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# PREFACE.

In aid of this undertaking, I have again the pleasure of acknowledging a grant of £100 from the British Association for the Advancement of Science, and a contribution of £150 from the Government Grant Fund of the Royal Society (the third contribution from that source); a fourth contribution of £50 has also been voted by the Council of the Zoological Society of London. I thank my fellow Recorders very sincerely for their continued co-operation. The engagements of Mr. Osbert Salvin, Recorder of *Aves*, will no longer permit him to assist in this work; a most efficient successor to that gentleman has, however, been found in Mr. Howard Saunders, who has kindly undertaken the relinquished portion—which, from the changes in the Bird-Recorders, would appear to be the most difficult in the volume.

It will be noticed that a scheme of separate pagination for each Class has been adopted in this volume. This has been tried, in the hope of saving time; and, although, as regards the present occasion, all that can be said in its favour is that it has enabled me to avoid a longer delay than usual, it will be continued in future issues, as possibly leading to other improvements.

EDWARD CALDWELL RYE.

Royal Geographical Society,
1, Savile Row, Burlington Gardens, London,
*May*, 1878.

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.

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*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 (München).

*Abh. Ges. Görl.*—Abhandlungen der naturforschenden Gesellschaft zu Görlitz.

*Abh. Ges. Götting.*—Abhandlungen der k. Gesellschaft der Wissenschaften zu Göttingen.

*Abh. Ges. Halle.*—Abhandlungen der naturforschenden Gesellschaft zu Halle.

*Abh. Ges. Nürnb.*—Abhandlungen der naturhistorischen Gesellschaft zu Nürnberg.

*Abh. senck. Ges.*—Abhandlungen herausgegeben von der senckenbergischen naturforschenden Gesellschaft (Frankfurt-am-Main).

*Abh. Ver. Brem.*—Abhandlungen herausgegeben vom naturwissenschaftlichen Verein zu Bremen.

*Act. Fenn.*—Acta Societatis Scientiarum Fennicæ (Helsingfors).

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

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

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

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

*Ann. Mal. Belg.*—Annales de la Société malacologique de Belgique (Bruxelles).

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

*Ann. Mag. N. H.* (4)—Annals and Magazine of Natural History. Fourth [illegible]).

*Ann. Sc. Nat.*—Annales des Sciences Naturelles. 5me série (Paris).

*Ann. Soc. Lyon* (4)—Annales de la Société d'Agriculture, Histoire [illegible] Lyon. 4me série.

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

*Ann. Soc. Géol. Nord.*—Annales de la Société Géologique du Nord (Lille).

*Ann. Soc. Hérault* (2)—Annales de la Société d'Horticulture et d'Histoire naturelle de l'Hérault (Montpellier). 2me série.

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

*An. Soc. Mod.*—Annuario della Società dei Naturalisti di Modena.

*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.

*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. og Naturvid.*—Archiv für Mathematik og Naturvidenskab (Christiania).

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

*Arch. Nat. Livl.*—Archiv für Naturkunde Liv-, Ehst-, und Kur-lands (Dorpat).

*Arch. Néerl.*—Archives Néerlandaises des Sciences exactes et naturelles (La Haye).

*Arch. Phys.*—Archives de Physiologie normale et pathologique (Paris).

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

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

*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 (Roma).

*Atti Acc. Tor.*—Atti della R. Accademia delle Scienze di Torino.

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

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

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

*Ber. Ges. Chemn.*—Bericht der naturwissenschaftlichen Gesellschaft zu Chemnitz.

*Ber. offenb. Ver.*—Bericht über die Thatigkeit des of[illegible] für Naturkunde (Offenbach-am-Main).

*Ber. senck. Ges.*—Bericht der senckenbergischen natur[illegible] schaft (Frankfurt-am-Main).

*Ber. St. Gal. Ges.*—Bericht über die Thätigkeit der St. Gallischen naturwissenschaftlichen Gesellschaft (St. Gallen).

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

*Bidr. Finl. Nat.*—Bidrag till Kännedom af Finlands Natur och Folk (Helsingfors).

*Bol. Ac. Cordova*—Boletin de la Academia nacional de Ciencias exactas existente en la Universidad de Cordova.

*Boll. Com. Geol. Ital.*—Bolletino del R. Comitato Geologico d'Italia (Roma).

*Boll. Soc. Adr.*—Bolletino della Società Adriatica di Scienze naturali (Trieste).

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

*Bull. Buff. Soc.*—Bulletin of the Society of Natural Sciences, Buffalo.

*Bull. Corn. Univ.*—Bulletin of the Cornell University (Ithaca, U. S. A).

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

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

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

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

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

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

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

*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 série (Paris).

*Bull. Soc. L. Brux.*—Bulletin de la Société Linnéenne de Bruxelles.

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

*Bull. Soc. Moselle*—Bulletin de la Société d'histoire naturelle du département de la Moselle (Metz).

*Bull. Soc. Pyrén.*—Bulletin de la Société agricole scientifique et littéraire des Pyrénées orientales (Perpignan).

*Bull. Soc. Rouen*—Bulletin de la Société des Amis des Sciences naturelles de Rouen.

*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. U. S. Geol. Surv.*—Bulletin of the United States Geological and Geographical Survey of the Territories (Washington).

*Canad. Ent.*—Canadian Entomologist (Bethune: Montreal).

*Canad. Nat.* (*n. s.*)—Canadian Naturalist and Quarterly Journal of Science. New Series (Montreal).
*Cat. Mus. C. Z.*—Illustrated Catalogue of the Museum of Comparative Zoology (Cambridge, U. S. A.).
*CB. med. Wiss. Würzb.*—Centralblatt für die medicinischen Wissenschaften in Würzburg.
*CB. Ver. Regensb.*—Correspondenz-Blatt des zoologisch-mineralogischen Vereins in Regensburg.
*C. H.*—Coleopterologische Hefte (München).
*Cincinn. J. Sci.*—Cincinnati quarterly Journal of Science.
*Cist. Ent.*—Cistula Entomologica (Janson: London).
*C. R.*—Comptes rendus des séances hebdomadaires de l'Academie des Sciences (Paris).
*CR. Ent. Belg.*—Comptes rendus des séances de la Société entomologique de Belgique (Bruxelles).

*Dan. Selsk. Skr.* (5)—K. Danske Videnskabernes Selskabs Skrifter; Naturvidenskabelig og mathematisk afdeling. 5te Række (Kjöbenhavn).
*Denk. Ak. Wien*—Denkschriften der k. Akademie der Wissenschaften zu Wien.
*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. Monatsbl.*—Entomologische Monatsblätter (Kraatz: Berlin).
*Ent. Nachr.*—Entomologische Nachrichten (Katter: Putbus).

*Feuil. Nat.*—Feuilles des jeunes Naturalistes (Mülhausen).
*Forh. Selsk. Chr.*—Forhandlinger i Videnskabs-Selskabet i Christiania.
*Förh. Sk. Naturf.*—Fördhandlingar vid det af Skandinaviska Natursforskare och Läkare möte (Sweden).

*Gard. Chron.*—The Gardener's Chronicle (London).
*Geol. Mag.*—Geological Magazine (Woodward: London).

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

*Ibis*—The Ibis (Salvin: London).
*Isis, Maandschr. v. Nat.*—Isis, Maandschrift voor Natuurwetenschap.

*J. Agric. Soc.* (2)—Journal of the Royal Agricultural Society. 2nd series (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. Erf.* (*n. f.*)—Jahresbericht der Akademie der Wissenschaften in Erfurt. Neue Folge.

*JB. Anat. Physiol.*—Jahresberiche über die Fortschritte der Anatomie und Physiologie (Hofmann & Schwalbe; Leipzig).

*JB. f. Mineral.*—Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie (Leonhard & Geinitz: Stuttgart).

*JB. Geol. Reichsanst.*—Jahrbuch der k.-k. geologischen Reichsanstalt (Wien).

*JB. Ges. Hannov.*—Jahresbericht der naturforschenden Gesellschaft in Hannover.

*JB. Leist. Forts. medecin*—Jahresbericht über die Leistungen und Fortschritte in der gesammten Medecin (Virchow & Hirsch).

*JB. mal. Ges.*—Jahrbuch der deutschen malakozoologischen Gesellschaft (Frankfurt-am-Main).

*JB. schles. Ges.*—Jahresbericht der schlesischen Gesellschaft für vaterländische Cultur (Breslau).

*JB. ungar. Geol. Anst.*—Jahrbuch der konigl.-ungarischen geologischen Anstalt (Pest).

*JB. Ver. Zwickau*—Jahresbericht des Vereins für Naturkunde zu Zwickau.

*JB. Westfäl. Prov.-ver.*—Jahresbericht der zoologischen Section des Westfälischen Provinzialvereins für Wissenschaft und Kunst (Münster).

*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. L. S.*—Journal of the Linnean Society, Zoology (London).

*J. Mus. Godeffr.*—Journal des Museum Godeffroy; Geographische ethnographische und naturwissenchaftliche Mittheilungen (Hamburg).

*J. Quek. Club*—Journal of the Quekett Microscopical Club (London).

*J. R. G. Soc. Irel.*—Journal of the Royal Geological Society of Ireland (Dublin).

*J. Sc. Lisb.*—Jornal de Sciencias da Academia de Lisboa.

*J. Zool.*—Journal de Zoologie (Gervais: Paris).

*L'Ab.*—L'Abeille (De Marseul: Paris).

*La Nature.*—La Nature, Revue des Sciences et de leurs applications aux Arts et à l'Industrie (Tissandier: Paris).

*Mal. Bl.*—Malakozoologische Blätter (Cassel).

*MB. Ak. Berl.*—Monatsberichte der k. Akademie der Wissenschaften zu Berlin.

*Medd. Soc. Fenn.*—Meddelanden af Societas pro Fauna et Flora fennica (Helsingfors).

*Mél. Biol.*—Mélanges biologiques tirés du Bulletin de la classe physico-mathématique de l'Academie Impériale des Sciences de St. Pétersbourg.

*Mém. Ac. Belg.*—Mémoires de l'Académie Royale des Sciences de Belgique (Bruxelles).

*Mem. Acc. Bologn.*—Memorie dell' Accademia di Scienze dell' Istituto di Bologna.

*Mém. Ac. Sci.*—Mémoires de l'Académie des Sciences (Paris).

*Mem. Am. Ass.*—Memoirs of the American Association for the Advancement of Science (Salem).

*Mem. Bost. Soc.*—Memoirs of the Boston Society of Natural History.

*Mem. Peab. Ac.*—Memoirs of the Peabody Academy of Arts and Sciences (Salem).

*Mém. Pétersb.* (7)—Mémoires de l'Académie impériale des Sciences de St. Pétersbourg. 7me série.

*Mém. Soc. Biol.*—Comptes-rendus des séances et Mémoires de la Société de Biologie (Paris).

*Mém. Soc. Cherb.* (2)—Mémoires de la Société des sciences naturelles de Cherbourg. 2me série.

*Mem. Soc. Phys. Genève.*—Mémoires de la Société de Physique et d'Histoire naturelle de Genève.

*M. Micr. J.*—Monthly Microscopical Journal (London).

*Morph. JB.*—Morphologisches Jahrbuch: eine Zeitschrift für Anatomie und Entwickelungsgeschichte (Gegenbauer: Leipzig).

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

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

*MT. schw. ent. Ges.*—Mittheilungen des naturwissenschaftlichen Vereins für Steiermark (Grätz).

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

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

*Nachr. Ges. Mosc.*—Nachrichten der k. Gesellschaft der Liebhaber der Naturkunde zu Moscau.

*Nachr. mal. Ges.*—Nachrichtsblatt der deutschen malako-zoologischen Gesellschaft (Frankfurt-am-Main).

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

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

*Nat. Mex.*—La Naturaleza (Mexico).

*Nat. Tids.*—Naturhistorisk Tidsskrift (Schiödte: Kjöbenhavn).

*Nature*—Nature (London).

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

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

*Not. Fenn.*—Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar (Helsingfors).

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

*Nunq. Ot.*—Nunquam Otiosus (Schaufuss: Dresden).

*Œfv. Ak. Förh.*—Œfversigt af k. Vetenskaps Akademiens Förhandlingar (Stockholm).
*Œfv. Fin. Soc.*—Œfversigt af Finska Vetenskaps Societetens Förhandlingar (Helsingfors).
*Op. Ent.*—Opuscules Entomologiques (Mulsant: Paris).
*Orn. Misc.*—Ornithological Miscellany (Rowley: London and Brighton).

*P. Ac. Philad.*—Proceedings of the Academy of Natural Sciences of Philadelphia.
*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 Natural History Society.
*P. Berw. Club.*—Proceedings of the Berwickshire Naturalists' Field Club (Berwick).
*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. Cincinn. Soc.*—Proceedings of the Cincinnati Society of Natural History.
*P. Davenport Ac.*—Proceedings of the Davenport Academy of Natural Science (Davenport: Iowa).
*P. E. Soc.*—Proceedings of the Entomological Society of London.
*Pet. Nouv.*—Petites Nouvelles Entomologiques (Deyrolle: Paris).
*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. G. Soc.*—Proceedings of the Liverpool Geological Society.
*P. Liverp. Soc.*—Proceedings of the Literary and Philosophical Society and Natural History Society of Liverpool.
*P. Lyc. N. York*—Proceedings of the Lyceum of Natural History, New York.
*P. N. H. Soc. Glasg.*—Proceedings of the Natural History Society of Glasgow.
*P. R. Phys. Soc. Edinb.*—Proceedings of the Royal Physical Society of Edinburgh.
*P. R. Inst.*—Proceedings of the Royal Institution of Great Britain (London).
*P. R. Irish Ac.*—Proceedings of the Royal Irish Academy (Dublin).
*P. R. Soc.*—Proceedings of the Royal Society (London).
*P. R. Soc. Edinb.*—Proceedings of the Royal Society of Edinburgh.

*P. R. Soc. Tasm.*—Proceedings of the Royal Society of Tasmania (Hobarton).
*P. Soc. Manch.*—Proceedings of the Literary and Philosophical Society of Manchester.
*P. Soc. Portl.*—Proceedings of the Society of Natural History, Portland (Maine, U.S.A.).
*Psyche.*—Psyche: Organ of the Cambridge [U. S. A.] Entomological Club.
*P. Z. S.*—Proceedings of the Zoological Society (London).
*P. Z. S. Vict.*—Proceedings of the Zoological and Acclimatization Society of Victoria.

*Q. J. Conch.*—Quarterly Journal of Conchology.
*Q. J. Micr. Sci.*—Quarterly Journal of Microscopical Science (London).

