins. 212.
Aplysilla, *Schultze*, Spong. 4, 8.
Apoballa, *Brunner*, Ins. 268.
Apocerycta, *Brunner*, Ins. 268.
Apocnosis, *J. Thomson*, Ins. 63.
Apocremnus ‖, *Milne-Edwards*, Crust. 16 [*Fieber*, Ins. 1858].
Apytho, *Reitter*, Ins. 54.
Aquinillum, *J. Thomson*, Ins. 108.
Arachnopsis, *Saussure*, Ins. 263.
Aracima, *Butler*, Ins. 219.
Aræspor, *J. Thomson*, Ins. 108.
Archidoris, *Bergh*, Moll. 57.
Archientrychæus, *Eisen*, Verm. 13.
Arethæa, *Stal*, Ins. 268.
Argaterma, *White*, Ins. 287.
Argillornis, *Owen*, Aves, 59.
Argyripa, *J. Thomson*, Ins. 63.
Arinia, *Mulsant*, Aves, 39.
Aristeus ‖, *Castelnau*, Pisc. 21 [*Dufrenoy*, Crust. 1840; rectius Aristæus].
Aristhala, *Moore*, Ins. 208.
Aristia, *Stal*, Ins. 274.
Aristobrium, *J. Thomson*, Ins. 108.
Arnobia, *Stal*, Ins. 268.
Arrhythmus, *Waterhouse*, Ins. 109.
Arthrolytus, *C. G. Thomson*, Ins. 150.
Arthrostictus, *Bates*, Ins. 33.
Arymylæna, *J. Thomson*, Ins. 108.
Asemantus, *Förster*, Ins. 148.
Asopis, *Haag*, Ins. 89 [-pus, *Burmeister*, Ins. 1835].
Assecla, *Streets*, Crust. 19.
Astacopsis, *Huxley*, Crust. 25.
Astrobolia, *Zittel*, Spong. 14.
Astrochele, *Verrill*, Ech. 11.
Astrocladia, *Zittel*, Spong. 14.
Astrimus, *Sharp*, Ins. 109.
Astylus ‖, *Moseley*, Cœl. 18 [*Laporte*, Ins. 1836].
Asyncrita, *Förster*, Ins. 140.
Atelius, *Waterhouse*, Ins. 75.
Atrachycnemis, *Blackburn*, Ins. 33.
Atritomus, *Förster*, Ins. 154.
Atrometus, *Förster*, Ins. 143.
Attatha, *Moore*, Ins. 197.
Atyphopsis, *Butler*, Ins. 197.
Auchoteles, *Zeller*, Ins. 226.
Aulacostethus ‖, *Uhler*, Ins. 278 [*C. O. Waterhouse*, Ins. 1869].
Aulaxinia [Aulac-], *Zittel*, Spong. 14.
Aulospongus, *Norman*, Spong. 7, 10.
Austenia, *Nevill*, Moll. 62.
Avenardia, *Giard*, Verm. 3.
Axinopsis, *Sars*, Moll. 84.
Azteca, *Forel*, Ins. 136.

Bæacis, *Förster*, Ins. 146.
Baltia, *Moore*, Ins. 172.
Barbiger, *Jakovleff*, Ins. 279.
Baroa, *Moore*, Ins. 200.
Barrandeocrinus, *Angelin*, Ech. 13.
Barsinella, *Butler*, Ins. 199.
Basanus [Dej.], *Chevrolat*, Ins. 87.
Bathydraco, *Günther*, Pisc. 19.
Bathygadus, *Günther*, Pisc. 24.
Bathylagus, *Günther*, Pisc. 30.
Bathynectes, *Günther*, Pisc. 24.

Bathyophis, *Günther*, Pisc. 29.
Bathypterois, *Günther*, Pisc. 29.
Bathysaurus, *Günther*, Pisc. 28.
Bathytroctes, *Günther*, Pisc. 34.
Beddomea, *Nevill*, Moll. 68.
Beradia (?), *Castelnau*, Pisc. 16.
Bermius, *Stal*, Ins. 273.
Beta, *Saussure*, Ins. 131.
Bibracte, *Stal*, Ins. 273.
Biopalla, *Wallace*, Spong. 13.
Blackburnia, *Sharp*, Ins 37.
Blastosmilia, *Duncan*, Cœl. 4.
Blastothela, *Verrill*, Cœl. 14.
Bledionotus, *Reuter*, Ins. 280.
Blepharum, *J. Thomson*, Ins. 66.
Bolidium, *Zittel*, Spong. 14.
Boreochiton, *Sars*, Moll. 55.
Boreofusus, *Sars*, Moll. 36.
Botryocrinus, *Angelin*, Ech. 13.
Brachyonychus, *Chaudoir*, Ins. 30 [-cha, *Agassiz*, 1848, amending Brachionycha, *Hübner*, Lepidoptera, 1816; -nyx, *Agassiz*, amending *Schönherr*, Coleoptera, 1826].
Brachyxanthia, *Butler*, Ins. 212.
Bradophila, *Levinsen*, Crust. 45.
Bradyina, *Möller*, Prot. 12.
Briarocrinus, *Angelin*, Ech. 13.
Brisbania, *Castelnau*, Pisc. 34.
Brounia, *Sharp*, Ins. 69.
Brunia, *Moore*, Ins. 200.
Bucapra, *Rütimeyer*, Mamm. 19.
Byrrhodes, *Sharp*, Ins. 74.
Byrrhodes, *Le Conte*, Ins. 81.
Byrsophlebs, *Jensen*, Verm. 3.

Cacoscapus, *J. Thomson*, Ins. 111.
Cacozelia, *Grote*, Ins. 223.
Cænocrepis, *C. G. Thomson*, Ins. 148.
Calamo[r]rhynchus, *Streets*, Crust. 34.
Calledema, *Butler*, Ins. 204 [Callid-, *Guérin*, Ins. 1843].
Calliana, *Moore*, Ins. 188.
Calliscotus, *Butler*, Ins. 213.
Callisto[r]rhina, *Bigot*, Ins. 244.
Callopegma [Calli-], *Zittel*, Spong. 14.
Calophya [Calli-], *F. Löw*, Ins. 289.
Calothemis [Calli-], *Selys*, Ins. 253.
Calpiocrinus, *Angelin*, Ech. 13.
Calybistum, *J. Thomson*, Ins. 108.
Calymmatina, *Zittel*, Spong. 14.
Calyptotrypus, *Saussure*, Ins. 264.
Camelocapsus, *Reuter*, Ins. 281.
Camiarus, *Sharp*, Ins. 50.
Capissa, *Moore*, Ins. 200.
Caprellina [, *W. Thomson*, Crust. 34 [*Erichson*, Crust. 1843, as a group].
Carcinias, *J. Thomson*, Ins. 65.
Cardiodactylus, *Saussure*, Ins. 264.
Carsula, *Stal*, Ins. 274.
Carterella, *Zittel*, Spong. 14.
Caryanda, *Stal*, Ins. 273.
Caryocystis, *Angelin*, Ech. 13.
Casigneta, *Brunner*, Ins. 267 [-tus, *Macleay*, Ins. 1819].
Cassidabothris, *J. Thomson*, Ins. 66.
Catagama, *Sollas*, Spong. 13.
Catodaulis, *Speyer*, Ins. 187.
Catolaccus, *C. G. Thomson*, Ins. 150.
Cecidiptera, *Berg*, Ins. 225.
Cecidostiba, *C.G.Thomson*, Ins. 149.
Centrodora, *Förster*, Ins. 148.
Centrofera, *Brunner*, Ins. 267.
Centropholis, *Hilgendorf*, Pisc. 18.
Ceranchia, *Butler*, Ins. 207.
Ceratopelta, *Bigot*, Ins. 244.
Cer[at]orrhineta, *Zeller*, Ins. 227.
Cercina, *Stal*, Ins. 274.
Cervidia, *Stal*, Ins. 274.
Cervinia, *Brady*, Crust. 43.
Chænothorax, *Cope*, Pisc. 27.
Chalaraspis, *Willemöes-Suhm*, Crust. 30.
Chalcophoropsis, *J.Thomson*, Ins.65.
Chalcopœcila, *J. Thomson*, Ins. 66.
Challengeria, *W. Thomson*, Prot. 9.
Charæa, *Baly*, Ins. 119.
Charistephane, *Chun*, Cœl. 20.
Charitolophus, *Förster*, Ins. 148.
Chasmistes, *Jordan*, Pisc. 31.
Cheiridia [Chi-], *Baly*, Ins. 114.
Cheno[r]rhamphus, *Oustalet*, Aves, 45.
Chiridotea, *Harger*, Crust. 35 [-ta, *Wiegmann*, Ech., 1836].
Chlamydochiton, *Dall*, Moll. 55.
Chlanidota, *Martens*, Moll. 35.
Chonella, *Zittel*, Spong. 14.
Chrostus, *Cameron*, Ins. 70.
Chrysocharis, *C. G. Thomson*, Ins. 151.
Chrysorethrum, *Butler*, Ins. 213.
Churinga, *Moore*, Ins. 199.
Clathrodictyon, *Nicholson*, (Cœl. 15) Prot. 11.
Clathropleura, *Tiberi*, Moll. 55.
Clathroscula, *Mereschkowsky*, Spong. 9.
Cleistimum, *J. Thomson*, Ins. 108.
Clidochirus, *Angelin*, Ech. 13.
Clistothyris, *Zeller*, Ins. 230.
Closterothrix, *Mabille*, Ins. 204.