*Rend. Acc. Bologn.*—Rendiconto dell' Accademia di scienze dell' Istituto di Bologna.
*Rend. Ist. Lomb.*—Rendiconti del R. Istituto Lombardo di scienze, &c. (Milan).
*Rep. Belf. Club.*—Annual Report of the Belfast Naturalists' Field Club.
*Rep. Br. Ass.*—Report of the British Association for the Advancement of Science.
*Rep. E. Soc. Ont.*—Report of the Entomological Society of the Province of Ontario (Toronto).
*Rep. Ins. Mo.*—Annual Report on the noxious, beneficial, and other Insects of the State of Missouri, made to the State Board of Agriculture (St. Louis).
*Rep. N. York Mus.*—Annual Report of the New York State Museum of Natural History.
*Rev. Montp.*—Revue des Sciences Naturelles (Montpellier).
*Rev. Sci. Nat.*—Revue des Sciences Naturelles (Montpellier).
*R. Z.* (3)—Revue et Magasin de Zoologie pure et appliquée. 3me série (Guérin-Meneville: Paris).

*SB. Ak. Wien*—Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe der k. Akademie der Wissenschaften (Wien).
*SB. bayer. Ak.*—Sitzungsberichte der mathematisch-physikalischen Classe der k. bayerischen Akademie der Wissenschaften (München).
*SB. böhm. Ges.*—Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften (Prag).
*SB. Ges. Dorp.*—Sitzungsberichte der Dorpater Naturforscher Gesellschaft (Dorpat).
*SB. Nat. Fr.*—Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin.
*SB. niederrhein. Ges.*—Sitzungsberichte des niederrheinischen Gesellschaft für Natur und Heilkunde (Bonn).
*Schr. Ges. Dans. (n. f.)*—Neueste Schriften des naturforschenden Gesellschaft zu Danzig. Neue Folge.
*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 (London).
*Scot. Nat.*—The Scottish Naturalist (Buchanan-White: Perth).
*S. E. Z.*—Stettiner entomologische Zeitung (Dohrn: Stettin).
*Str. Feath.*—Stray Feathers (Calcutta).
*Sv. Ak. Handl.*—K. Svenska Vetenskaps Akademiens Handlingar (Stockholm).

*Tids. Naturvid.*—Tidsskrift for populäre Fremstillinger af Naturvidenskabene (Kjöbenhavn).
*Tijdschr. Ent.*—Tijdschrift voor Entomologie ('s Gravenhage).
*Tijdschr. Nederl. Ind.* (7)—Natuurkundig Tijdschrift voor Nederlandsch Indië, uitgegeven door de Natuurkundige Vereeniging. 7de Reeks (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. E. Soc.*—Transactions of the Entomological Society of London.
*Tr. Glasg. Soc. F. Nat.*—Transactions of the Glasgow Society of Field Naturalists.
*Tr. G. Soc. Edinb.*—Transactions of the Geological Society of Edinburgh.
*Tr. L. S.*—Transactions of the Linnean Society (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).
*Tr. R. Irish Ac.*—Transactions of the Royal Irish Academy (Dublin).
*Tr. R. Soc. Edinb.*—Transactions of the Royal Society of Edinburgh.
*Tr. Z. S.*—Transactions of the Zoological Society (London).

*Verh. Ak. Amst.*—Verhandelingen der koninklijke Akademie van Wetenschappen (Amsterdam).
*Verh. geol. Reichsanst.*—Verhandlungen der k. k. geologischen Reichsanstalt (Wien).
*Verh. Ges. Bas.*—Verhandlungen der naturforschenden Gesellschaft in Basel.
*Verh. Ges. Würzb.* (2)—Verhandlungen der physikalisch-medicinischen Gesellschaft in Würzburg. Neue Folge.
*Verh. Ver. Brünn*—Verhandlungen des naturforschenden Vereins in Brünn.
*Verh. Ver. Hamb.*—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.

*Versl. Ak. Amst.*—Verslagen en Mededeelingen der k. Akakemie van Wettenschappen (Amsterdam).

*Vid. Medd.*—Videnskabelige Meddelelser fra den Naturhistoriske Forening (Kjöbenhavn).

*Viert. Ges. Zürich*—Vierteljahrsschrift der naturforschenden Gesellschaft in Zurich.

*Württ. nat. JH.*—Württembergische naturwissenschaftliche Jahreshefte (Stuttgart).

*Z. Anat. Entwickel.*—Zeitschrift für Anatomie und Entwickelungsgeschichte (Leipzig).

*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. Naturw.* (2)—Zeitschrift für die gesammten Naturwissenschaften. Neue Folge (Giebel : Berlin).

*Zool. Gart.* — Der Zoologische Garten (Weinland, Bruch, & Noll : Frankfurt-am-Main).

*Zool. Rec.*—Zoological Record (Rye : London).

*Zool. (s.s.)*—The Zoologist. Second Series (Newman : London).

*Z. Parasit.*—Zeitschrift für Parasitenkunde (Jena).

*Z. wiss. Zool.*—Zeitschrift für wissenschaftliche Zoologie (Siebold & Kölliker : Leipzig).

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ZOOLOGICAL
Kolkata

# ZOOLOGICAL RECORD

FOR 1876.

Acc no. 501
dt. 13/12/06

## MAMMALIA.

BY

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

THE year 1876 has been a marked one in the department of Geographical Zoology, Wallace's long expected and admirably executed work on the Distribution of Animals having at length appeared [*infrà*, p. 7], as have also valuable memoirs on similar subjects by Sclater [p. 6], Von Pelzeln [p. 6], Blanford [p. 2], and Lydekker [p. 5]. Of works mentioned in former years, Milne-Edwards and Grandidier's great Fauna of Madagascar [p. 5], and Van Beneden and Gervais' work on the *Cetacea* [p. 14] have been continued, while the last-named naturalist has begun a new series of his palæontological and zoological memoirs [p. 4]. Turner has carried still further his exposition of the various types of placentation [pp. 7, 10, 23], and Ferrier has summed up the result of his experiments on the brain [p. 4]. At length there has been a slackening in the flow of palæontological novelties from America, but Marsh [pp. 12, 16, 17] and Cope [p. 12] have added considerably to our knowledge of the wonderful forms which they had previously discovered, while Wallace's [p. 7] and Flower's [pp. 4, 9, 17] critical reviews of their labours have done much towards bringing their conclusions into conformity and order.

### THE GENERAL SUBJECT.

ALBRECHT, —. Beitrag zur Torsionstheorie des Humerus, und zur morphologischen Stellung der Patella in der Reihe der Wirbel-

thiere. Kiel: 1875. [Not seen by the Recorder; *cf.* Arch 1876, ii. p. 3.]

Allen, J. A. Geographical Variation among North American mals, especially in respect to size. Bull. U. S. Geol. Surv. ii. pp. 309–344.

Most animals are smaller in higher latitudes, but in some species the reverse is shown to be the case. Careful measurements are given of a very large number of skulls in the U. S. National Museum.

Baldwin, J. H. The Large and Small Game of Bengal and the North-western Provinces of India. London: 1876, 8vo, Mammalia, pp. 1–245.

Field-notes on the habits and chase of the principal Carnivores and Ungulates of India.

Barceló y Combis, F. Catálogo metódico de los Mamíferos observados en las Islas Baleares. An. Soc. Esp. iv. (1875) pp. 53–58.

Contains twenty-eight species, including five Cetaceans. *Ovis musimon* is not found in any of the Balearic Islands.

Barrington-Brown, C. Canoe and Camp Life in British Guiana. London: 1876, 8vo, pp. 400.

Contains many notes on the habits of various Mammals.

Beauregard, H. Recherches sur les réseaux vasculaires de la chambre postérieure de l'œil des Vertébrés. Ann. Sci. Nat. (6) iv. art. i. Mammifères, pp. 55–70.

Blanford, W. T. Eastern Persia, an Account of the Journeys of the Persian Boundaries Commission, 1870–72. 2 vols. 8vo. London: 1876. Zoology and Geology. Mammalia, vol. ii. pp. 18–97, pls. i.–viii.

The observations of former travellers are combined with those of the author and of O. St. John. 89 Mammals are enumerated, and several of the new species, which have already been characterized [*cf.* Zool. Rec. xii. p. 2], are figured.

——. Note on the "Africa-Indien" of A. von Pelzeln, and on the Mammalian Fauna of Tibet. P. Z. S., 1876, pp. 631–634.

Criticises Von Pelzeln's inclusion of the Tibetan plateau in the Malayan region [*infrà*, p. 6], and gives a list of the recorded Mammals of the country.

——. The African Element in the Fauna of India: a Criticism of Mr. Wallace's views as expressed in the "Geographical Distribution of Animals." Ann. N. H. (4) xviii. pp. 277–294.

Observations in support of the author's opinions as to the relationship of the fauna of the Indian Peninsula with that of the Ethiopian Region. The Mammals are treated of at pp. 283–287.

Brock, J. Ueber die Entwicklung des Unterkiefers der Säugethiere. Z. wiss. Zool. 1876, pp. 287–318, pls. xix. & xx.

Observations on the development of the mandible in the Pig. The

...n the Past and Present Geographical Distribution ... the Large Mammals of South Africa. P. Z. S. 1876, pp. 277–293.

Notes on the decreasing ranges of the Elephant, Rhinoceroses, Zebras, Antelopes, Buffalo, and Giraffe.

Burton, R. F. Two Trips to Gorilla Land and the Cataracts of the Congo. London: 1876, 2 vols. 8vo, pp. 261, 255.

Contains some notes on the Gorilla and other West African Mammals.

Calderon, S. Enumeración de los Vertebrados Fósiles de España; Mamíferos. An. Soc. Esp. v. pp. 421–436.

A list of the fossil Mammals hitherto found in Spain, with localities and full references.

Collett, R. Bemærkninger til Norges Pattedyrfauna. N. Mag. Naturv. 1876 (also separately printed, pp. 116).

A list of 66 species of Norwegian Mammals, with full notes on their distribution.

——. Norvège, Carte Zoo-Géographique, contenant une liste complète de tous les Animaux Vertébrés de Norvège. Christiania: 1875.

A large map in four sheets, with marginal lists showing the distribution of the various species.

Coues, E. Account of the various Publications relating to the Travels of Lewis and Clark, with a Commentary on the Zoological results of their Expedition. Bull. U. S. Geol. Surv. i. pp. 430–439.

An attempt to identify certain species founded by Ord and Rafinesque.

—— & Yarrow, H. C. Report upon the Collections of Mammals made in portions of Nevada, Utah, California, New Mexico, and Arizona, during the years 1871–74. Wheeler's Rep. Expl. W. of 100th M., v. (1875), pp. 35–129.

A list of 50 species, with notes on distribution and details of specimens procured.

Creighton, C. On the Development of the Mamma and of the Mammary Function. J. Anat. Phys. xi. pp. 1–32, pl. i.

Argues that the mamma is not a downward extension of the ectoderm, but, as suggested by Goodsir, a further specialization of fat tissue, and consequently a product of the mesoblast.

——. Physiological Processes of the Mamma. Rep. Medical Officer of Privy Council, 1875, sec. iv. [Not seen by the Recorder.]

Dastre, A. Recherches sur l'allantoïde et le chorion de quelques Mammifères. Ann. Sci. Nat. (6) iii. art. 4, p. 118, pls. vii.–x.

on the geographical distribution of Ch[illegible]

Dobson, G. E. On Peculiar Structures in the Feet of certain [illegible] of Mammals which enable them to walk on smooth perpendicul[illegible] surfaces. P. Z. S. 1876, pp. 526–535, pl. lv.

Describes the suctorial and adhesive foot-pads of species of *Vespertugo*, *Mystacina*, *Thyroptera*, and *Hyrax*.

Ferrier, D. The Functions of the Brain. London: 1876, 8vo, pp. 323.

Contains the result of the author's experiments on the physiology of the cerebro-spinal system. [*Cf.* Zool. Rec. xii. p. 2.]

Flower, W. H. Hunterian Lectures on the Relation of Extinct to Existing Mammalia. (Abstract) Nature, xiii. pp. 307 & 308, 327 & 328, 350–352, 387 & 388, 409 & 410, 449 & 450, 487 & 488, 513 & 514, xiv. p. 11.

A review of our knowledge of fossil Mammals, with particular attention to the recent discoveries in N. America.

——. The Extinct Animals of North America. P. R. Inst. viii. pp. 103–125.

Gives a brief but clear account of the recent discoveries of Leidy, Marsh, and Cope.

Frivaldsky, J. Adatok Máramaros vármegye faunájához (Data for a Fauna of the Maramaroz Comitat [of Hungary]). Term. Közl. ix. (1875) pp. 183–232.

Gervais, P. Zoologie et Paléontologie Générales. 2me ser. liv. 14–16, pp. 1–72, pls. i.–xiii. 4to, Paris: 1876.

After a long interval, the publication of this valuable miscellany is resumed. The principal matters treated of in these parts are fossil Monkeys and Lemurs, the Mammalian remains of the phosphate chalks of Tarn-et-Garonne and Lot [*cf.* C. R. lxxiv. (1872) pp. 1217–1223, 1367–1371], and notes on certain genera of *Carnivora*.

Giebel, C. G. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs, Abth. 5, *Mammalia*; Nos. 11 & 12. Leipzig & Heidelberg: 1876, 8vo, pp. 161–244, pls. xliii.–xlvii.

Both text and plates of these numbers are devoted to the dentition of the various orders. [*Cf.* Zool. Rec. xii. p. 3.]

Gordon, T. E. The Roof of the World, being a Narrative of a Journey over the high plateau of Tibet to the Russian Frontier and the Oxus Sources on Pamir. Edinburgh: 1876, 8vo, pp. 172.

Contains occasional notes on Tibetan Mammals, especially on *Ovis poli*.

Grandidier, A. [See Milne-Edwards, A.]

Gudden, — von. Experimental-Untersuchungen über das Schädelwachsthum. Untersuchungen an neugeborenen Kaninchen. Munich: 1874. [Not seen by the Recorder: *cf.* Arch. f. Nat. 1876, ii. p. 2.]

Günther, A. Remarks on some Indian and more especially Bornean Mammals. P. Z. S. 1876, pp. 424–428, pls. xxxvi. & xxxvii.

——. Report on some of the additions to the Collection of Mammalia in the British Museum. *Tom. cit.* pp. 735–751, pls. lxix.–lxxiv.

New species of *Hapalidæ*, *Mustelidæ*, *Sciuridæ*, *Hystricidæ*, and *Octodontidæ* are described.

Harvey, R. J. On the Intertubular Tissue of the Mammalian Testis. Tr. R. Irish Ac. xxvi. pp. 31–48, pl. i.

Heuglin, M. T. von. Reisen nach dem Nordpolarmeer, in den Jahren 1870 und 1871. Brunswick: 3 vols. 8vo, 1872–74. Die Säugethiere von Spitzbergen und Novaja Semlja, iii. pp. 3–78.

Nineteen species are recognized (of which seven are Cetaceans) with notes on their distribution and habits.

Homeyer, E. F. von. Deutschlands Säugethiere und Vögel, ihr Nutzen und Schaden. I. Säugethiere. Zool. Gart. 1876, pp. 133–139, 197–203, 248–257, 282–286.

Notes on the good and harm done to Man by various Mammals.

Humphry, G. M. On the Comparison of the Fore and Hind Limbs in Vertebrates. J. Anat. Phys. x. pp. 659–671.

Remarks principally suggested by Albrecht's dissertation [*suprà*, p. 1].

Jordan, D. S. Manual of the Vertebrates of the Northern United States. 8vo. Chicago: 1876. Mammalia, pp. 12–35.

Gives short diagnoses of the genera and species.

Kölliker, A. Ueber die erste Entwicklung der Säugethier-embryo. Verh. ges. Würzb. ix. (1875) pp. 98–101.

Laodowsky, M. Untersuchungen über den akustischen End-apparat der Säugethiere. Arch. mikr. Anat. xiii. pp. 497–557, pls. xxxii.–xxxv.

Lydekker, R. Notes on the Fossil Mammalian Faunæ of India and Burma. Rec. Geol. Surv. Ind. ix. pp. 86–106, 154.

The Mammalian series of various Indian and Burmese deposits are compared with one another, with the existing fauna, and with the fossil faunæ of other regions. Two new genera are described [*Sivatheriidæ*].

Milne-Edwards, A., & Grandidier, A. Histoire Physique, Naturelle, et Politique de Madagascar. VI. Histoire Naturelle des Mammifères, I. part ii. 4to, texte, pp. 193–396. Paris: 1876.

This part completes the account of the family *Indriside* [cf. *infrà*, p. 9], and concludes the first volume of the work [*cf.* Rec. Zool. xii. p. 3].

PELZELN, A. VON. Africa-Indien. Darstellung der Beziehungen zwischen der africanischen und indo-malayischen Vogel-Fauna, nebst allgemeineren Betrachtungen über die geographische Verbreitung der Säugethiere. Verh. z.-b. Wien, xxv. (1875), pp. 33–62.

——. Ueber die Malayische Säugethier-Fauna. Festschrift z.-b. Wien, 1876, pp. 24, 1 map.

In these two papers, the views of Blanford, Blyth, and Stoliczka as to the distinctness of the Malayan and Indian Regions are adopted; Tibet is included in the former [*cf.* Blanford, *suprà*, p. 2].

PETERS, W. Ueber die Pelzrobbe von den Inseln St. Paul und Amsterdam, und über die von S.M.S. Gazelle mitgebrachten Flederthiere. MB. Ak. Berl. 1876, pp. 315–319, 1 pl.

A new Fur Seal is named but not described, and five Bats are enumerated, of which one is new [*Pteropodidæ*].

——. Ueber die von S.M.S. Gazelle gesammelten Säugethiere aus den Abtheilungen der Nager, Hufthiere, Sirenen, Cetaceen, und Beutelthiere. *Tom. cit.* pp. 355–366, 3 pls.

Thirteen species, of which two are new (*Delphinidæ*, *Muridæ*).

——. Ueber die von dem verstorbenen Dr. Reinhold Buchholz in Westafrika gesammelten Säugethiere. *Tom. cit.* 1876, pp. 469–485, 4 pls.

Notes on 56 species, of which 6 are described as new [*Lemuridæ*, *Soricidæ*, *Muridæ*, *Bovidæ*].

PREJEVALSKI, N. Mongolia, the Tangut Country, and the Solitudes of Northern Tibet. Translated by E. Delmar Morgan. London: 1876, 8vo, 2 vols. pp. 287, 320.

Contains incidental notices of various Mongolian Mammals.

PRITCHARD, N. The Organ of Corti in Mammals. P. R. Soc. xxiv. pp. 346–352.

ROSENBERG, C. B. H. VON. Reistochten naar de Geelvinkbaai op Nieuw Guinea in de Jaren 1869 en 1870. s'Gravenhage: 1875, 4to, pp. 153, pls. xxi.

Contains occasional notes on Mammals.

ROTHE, —. Programm der Säugethiere Niederösterreichs. Vienna: 1875. [Not seen by the Recorder; *cf.* Arch. f. Nat. 1876, ii. p. 8.]

SCHÄFER, E. A. A contribution to the history of development of the Guinea Pig. Part I. J. Anat. Phys. x. pp. 772–777.

On the early development of the embryo.

——. Description of a Mammalian Ovum in an early condition of Development. P. R. Soc. xxiv. pp. 399–403, pl. x.

SCLATER, P. L. On the Present State of our Knowledge of Geographical Zoology. Rep. Br. Ass. 1875, Misc. Comm., pp. 85–133.

This address to Section D of the British Association forms a guide to the bibliography of the geographical distribution of the *Vertebrata*,

considerable space being allotted to the *Mammalia*. Full references are given to all the works and papers cited.

SEVERTZOFF, N. The Mammals of Turkestan. Ann. N. H. (4) xviii. pp. 40–57, 168–174, 208–225, 325–336, 377–388.

A translation of the part of the "Turkestanskie Jevotnie" relating to Mammals [*cf.* Zool. Rec. x. p. 6], by F. C. Craemers, with some additional notes by the author. The Recorder has added some references to recent memoirs; and G. E. Dobson remarks on the Bats described, *tom. cit.* pp. 130–132.

TOMES, C. S. A Manual of Dental Anatomy, Human and Comparative. London: sm. 8vo, 1876. *Mammalia*, pp. 241–400.

A concise review of the dentition of both recent and extinct Mammals, illustrated with many woodcuts.

TROSCHEL, F. H. Bericht über die Leistungen in der Naturgeschichte der Säugethiere während des Jahres 1875. Arch. f. Nat. 1876, ii. pp. 1–37.

TURNER, W. Some General Observations on the Placenta, with especial reference to the Theory of Evolution. J. Anat. Phys. xi. pp. 33–53.

Comes to the conclusion that the placenta cannot be accepted as a dominant organ for purposes of classification. [*Cf. infrà*, pp. 10, 23.]

VAN BENEDEN, E. La Maturation de l'œuf, la Fécondation, et les premières Phases du Développement embryonnaire des Mammifères. J. Zool. v. pp. 10–56.

A summary of observations on the development of the ova in the Rabbit; generalizations on the facts noted are postponed.

WALLACE, A. R. The Geographical Distribution of Animals. London: 1876, 2 vols. 8vo. pp. 503–607.

A considerable part of this most important work is devoted to the Mammalia. Besides the discussion of the genera characteristic of each of the zoological regions and sub-regions, the classification of Mammals is considered (i. pp. 85–90), the distribution of the extinct forms (i. pp. 107–160), and that of existing families and genera (ii. pp. 170–254). The author believes that the principal groups first appeared in the northern hemisphere, from which the southern continents were peopled by successive waves of migration.

YARROW, H. C. Notes upon Geographical Distribution and Variation, with regard to the Zoology of the Western United States, as relates more particularly to Mammals and Birds. Wheeler's Rep. Expl. W. of 100th M., v. (1875) pp. 15–34.

——. [See GOULD, E.]

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W. VON BISCHOFF contradicts the statement in E. Häckel's "Anthropogenie," that the ova and young embryos of Man and other Mammals are not distinguishable. SB. bayer. Ak. 1876, p. 1.

— Brümmer describes the stomachs of various Mammals. Deutsch. Zeitsch. Thiermed. ii. p. 158, *et seq.* [not seen by the Recorder : *cf.* Arch. f. Nat. 1876, ii. p. 4].

E. R. Alston has notes on, and T. King catalogues, the Mammals of the West of Scotland. Notes on the Fauna and Flora of the West of Scotland (British Association Guide-Book). Glasgow : 1876, 12mo, pp. v.–viii., 5 & 6.

W. Peters names ten Mammals collected by J. M. Hildebrandt at Mombas, East Africa ; two are new [*Galaginidæ*, *Rhinolophidæ*]. MB. Ac. Berl. 1876, pp. 912–914.

J. A. Allen enumerates ten species of Mammals collected at Lake Titicaca. Bull. Mus. C. Z. iii. pp. 350–353.

L. M. D'Albertis briefly remarks on some of the Mammals found by him in New Guinea. Abh. Ver. Hamb. 1876, p. 65.

J. H. Kidder describes the Mammals observed at Kerguelen Island by the American Transit Expedition. Bull. U. S. Nat. Mus. i. No. 3, pp. 38–41 ; abstr. Am. Nat. 1876, pp. 481–484.

W. Boyd-Dawkins reports on the Mammalian bones found along with human remains in the Robin Hood Cave, Derbyshire. J. G. Soc. xxxii. pp. 245–249.

S. Haughton & A. Macalister report on the Mammalian bones found along with human remains in the Knockninny Cave, Lough Erne. P. R. Irish Ac. (2) ii. pp. 482 & 483.

A. Leith Adams reports on Mammalian remains from the Shandon Cave. Tr. R. Irish Ac. xxvi. pp. 209–228.

E. Frank enumerates remains of Mammals found in lake dwellings at Schussenried. Württ. Nat. JH. 1876, pp. 72 & 73.

T. Studer reports on the Mammalian bones found in the lake dwellings at Lüscherz. MT. Ges. Bern, 1875, pp. 283–290.

F. Molon describes remains of fossil Mammalia from the cavern of Zoppega, Venetia. Atti Ist. Venet. (5) i. pp. 1125–1146, pls. ix. & x. *Cf.* J. Zool. v. pp. 260 & 261.

## MONODELPHIA.

### QUADRUMANA.

Schlegel, H. Les Singes, *Simiæ*. Mus. P.-B. vii. pp. 1–356.

A detailed review of the genera and species of *Quadrumana* and *Lemures*, with particulars as to the specimens in the Leyden Museum. One species is new [*Cebidæ*].

#### Simiidæ.

Leńz, H. Die Anthropomorphen Affen des Lübecker Museums. Lübeck : 1876, 4to, pp. 20, pls. i.–vii.

Describes the specimens collected by the late H. Brehmer, with photographic illustrations by J. Nöhring.

W. S. Barnard compares the myology of Apes with that of Man, and elaborately describes the muscles of the limbs of *Simia satyrus*. P. Am. Ass. 1875, ii. pp. 112–144.

E. Friedel has notes on the Anthropoid Apes living in the Zoological Gardens at Berlin. Zool. Gart. 1876, pp. 73–77.

R. Hartmann continues his papers on the anatomy of this family [*cf.* Zool. Rec. xii. p. 5]. Arch. Anat. Phys. 1876, pp. 636–661, pls. xiv. & xv.

*Simia satyrus*. W. v. Bischoff describes and figures the brain of a young Orang. He is confirmed in his former opinion that the brain of this species is better developed than that of any of the other Anthropoid Apes. SB. bayer. Ak. 1876, pp. 193–205, 3 pls.

*Troglodytes niger*. The supposed Gorilla of the Dresden Zoological Gardens proved to be a Chimpanzee [*cf.* Zool. Rec. xii. p. 5]. A. B. Meyer; SB. Ges. Isis, 1876, pp. 30 & 31.

*Gorilla savagii*. A skeleton in the Brest Museum is described; the Gorilla is held to be the least imperfect of the Anthropoid Apes in regard to the bipedal attitude; E. Häckel, Rev. d'Anthr. v. pp. 1–20, pl. i. Notes on its habits and history; R. Burton, Gorilla Land, i. pp. 238–252 [*suprà*, p. 3]. On the living Gorilla at the Berlin Aquarium; F. C. Noll, Zool. Gart. 1876, pp. 338 & 339; O. Hermes, *tom. cit.* p. 449; *cf.* Nature, xiv. pp. 200, 242.

### Cercopithecidæ.

*Macacus brunneus*, And., = *M. arctoides*, Geoffr. [*cf.* Zool. Rec. xi. p. 6], ? = *M. speciosus*, Geoff. & F. Cuv. (*nec* Temm.); J. Anderson, P. Z. S. 1876, p. 332.

*Macacus melanotus* (Ogilby) is a native of Borneo, not of India; A. Günther, *tom. cit.* p. 425.

*Cynocephalus mormon*. Notes on habits in captivity; J. v. Fischer, Zool. Gart. 1876, pp. 116–127, 174–179.

### Cebidæ.

*Ateles pan*, sp. n., H. Schlegel, Mus. P.-B. vii. p. 180, Guatemala.

### Hapalidæ.

*Hapale leucopus*, sp. n., A. Günther, P. Z. S. 1876, p. 743, pl. lxxii., Columbia.

## LEMURES.

A. Milne-Edwards & A. Grandidier complete their monograph of the family *Indrisidæ* [cf. Zool. Rec. xii. p. 6]. They describe the brain, sense-organs, and viscera (pp. 193–278), and the placentation (pp. 278–286), showing that, as already indicated, the placenta is diffuse and non-deciduate [*cf.* Zool. Rec. x. p. 7]. They contest the theory of Häckel that the Lemuroids were the probable ancestors of the higher Mammals, and monograph the genera, species, and races (pp. 286–344), recognizing

three species of *Propithecus*, one of *Avahis*, and one of *Indris*. Mamm. de Madag. i. pt. 2 [*cf. supra*, p. 5].

W. H. Flower reviews our present knowledge of "Extinct Lemurina;" further information is needed before we can determine the true affinities of the American genera referred by Marsh and Cope to this order or to Quadrumana. Ann. N. H. (4) xvii. pp. 323–328.

M. Schmidt has notes on the Lemurs living in the Zoological Gardens at Frankfurt. Zool. Gart. 1876, pp. 45–51, 78–81.

W. Turner has followed up Milne-Edwards' researches, and arrived at similar results. He described gravid uteri of *Propithecus*, *Lemur*, and *Indris*, in all of which the placenta is diffuse and presumably non-deciduate. (Abstract) P. R. Soc. xxiv. p. 409.

### Indrisidæ.

*Propithecus coronatus* (Gray, 1872) is renamed "*P. damanus*, Pollen, in litteris, 1869"; H. Schlegel, Mus. P.-B. vii. p. 293.

### Galaginidæ.

*Galago lasiotis*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 912, East Africa.