Clytarlus, *Sharp*, Ins. 109.
Cnemidiastrum, *Zittel*, Spong. 14.
Cnethocerus, *Bates*, Ins. 107.
Coccinellopsis, *J. Thomson*, Ins. 66.
Coccobaphes, *Uhler*, Ins. 282.
Coccotrypes, *Eichhoff*, Ins. 103.
Coccycolius, *Oustalet*, Aves, 51.
Cœlioxioides, *Cresson*, Ins. 127.
Cœlocorypha, *Zittel*, Spong. 14.
Cœlocrabro, *C. G. Thomson*, Ins. 134.
Cœlopisthus*, *C. G. Thomson*, Ins. 150.
Cœnotiata, *Buchecker*, Ins. 254.
Collita, *Moore*, Ins. 200.
Colynthæa, *J. Thomson*, Ins. 108.
Comps [o] helus, *Candèze*, Ins. 70.
Conoderus ‖, *De Sauley*, Ins. 50 [*Eschscholtz*, Ins. 1829].
Conophera, see Konophera.
Conopora, *Moseley*, Cœl. 18.
Copablepharon, *Harvey*, Ins. 213.
Copechæte, *Hesse*, Crust. 41.
Copocercia, *Zeller*, Ins. 230.
Cora ‖, *Brunner*, Ins. 268 [*Selys*, Ins. 1853].
Corallidium, *Zittel*, Spong. 14.
Corallis, *Fauvel*, Ins. 48.
Cordylocrinus, *Angelin*, Ech. 13.
Cornelia, *J. Thomson*, Ins. 68.
Corone ‖, *Mabille*, Ins. 189 [*Kaup*, Aves, 1829].
Correa, *Fauvel*, Ins. 43.
Corydalites, *Scudder*, Ins. 9.
Corymbocrinus, *Angelin*, Ech. 13.
Corymeta, *Brunner*, Ins. 267.
Coryphæola, *Butler*, Ins. 178.
Coryphoda, *Brunner*, Ins. 267 [-don, *Owen*, Mamm., 1845].
Cosmoderes, *Eichhoff*, Ins. 103.
Cosmochilus, *Sauvage*, Pisc. 31.
Cotylosoma, *Wood-Mason*, Ins. 262.
Cranae, *Stal*, Ins. 273.
Craspedochilus, *Sars*, Moll. 55.
Cratæpus, *Förster*, Ins. 151.
Cratinus, *Steindachner*, Pisc. 13.
Cratotechus, *C. G. Thomson*, Ins. 151.
Crepidocercus, *Birge*, Crust. 41.
Cribrospira, *Möller*, Prot. 12.
Cricellius, *C. G. Thomson*, Ins. 149.
Crossostoma, *Sauvage*, Pisc. 33.
Crucita, *Westerlund*, Moll. 71, 72.
Crypsodomus, *Levinsen*, Crust. 45.
Cryptazeca, *Folin*, Moll. 69.
Cryptobelus, *J. Thomson*, Ins. 107.
Cryptodacne, *Sharp*, Ins. 121.
Culapa, *Moore*, Ins. 181.
Cyalithus, *J. Thomson*, Ins. 65.
Cychramptodes, *Reitter*, Ins. 52.
Cycloidura, *Stebbing*, Crust. 37.
Cyclosemia, *Mabille*, Ins. 189.
Cyema, *Günther*, Pisc. 35.
Cylindrocranius, *Chaudoir*, Ins. 27.
Cylindrogryllus, *Saussure*, Ins. 264.
Cylindrohyphasma, *Steinmann*, Cœl. 16.
Cyllenula, *Czerniavsky*, Crust. 16.
Cylosphæra, see Kylosphæra.
Cyocyphax, *J. Thomson*, Ins. 111.
Cyphanus, *Sharp*, Ins. 74.
Cyphotelus, *Sharp*, Ins. 74.
Cyprobius, *Sharp* Ins. 74.
Cyrtidocrinus *Angelin*, Ech. 13.

Dacentrus, *Jordan*, Pisc. 23.
Dactychilikion, *Thominot*, Rept. 9.
Dakruma, *Grote*, Ins. 224.
Damarsila, *J. Thomson*, Ins. 66.
Daphænura. *Butler*, Ins. 196.
Dasyarthrus, *Mik*, Ins. 242.
Dasycarea, *Zeller*, Ins. 230.
Dasycephala ‖, *Staudinger*, Ins. 219 [*Swainson*, Aves, 1831].
Dasycrotapha, *Tweeddale*, Aves, 43.
Datanoides, *Butler*, Ins. 204.
Davidius, *Selys*, Ins. 256.
Debora, *Power*, Ins. 105.
Decophthalmus, *Chevrolat*, Ins. 95.
Dectonura, *Butler*, Ins. 286.
Deiopea, *Chun*, Cœl. 20 [-peia, *Stephens*, Ins., 1829].
Delia ‖, *Stal*, Ins. 273 [*R. Desvoidy*, Ins. 1830].
Delphinulopsis ‖, *Wright*, Moll. 51 [*Laube*, Moll., 1870].
Demetridula, *Chaudoir*, Ins. 28.
Demodocus, *Stal*, Ins. 273.
Demonax, *Stal*, Ins. 273.
Dercetis ‖, Grote, Ins. 217 [*Münster & Agassiz*, Pisc. 1834].
Dereutes, *Chevrolat*, Ins. 78.
Descoreba, *Butler*, Ins, 219.
Desicasta, *J. Thomson*, Ins. 63.

* The absence of the usual indications of novelty in Thomson's work renders it difficult to determine which of his groups are really new. There is a Cœlopisthia of *Förster*, 1856, in the same family, and five other groups, marked * infrà, are all attributed to this author under that date by Marschall.