*Otolicnus pusillus*, sp. n., W. Peters, *tom. cit.* p. 473 (= *Galago demidoffi*, Ptrs., *nec* Fisch.), West Africa. *O. alleni*, var. n. *cameronensis*, id. *tom. cit.* p. 472.

## CHIROPTERA.

Dobson, G. E. Monograph of the Asiatic *Chiroptera*, and Catalogue of the species of Bats in the Collection of the India Museum, Calcutta. London: 1876, 8vo, pp. 228.

All the Asiatic Bats are fully described and diagnoses of the remaining European species are added in footnotes. The arrangement is that of the author's "Conspectus" [*cf.* Zool. Rec. xii. p. 7].

G. E. Dobson makes additional remarks on his "Conspectus" with the view of showing that his families *Emballonuridæ* and *Nycteridæ* are not equivalent, as had been suggested, with *Noctilionidæ*, Gray, and *Megadermata*, Peters, respectively. Ann. N. H. (4) xviii. pp. 345–347.

W. Leche discusses the milk dentition of this order; Lund's Univ. Års-skr. xii. (1875). [Not seen by the Recorder: *cf.* J. Zool. v. pp. 258 & 259.]

W. Peters enumerates four Bats collected by L. Krug & J. Gundlach in Portorico; MB. Ak. Berl. 1876, p. 704.

### Pteropodidæ.

*Pteropus capistratus*, p. 316, New Ireland, *P. degener*, p. 318, Aru Islands, spp. nn., W. Peters, *tom. cit.* 1 pl.

### Rhinolophidæ.

*Triænops afer*, sp. n., W. Peters, *tom. cit.* p. 913, East Africa.

### Vespertilionidæ.

*Vesperugo grandidieri*, sp. n., G. E. Dobson, Ann. N. H. (4) xviii. p. 500, Zanzibar.

*Chalinolobus signifer*, sp. n., G. E. Dobson, *op. cit.* xvii. p. 289, Queensland.

*Thyroptera tricolor*. On the structure of its feet; G. E. Dobson [*suprà*, p. 4].

### Emballonuridæ.

G. E. Dobson monographs his group *Molossi*, characterizing 1 species of *Chiromeles*, 9 of *Molossus*, and 21 of *Nyctinomys*. P. Z. S. 1876, pp. 701–735.

*Nyctinomys megalotis*, p. 728, Surinam, and *N. albiventer*, p. 733, Madagascar, *id.* l. c.; *N. africanus*, id. Ann. N. H. (4) xvii. p. 348, South Africa: spp. nn.

*Mystacina tuberculata*. On the structure of the feet, claws, and wing-membrane; *id.* P. Z. S. 1876, pp. 486–488.

*Taphozous hargravii*, sp. n., E. Pierson Ramsay, P. Linn. Soc. N.S.W. i. p. 81, New South Wales.

### Phyllostomatidæ.

*Pelto[r]rhinus*, g. n.; allied to *Stenoderma*, but differing in dentition. Type, *Artibeus achradophilus*, Gosse. W. Peters, MB. Ak. Berl. 1876, p. 429, pl. ii.

*Stenoderma*. W. Peters figures the types of *S. rufum*, Geoff., figs. 1–7, and *Vampyrops lineatus*, Geoff., figs. 8–14, *l. c.* pl. i.

*Macrotus bocourtianus*, sp. n., G. E. Dobson, Ann. N. H. (4) xviii. p. 436, Guatemala.

## INSECTIVORA.

Gill, T. Synopsis of Insectivorous Mammals. Bull. U. S. Surv. i. (1875) pp. 91–120.

Various arrangements are reviewed, and the following modification of that suggested by the author in 1873 [*cf.* Zool. Rec. x. p. 3] is adopted:—

Sub-Ord. I. Dermoptera, with *Galeopithecidæ*.

„ II. Bestiæ.

*Superfam.* 1. *Tupaioidea*, with Tupaiidæ and Macroscelididæ.

„ 2. *Erinaceoidea*, with Erinaceidæ.

„ 3. *Soricoidea*, with Talpidæ and Soricidæ.

„ 4. *Centetoidea*, with Centetidæ and Potamogalidæ.

„ 5. *Chrysochloroidea*, with Chrysochloridæ.

All the super-families, families, and sub-families are characterized, and the principal features of the two American families (*Talpidæ* and *Soricidæ*) are contrasted in parallel columns.

E. D. Cope thinks the name Insectivora should be only used for a sub-order of Bunotheria, ord. n., which he divides into five sub-orders—I. Creodonta [*cf.* Zool. Rec. xii. p. 9]; II. Mesodonta, sub-ord. n. (foss.), containing *Tomitherium*, &c., removed from the Lemurs; III. Insectivora; IV. Tillodonta; V. Tæniodonta, sub-ord. n. (foss.), consisting of *Ectoganus* and *Calamodon* [cf. Zool. Rec. xii. p. 10]. P. Ac. Philad. 1876, pp. 39, 88 & 89.

### Tupaiidæ.

*Tupaia*. A. Günther reviews and characterizes the species, and names three varieties of *T. tana*, vars. *tana*, *speciosa*, and *chrysura*; the last is figured. P. Z. S. 1876, pp. 425–427, pl. xxxvi.

### Erinaceidæ.

*Erinaceus macracanthus* figured; W. T. Blanford, "Eastern Persia," ii. pl. i.

*Gymnura rafflesi*. A white race, inhabiting Labuan and Sarawak, is named var. *candida*; A. Günther, P. Z. S. 1876, p. 425.

### Chrysochloridæ.

*Chrysochloris trevelyani*. Its very remarkable skull described and figured [*cf.* Zool. Rec. xii. p. 9]; A. Günther, Ann. N. H. (4) xvi. pp. 346–348, pl. xx.

### Soricidæ.

*Crocidura dolichura*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 475, pl. ii. West Africa.

## "TILLODONTIA."

### Anchippodidæ.

O. C. Marsh further illustrates the characters of his order Tillodontia [*cf.* Zool. Rec. xii. p. 9] by describing the remains of *Tillotherium*. The brain cavity was small, but proportionately larger than in *Dinoceras* [cf. *infrà*, p. 16]. Am. J. Sci. (3) xi. pp. 249–252, pls. viii. & ix. Translated, J. Zool. v. pp. 244–248, pl. xi. *Cf.* W. H. Flower, P. R. Inst. viii. pp. 122–124.

E. D. Cope makes *Tillodonta* a sub-order of *Bunotheria* [*suprà*, Insectivora].

*Dryptodon*, g. n., foss., allied to *Stylinodon*; type, *D. crassus*, sp. n., Lower Eocene of New Mexico. O. C. Marsh, Am. J. Sci. (3) xii. p. 403.

## CARNIVORA.

Allen, J. A. The former Range of some New England Carnivorous Mammals. Am. Nat. x. pp. 708–715.

The Bear and Puma still linger in some parts, but the Wolf is extinct.

Van Beneden, P. J. Les Phoques Fossiles du Bassin d'Anvers. Bull. Ac. Belg. (2) xli. pp. 783–802; J. Zool. v. pp. 188–205.

The following species of *Phocidæ*, *Trichecidæ*, and *Otariidæ*, some of which appear to be new, are described:—*Trichecus rosmarus*, *Trichecodon koninckii*, *Alachterium cretsi*, *Mesotaria ambigua*, *Paleophoca nysti*, *Callophoca obscura*, *Platyphoca vulgaris*, *Gryphoca similis*, *Phocanella pumilla*, *P. minor*, *Phoca vitulinoides*, *Monotherium delognii*, *M. affine*, *M. aberratum*, *Prophoca rousseaui*, and *P. proxima*.

W. Stirling describes the anatomy of the skin in the Dog; J. Anat. Phys. x. pp. 464–474, pls. xix. & xx.

W. Turner has further remarks on the placentation of the cat; *tom. cit.* x. pp. 433 & 434.

### Felidæ.

*Felis catus*. The period of gestation is 68 days; A. H. Cocks, Zool. (s.s.), pp. 4868, 5038.

*Felis shawiana*, sp. n., W. T. Blanford, J. A. S. B. (n.s.) xlv. pt. 2, p. 49; P. A. S. B. 1876, p. 124, Eastern Turkestan.

*Felis diardi*. Notes on its habits in confinement; J. v. Fischer, Zool. Gart. 1876, pp. 279–281.

*Dromocyon*, g. n. foss., resembling *Hyænodon* in general characters; type, *D. vorax*, sp. n., Eocene of Wyoming. O. C. Marsh, Am. J. Sci. (3) xii. p. 403.

### Viverridæ.

*Viverra tangalunga* is figured; it is a native of Borneo. A. Günther, P. Z. S. 1876, p. 427, pl. xxxvii.

*Eupleres goudoti*. P. Gervais describes and figures its osteology; Zool. et Pal. Gén., ii. pp. 64–72, pl. vii.

### Canidæ.

*Canis gracilis* and *C. cancrivorus*. H. Burmeister replies to remarks by R. A. Philippi [*cf.* Zool. Rec. vi. p. 16]; Arch. f. Nat. 1874, pp. 116–124.

*Canis mississippiensis*, sp. n., foss., J. A. Allen, Am. J. Sci. (3) xi. p. 49, superficial strata of the Upper Mississippi.

*Vulpes persicus* figured; W. T. Blanford, East. Persia, ii. pl. ii.

### Procyonidæ.

*Bassaris monticola*, sp. n., Cordero, Nat. Mex. iii. p. 269, Mexico. [Not seen by the Recorder; *cf.* Arch. f. Nat. 1876, ii. p. 22.]

*Bassaricyon*, g. n., allied to *Procyon*, *Bassaris*, and *Nasua*, but differing in cranial structure; type, *B. gabbi*, sp. n., Costa Rica; the skull only is yet known; J. A. Allen, P. Ac. Philad. 1876, pp. 20–22.

### Mustelidæ.

*Martes abietum*. On its former existence in Suffolk; J. H. Gurney, Tr. Norw. Soc. ii. pp. 223 & 224.

*Martes foina*. Notes on its habits; O. v. Krieger, Zool. Gart. 1876, pp. 188–195.

*Mustela putorius*. Notes on its habits; *id. tom. cit.* pp. 9–16.

*Putorius communis*. Description of its myology; E. Alix. J. Zool. v. pp. 152–188, pls. v. & vi.

*Lutra lovii*, sp. n., A. Günther, P. Z. S. 1876, p. 736, Borneo.

*Meles canescens* figured; W. T. Blanford, East. Persia, ii. pl. iii.

### Otariidæ.

[*Cf.* Van Beneden, P. J., *suprà*, p. 13.]

*Otaria* (*Arctophoca*) *elegans*, sp. n., W. Peters (*sine descr.*), MB. Ak. Berl. 1876, p. 316, St. Paul and Amsterdam Islands.

### Phocidæ.

[*Cf.* Van Beneden, P. J., *suprà*, p. 13].

*Macrorrhinus leoninus*. On its habits at Kerguelen Island; J. H. Kidder, Bull. U. S. Mus. No. 3, pp. 39 & 40.

## CETACEA.

Van Beneden, P. J., & Gervais, P. Ostéographie de Cétacés Vivantes et Fossiles. Paris: 1876 [1877 on cover], text (4to) livr. 14, atlas (fol.) livr. 14.

This portion of the text includes *Platanista*, *Inia*, *Pontiporia*, and the fossil genera, *Champsodelphis*, *Eurrhinodelphis*, *Priscodelphinus*, *Pachyacanthus*, *Schizodelphis*, *Cetorrhynchus*, *Tretosphys*, *Zarachis*, and *Lophocetus*. The plates issued illustrate the genera *Berardius*, *Eurrhinodelphis*, *Priscodelphinus*, *Platydelphis*, *Champsodelphis*, *Squalodon*, *Ziphius*, and *Tursiops* [cf. Zool. Rec. xii. p. 13].

— Hæst gives an account of the Cetaceans annually captured at the Færoe Islands; in 1843 the number of Pilot Whales killed was 3143. Tids. Fisk. ii. p. 313 *et seq.* [Not seen by Recorder; *cf.* Arch. f. Nat. 1876, ii. p. 35.]

### Zeuglodontidæ.

*Phococetus*, g. n. (foss.), P. Gervais considers the *Phocodon* of Agassiz to be a true *Zeuglodon*, while *Z. vasconum* [cf. Zool. Rec. xi.

p. 12] probably belongs to a distinct genus for which this name is provisionally suggested. J. Zool. v. pp. 64–70.

*Zeuglodon wanklyni*, sp. n. foss., H. G. Seeley, J. G. Soc. xxxii. p. 428, Barton Clay of Hampshire.

*Squalodon catulli*. A. de Zigno describes and figures the upper jaw; Mem. Ist. Venet. xx. [Not seen by Recorder; *cf.* J. Zool. v. p. 445.]

## Delphinidæ.

*Orca antarctica*, sp. n., P. Fischer, J. Zool. v. p. 146; founded on a drawing of a Cetacean observed by Dumourtier near the New Shetlands during the voyage of the "Astrolabe."

*Orca gladiator*. Occurrence on the Cheshire Coast; T. J. Moore, P. Liverp. Soc. xxx. p. lxxxv.

*Globiocephalus brachypterus*, sp. n., E. D. Cope, P. Ac. Philad. 1876, p. 129, Delaware Bay.

*Delphinus albirostris*. Specimens taken off Great Grimsby and Lowestoft are fully described and figured by D. J. Cunningham & J. W. Clark, P. Z. S. 1876, pp. 679–686, 686–691, pls. lxiv. & lxv.

*Delphinus acutus*. Occurrence on the Irish coast; J. Douglas-Ogilby, Zool. (s.s.) 5077 & 5078.

*Delphinus* (*Steno*) *perspicillatus*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 360, 2 pls. Atlantic.

*Feresa attenuata*, sp. n., J. E. Gray, J. Mus. Godeff. viii. p. 52, pl. vi. South Seas. [This posthumous paper was the last which the author prepared for publication.]

*Lagenorrhynchus perspicillatus* (p. 136) and *L. gubernator* (p. 138, pl. iv.), spp. nn., E. D. Cope, P. Ac. Philad. 1876, North Atlantic.

*Tursio metis*. A specimen described; F. W. Hutton, Tr. N. Z. Inst. viii. pp. 180 & 181.

*Phocæna lineata*, sp. n., E. D. Cope, P. Ac. Philad. 1876, p. 134, New York Harbour. *P. brachycium* further described; *id. l. c.*

*Monodon monoceros*: on the fœtus and placenta; W. Turner, P. R. Soc. Edinb. 1875–76, pp. 103–110. On its dentition; *id.* J. Anat. Phys. x. p. 516.

## Physeteridæ.

*Ziphius novæ-zealandiæ*. The skeleton described and figured; J. von Haast, P. Z. S. 1876, pp. 466–477, pls. xlv. & xlvi. W. H. Flower cannot distinguish it from *Z. chatamiensis*, and holds that there is no proof of the existence of more than one species of *Ziphius*; tom. cit. pp. 477 & 478.

*Mesoplodon floweri*, sp. n., J. von Haast, *tom. cit.* pp. 478–485, pls. xlv. & xlvi., skeleton described and figured, New Zealand Seas. W. H. Flower cannot distinguish it from *M. layardi*; tom. cit. pp. 485 & 486.

*Oulodon* [*Ulo*], g. n., J. von Haast, *tom. cit.*, p. 457. Allied to *Mesoplodon*, but with a row of small teeth in the upper jaw. Type, *M. grayi*, sp. n., *id. tom. cit.* p. 13, New Zealand Seas.

*Prorosiphius chonops*, sp. n. (foss.), J. Leidy, P. Ac. Philad. 1876, p. 114, phosphate beds of S. Carolina.

### Balænidæ.

P. Gervais records five species as having occurred on the French coasts, viz., *Balæna biscayensis*, *Balænoptera musculus*, *B. rostrata*, *B. sibbaldii*, and *B. borealis* [= *laticeps*]. J. Zool. v. p. 463.

*Sibbaldius schlegeli.* P. Gervais figures the skull and ear-bones, and remarks on the other described species of Japanese *Balænidæ*; tom. cit. pp. 1–10, pls. i. & ii.

*Balænoptera musculus.* Note of its occurrence at Lynn; T. Southwell, Zool. (s.s.) p. 4756; Tr. Norw. Soc. ii. pp. 222 & 223.

*Balænoptera borealis.* Note of its occurrence at Biarritz in 1874; P. Fischer, C. R. lxxxiii. pp. 1298–1301.

## SIRENIA.

### Halitheriidæ.

A. de Zigno treats of the fossil Sirenians of Venetia and describes *Halitherium belluense*, p. 438, Miocene, *H. angustifrons*, p. 441, *H. curvidens*, p. 443, and *H. veronense*, p. 445, Eocene, spp. nn. (foss.). Mem. Ist. Venet. xviii. (1875), pp. 427–453, pls. xiv.–xviii. *Cf.* J. Zool. v. pp. 71 & 72.

## PROBOSCIDEA.

### Elephantidæ.

*Elephas primigenius.* On its distribution; A. J. Malmgren, Œfv. Finn. Soc. xvii. (1875) pp. 139–154.

*Stegodon.* R. Lydekker has notes on this genus, describes a cranium of *S. ganesa*, and traces the probable pedigree of the Proboscidea from a common ancestor. Rec. Geol. Surv. Ind. ix. pp. 42–49.

## UNGULATA PERISSODACTYLA.

### Uintatheriidæ.

O. C. Marsh gives additional details as to the characters of his order *Dinocerata* [cf. Zool. Rec. x. p. 13, xi. p. 13], and figures the skull, teeth, feet, and a cast of the cranial cavity of *Dinoceras*. The latter shows that the brain was proportionately smaller than in any other known Mammal, and even less than in some Reptiles. Am. J. Sci. (3) xi. pp. 163–168, pls. ii.–vi.; transl., J. Zool. v. pp. 136–145, pl. iv.

R. Owen considers that there is no evidence that the cranial protuberances of these animals supported horns of any kind. He regards

their dental and osteological characters as "consistently perissodactyle." Am. J. Sci. (3) xi. pp. 401–403.

W. H. Flower considers this group to be somewhat intermediate between the Perissodactyla and Proboscidea, but nearer to the former than was at first supposed. P. R. Inst. viii. pp. 115–118.

*Bathmodon*, Cope, = *Coryphodon*, Owen; as in other Eocene Mammals its brain was extremely small; O. C. Marsh, Am. J. Sci. (3) xi. pp. 425–428.

*Coryphodon hamatus*, sp. n. (foss.), *id. l. c.* p. 426, Eocene of Wyoming.

## Titanotheriidæ.

O. C. Marsh recognizes four genera of his family *Brontotheriidæ*, 1, *Menodus*, Pomel, 1849 (= *Titanotherium*, Leidy, 1852); 2, *Megacerops*, Leidy; 3, *Brontotherium*, Marsh; and 4, *Diconodon*, Marsh. They may yet prove to be nearly related to *Diplacodon*. The skeleton of *Brontotherium* is described, and the skull, teeth, feet, and a cast of the brain cavity are figured. Am. J. Sci. (3) xi. pp. 335–340, pls. x.–xiii.; transl., J. Zool. v. pp. 248–255, pl. xii. *Cf.* P. Gervais, *tom. cit.* p. 156.

W. H. Flower retains Leidy's name *Titanotherium*, Pomel's *Menodus* being too close to *Menodon*, V. Meyer. P. R. Inst. viii. p. 108.

## Rhinocerontidæ.

W. H. Flower points out the cranial and dental characters of the existing species, and recognizes the following groups, which may be considered either as generic or sub-generic: I. *Rhinoceros*, Linn., with *R. unicornis* and *R. sondaicus*; II. *Ceratorrhinus*, Gray, with *C. sumatrensis* and *C. lasiotis*; III. *Atelodus*, Pomel, with *A. bicornis* and *A. simus*. To include all the extinct forms, three other genera must be added, *Aceratherium*, Kaup, *Diceratherium*, Marsh, and *Hyracodon*, Leidy. P. Z. S. 1876, pp. 443–457.

P. L. Sclater figures the species now or lately living in the Zoological Gardens of London (*R. unicornis*, *sondaicus*, *sumatrensis*, *lasiotis*, and *bicornis*), and remarks on the history of the individuals in question. Tr. Z. S. ix. pp. 645–660, pls. xcv.–xcix.

W. H. Drummond has notes on the African species, of which either four or five are regarded as distinct. P. Z. S. 1876, pp. 109–114.

J. F. Brandt remarks on the fossil species hitherto found in Russia; Bull. Pétersb. xxi. pp. 81–84.

*Rhinoceros sumatranus*. H. Filhol states that a fossil premolar, not specifically separable from that of the Rhinoceros of Sumatra, was shown him in New Caledonia, and was stated to have been found in that island. Ann. Sci. Nat. (6) iii. art. 2.

*Rhinoceros antiquitatis* (= *tichorrhinus*). Preliminary remarks on a microscopical examination of the remains of its food, which consisted of plants of a northern type; J. Schmalhausen, Bull. Pétersb. xxii. pp. 291–295.

### EQUIDÆ.

*Eohippus*, gen. n. foss., O. C. Marsh, allied to *Orohippus*, but with a rudiment of the fifth metatarsal and different premolars; types, *E. validus* and *E. pernix*, spp. nn., lowest Eocene of New Mexico and Wyoming. Am. J. Sci. (3) xii. pp. 401 & 402.

## UNGULATA ARTIODACTYLA.

### ANTHRACOTHERIIDÆ.

*Merycopotamus*. R. Lydekker describes the osteology of *M. dissimilis* in detail; he places the genus among the *Hippopotamidæ*, forming a link between that family and the *Anthracotheriidæ*. Rec. Geol. Surv. Ind. ix. pp. 144–153.

*Anthracotherium magnum*. Remains found in Styria described; R. Hoernes, JB. geol. Reichsanst. 1876, pp. 109–142, pl. xv.

### HIPPOPOTAMIDÆ.

*Hippopotamus hipponensis*, sp. n. (foss.), A. Gaudry, Bull. Soc. Géol. 1876, p. 504, pl. xviii.

### ELOTHERIIDÆ.

*Parahyus*, g. n. (foss.), O. C. Marsh, Am. J. Sci. (3) xii. p. 402; allied to *Elotherium* and *Helohyus*, but with one less premolar. Type, *P. vagus*, sp. n., Lower Eocene of Wyoming.

### SUIDÆ.

*Sus*. R. Hensel discusses the homologies of the teeth; Ver. L.-C. Ak. xxxvii. (1875) art. 5, pl. xxvi. In an abstract of a paper "On the Pre-historic British *Sus*," G. Rolleston considers the pre-Roman British Pig to have been derived from *S. scrofa*, while the Asiatic domesticated *S. indicus* probably descends from *S. cristatus*; P. L. S. xiii. pp. 108 & 109.

*Phacochœrus æliani*. Notes on its habits; J. Menges, Zool. Gart. 1876, pp. 265–271.

### ANOPLOTHERIIDÆ.

*Xiphodon platyceps*, sp. n. (foss.), W. H. Flower, P. Z. S. 1876, p. 7, pl. i., "box stones" of Suffolk Crag?

### OREODONTIDÆ.

*Merycochœrus*. G. T. Bettany describes skulls collected in Oregon by Lord Walsingham, revises the generic characters, and describes *M. temporalis* (p. 269) and *M. leidyi* (p. 270), spp. nn. (foss.), J. G. Soc. xxxii. pp. 259–273, pls. xvii. & xviii.

## Tragulidæ.

*Tragulus*. A. Kölliker describes the placenta, which is intermediate in character between those of the Suina and Ruminants. Verh. Ges. Würzb. x. pp. 74–83, pls. iv. & v.

## Cervidæ.

*Alces malchis*. Note on sub-fossil remains in Scotland; J. Young, P. N. H. Soc. Glasg. ii. pp. 176 & 177.

*Cervus mesopotamicus*. Further notes on this species [*cf.* Zool. Rec. xii. p. 18], with figures of antlers; V. Brooke, P. Z. S. 1876, pp. 298–303.

*Cervus schomburgki* characterized, with figures of normal and abnormal antlers; *id. tom. cit.* pp. 304–307.

*Cervus dybowskii*, sp. n., L. Taczanowski, [illegible] Ussuri (Eastern Siberia).

*Cervus capreolus*. On its existence in Palestine; H. B. Tristram, *tom. cit.* pp. 420–421; A. Newton, *tom. cit.* p. 701.

*Cervus macrotis*. A "very pronounced variety [illegible] "var. *californicus*"; J. D. Caton, Am. Nat. x. pp. 464–469.

*Cervus whitneyi*, sp. n. foss., J. A. Allen, Am. J. Sci. (3) x. p. 19, superficial strata of the Upper Mississippi.

*Cervulus micrurus*, Scl. [*cf.* Zool. Rec. xii. p. 18], = *C. reevesi*; P. L. Sclater, P. Z. S. 1876, p. 696.

*Lophotragus michianus*, Swinhoe, = *Elaphodus cephalophus*, M.-Ed.; A. H. Garrod; its external characters and anatomy are described. *Elaphodus* is closely allied to *Cervulus*, and the two might be united in a subfamily *Cervulinæ*; tom. cit. pp. 757–765, pl. lxxvi.

*Moschus moschiferus*. F. J. Bell describes the myology of the limbs, which tends to confirm Flower's views [*cf.* Zool. Rec. xii. p. 18] as to the affinities of the genus; *tom. cit.* pp. 182–188.

## Sivatheriidæ.

*Vishnutherium*, g. n. (foss.), R. Lydekker, Rec. Geol. Surv. Ind. ix. p. 103. Allied to *Sivatherium* and *Bramatherium*, but differing in dentition. Type, *V. iravadicum*, sp. n., Burma.

*Hydaspidotherium*, g. n. (foss.), R. Lydekker, *tom. cit.* p. 154. Allied to *Bramatherium*, but with one common horn-base on the vertex and no anterior horns. Type, *H. megacephalum*, sp. n., River Jhelum (Siwaliks).

## Bovidæ.

R. Hensel has notes on the tame and feral cattle of Brazil and Europe; he discusses the "Thur" of Heberstein, which has been identified with *Bos primigenius*, and comes to the conclusion that there is no evidence of its having been a really wild species; Zool. Gart. 1876, pp. 37–45, 97–130, 139–145.

*Cephalophus callipygus*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 48[illegible] pls. iii. & iv. West Africa.

*Antilocapra americana*. Notes on this species, especially on t[illegible] shedding of its horns; J. D. Caton, Am. Nat. x. pp. 193–205.

*Ovis jubata*, sp. n., W. Peters, MB. Ak. Berl. 1876, pp. 177–188, 4 pls. Eastern Mongolia.

*Ovis poli*. Additional note on the plate in P. Z. S. 1874 [*cf.* Zool. Rec. xi. p. 17, xii. p. 7]; A. Grote, P. Z. S. 1876, pp. 414 & 415.

### Camelidæ.

*Camelus bactrianus*. Note on its reported existence in a wild state in Central Asia; O. Finsch, *tom. cit.* pp. 696–698; Zool. Gart. 1876, pp. 339 & 340.

*Protolabis*, g. n. (foss.), E. D. Cope, P. Ac. Philad. 1876, p. 145. Allied to *Procamelus*, but with three upper incisors; type, *Procamelus heterodontus*, Cope.

*Procamelus fissidens*, sp. n. (foss.), E. D. Cope, *l. c.*, Colorado.

## HYRACES.

### Hyracidæ.

G. E. Dobson describes the structure of the adhesive foot-pads of the Hyrax [*cf. supra*, p. 4].

## GLIRES.

Alston, E. R. On the classification of the Order Glires. P. Z. S. 1876, pp. 61–98, pl. iv. [*cf.* J. Zool. v. pp. 259 & 260].

Various arrangements are reviewed, and the following modification of that first proposed by Waterhouse is adopted:—

Sub-Ord. I. Glires Simplicidentati.

Sec. 1. *Sciuromorpha*, with Anomaluridæ, Sciuridæ, Ischyromyidæ (fam. n., foss.), Haplodontidæ and Castoridæ.

Sec. 2. *Myomorpha*, with Myoxidæ, Lophiomyidæ, Muridæ, Spalacidæ, Geomyidæ, Theridomyidæ (fam. n., foss.), and Dipodidæ.

Sec. 3. *Hystricomorpha*, with Octodontidæ, Hystricidæ, Chinchillidæ, Dasyproctidæ, Dinomyidæ, and Caviidæ.

Sub-Ord. II. Glires Duplicidentati, with Lagomyidæ and Leporidæ.

Sub-Ord. III. Glires Hebedidentati (sub-ord. n., foss.), with Mesotheriidæ.

All the families and genera are characterized, and the supposed affinities of the former are indicated on a chart.

### Sciuridæ.

*Sciurus steeri*, sp. n., A. Günther, P. Z. S. 1876, p. 735, pl. lxix. Philippine Isles.