Desmidocrinus, *Angelin*, Ech. 13.
Dexoris, *Waterhouse*, Ins. 75.
Diabaticus, *Bates*, Ins. 27.
Diadoxus, *J. Thomson*, Ins. 65.
Diana ‖, *Clessin*, Moll. 46 [*Risso*, Pisc. 1826].
Diaphora ‖, *F. Löw*, Ins. 289 [*Stephens*, Ins. 1829].
Diastella, *Brunner*, Ins. 267.
Dibrachys*, *C. G. Thomson*, Ins. 150.
Dicæarchus, *Stal*, Ins. 273.
Dicax, *Faucel*, Ins. 46.
Dichatomus, *Förster*, Ins. 150.
Dichopetala, *Brunner*, Ins. 266.
Dichromanassa, *Ridgway*, Aves, 57.
Dichthorrhinus, *Waterhouse*, Ins. 101.
Dicranaspes, *Mabille*, Ins. 188.
Dictator, *J. Thomson*, Ins. 108.
Dictyota, *Brunner*, Ins. 267.
Didrepanephorus, *Wood-Mason*, Ins. 60.
Digentia, *Stal*, Ins. 273.
Dignamptus, *Le Conte*, Ins. 88.
Diglochis*, *C. G. Thomson*, Ins. 150.
Diglyphis, *C. G. Thomson*, Ins. 151
Dilochrosis, *J. Thomson*, Ins. 63.
Dimachus, *C. G. Thomson*, Ins. 148.
Dinarmus, *C. G. Thomson*, Ins. 149.
Diogena, *Brunner*, Ins. 268.
Dioncomena, *Brunner*, Ins. 267.
Diphycerus, *Fairmaire*, Ins. 59.
Di[r]rhicnus, *C. G. Thomson*, Ins. 150.
Discostroma, *Zittel*, Spong. 14.
Disema ‖, *Förster*, Ins 148 [*Mäklin*, Ins. 1875].
Disenochus, *Blackburn*, Ins., 37.
Dolgoma, *Moore*, Ins. 200.
Dolichopsis, *Gorham*, Ins. 80.
Dohrnia ‖, *Czerniavsky*, Crust. 16 [*Newman*, 1851, *Bigot*, 1854, Ins.].
Doriduneulus, *Sars*, Moll. 58.
Doryderma, *Zittel*, Spong. 14.
Dotilla ‖, *Bergh*, Moll. 59 [Crustacea, teste *Von Martens*, l. c.].
Dromiella, *Czerniavsky*, Crust. 16.
Drymocoris, *Jakovleff*, Ins. 280.
Dryolestes, *Marsh*, Mamm. 23.
Dysagrion, *Scudder*, Ins. 9.
Dyscophus, *Burmeister*, Ins. 188.
Dysguorima, *Zeller*, Ins. 230.
Dysmorpha, *Brunner*, Ins. 268.

Eccoptoptera, *Chaudoir*, Ins. 29 [-rus, *Motschulsky*, Ins., 1863].
Echinosphæra, *Angelin*, Ech. 13.
Ecliptoloma, *Zeller*, Ins. 230.
Ecphantus, *Stal*, Ins. 273.
Ectadia, *Brunner*, Ins. 266 [-ius, *Förster*, Ins., 1856].
Ectecous, *Saussure*, Ins. 263.
Ectemna, *Brunner*, Ins. 268 [-nius, *Dahlbom*, Ins. 1845].
Ectomis, *Mabille*, Ins. 188.
Ectomus, *Mik*, Ins. 242.
Edaphellus, *Faucel*, Ins. 47.
Eguatius, *Stal*, Ins. 274.
Elaphocottus, *Sauvage*, Pisc. 20.
Elapocephalus, *Macleay*, Rept. 12.
Elbeuia, *Stal*, Ins. 268.
Elephantodeta, *Brunner*, Ins. 267.
Ellipsactinia, *Steinmann*, Cœl. 16.
Elopomorphus, *Cope*, Pisc. 27.
Emphylia, *Kölbel*, Crust. 37.
Enargopelte, *Förster*, Ins. 150.
Encarsia, *Förster*, Ins. 148.
Endecous, *Saussure*, Ins. 263.
Engonia, *Brunner*, Ins. 267.
Enharpya, *J. Thomson*, Ins. 68.
Enneboeus, *Waterhouse*, Ins. 87.
Enosmæus, *J. Thomson*, Ins. 108.
Enthymius, *Waterhouse*, Ins. 109.
Entium, *Sharp*, Ins. 101.
Epapterus, *Cope*, Pisc. 27.
Epicordulia, *Selys*, Ins. 255.
Epidromia, *Kossmann*, Crust. 21 [-mus, *Klein*, Moll. 1753].
Epigraphus, *Chaudoir*, Ins. 30 [-phia, *Stephens*, Ins. 1829].
Epimelus, *Milne-Edwards*, Crust. 19.
Epistomella, *Zittel*, Spong. 14.
Erebodes, *J. Thomson*, Ins. 68.
Erionota, *Mabille*, Ins. 188.
Erogala, *Jordan & Brayton*, Pisc. 33.
Eubrachis [-chys], [*Dej.*] *Baly*, Ins. 114 [-ium, *Wollaston*, Ins. 1862].
Euciroa, *Dall*, Moll. 83.
Eucrinus, *Angelin*, Ech. 13.
Euctimenaria, *Woods*, Moll. 94.
Eucystis, *Angelin*, Ech. 13.
Eulampra ‖, *Baly*, Ins. 115 [*Chaudoir*, Ins. 1848; -rus, *Fitzinger*, Rept. 1843].
Eumeda, *Castelnau*, Pisc. 26 [-don, *M. Edwards*, Crust. 1834; *Pascoe*, Ins. 1876].
Eumigus, *Bolivar*, Ins. 272.
Euparthenos, *Grote*, Ins. 211.
Euplocamis, *Chun*, Cœl. 20 [-mus, *Latreille*, Ins. 1809; *Philippi*, Moll. 1836; *Temminck*, Aves, 1838].
Euplomyia, *Bigot*, Ins. 239.
Eurycarabus, *Géhin*, Ins. 24.
Eurydinota, *Förster*, Ins. 148.

Eurypalpa, *Brunner*, Ins. 267 [-pus, *Macquart*, 1835, *Dejean*, 1837, Ins].
Euryphymus, *Stal*, Ins. 274.
Euryscapus, *Chevrolat*, Ins. 100.
Eurysphindus, *Le Conte*, Ins. 83.
Eurystomis, *Chaudoir*, Ins. 35 [-mus, *Vieillot*, Aves, 1816; *Rafinesque*, Pisc. 1820].
Eusomostrophus, *Tournier*, Ins. 95.
Euspirocrinus, *Angelin*, Ech. 13.
Eutelocarabus, *Géhin*, Ins. 24.
Eutheca ‖, *Baly*, Ins. 118 [*Kiesenwetter*, Ins. 1877].
Euthymele, *Mabille*, Ins. 188.
Euthyrrhachis, *Brunner*, Ins. 268.
Euxenura, *Ridgway*, Aves, 56.
Evides ‖, *J. Thomson*, Ins. 65 [*Hübner*, 1816, *Serville*, 1833, Ins.].
Exolytus, *Förster*, Ins. 140.
Exora ‖, *Brunner*, Ins. 266 [*Chevrolat*, Ins. 1839].

Falculina, *Zeller*, Ins. 230.
Floria, *F. Löw*, Ins. 289.
Frauenfeldia ‖, *Clessin*, Moll. 46 [*Egger*, Ins. 1865].
Furnia, *Stal*, Ins. 268.