*Sciurus fulcus* figured; W. T. Blanford, East. Persia, ii. pl. iv.

*Sciurus callisurus* figured; W. Peters, MB. Ak. Berl. 1876, p. 476, pl. i.

*Spermophilus tridecemlineatus*. On its hibernation; P. R. Hoy, P. Am. Ass. 1875, n. pp. 148–150.

*Arctomys dichrous*. Note on its distinctness from *A. aureus*, Blanf. [*cf.* Zool. Rec. xii. p. 20]; J. Anderson, P. L. S. xii. pp. 579 & 580, pl. xxxi.

### Castoridæ.

*Castor fiber*. Note of its occurrence in Jemtland in 1873; P. Olson, Œfv. Ak. Förh. 1875, No. 3, p. 1. The last killed in Westphalia in 1840; Pieler, JB. Westf. Ver. 1874, p. 17.

### Myoxidæ.

*Myoxus glis*. Its occurrence in Mecklenburg; Schmidt and Arndt, Arch. Ver. Mecklenb. xxviii. p. 130.

*Myoxus pictus* figured; W. T. Blanford, East. Persia, ii. pl. iv.

### Muridæ.

*Gerbillus nanus* (pl. v.) and *G. persicus* (pl. vii.) figured; W. T. Blanford, East. Persia, ii.

*Nesokia huttoni* figured; *id. tom. cit.* pl. vi.

*Nesokia scullyi*, sp. n., J. Wood-Mason, P. A. S. B. 1876, p. 80, Central Asia.

*Cricetus murinus*, Sev., is from European Russia [not from Turkestan, as stated Zool. Rec. x. p. 18]; N. Severtzoff, Ann. N. H. (4) xviii. p. 54.

*Mus decumanus*. T. H. MacGillavry's remarks on the development of the incisors [*cf.* Zool. Rec. xii. p. 21] appear in Dutch. Versl. Ak. Amst. 1876, pp. 51–74, 1 pl.

*Mus bactrianus* and *M. erythronotus* figured; W. T. Blanford, East. Persia, ii. pl. v.

*Mus rutilans* (p. 478), *M. univittatus* (p. 479), *M. setulosus* (p. 480), spp. nn., W. Peters, MB. Ak. Berl. 1876, pl. ii. West Africa. The last is the type of *Nannomys*, sub-g. n.

*Golunda ellioti* redescribed; W. T. Blanford, J. A. S. B. (n.s.) xlv. pt. 2, pp. 165–171, pl. x.

*Pelomys watsoni*, sp. n., *id.*, P. A. S. B. 1876, p. 181, Sind.

*Uromys bruijni*, sp. n., W. Peters and G. Doria, Ann. Mus. Genov. viii. p. 336, Salawatti [near New Guinea].

*Uromys papuanus*, sp. n., A. B. Meyer; New Guinea (*sine descr.*); *U. arvensis*, Gray, was not met with by Meyer in Celebes [*cf.* Zool. Rec. x. p. 18]. Ann. N. H. (4) xvii. p. 145.

*Hapalotis macrura*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 355, pl. North Australia.

*Hesperomys teguina* [*-nus*], p. 755, and *H. concsi*, p. 756, spp. nn., E. R. Alston, P. Z. S. 1876, Central America.

*Arvicola campestris*, Blas., = *A. agrestis*, auctt.; Winge, Vid. Medd. 1875, p. 237.

*Arvicola fulvus*, Desm., = *A. savii*, De Sel., = *A. subterraneus*, De Sel.; L. H. Jeitteles, Verh. z.-b. Wien, xxv. (1875) pp. 555–562.

*Myodes lemmus*. W. D. Crotch remarks on its migrations, which he states to be directed due westward, and suggests that they may be caused by an instinct inherited from ancestors which were in the habit of visiting the "Miocene Atlantis," now sunk beneath the ocean. P. L. S. xiii. pp. 27–34, 83.

## Geomyidæ.

*Geomyinæ*. E. Coues compares very minutely the cranial and dental characters of *Geomys* and *Thomomys*, which he regards as forming a family, *Geomyidæ*, allied to but distinct from the *Saccomyidæ* [= *Heteromyinæ*, Alst.]. Bull. U. S. Geol. Surv. i. (1875) pp. 83–90. He also fully describes the species and discusses their distribution; Powell's Report on Colorado River (Washington: 1875), pp. 217–279.

*Thomomys clusius*, sp. n., E. Coues, *tom. cit.* p. 263, pl. i. Rocky Mountains.

*Geomys tuza*. Notes on its habits; G. B. Goode, *tom. cit.* pp. 281–285.

## Dipodidæ.

*Meriones*, F. Cuv. (*nec* Illiger), renamed *Zapus*, is made the type of *Zapodidæ*, fam. n., = *Jaculidæ*, Gill. The only species, *Z. hudsonius* (Zimm.), is fully described, with notes on its distribution and history. E. Coues, Bull. U. S. Geol. Surv. i. (1875) pp. 253–262.

*Dipus loftusi* figured; W. T. Blanford, East. Persia, ii. pl. vii.

## Octodontidæ.

*Ctenodactylus gundi*. On its anatomy and position; it is considered to be closely allied to *Pedetes*, *Petromys*, and *Pectinator*, P. Gervais, J. Zool. v. pp. 223–232, pls. vii. & viii.

*Loncheres caniceps*, sp. n., A. Günther, P. Z. S. 1876, p. 745, pl. lxxiii. Columbia.

*Echimys dimidiatus* (p. 747), *E. brevicauda* (p. 743), and *E. ferrugineus* (p. 750, pl. lxxiv.), spp. nn., A. Günther, *tom. cit.* Tropical S. America.

## Hystricidæ.

*Atherura*. A. Günther gives cranial characters of *A. macrura* and *A. africana*. Tom. cit. pp. 742 & 743.

*Trichys*, g. n., allied to *Atherura*, but with the tail rudimentary; skull without enlarged air-sinuses and with distinct post-orbital processes. Type, *T. lipura*, sp. n., A. Günther, *l. c.* p. 739, pl. lxxi. Borneo.

*Hystrix crassispinis*, sp. n., A. Günther, *tom. cit.* p. 736, pl. lxx. Borneo.

### Dasyproctidæ.

*...syprocta isthmica*, sp. n., E. R. Alston, *tom. cit.* p. 347, Central America. The other species are reviewed and characterized, and *D. azaræ*, Licht., is figured, pl. xxix.

### Caviidæ.

*Dolichotis salinicola*. Further notes on this species [*cf.* Zool. Rec. xii. p. 22]; H. Burmeister, *tom. cit.* pp. 461 & 462.

*Hydrochœrus capybara*. On the form of its cœcum; A. H. Garrod, *tom. cit.* pp. 20–23.

### Lagomyidæ.

*Lagomys rufescens* figured; W. T. Blanford, Eastern Persia, ii. pl. vi.

### Leporidæ.

J. A. Allen reviews the American species; P. Bost. Soc. xvii. (1875) pp. 430–436.

*Lepus craspedotus* figured; W. T. Blanford, *l. c.* p. viii.

## EDENTATA.

W. Turner describes the placentation of *Orycteropsis capensis*. The placenta is broadly zonular, but it could not be determined from the specimens examined whether it is deciduate or not. The Edentata are now known to show all the group-forms of placentation except the cotyledonary, and present both deciduate and non-deciduate forms [*cf.* Zool. Rec. xi. p. 19]. J. Anat. Phys. x. pp. 693–706.

### Macrotheriidæ.

*Pernatherium*, g. n. (foss.), P. Gervais, J. Zool. v. pp. 424–432, pl. xviii. differing from *Ancylotherium* and *Macrotherium* in the form of its calcaneum. Type, *P. rugosum*, sp. n., Eocene of Paris.

## DIDELPHIA.

## MARSUPIALIA.

C. K. Hoffman describes the anatomy of the retina in this order. Niederl. Arch. Zool. iii. pp. 195–199, pl. xii.

R. Owen's Memoirs "On the Fossil Mammals of Australia," part x. already recorded [*cf.* Zool. Rec. xii. p. 23], is published in full; Phil. Tr. clxvi. pp. 197–226, pls. xix.–xxxi.

W. Turner describes the minute anatomy of a non-gravid uterus of *Macropus giganteus*. J. Anat. Phys. x. pp. 513–515.

### Didelphyidæ.

*Didelphis virginiana*. Observations on its development; W. [illegible] nard (abst.), P. Am. Ass. 1875, ii. pp. 145–147.

### Dasyuridæ.

*Phascologale dorsalis*, sp. n., W. Peters & G. Doria, Ann. Mus. Genov. viii. p. 335, New Guinea.

*Dactylopsila trivirgata*. On its range; E. Pierson Ramsay, Ann. N. H. (4) xvii. p. 331.

### Peramelidæ.

*Perameles longicauda*, sp. n., W. Peters & G. Doria, Ann. Mus. Genov. viii. p. 335, New Guinea.

### Macropodidæ.

E. A. Schäfer & D. J. Williams describe the minute structure of the mucous membrane of the stomach in *Macropus* and *Dorcopsis*, P. Z. S. 1876, pp. 165–177, pls. viii.–xi.

*Hypsiprymnodon*, g. n., allied to *Hypsiprymnus*, but differing in dentition; type, *H. moschatus*, sp. n. (p. 34), North-east Australia. E. Pierson-Ramsay, P. Linn. Soc. N.S.W. i. p. 33.

*Halmaturus crassipes*, sp. n., *id. l. c.* p. 162, New Guinea.

### Genus incertæ sedis.

*Thylacoleo carnifex*. On its dentition; F. McCoy, Prodr. Palæont. Vict., lec. iii. pp. 7–12, pl. xxi.

## ORNITHODELPHIA.

### MONOTREMATA.

C. Creighton suggests that the *glandula femoralis*, which opens by a long duct on the "spur" of the male in *Ornithorrhynchus* and *Echidna*, may prove to be the homologue of the mammary gland of the female. J. Anat. Phys. xi. pp. 29–31.

# AVES.

BY

OSBERT SALVIN, M.A., F.R.S., &c.

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## TITLES OF SEPARATE WORKS AND OF PAPERS PUBLISHED IN PROCEEDINGS OF SOCIETIES, ETC.*

ALIX, E. Sur la Myologie des *Rhynchotus rufescens*. J. Zool. v. p. 411.

ALLEN, J. A. The availability of certain Bartramian names in Ornithology. Am. Nat. x., pp. 21–29 and 176 & 177. See also COUES, E., *tom. cit.* pp. 98–102.

A discussion as to the validity of certain names for birds used by Bartram in his "Travels," originally raised by Coues in P. Ac. Philad. 1875. [*Cf.* Zool. Rec. 1875, p. 30.]

——. Progress of Ornithology in the United States during the last Century. *Tom. cit.* pp. 536–550.

A concise history of the literature of the Ornithology of the United States down to the present time. It contains a brief account of the early papers on the subject, of the general works, and of the works and papers of a special or local character, and a summary of the progress made in the study of the subject.

——. Decrease of Birds in Massachusetts. Bull. Nutt. Orn. Club, i. p. 53.

An interesting paper, giving evidence of the reduced numbers (in some cases amounting to extinction) of a considerable number of birds once abounding in the State of Massachusetts.

——. Geographical Variation in the Number and Size of the Eggs of Birds. *Tom. cit.* p. 74.

The eggs of *Icteria viridis* and of *Molothrus pecoris* are shown to be larger at the northern than at the southern extremity of the range of these birds.

* In addition to the papers cited, numerous notices of birds, chiefly relating to their local distribution, unusual occurrence, &c., will be found in "The Field," "Land and Water," "The American Sportsman," "Field and Forest," and other periodicals of a similar kind.—O. S.

ALLEN, J. A., & GARMAN, S. W. Exploration of Lake Titicaca by Alexander Agassiz and S. W. Garman. III. List of Mammals and Birds. Bull. Mus. C. Z. iii. pp. 353–359.

Mention is made in this list of 69 species of birds, of which two are described as new [*Rallidæ*, *Ibididæ*]. There are interesting notes on many of the species [*Podicipidæ*].

ALLÉON, —., & VIAN, J. Explorations ornithologiques sur les rives européennes du Bosphore. Buse albicaude, Aigle impérial, et Moineau espagnol. Épervier brun. R. Z. (3) iv. pp. 312–316.

ANDERSON, ANDREW. Corrections of and Additions to "Raptorial Birds of North-western India." Part II., P. Z. S. 1876, pp. 310–317. Part III., *tom. cit.* pp. 776–781 [*Falconidæ* and *Strigidæ*].

ARMSTRONG, JAMES. Notes on some Birds collected in the Eastern or Rangoon District of the Irrawaddy Delta. Str. Feath. iv. pp. 295–351, map.

Contains careful notes of measurement, colour, locality, and habits of a number of birds collected in the above-named district. Mr. Hume adds a number of notes chiefly referring to the determination of the species [*Scolopacidæ*].

AYRES, THOMAS. Notes on Birds collected and observed in the Lydenburg District of the Republic of Transvaal. Ibis, 1876, pp. 422–433.

A list of 44 species, with notes on their habits and the colours of the soft parts. Mr. Gurney has added notes on many of the species mentioned.

BAILEY, H. B. Notes on Birds found Breeding on Cobb's Island, Va., between May 25th and May 29th, 1875. Bull. Nutt. Orn. Club, i. pp. 24–28.

BAIRD, S. F. A List of Birds, in Explorations across the Great Basin of Utah in 1859, in charge of Capt. J. H. Simpson, Topographical Engineer. Appendix K, Ornithology. Washington: 1876, 4to, pp. 373–381.

Contains 114 species of birds from Utah, with the localities where the specimens, 258 in number, were obtained.

BALL, V. Notes on some Birds collected in Sambalpur and Orissa. Str. Feath. 1876, pp. 231–237.

BARRATT, F. A. Ornithological Notes made during Trips between Bloemfontein and the Lydenburg Gold-fields. Ibis, 1876, pp. 191–214.

Contains brief notes on 122 species of birds, one of which is figured (*Sylviidæ*).

BAU, —. Notiz über *Pastor roseus*. J. f. O. 1876, p. 101.

BENDIRE, C. Notes on the Breeding Habits of Clarke's Crow (*Picicorvus columbianus*), with an account of its nest and eggs. Bull. Nutt. Orn. Club, i. pp. 44 & 45.

Berlepsch, H. v. *Lanius minor*, Lin., in Niederhessen, und seine geographische Verbreitung. J. f. O. 1876, pp. 380–387.

Berthelot, S. Oiseaux Voyageurs et Poissons de passage; Étude comparative d'organisme de mœurs et d'instinct. 2 vols. Paris: 1876, 8vo.