Gampola, *Moore*, Ins. 200.
Gandhara, *Moore*, Ins. 200.
Gastropterus, *Cope*, Pisc. 22 [-rum, *Meckel*, 1813, -ra, *Blainville*, 1825, Moll.].
Gaurambopsis, *Kraatz*, Ins. 53.
Gelonætha, *J. Thomson*, Ins. 108.
Gemmulatrochus, *Duncan*, Cœl. 4.
Gerenia, *Stal*, Ins. 273.
Gesonia, *Stal*, Ins. 273.
Ghoria, *Moore*, Ins. 200.
Gissocrinus, *Angelin*, Ech. 13.
Gitognathus, *C. G. Thomson*, Ins. 147.
Gloidium, *Sorokin*, Prot. 16.
Glutops, *Burgess*, Ins. 239.
Glycichæra, *Salvadori*, Aves, 41.
Glyptocystis, *Angelin*, Ech. 13.
Glyptoderes, *Eichhoff*, Ins. 103.
Glyptolenus, *Bates*, Ins. 37.
Glyptosphæra, *Angelin*, Ech. 13.
Glyptostoma, *Binney*, Moll. 67.
Golinca, *J. Thomson*, Ins. 63.
Gomphocranum, *Jakovleff*, Ins. 279.
Gomphocystis, *Angelin*, Ech. 13.
Gonimbrasia, *Butler*, Ins. 207.
Goniochilus, *Harold*, Ins. 63 [-le, *Bell*, Crust. 1858].
Gonioryctus, *Sharp*, Ins. 52.
Gonyacantha, *Stal*, Ins. 274.
Gramma[to]dera, *Brunner*, Ins. 268.
Gulliveria, *Castelnau*, Pisc. 14.
Habritys, *C. G. Thomson*, Ins. 149.
Habrocytus, *C. G. Thomson*, Ins. 149.
Hæckelina, *Mereschkowsky*, Prot. 16.
Hæmatoides, *Fairmaire*, Ins. 74 [-todes, *Laporte*, Ins. 1835].
Halpe, *Moore*, Ins. 189.
Hammatofera [vox hybr.], *Brunner*, Ins. 267.
Hapa, *White*, Ins. 282.
Haplanar, *Chaudoir*, Ins. 33.
Harmocrinus, *Angelin*, Ech. 13.
Helicomitra, *Butler*, Ins. 202.
Helicothrix, *Galeb*, Verm. 7.
Heliodilus, *Milne-Edwards*, Aves, 35.
Hemiaclis, *Sars*, Moll. 48.
Hemi[a]rrhaphes, *Candèze*, Ins. 70.
Hemicophus, *Saussure*, Ins. 263.
Hemielimæa, *Brunner*, Ins. 266.
Hemiglypha, *Pohlig*, Ech. 12.
Hemiphonus, *Saussure*, Ins. 265.
Hemisobothris, *J. Thomson*, Ins. 68.
Hemisphærium, *Czerniavsky*, Crust. 16.
Hemitrichus, *C. G. Thomson*, Ins. 149.
Henoticonus, *Reitter*, Ins. 55.
Hepomidion, *J. Thomson*, Ins. 111.
Hermissenda, *Bergh*, Moll. 59.
Herozoum, *J. Thomson*, Ins. 108.
Hesudra, *Moore*, Ins. 199.
Heterobrissus, *Manzoni*, Ech. 12.
Heterostinia, *Zittel*, Spong. 14.
Heterotrypus, *Saussure*, Ins. 264.
Hilarotes, *J. Thomson*, Ins. 66.
Himerta, *Brunner*, Ins. 267.
Histeropsis, *Chevrolat*, Ins. 87.
Hisychius, *Stal*, Ins. 273.
Holcæus, *C. G. Thomson*, Ins. 149.
Holcomyrmex, *Mayr*, Ins. 136.
Holcorpa, *Scudder*, Ins. 9.
Holmgrenia, *Kreichbaumer*, Ins. 144.
Holocentropus, *McLachlan*, Ins. 248.
Homalocrinus, *Angelin*, Ech. 13.
Homœodytes, *Régimbart*, Ins. 41.
Homoporus, *C. G. Thomson*, Ins. 149.
Homotropus, *Waterhouse*, Ins. 61.
Honora, *Grote*, Ins. 224.
Hoplocrabro, *C. G. Thomson*, Ins. 134.
Hoplodactylus ‖, *Chaudoir*, Ins. 35 [*Grube*, Ech. 1840; *Fitzinger*, Rept. 1843].
Hoplopisa, see Oplopisa.
Hoplo[r]rhinus, *Cheevrolat*, Ins. 100.
Hyadella, *Czerniavsky*, Crust. 16.

Hyalothyrus, *Mabille*, Ins. 188.
Hyalotragos [-gus], *Zittel*, Spong. 14.
Hydranassa, *Ridgway*, Aves, 57.
Hydrocassis, *Fairmaire*, Ins. 42.
Hydronympha, *Buchecker*, Ins. 253.
Hylemera, *Butler*, Ins. 202.
Hylypsornis, *Bocage*, Aves, 49.
Hymenodora, *Sars*, Crust. 26.
Hyperammina, *Brady*, Prot. 9.
Hyperbius, *Förster*, Ins. 148.
Hyperius, *Fairmaire*, Ins. 59 [-ris, *Dejean*, Ins. 1833 ; -ria, *Latreille*, Crust. 1829].
Hyperomma, *Fauvel*, Ins. 47.
Hyperophora, *Brunner*, Ins. 267.
Hyperphrona, *Brunner*, Ins. 268.
Hypocharassus, *Mik*, Ins. 242.
Hypsinephus, *Bates*, Ins. 33.

Icaria ‖, *J. Thomson*, Ins. 66 [*Saussure*, 1853, *Schiner*, 1868, Ins].
Ilarionia, *Dames*, Ech. 12.
Ilburnia, *White*, Ins. 288.
Incalia, *Cameron*, Ins. 157.
Ioa, *Jordan & Brayton*, Pisc. 13.
Iosillago, *Macleay*, Pisc. 18.
Ipnops, *Günther*, Pisc 28.
Irma, *Grube*, Verm. 11.
Ischionoplus, *Chevrolat*, Ins. 95.
Ischyomius, *Chevrolat*, Ins. 89.
Ischyra, *Brunner*, Ins. 268 [-rus, *Chevrolat*, Ins. 1834].
Ismarus ‖, *Haag*, Ins. 90 [*Westwood*, Ins. 1840].
Isophya, *Brunner*, Ins. 266.
Isopora, *Studer*, Cœl. 5.
Isopsera, *Brunner*, Ins. 267.
Isor [rh] aphinia, *Zittel*, Spong. 14.
Isotima, *Brunner*, Ins. 267.
Ita, *Tournier*, Ins. 97.
Iulodimorpha, *J. Thomson*, Ins. 66.

Jansonius, *Baly*, Ins. 115.
Jereica, *Zittel*, Spong. 14.

Kangoropus, *Chevrolat*, Ins. 99.
Katha, *Moore*, Ins. 200.
Kolenatia, *Rondani*, Ins. 244.
Konophera [Co-], *Hutton*, Moll. 74.
Korawa, *Moore*, Ins. 199.
Kylosphæra [Cy-], *Jensen*, Verm. 3.

Labiopora, *Moseley*, Cœl. 18.
Laconides, *J. Thomson*, Ins. 68.
Læmostenus, *Bedel*, Ins. 37.
Laglaizia, *Bigot*, Ins. 243.
Lampetia ‖, *Chun*, Cœl. 20 [*Stephens*, 1829, *Boie*, 1837, Ins.].
Lamprochromus, *Mik*, Ins. 242.
Lamprogaster ‖, *Bolivar*, Ins. 269 [*Macquart*, Ins. 1843].
Langucys, *Butler*, Ins. 197.
Laonicus, *Haag*, Ins. 89.
Laphyctes, *Förster*, Ins. 142 [-tis, *Löw*, Ins. 1859].
Lasiargyra, *Mik*, Ins. 242.
Lefroyella, *W. Thomson*, Spong. 10.
Leiochiton [Lio-] ‖, *Guinard*, Ins. 248 [*Curtis*, Ins. 1831].
Leiodorella [Lio-], *Zittel*, Spong. 14.
Leiolophus [Lio-], *Miers*, Crust. 20.
Leiopython [Lio-], *Hubrecht*, Rept. 12.
Lenora, *Grube*, Verm. 11.
Lentula, *Stal*, Ins. 273.
Lepi [do] cerus, *Eichhoff*, Ins. 103 [-ra, *Stephens*, Ins. 1829].
Lepidops, *Miers*, Crust. 22.
Leptacotherulum, *Filhol*, Mamm. 17.
Leptobos, *Rütimeyer*, Mamm. 20.
Leptobrama, *Steindachner*, Pisc. 18.
Leptocotis, *Streets*, Crust. 34.
Leptocrinus, *Angelin*, Ech. 13.
Leptogomphus, *Selys*, Ins. 256.
Leptomicrus, *Fauvel*, Ins. 46.
Leptopom [at] oides, *Nevill*, Moll. 78.
Leptoscapus, *Chevrolat*, Ins. 95.
Leptosphetta, *Butler*, Ins. 204.
Leucitus, *Fauvel*, Ins. 46.
Leucographus, *Waterhouse*, Ins. 111.
Leucoptychia, *Crosse*, Moll. 78.
Libnetus, *Waterhouse*, Ins. 75.
Ligypterus, *Saussure*, Ins. 264.
Limernæa, *J. Thomson*, Ins. 108.
Lioderma ‖, *Uhler*, Ins. 279 [*Marseul*, Ins. 1857].
Lioponera, *Mayr*, Ins. 136.
Liostomia, *Sars*, Moll. 49 [-ma, *Swainson*, Moll. 1840].
Liothula, *Fereday*, Ins. 203.
Liotrachela, *Brunner*, Ins. 267. [See also Leio-.]
Lithopsis, *Scudder*, Ins. 10.
Lithymnetes, *Scudder*, Ins. 9.
Lobogestoria, *Reitter*, Ins. 56.
Logisticus, *Waterhouse*, Ins. 108.
Lophaster, *Verrill*, Ech. 6.
Lophophorus ‖, *Brady*, Crust. 43 [*Temminck*, Aves, 1815].
Lophosalea, *Beddome*, Rept. 10.
Lopidea, *Uhler*, Ins. 282.
Loryma, *Stal*, Ins. 274.
Lovenella ‖, *Sars*, Moll. 43 [*Hincks*, Cœl. 1869].
Lubomirskia, *Dybowsky*, Spong. 10.

Lucretilis, *Stal*, Ins. 273.
Luehdorfia, *Crüger*, Ins. 172.
Luetkenia ‖, *Duncan*, Ech. 11 [*Claus*, Crustacea, 1864; *Steindachner*, Pisces, 1876].
Lyctopholis, *Reitter*, Ins. 82.
Lyctoxylon, *Reitter*, Ins. 82.
Lygranea, *Butler*, Ins. 220.
Lygrotes, *Butler*, Ins. 199.
Lype, *McLachlan*, Ins. 248.
Lyponia, *Waterhouse*, Ins. 75.
Lyropæus, *Waterhouse*, Ins. 75.

Macellocerus, *Mik*, Ins. 242 [Macellecerus, *Solier*, Ins. 1848].
Machima, *Brunner*, Ins. 267 [-mus, *Löw*, Ins. 1849].
Macotasa, *Moore*, Ins. 200.
Macrima, *Baly*, Ins. 119.
Macrocephus, *Schlechtendal*, Ins. 155.
Macrocis, *Reitter*, Ins. 83.
Macrolycus, *Waterhouse*, Ins. 75.
Macroproctus, *Chaudoir*, Ins. 35.
Macropsebium, *Bates*, Ins. 109.
Macro[r]rhamphus, *Jakovleff*, Ins. 280.
Macruropsar, *Salvadori*, Aves, 51.
Mænolenura, *Butler*, Ins. 199.
Mahathala, *Moore*, Ins. 185.
Mahavira, *Moore*, Ins. 199.
Malacomys, *Milne-Edwards*, Mamm. 22.
Malaxia, *Fairmaire*, Ins. 120.
Mangalura, *Miers*, Crust. 28.
Marenestha, *Brunner*, Ins. 267.
Margareta, *White*, Ins. 280 [-rita, *Leach*, Moll. 1814].
Marsipella, *Norman*, Spong. 10.
Marthasterias, *Jullien*, Ech. 6.
Mascaria, *Angas*, Moll. 78.
Mastigochirus, *Miers*, Crust. 22.
Mastusia, *Stal*, Ins. 273.
Mayria, *Forel*, Ins. 136.
Mazæa, *Stal*, Ins. 274.
Mecedanops, *Reitter*, Ins. 53.
Megacystis, *Angelin*, Ech. 13.
Megalithista, *Zittel*, Spong. 14.
Megalognatha, *Baly*, Ins. 119.
Megalosoma, *Fedrizzi*, Myr. 1.
Megarrhaphis, *White*, Ins. 279.
Melanobatrachus, *Beddome*, Rept. 14.
Melanonus, *Günther*, Pisc. 23.
Menandris, *Haag*, Ins. 89.
Merimna, *J. Thomson*, Ins. 66.
Merotricha, *Mereschkowsky*, Prot. 16 [-trichæa, *Reuter*, Ins. 1875].
Mesambria, *Stal*, Ins. 273.
Mesenchytræus, *Eisen*, Verm. 13.
Mesocyphon, *Sharp*, Ins. 74.
Mesomedes, *Stal*, Ins. 268.
Mestocharis, *Förster*, Ins. 151.
Mesystœchus, *Waterhouse*, Ins. 61.
Metadichobunc, *Filhol*, Mamm. 17.
Metagerra, *White*, Ins. 280.
Metamorpha ‖, *Frey*, Ins. 230 [*Hübner*, Ins. 1816].
Metapa, *Stal*, Ins. 274.
Metrarga, *White*, Ins. 280.
Metridia ‖, *Norman*, Crust. 44 ["proposed for Metridium, which is preoccupied in the Cœlenterata" (*Oken*, 1815). *Boeck*, 1864, writes Metridia, teste *Marschall*; under any circumstances the alteration would be insufficient].
Metynnis, *Cope*, Pisc. 27.
Mezentia, *Stal*, Ins. 273.
Micardia, *Butler*, Ins. 212.
Micræschus, *Butler*, Ins. 219.
Micrambina, *Reitter*, Ins. 55.
Microcosmus ‖, *Heller*, Moll. 91 [*Linnæus*, Moll. 1746].
Microdynamis, *Salvadori*, Aves, 38.
Microdynerus, *C. G. Thomson*, Ins. 132.
Microlycus, *C. G. Thomson*, Ins. 151.
Micromalthus, *Le Conte*, Ins. 80.
Micromorphus, *Mik*, Ins. 242.
Microsaurus, [Dej.] *Bates*, Ins. 32.
Microsomus, *Chaudoir*, Ins. 30 [-ma, *Macquart*, Ins. 1855].
Microspongia, *Miller*, Spong. 13.
Minytrema, *Jordan*, Pisc. 31.
Miotropis *C. G. Thomson*, Ins. 150.
Mithuna, *Moore*, Ins. 200.
Mitradæmon, *Butler*, Ins. 199.
Molicorynes, *Waterhouse*, Ins. 99.
Monocotyle, *Taschenberg*, Verm. 2.
Monosacra *J. Thomson*, Ins. 66.
Morna, *White*, Ins. 282.
Mouhotia, *Baly*, Ins. 115.
Myagrus ‖, *Pascoe*, Ins. 111 [*Boie*, Aves, 1826].
Myelophilus, *Eichhoff*, Ins. 102 [-la, *Treitschke*, Ins. 1835].
Mylagaulus, *Cope*, Mamm. 22.
Myomenippe, *Hilgendorf*, Crust. 18.
Mysolius, *Fauvel*, Ins. 46.
Mythozoum, *J. Thomson*, Ins. 108.
Myxopoda, *Milne-Edwards*, Mamm. 11.

Nabidea, *Uhler*, Ins. 283.
Nannophlebia, *Selys*, Ins. 253.
Narathura, *Moore*, Ins. 185.

Nautia, *Stal*, Ins. 273.
Neanthes ‖, *Pascoe*, Ins. 111 [*Stal*, Ins. 1875].
Necremnus, *C. G. Thomson*, Ins. 151.
Nehela, *White*, Ins. 287.
Nelidus, *Chaudoir*, Ins. 35.
Neoenchytræus, *Eisen*, Verm. 13.
Neomiresa, *Butler*, Ins. 205.
Neophonia, *J. Thomson*, Ins. 63.
Neorrhina, *J. Thomson*, Ins. 63.
Neosilurus, *Castelnau*, Pisc. 26.
Neurocordulia, *Selys*, Ins. 254.
Neurogymnurus, *Filhol*, Mamm. 12.
Nibilia, *Milne-Edwards*, Crust. 17.
Nicarchus, *Stal*, Ins. 273.
Niphonissa, *Butler*, Ins. 219.
Niphræa, *Baly*, Ins. 118.
Nishada, *Moore*, Ins. 200.
Nisibistum, *J. Thomson*, Ins. 108.
Nothomorpha, *J. Thomson*, Ins. 66.
Nuceria ‖, *Stal*, Ins. 273 [*Walker*, Ins. 1856].