Besnard, A. Nouvelles acquisitions de la Faune de la Sarthe. Le Merle varié ou doré. Le Gros-bec à gorge rousse, ou de montague, ou Linotte à bec jaune. Le Phalarope platyrhynque. Le Macareux moine ou arctique. Bull. Soc. Zool. Fr. 1876, pp. 83–90.

Bingham, C. T. *Anastomus oscitans.* Str. Feath. 1876, pp. 212–214.

Describes the habits during the breeding season in the Doab, and the changes the plumage and bill undergo.

Black, W. T. Natural History of the Grey-wing and Red-wing Partridges of South Africa. P. Liverp. Soc. xxx. pp. 295–302.

Blanford, W. T. Eastern Persia, an Account of the Journeys of the Eastern Boundary Commission, 1870–71–72. Vol. ii. The Zoology and Geology. London: 1876, 8vo.

This work is mainly based on the collections made by Major St. John in 1869–71, and those formed by himself in 1872. The united collections contained 1236 specimens of 248 species. By incorporating into his list the species mentioned by De Filippi in his 'Note di un Viaggio in Persia,' the total number of species is raised to 384. Most of the new species obtained were described in "The Ibis," for 1873 & 1874; many of these are now figured. [*Picidæ*, *Syleiidæ*, *Pycnonotidæ*, *Nectariniidæ*, *Paridæ*, *Sittidæ*, *Fringillidæ*, *Coracidæ*.]

——. The African Element in the Fauna of India; A Criticism of Mr. Wallace's views as expressed in the "Geographical Distribution of Animals." Ann. N. H. (4) xviii. pp. 277–294.

The author maintains his former views that there exists in India a strong element of the fauna of Africa, and shows that it is of more importance than allowed by Mr. Wallace in his work. The author's views as to the minor faunistic divisions of India are shown on a small map. His arguments are based upon a consideration of the Mammals and Birds.

——. Note on the Synonymy of *Spizalauda*. Str. Feath. 1876, pp. 237–242.

Relates to *Alauda deva*, Sykes, and *A. malabarica*, Scop.

——. Letter on *Glareola pratincola* and *Cotyle riparia* in Sindh. *Tom. cit.* p. 507.

Bocage, Barboza du. Dié im Museum zu Lissabon befindlichen Vögel der Westafrikanischen Besitzungen Portugals. J. f. O. 1876, pp. 285–317, 401–441.

A translation of Prof. Bocage's papers on West African birds (origi-

nally published in J. Sc. Lisb.). These papers have been re-arranged by the translator, Herr Hans Gadow, so as to form a continuous article, references being given to the original articles throughout.

BOUCARD, A. Catalogus Avium hucusque descriptarum. London: 1876, 8vo, pp. 350.

A catalogue of all known birds, compiled chiefly from Gray's "Hand-list of Birds," Sclater & Salvin's "Nomenclator Avium Neotropicalium," and Sharpe's "Catalogue" (vols. i. & ii.). The number of species recognized is 11,030, divided into 2456 genera.

BOUVIER, A. [See SHARPE, R. B.]

BOURDILLON, F. [See HUME, A. O.]

BREHM, A. E. Gefangene Vogel. Ein Hand- und Lehr-buch fur Liebhaber und Pfleger einheimischer und fremdländischer Käfigvögel. 2 vols. Leipzig und Heidelberg: 1875. (Zool. Gart. 1876, p. 111).

BREWER, T. M. Birds of New England. Bull. Nutt. Orn. Club, i. p. 89.

A reply to criticisms on the author's Catalogue of the Birds of New England.

BREWSTER, W. Description of a new species of *Helminthophaga*. Tom. cit. pp. 1 & 2, pl. i.

——. On the occurrence of certain Birds in the New England States. *Tom. cit.* i. pp. 17–20.

BROOKS, W. E. A few Ornithological Notes and Corrections. Ibis, 1876, pp. 499–501.

Contains notes on certain Pipits and Wagtails mentioned by Dr. Severtzoff and others, also on some *Sylviidæ* and *Aquilæ* mentioned in the volume of the Ibis for 1875–76. An *Anthus* is named *neglectus* [*Motacillidæ*, *Sturnidæ*.]

——. *Drymoipus terricolor* and *D. longicaudatus*. Str. Feath. 1876, p. 229.

——. Ornithological Notes and Corrections. *Tom. cit.* pp. 268–278.

Mr. Brooks has more to say on the vexed question of the Spotted Eagle, and this time describes the smaller European species as *Aquila rufo-nuchalis*, considering that none of the older names are applicable to it. The rest of the paper consists chiefly of notes on various species of Warblers. [*Falconidæ*, *Sylviidæ*.]

BROWN, J. A. HARVIE. [See SEEBOHM, HENRY.]

BROWN, C. B. Canoe and Camp Life in British Guiana. London: 1876, 8vo.

Though Mr. Brown's travels were chiefly undertaken for the purpose of geographical survey, the text of his work contains numerous ornithological notes of interest. [*Cf.* Ibis, 1877, p. 239.]

BRÜGGEMANN, F. Ueber die Lebensweise der Löffel-Ente. Zool. Gart. 1876, pp. 195–197. [*Anatidæ.*]

——. Ueber die Paarung der Schell-Ente. *Tom. cit.* pp. 366–368. [*Anatidæ.*]

BUCKLEY, T. E. Letter containing Corrections and Additions to his paper on Matabili Birds (Ibis, 1874). Ibis, 1876, p. 132.

BUREAU, L. L'Aigle botté, *Aquila pennata* (Cuv.), d'après des observations recueillies dans l'ouest de la France. Congr. Sci., Nantes, 1875, and Bull. Soc. Zool. Fr. 1876, pp. 54–62.

A very complete account of this Eagle, including full descriptions of the various plumages assumed by it at different ages. The second paper is a summary of the conclusions arrived at in the former memoir.

BULLER, W. L. Notes on the Ornithology of New Zealand. Tr. N. Z. Inst. viii. pp. 181–190.

Contains notes on a number of New Zealand birds, chiefly relating to their nests and eggs.

——. Note on *Gerygone flaviventris*. Tom. cit. pp. 190–192.

Relates to the breeding habits of *Eudynamis taitensis*, with reference to this species.

——. On the Nesting Habits of the Huia (*Heteralocha acutirostris*) Tom. cit. p. 192.

——. On the Occurrence of *Apteryx oweni* at high altitudes in the North Island. *Tom. cit.* p. 193.

Notes the capture of *Apteryx oweni* at an elevation of 3000 feet above the sea, and its occurrence at higher altitudes in the North Island of New Zealand.

——. Remarks on Dr. Finsch's Paper on New Zealand Ornithology. *Tom. cit.* pp. 194–196.

Critical remarks on differences of opinion between the author and Dr. Finsch relating to certain New Zealand birds. [See FINSCH, O. *Tom. cit.* p. 226.]

——. Remarks on various species of New Zealand Birds, in Explanation of Specimens Exhibited at Meetings of the Wellington Philosophical Society, 1875–76. *Tom. cit.* pp. 196–199.

Describes several varieties of New Zealand birds, and also some specimens of species of rare occurrence in those islands.

BUTLER, E. A. Notes on the Avifauna of Mount Aboo and Northern Guzerat. Str. Feath. 1876, pp. 1–41.

The conclusion of the paper commenced in 1875 (Zool. Rec. xii. p. 29). As an Appendix, Mr. Hume has added an analysis of the Bird Fauna of this district, to show its relationship with that of the surrounding country.

CABANIS, J. Neue west-afrikanische Vögel. J. f. O. 1876, pp. 91–95. [*Pycnonotidæ*, *Sturnidæ*, *Ploceidæ*, *Capitonidæ*.]

——. Ueber *Numida orientalis*, sp. n., von Zanzibar, und *Lanius major*, Pall., in südwestlich Deutschland. *Tom. cit.* p. 209.

——. Ueber die Arten des Genus *Orcotetrax* (*Megaloperdix*). Tom. cit. p. 217.

Five species are here recognized, and their synonymy, habitats, and brief diagnoses given.

——. Ueber *Nicator virco*, sp. n., von Loango. *Tom. cit.* p. 333.

——, & REICHENOW, A. Uebersicht der auf der Expedition Sr. Maj. Schiff "Gazelle" gesammelten Vögel. *Tom. cit.* p. 319.

Contains the Ornithological results of the Expedition of the "Gazelle," the ship sent by the German Government to observe the Transit of Venus in 1874. The chief places visited were Kerguelen's Island, the Coast of New Guinea, New Hanover, and New Ireland, several islands of the South Pacific, and the Straits of Magellan. The descriptions of the new species obtained (except 1 [*Megapodidæ*]), originally published in SB. Nat. Fr. 1876, are here reproduced.

COCKBURN, J. Letter on *Totanus fuscus*, &c., in India. St. Feath. 1876, p. 509.

COLLIN, JONAS. Skandinaviens Fugle, med særligt Hensyn til Danmark og de Nordlige Bilande. Af R. Kjærbolling, Anden, fuldstændigt omarbeidede Udgave véd Jonas Collin. Kjobenhavn: 1875–77, 8vo, pp. 838.

This is a revised edition of Kjærbölling's "Danmarks Fugle" (1852), into which are introduced notices of the species of birds found in the Scandinavian Peninsula, Greenland, Iceland, and the Faroe Islands. Many of the errors of the first edition have been corrected. A very useful book.

COOPER, J. G. Californian Garden Birds. Am. Nat. x. pp. 90–96.

An interesting account of the birds frequenting a garden about 18 miles south-east of San Francisco.

COPE, E. D. On a gigantic Bird from the Eocene of New Mexico. P. Ac. Philad. 1876, p. 10.

A tarso-metatarsus of a bird twice the size of an Ostrich described under the new generic and specific name of *Diatryma gigantea*[*-tenn*]. (See J. Zool. v. p. 264).

CORDEAUX, JOHN. Letter on Heligoland Birds captured by Mr. Gätke in 1875. Ibis, 1876, p. 128.

COUES, ELLIOTT. On the Number of the Primaries in *Oscines*. Bull. Nutt. Orn. Club, i. pp. 60–63.

An investigation chiefly of the apparently abnormal number in some *Vireonidæ* and *Alaudidæ*.

COUES, ELLIOTT. On the Breeding Habits, Nest, and Eggs of the White-tailed Ptarmigan (*Lagopus leucurus*). Bull. U. S. Geol. Surv. i. pp. 263–266.

——. [See KIDDER, J. H.]

DAVID, ARMAND. Journal de mon troisième Voyage d'Exploration dans l'Empire Chinois. 2 vols. Paris: 1875.

Numerous ornithological notes are interspersed throughout this work, and descriptions of 9 new species and a new genus are given. [*Pycnonotidæ, Timeliidæ, Fringillidæ, Troglodytidæ, Paridæ, Phasianidæ.*]

DEANE, RUTHVEN. Albinism and Melanism among North American Birds. Bull. Nutt. Orn. Club, i. pp. 20–24.

D'HAMMONVILLE, J. C. L. T. Catalogue des Oiseaux d'Europe ou Énumération des espèces et races d'oiseaux dont la présence, soit habituelle, soit fortuite, a été dûment constatée dans les limites géographiques de l'Europe. Paris & London: 1876, 8vo, pp. 74.

A list in Latin and French, based upon Degland & Gerbe's work, supplemented by a few footnotes on doubtful species and rare occurrences.

DRESSER, H. E. A History of the Birds of Europe, including all the species inhabiting the Western Palæarctic Region. Parts xlvii.–lvi.

Ten parts of this work bear the date of 1876. [*Falconidæ, Strigidæ, Meropidæ, Cuculidæ, Turdidæ, Sylviidæ, Motacillidæ, Paridæ, Fringillidæ, Columbidæ, Pteroclidæ, Perdicidæ, Turnicidæ, Rallidæ, Scolopacidæ, Charadriidæ, Otididæ, Anatidæ, Laridæ, Pelecanidæ, Colymbidæ.*]

——. *Falco labradorus* (The Labrador Falcon). Orn. Misc. i. pp. 185–191.

——. Notes on Severtzoff's "Fauna of Turkestan" (Turkestanskie Jevotnie). Ibis, 1876, pp. 77–94, 171–191, 319–330, 410–422. [*Cf.* Zool. Rec. xii. p. 31.] [*Sylviidæ, Paridæ, Motacillidæ, Alaudidæ, Laniidæ.*]

——. Remarks on a Hybrid between the Black Grouse and the Hazel Grouse. P. Z. S. 1876, pp. 345–347.

——. On a new species of Broad-billed Sandpiper. *Tom. cit.* p. 674. [*Scolopacidæ.*]

——. On a new Species of *Tetraogallus*. Tom. cit. p. 675. [*Perdicidæ.*]

——. [See EVERSMANN, E.]

DURNFORD, HENRY. Ornithological Notes from the Neighbourhood of Buenos Ayres. Ibis, 1876, pp. 157–166.

Contains numerous field notes on birds of Buenos Ayres.

ELLIOT, D. G. Remarks on some Type Specimens of *Trochilidæ* from the Museums of Neuchâtel and Florence. Ibis, 1876, pp. 5–11.

The results of an examination of the type specimens described by Tschudi in the "Fauna Peruana," and those characterized by Benvenuti in Ann. Mus. Fis. 1865. [*Trochilidæ*.]

——. Notes on the *Trochilidæ*. The genus *Lampropygia*. Tom. cit. pp. 54–60.

Seven species (one doubtful) of this genus are recognized, and their characters and synonymy detailed. One common Columbian species has a new name given to it. [*Trochilidæ*].

——. Letter on *Phasianidæ* described by Dr. N. Severtzoff. *Tom. cit.* p. 131.

——. Notes on the *Trochilidæ*. The genera *Cyanomyia* and *Heliotrypha*. Tom. cit. pp. 311–319.

Seven species of *Cyanomyia* (1 new) are recognized in this paper, and 3 of *Heliotrypha*. [*Trochilidæ*.]

——. Notes on the *Trochilidæ*. The genera *Heliothrix*, *Calliphlox*, *Catharma*, and *Petasophora*. Tom. cit. pp. 394–407.

As in Nomenclator Av. Neotr., 3 species of *Heliothrix* and 2 of *Calliphlox* are admitted to specific rank by Mr. Elliot in this paper. Of *Petasophora*, 6. *Catharma* is a new generic name proposed for *Ornysmia orthura*, Less. The synonymy and distribution, as well as diagnostic tables, of all the species of these genera are given. [*Trochilidæ*.]

——. A Review of the Genus *Malimbus*, Vieillot. *Tom. cit.* pp. 456–466.