Obriaccum, *J. Thomson*, Ins. 108.
Ocypetes ‖, *J. Thomson*, Ins. 66 [*Wagler*, Aves, 1832; *E. Saunders*, Ins. 1871].
Odontosphindus, *Le Conte*, Ins. 83.
Olceclostera, *Butler*, Ins. 204.
Oligochætus, *Mik*, Ins. 242.
Oligoneura, *Bigot*, Ins. 239 [-ria, *Pictet*, Ins. 1845].
Omocestus, *Bolivar*, Ins. 272.
Omogonus, *Chevrolat*, Ins. 98.
Oncolopha, *Stal*, Ins. 274.
Onosandrus, *Stal*, Ins. 268.
Ophiernus, *Lyman*, Ech. 8.
Ophiobyrsa, *Lyman*, Ech. 9.
Ophiocamax, *Lyman*, Ech. 10.
Ophiochiton, *Lyman*, Ech. 9.
Ophiocrinus ‖, *Angelin*, Ech. 13 [*Salter*, 1856, and *Semper*, 1868, Ech.].
Ophiogeron, *Lyman*, Ech. 11.
Ophiolebes, *Lyman*, Ech. 11.
Ophiolipus, *Lyman*, Ech. 8.
Ophiomastus, *Lyman*, Ech. 7.
Ophiophyllum, *Lyman*, Ech. 9.
Ophioplinthus, *Lyman*, Ech. 7.
Ophiopyren, *Lyman*, Ech. 9.
Ophiopyrgus, *Lyman*, Ech. 8.
Ophiosciasma, *Lyman*, Ech. 11.
Ophiotrochus, *Lyman*, Ech. 9.
Oplopisa [Hop-], *Milne-Edwards*, Crust 17.
Orbillus, *Stal*, Ins. 274.
Orchithemis, *Brauer*, Ins. 253.
Oreocarabus, *Géhin*, Ins. 24.
Oreomys, *Heuglin*, Mamm. 21.
Orinocarabus, *Kraatz*, Ins. 26.
Orizabus, *Fairmaire*, Ins. 62.
Ornithoica[-œca], *Rondani*, Ins. 245.
Orobanus, *Le Conte*, Ins. 49.
Orogomphus, *Selys*, Ins. 256.
Orophora, *Fereday*, Ins. 203.
Orthoclostera, *Butler*, Ins. 204.
Osmilia, *Stal*, Ins. 274.
Oticlypeus, *Dames*, Ech. 12.
Oxymorpha*, *C. G. Thomson*, Ins. 151.
Oxyprora ‖, *Brunner*, Ins. 267 [*Stal*, Ins. 1873].

Pachycarabus, *Géhin*, Ins. 24.
Pachylælia, *Butler*, Ins. 203.
Pachyligia, *Butler*, Ins. 220.
Pachynesthus, *Hesse*, Crust. 44.
Pachynion [-nium], *Zittel*, Spong. 14.
Pachystroma, *Nicholson*, (Cœl. 15) Prot. 11.
Palæospiza, *Allen*, Aves, 50.
Palembolus, *Scudder*, Ins. 9.
Palinurellus, *Martens*, Crust. 23.
Pamphagodes, *Bolivar*, Ins. 272.
Parableta, *Brunner*, Ins. 268.
Paracaloptenus, *Bolivar*, Ins. 273.
Paracara, *Bleeker*, Pisc. 23.
Paracephala ‖, *J. Thomson*, Ins. 66 [*Baly*, Ins. 1877].
Paradesmarestia, *Czerniavsky*, Crust. 16.
Paradigma, *Buchecker*, Ins. 256.
Paraeneopterus [Paren-], *Saussure*, Ins. 264.
Paragalene, *Kossmann*, Crust. 18.
Par [a] hemiops, *Candèze*, Ins. 70.
Parallotrius, *Candèze*, Ins. 70.
Paramisgurnus, *Sauvage*, Pisc. 33.
Paramonolepis, *Czerniavsky*, Crust. 16.
Paranaudus, *Saussure*, Ins. 265.
Paranilicus, *Candèze*, Ins. 70.
Paraona, *Moore*, Ins. 199 [-nis, *Grube*, Verm. 1873].
Parapinotus, *Harold*, Ins. 58.
Parapontella, *Brady*, Crust. 44.
Parascela, *Baly*, Ins. 114.
Parastacus, *Huxley*, Crust. 25.
Paratillus, *Gorham*, Ins. 80.
Paratribola, *Czerniavsky*, Crust. 16.
Parcella, *Grimm*, Prot. 17.
Pardalota, *Brunner*, Ins. 267 [-tus, *Vieillot*, Aves, 1816].
Parolamia, *Scudder*, Ins. 9.
Pasiphae ‖, *J. Thomson*, Ins. 65 [*Spinola*, 1851, *E. Saunders*, 1871, Ins.].

Passandrina, *Reitter*, Ins. 54.
Patelliocrinus, *Angelin*, Ech. 13.
Pediomorphus, *Chaudoir*, Ins. 34.
Pelagophis, *Peters & Doria*, Rept. 12.
Pelanechinus, *Keeping*, Ech. 12.
Peleopoda, *Zeller*, Ins. 230.
Pellinula, *Czerniavsky*, Spong. 9.
Peltodytes, *Régimbart*, Ins. 40.
Pentacentrus, *Saussure*, Ins. 263.
Pentacheles, *Bate*, Crust. 24 [-chiles, *Klein*, Moll. 1751, as a group].
Peribos, *Lydekker*, Mamm. 20.
Perinænia, *Butler*, Ins. 213.
Perrieria, *Tapparone-Canefri*, Moll. 70.
Petrolystra, *Scudder*, Ins. 9.
Phænacra, *Förster*, Ins. 150.
Phænotherion [-ium], *Frivaldszky*, Ins. 106.
Phaneta, *Lefèvre*, Ins. 115.
Phaula ‖, *Brunner*, Ins. 267 [*Dejean*, Ins. 1834].
Phenomoe, *Stal*, Ins. 273.
Phidias, *Vollenhoven*, Ins. 145.
Philotrypesis, *Förster*, Ins. 148.
Phobetodes, *J. Thomson*, Ins. 65
Phœbolampta, *Brunner*, Ins. 268.
Phormincter, *Saussure*, Ins. 264.
Phosphæres, *J. Thomson*, Ins. 65.
Photismus, *C. G. Thomson*, Ins. 148.
Phthorius, *Eichhoff*, Ins. 104.
Phygela, *Stal*, Ins. 268.
Phyllogryllus, *Saussure*, Ins. 264.
Phyllomacromia, *Selys*, Ins. 255.
Phymatella, *Zittel*, Spong. 14.
Piestodactylus, *Saussure*, Ins. 264.
Pigiphila, *Buchecker*, Ins. 254.
Pinipestis, *Grote*, Ins. 224.
Pionocrinus, *Angelin*, Ech. 13.
Pisolambrus, *Milne-Edwards*, Crust. 18.
Pithauria, *Moore*, Ins. 188.
Plastocharis, *Förster*, Ins. 148.
Plataplecta, *Butler*, Ins. 212.
Platidiolus, *Chaudoir*, Ins. 39.
Platychonia, *Zittel*, Spong. 14.
Platygerrhus, *C. G. Thomson*, Ins. 148.
Platylambrus, *Milne-Edwards*, Crust. 18.
Platynectes, *Régimbart*, Ins. 41.
Platystolus, *Bolivar*, Ins. 269.
Platysyllis, *Grube*, Verm. 11.
Platytermus, *C. G. Thomson*, Ins. 149 [-ma, *Walker*, Ins. 1834].
Platytroctes, *Günther*, Pisc. 34.
Pleurodirus, *Chevrolat*, Ins. 95.
Pleuropachys ‖, *C. G. Thomson*, Ins. 151 [*Westwood*, Ins. 1837].
Pleurotropis, *C. G. Thomson*, Ins. 151.
Plinthosella, *Zittel*, Spong. 14.
Podopisa, *Hilgendorf*, Crust. 17.
Podur [o] hippus [Hippopodura], *Mégnin*, Ins. 249.
Pœcilobothrus, *Mik*, Ins. 242.
Pœcilochroa, *Chevrolat*, Ins. 78.
Pœcilocoris ‖, *Jakovleff*, Ins. 279 [*Dallas*, Ins. 1848].
Pœmenorthrus, *J. Thomson*, Ins. 111.
Poliopogon, *W. Thomson*, Spong. 10.
Polyarœa, *Fritsch*, Cœl. 8.
Polyaulacus, *Chaudoir*, Ins. 28.
Polycarpa, *Heller*, Moll. 92.
Polycelis ‖, *C. G. Thomson*, Ins. 150 [*Ehrenberg*, Verm. 1831].
Polyomyia, *Scudder*, Ins. 9.
Polyoon, *Hesse*, Crust. 44.
Polypea, *Fauvel*, Ins. 43.
Polypeltes, *Angelin*, Ech. 13.
Polyphyma, *Jakovleff*, Ins. 278.
Polypocephalus, *Braun*, Verm. 2.
Poly [r] rhembia, *Förster*, Ins. 140.
Pomelia, *Zittel*, Spong. 9.
Porenomena, *Brunner*, Ins. 267.
Porosphæra, *Steinmann*, Cœl. 16.
Potamo [r] rhina, *Cope*, Pisc. 27.
Potera, *Moore*, Ins. 219 [-ria, *Gray*, Moll. 1840].
Prabhasa, *Moore*, Ins. 200.
Prasyptera, *Baly*, Ins. 119.
Praxilla, *Stal*, Ins. 274.
Premnobius, *Eichhoff*, Ins. 103.
Prionacris, *Stal*, Ins. 273.
Prionolopha, *Stal*, Ins. 274.
Prionosthenus, *Bolivar*, Ins. 272.
Prismoptera, *Butler*, Ins. 208.
Problechilus, *Eichhoff*, Ins. 103.
Prodryas, *Scudder*, Ins. 9, 178.
Prolobodontus, ? *Desbrochers*, Ins. 99.
Prorasea, *Grote*, Ins. 223.
Prosagoga, *Brunner*, Ins. 268.
Protalpa, *Filhol*, Mamm. 12.
Proteocarabus, *Géhin*, Ins. 24.
Prote [r] rhinus, *Sharp*, Ins. 95.
Protocyathus, *Ford*, Cœl. 8.
Protodesmarestia, *Czerniavsky*, Crust. 16.
Protoesperia, *Czerniavsky*, Spong. 9.
Protomachus, *Stal*, Ins. 274.
Protomonolepis, *Czerniavsky*, Crust. 16.
Protophasma, *Brongniart*, Ins. 261.
Protoschmidtia, *Czerniavsky*, Spong. 9.
Proxenetes, *Jensen*, Verm. 3.
Psadara, *Miller*, Moll. 68.

Pseudambassis, *Castelnau*, Pisc. 15.
Pseudoburgilis, *Brunner*, Ins. 267.
Pseudochilus, *Fairmaire*, Ins. 74.
Pseudocyllene, *Czerniavsky*, Crust. 16.
Pseudomonolepis, *Czerniavsky*, Crust. 16.
Pseudophaneroptera, *Brunner*, Ins. 266.
Pseudophthalma, *J. Thomson*, Ins. 68.
Pseudosebastes, *Sauvage*, Pisc. 16.
Pseudototanus, *Hume*, Aves, 56.
Psilonotus ‖, *C. G. Thomson*, Ins. 149 [*Walker*, Ins. 1834; *Swainson*, Pisc. 1839].
Psychophasma, *Butler*, Ins. 197.
Psylacrida, *J. Thomson*, Ins. 108.
Psyllopsis, *F. Löw*, Ins. 289.
Psyra, *Stal*, Ins. 268.
Pteroscytus, *C. G. Thomson*, Ins. 149.
Pterosima, *Förster*, Ins. 148.
Pterostylus, *Mik*, Ins. 242.
Ptilanthura, *Harger*, Crust. 35.
Ptychogastria, *Allman*, Cœl. 15.
Pycnarthrum, *Eichhoff*, Ins. 103.
Pycnobothris, *J. Thomson*, Ins. 68.
Pycnosaccus, *Angelin*, Ech. 13.
Pyrgochonia, *Zittel*, Spong. 14.
Pyrocystis, *Murray*, Prot. 10.

Quadribola, *Czerniavsky*, Crust. 16.
Quassilabia, *Jordan*, Pisc, 31.
Quediopsis, *Fauvel*, Ins. 45.

Racilia, *Stal*, Ins. 274.
Radinacra, *Butler*, Ins. 212.
Ragadinia [Rha-], *Zittel*, Spong. 14.
Ranghana, *Moore*, Ins. 200.
Reclada, *White*, Ins. 280.
Reinhardtia, *Böttger*, Moll. 73.
Reuda, *White*, Ins. 282.
Rhabdophorus ‖, *Lefèvre*, Ins. 115 [*Agassiz*, 1848, amending Rabdophorus, *Swainson*, Pisces, 1839].
Rhacodiscula, *Zittel*, Spong. 9, 14.
Rhagadinia, see Ragadinia.
Rhagiosoma, *Chapuis*, Ins. 113.
Rhamphomantis, *Salvadori*, Aves, 38.
Rhaphidistia, *Carter*, Spong. 13.
Rhicnopelte, *Förster*, Ins. 150.
Rhinolius, *Chevrolat*, Ins. 98.
Rhinoscepsis, *Le Conte*, Ins. 49.
Rhinospathe, *Chevrolat*, Ins. 95.
Rhipistena, *Sharp*, Ins. 93.
Rhizœcus, *Künckel*, Ins. 291.
Rhodinicola, *Levinsen*, Crust. 45.
Rhopalotria, *Chevrolat*, Ins. 97.
Rhopalotus*, *C. G. Thomson*, Ins. 151.
Rufina, *Clessin*, Moll. 60.
Rusobria, *Cameron*, Ins. 157.

Saccopsis, *Levinsen*, Crust. 45.
Saporœa, *J. Thomson*, Ins. 108.
Saribia, *Butler*, Ins. 182.
Sarpestus, *Spangberg*, Ins. 287.
Saulostomus, *Waterhouse*, Ins. 61.
Scambophyllum, *Brunner*, Ins. 267.
Scarelus, *Waterhouse*, Ins. 75.
Scedopla, *Butler*, Ins. 213.
Schizoplax, *Dall*, Moll. 55.
Schœnophilus, *Mik*, Ins. 242.
Scleranthelia, see Skleranthelia.
Sclerisis, *Studer*, Cœl. 7.
Scolytogenes, *Eichhoff*, Ins. 103.
Scytalia, *Zittel*, Spong. 14 [-le, *Neuwied*, Rept. 18—].
Sebastapistes, *Streets*, Pisc. 17.
Sedulia, *Stal*, Ins. 273.
Selenochilus, *Chaudoir*, Ins. 35.
Selioides, *Levinsen*, Crust. 45.
Seliscothon [-thum], *Zittel*, Spong. 14.
Sema, *Jordan*, Pisc. 21.
Sephilus, *Candèze*, Ins 72.
Setalidius, *Chaudoir*, Ins. 35.
Sharpia, *Bocage*, Aves, 51.
Sharpia ‖, *Fauvel*, Ins. 48 [*Tournier*, Ins. 1873].
Sicyocrinus, *Angelin*, Ech. 13.
Sigsbeia, *Lyman*, Ech. 11.
Silurispongia, *Martin*, Spong. 13.
Simarcea, *Moore*, Ins. 200.
Sinocaulus, *Fairmaire*, Ins. 74.
Siphonentalis, *Sars*, Moll. 80.
Sivalhippus, *Lydekker*, Mamm. 17 [erroneously Sivatherium, Zool. Rec. xiv.]
Skleranthelia [Scle-], *Studer*, Cœl. 5.
Smicrips, *Le Conte*, Ins. 56.
Smicromyrme, *C. G. Thomson*, Ins. 134 [rectius Smicro- *vel* Micro-; Micromyrma, *Dufour*, Ins. 1857].
Solenotus*, *C. G. Thomson*, Ins. 151.
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Sphæractinia, *Steinmann*, Cœl. 16.
Sphæronis, *Angelin*, Ech. 13.
Sphalerus, *Kriechbaumer*, Ins. 141 [-ra, *Le Conte*, 1859, and *Chaudoir*, 1873, Ins.].
Sphenaspis, *Jakovleff*, Ins. 278.

Sphenocarcinus, *Milne-Edwards*, Crust. 17.
Sphenophryne, *Peters & Doria*, Rept. 14.
Sphida, *Grote*, Ins. 213.
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Spinaria ‖, *Czerniavsky*, Crust. 16 [*Brullé*, Ins. 1846].
Spinopora ‖, *Moseley*, Cœl. 18 [*Blainville*, Prot. 1830].
Spintherus, *C. G. Thomson*, Ins. 149.
Spirotropis, *Sars*, Moll. 39.
Spongodiscus, *Zittel*, Spong. 14.
Sporadopora, *Moseley*, Cœl. 17.
Stachyspongia, *Zittel*, Spong. 14.
Stætherinia, *Butler*, Ins. 205.
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Stenocarenus, *Jakovleff*, Ins. 280.
Stenocinclis, *Scudder*, Ins. 9.
Stenocladius, *Fairmaire*, Ins. 76.
Stenogryllus, *Saussure*, Ins. 264.
Stenomalus, *C. G. Thomson*, Ins. 149.
Stenophyllia, *Brunner*, Ins. 267.
Stephostethus, *Le Conte*, Ins. 56.
Steropleurus, *Bolivar*, Ins. 269.
Stibara, *Brunner*, Ins. 268.
Stibolepis, *Butler*, Ins. 207.
Stichocrepis, *Förster*, Ins. 150 [Verh. Ver. Rheinl. 1860, teste *Marschall*].
Stictomischus, *C. G. Thomson*, Ins. 148.
Stictoplœa, *Butler*, Ins. 175.
Stinoplus, *C. G. Thomson*, Ins. 149.
Stoliczkaria, *Duncan*, Prot. 12.
Stomylia, *Snellen*, Ins. 230.
Stonasla, *White*, Ins. 287.
Stromatiodes, *J. Thomson*, Ins. 108.
Stropis, *Stal*, Ins. 274.
Stylodictyon, *Nicholson*, (Cœl. 15) Prot. 11.
Stylura, *Burmeister*, Ins. 195.
Suberia, *Studer*, Cœl. 7.
Sulychra, *Butler*, Ins. 203.
Suniopsis, *Fauvel*, Ins. 47.
Surendra, *Moore*, Ins. 185.
Syene, *Vollenhoven*, Ins. 145.
Syllectus, *Bates*, Ins. 33.
Symmachis, *Brunner*, Ins. 267.
Symmetopleura, *Brunner*, Ins. 268.
Sympæstria, *Brunner*, Ins. 267.
Symphysanodon, *Bleeker*, Pisc. 15.
Sympiesnus [-pyc-], *C. G. Thomson*, Ins. 150 [*Löw*, Ins. 1857].
Synarsis, *Förster*, Ins. 154.
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Syntechna, *Brunner*, Ins. 268.
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Syringosphæra, *Duncan*, Prot. 11.
Systomosphyrum, *Förster*, Ins. 151.

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Tapinopus, *Saussure*, Ins. 265.
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Targarema, *White*, Ins. 280.
Tarika, *Moore*, Ins. 200.
Tauchira, *Stal*, Ins. 274.
Technitella, *Norman*, Spong. 10.
Tecmessa, *Burmeister*, Ins. 204.
Tedaniella, *Czerniavsky*, Spong. 9.
Teichonella, *Carter*, Spong. 8, 10.
Teleogmus, *C. G. Thomson*, Ins. 150.
Temnoscapus, *Chevrolat*, Ins. 95.
Teracotona, *Butler*, Ins. 197.
Terobia, *Förster*, Ins. 148.
Tetana, *Brunner*, Ins. 267.
Tetragonomenes, *Chevrolat*, Ins. 87.
Tetraprio[no]cera, *Horn*, Ins. 82.
Thaduka, *Moore*, Ins. 185.
Thalaminia, *Steinmann*, Cœl. 16.
Thamala, *Moore*, Ins. 185.
Thamnoscirtus, *Saussure*, Ins. 263.
Thecosiphonia, *Zittel*, Spong. 14.
Thenarotes, *Bates*, Ins. 32.
Theobaldius, *Nevill*, Moll. 78.
Thesbia, *Sars*, Moll. 38.
Thesilea, *Haag*, Ins. 89.
Thiopsyche, *Butler*, Ins. 219.
Thoe ‖, *Chun*, Cœl. 20 [*Bell*, Crustacea, 1835; *Kinberg*, Vermes, 1855].
Thor, *Kingsley*, Crust. 28.
Thoracus, *Chevrolat*, Ins. 99.
Thriocera, *Gorham*, Ins. 80.
Thryptocerus, *Chaudoir*, Ins. 30 [-ra, *Macquart*, Ins. 1835].
Thysanochilus, *Butler*, Ins. 219.
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Tinoderus, *Chaudoir*, Ins. 30.
Tinognathus, *Chaudoir*, Ins. 30.
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Trachysma, *Sars*, Moll. 48.
Trachyspongilla, *Dybowsky*, Spong. 10.
Trachysycon, *Zittel*, Spong. 14.
Trailia, *Cameron*, Ins. 157.
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Triarmocerus, *Eichhoff*, Ins. 103.
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Trichogonus, *Fairmaire*, Ins. 100.
Trichomalus, *C. G. Thomson*, Ins. 150 [-mallus, *Lacordaire*, Ins. 1868].
Trichomastix, *Vollenhoven*, Ins. 144.
Trichosphærium, *Schneider*, Prot. 10.
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Tricycloseris, *Tomes*, Cœl. 8.
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Trochopsammia, *Pourtales*, Cœl. 5.
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Tropidocerus ‖, *Chaudoir*, Ins. 35 [-ra, *Stal*, Ins. 1869].
Tropidosteptes, *Uhler*, Ins. 282.
Trypocranus, *Eichhoff*, Ins. 104.
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Turritellopsis, *Sars*, Moll. 43.
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Ulocentra, *Jordan & Brayton*, Pisc. 13.
Ulupe, *Blanford*, Rept. 11.
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Urceolus, *Mereschkowsky*, Prot. 16.
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Victrix, *Staudinger*, Ins. 212.
Vilerna, *Stal*, Ins. 274.

Wagnerella, *Mereschkowsky*, Spong. 11.
Wartelia, *Giard*, Verm. 13.

Xantia, *Brunner*, Ins. 268.
Xenippa, *Stal*, Ins. 274.
Xenismus, *Waterhouse*, Ins. 77 [-ma, *Jordan*, Pisc. 1877].
Xenobatrachus, *Peters & Doria*, Rept. 14.
Xenodermichthys, *Günther*, Pisc. 35.
Xestina, *Pfeffer*, Moll. 62.
Xestophya, *Förster*, Ins. 140.
Xiphidion [-ium ‖], *Provancher*, Ins. 155 [Serville, Ins. 1831].
Xiph[oh]ispa, *Chapuis*, Ins. 120.
Xylophis, *Beddome*, Rept. 11.
Xylophylax, *Kriechbaumer*, Ins. 145.
Xyroscelis ‖, *J. Thomson*, Ins. 66 [*E. Saunders*, Ins. 1871].

Zacrita, *Förster*, Ins. 147.
Zadadra, *Moore*, Ins. 200.
Zapachia, *Förster*, Ins. 148.
Zaplous, *Le Conte*, Ins. 111.
Zarca, *Cameron*, Ins. 157.
Zetesima, *Förster*, Ins. 140.
Zingis, *Martens*, Moll. 63.

Brevipalpus, *Donnadieu*, Arachn. p. 22, was accidentally omitted from the List of New Genera in Zool. Rec. xiv. [1877].

END OF THE FIFTEENTH VOLUME.

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