The genus *Malimbus* (sive *Sycobius*) is here divided into 4 sub-genera, *Sycobius*, *Ficophagus* [vox hybr.], *Atalochrous*, and *Anaplectes*, and the 9 species comprised in the genus are differentiated in a diagnostic table. The synonymy of each species is given, together with the geographical range. 2 species are figured (pl. xiii.). [*Ploceidæ*.]

ENYS, J. D. An account of the Maori manner of preserving the Skin of the Huia, *Heteralocha acutirostris*. Tr. N. Z. Inst. viii. p. 264.

As the author of this paper ascertained that over 600 skins of this bird were prepared in one year, the extinction of the species seems not far distant.

EVERSMANN, E. Addenda ad celeberrimi Pallasii Zoographiam Rosso-asiaticam. Aves. Kasani: 1835, 8vo, pp. 32; Fasc. ii., 1841, pp. 16; Fasc. iii. 1842, pp. 19. Reprinted by H. E. Dresser, London: 1876, 8vo.

A reprint of this rare tract, the third fasciculus of which was destroyed by fire. The exact pagination has been preserved, and even the type differs but slightly from that of the original.

FAIRBANK, S. B. List of Birds collected in the Vicinity of Khandala, Mahabaleshwar, and Belgaw, along the Sahyadri Mountains, and near Ahmednagar in the Dakhan. Str. Feath. 1876, pp. 250–268.

A list of 313 species, with brief notes on the localities where they

were obtained. At the end of the paper a comparison is made between the bird fauna of this district and that of Mount Aboo and Northern Guzerat, as described by Captain Butler.

FINSCH, O. *Nasiterna geelvinkiana* and its allies. Orn. Misc. i. pp. 157–163.

——. *Trichoglossus muzschenbroekii* (von Rosenberg). *Op. cit.* ii. pp. 61 & 62.

——. Zur Ornithologie der Südsee-inseln. II. Ueber neue und weniger gekannte Vögel von den Viti-, Samoa-, und Carolinen-Inseln. J. Mus. Godeffr. xii. pp. 42.

The first part of this paper relates to new or little known species from Viti and Samoa, most of which have been previously described in P. Z. S. The 2nd (p. 12) and 3rd (p. 13) parts contain notes by T. Kleinschmidt on *Chrysena victor* and *Ptilotis procerior*, and the 4th part (p. 15) contains an account of 22 species of birds collected by Herr Kubary in Ponapé, an island of the Seniavin group, amongst which are several new. In part 5 (p. 41), Dr Finsch has a note on the *Artamus* of the Pelew group, for which he proposes a new name. [*Psittacidæ*, *Artamidæ*.]

——. Notes on some Fijian Birds, including description of a new Genus and Species. P. Z. S. 1876, p. 19. [*Sylviidæ*, *Laniidæ*.]

——. Further Remarks on some New Zealand Birds. Tr. N. Z. Inst. viii. pp. 200–204.

Contains important notes relating to the nomenclature of New Zealand Ornithology. [*Sylviidæ*, *Sturnidæ*, *Spheniscidæ*, *Procellariidæ*.]

FRITSCH, A. Ornithologische Notizen aus Lesina, gesammelt von S. Bruchich. J. f. O. 1876, p. 66.

Relates to the emigration of Birds as observed in the Island of Lesina.

——. Ornithologische Notizen aus Böhmen. *Tom. cit.* pp. 77–79.

GADOW, H. Ueber das Verdauungs-system der Vögel. *Tom. cit.* pp. 163–173.

After an examination of the digestive system, the author proceeds to arrange birds into 4 (? 3) chief groups, according to their characters in that respect, viz.:—

I. Insect eaters.
II. Flesh eaters, containing (*a*) Birds of Prey, (*b*) Fish eaters.
III. Plant and seed eaters, containing (*a*) Ducks, (*b*) Waders, (*c*) Fowls and Pigeons.

The chief characteristics of the digestive system of each of these groups are given.

——. Osteologische und splanchnologische Verhältnisse von *Dicholophus cristatus*. Tom. cit. p. 445.

GÄTKE, H. Briefliches über Helgoland. *Tom. cit.* p. 99.

Gammie, J. Letter on *Micropternus phaioceps* breeding in Ants' Nests. Str. Feath. 1876, p. 511.

Garman, S. W. [See Allen, J. A.]

Garrod, A. H. On a peculiarity in the Carotid Arteries, and other Points in the Anatomy of the Ground Hornbill (*Bucorvus abyssinicus*). P. Z. S. 1876, pp. 60 & 61.

The carotid arteries in *Bucorvus*, instead of meeting and running together, course up the *sides* of the neck in company with the pneumogastric nerves and jugular veins of their respective sides as they do in Mammals, but in no other Birds, so far as the author is aware. *Bucorvus* differs from *Buceros* and *Toccus* in wanting the accessory femoro-caudal muscle. Other points in the anatomy of this bird are described.

——. On the Anatomy of *Chauna derbiana* and on the Systematic Position of the Screamers (*Palamedeidæ*). Tom. cit. pp. 189–200.

In this paper, the anatomy of *Chauna* is examined with reference to the following points: Cutaneous system with pterylosis, alimentary canal, respiratory organs, myology, as regards the following characters:—1. The presence or absence of the expansor secundariorum muscle. 2. The presence or absence of a special muscular slit from the biceps humeri to the propatagium. 3. The area of origin of the obturator internus. 4. The degree of development of the tensor-cruris fasciæ. Then follows an examination of the osseous system. The author differs from Parker and Huxley in his views of the systematic position of the *Palamedeidæ*, and contends that the Screamers cannot be placed amongst the Anserine birds. He considers that this family occupies an independent position, and that it sprang from the primary avian type at about the same time as most of the other important families. Four plates illustrate the paper, on which are depicted views of the proventriculus and gizzard, the windpipe, the myological points dwelt upon in the paper, and the cœca. Woodcuts give the posterior aspect of the skull in *Chauna*, *Cereopsis*, and *Crax*, and the under surface of the skull of *Chauna*.

——. On the Anatomy of *Aramus scolopaceus*. Tom. cit. pp. 275–277.

Some points in the structure of the skull (woodcuts of which are given) of *Aramus* are described in this paper, as are also the trachea, the myology of the leg, and the characters of the alimentary canal. The systematic position of *Aramus* is pronounced to be near *Grus*, and not distant from *Ibis*, *Platalea*, and *Eurypyga*.

——. Notes on the Anatomy of *Plotus anhinga*. Tom. cit. pp. 335–345.

Several points in the anatomy of *Plotus* are here described, the peculiarity of the position of certain cervical vertebræ and the muscles in connection therewith being specially examined, as also the presence in the stomach of a highly peculiar hairy mass, serving to sift the food as it

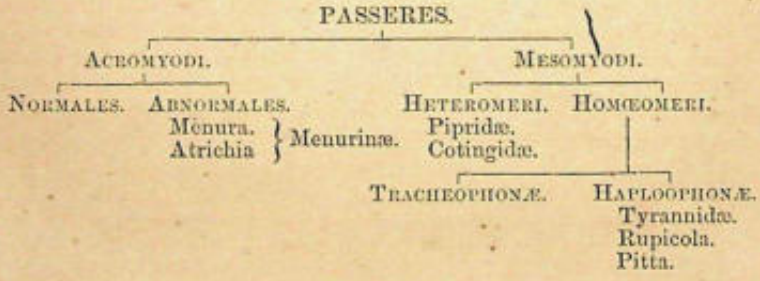
passes into the small intestines. Three plates accompany the paper, illustrating the chief points of the anatomy of this bird.

Garrod, A. H. Notes on the Anatomy of the Colies (*Colius*). Tom. cit. pp. 416–419.

After alluding to previous work on the genus *Colius*, especially to Dr. Murie's article on the subject (Ibis, 1872, p. 262), Prof. Garrod describes the development of the maxillo-palatine processes which show a desmognathous form of skull. The vomer, he found unossified. An examination of the muscles shows that *Colius* belongs to the author's group *Anomalogonatæ*, and, from the absence of cæca and the presence of a tufted oil gland, to the section *Piciformes*. The relationships of *Colius* to *Musophaga* and the Parrots is also referred to.

——. On some Anatomical Characters which bear upon the major divisions of Passerine Birds. Part i. *Tom. cit.* pp. 506.

The chief points investigated in this paper are:—The method of insertion of the *tensor patagii brevis* in Passeres and many other birds; the muscles of the syrinx; the scutellation of the tarsi; the development of the sciatic and femoral arteries, and other minor features. Several new terms are introduced into the classification of the Passeres, such as Acromyodi, in which the muscles of the syrinx are attached to the extremities of the semi-bronchial rings; Mesomyodi, in which the muscles of the syrinx join the semi-rings in their middles; Homœomeri, in which the sciatic is the artery of the thigh; and Heteromeri, in which the femoral is the artery of the thigh. The Homœomeri are again divided into Tracheophonæ of Müller, and a group containing the *Tyrannidæ*, *Rupicola*, and *Pitta*, which is here termed Haploophonæ. A classification of the major groups of Passeres is finally thus sketched.




Five plates (xlviii.–lii.) accompany this paper, in which are shown the muscles of the wing in various groups of birds; the syrinx of *Menura*, *Atrichia*, and *Pitta*; the sternum of *Atrichia*, showing the rudiments of the furcula; and the sternum and back view of the skull of *Pitta*.

——. Notes on the Anatomy of certain Parrots. *Tom. cit.* pp. 691 & 692.

Supplements the author's former paper on the anatomy of the Parrots (P. Z. S. 1874, p. 586). [*Psittacidæ.*]

Gentry, T. G. Life-Histories of the Birds of Eastern Pennsylvania. 2 vols. Philadelphia: 1876, 12mo, p. 309. (Bull. Nutt. Orn. Club, i. p. 49.)

Gerbe, Z. Simples notes sur quelques Oiseaux de France. R. Z. (3) iv. pp. 1–10, 268–274.

Treats of the following subjects:—

I. Excès de mâles, par rapport aux femelles, chez le Pinson vulgaire.

II. Observations sur quelques habitudes naturelles des Traquets stapazin et orcillard.

III. Passage extraordinaire de Geais glandivores et observations sur quelques habitudes de ces oiseaux.

IV. Reproduction de la Perdrix rouge en captivité.

Giebel, C. G. Thesaurus Ornithologiæ, iii. 5te Halb-band, 1876 [Zool. Rec. xii. p. 33].

Girtánner, A. Der Kolkrabe (*Corvus corone*) in der Schweiz. Zool. Gart. 1876, pp. 305–313.

Gloeden, Dr. v. Begegnung mit einem Paar Kuckuke. J. f. O. 1876, pp. 204–206.

——. Ueber die Quelle, woher die Vögel ihr Kalkbedürfniss zur Bildung der Eischale befriedigen. *Tom. cit.* pp. 283–285.

——. Zur Unterscheidung der Geschlechter der Dompfaffen in Nestgefieder. *Tom. cit.* p. 373.

Godwin-Austen, H. H. Description of a Supposed New *Suthora* from the Dafla Hills, and a *Minla* from the Nágá Hills, with remarks on *Pictorhis* (*Chrysomma*) *altirostre*, Jerdon. Ann. N. H. (4) xvii. pp. 32–34 [*Paridæ*, *Timeliidæ*.]

——. Descriptions of Supposed New Birds from the Khási-Nágá Hill-ranges south of the Brahmaputra River, Assam. *Op. cit.* xviii. pp. 411 & 412. [*Timeliidæ*, *Sylviidæ*.]

——. List of the Birds Collected on the Expedition into the Dafla Hills, Assam, together with those obtained in the adjacent Darrang-Terai. J. A. S. B. (n. s.) xlvi pt. 2, pp. 64–85.

The new species obtained during this expedition were described in Ann. N. H. 1875–76. The present paper gives a complete list of all the species obtained, two of the novelties being figured. [*Paridæ*, *Timeliidæ*.]

Golz, —. Zur Frage des Vogelschutzes. J. f. O. 1876, p. 207.

Gould, J. The Birds of Asia. Part xxviii. July 1st, 1876.

[*Phasianidæ*, *Turdidæ*, *Timeliidæ*, *Cuculidæ*, *Picidæ*, *Paridæ*, *Timeliidæ*.]

——. The Birds of New Guinea and the adjacent Papuan Islands,

including any new species that may be discovered in Australia. Parts ii. & iii. Jan. 1 and May 1, 1876.

[*Psittacidæ*, *Paradiscidæ*, *Pittidæ*, *Campephagidæ*, *Meliphagidæ*, *Muscicapidæ*, *Columbæ*, *Sylviidæ*, *Alcedinidæ*, *Laniidæ*, *Eupetidæ*, *Laridæ*.]

GRANDIDIER, ALFRED. Histoire, Physique, Naturelle, et Politique de Madagascar. Volume xiii. Histoire Naturelle des Oiseaux par MM. Alph. Milne-Edwards et Alf. Grandidier. Tome ii. Atlas, I. 1re partie, fol. Paris: 1876.

This portion of M. Grandidier's great work on Madagascar contains the plates only of some of the birds. They are upwards of 70 in number, and represent the species of the following families—*Psittacidæ*, *Falconidæ*, *Strigidæ*, *Cuculidæ*. The figures of most of the species are accompanied by a plate of the skeleton and osteological details. Peculiarities in the internal organs of some species are also depicted, and the distribution of the members of the genus *Coua* is shown on a map.

GURNEY, J. H. Notes on a "Catalogue of the Accipitres in the British Museum," by R. Bowdler Sharpe (1874). Ibis, 1876, pp. 65–76, 230–243, 364–376, 467–493 (*Falconidæ*). [Cf. Zool. Rec. xii. p. 34.]

——. Letter on *Circus maillardi* and *C. melanoleucus*. Tom. cit. p. 129.

——. Letter on *Accipiter virgatus*, from Burma, and *Circus macroscelus*. Tom. cit. p. 278.

——. Letter on Fijian Hawks. *Tom. cit.* pp. 383 & 384 [*Falconidæ*].

——. Letter from, containing notes on the breeding of a pair of the Polish Swan (*Cygnus immutabilis*). P. Z. S. 1876, p. 466.

——. [See AYRES, THOMAS.]

GURNEY, J. H., JR. Rambles of a Naturalist in Egypt and other countries, with an analysis of the Claims of certain Foreign Birds to be considered British, and other Ornithological Notes. London: 1876, 8vo.

Notes on Egyptian and Algerian birds form the larger portion of this volume; but there are also observations on certain species observed in Russia, France, and Italy, as well as other matters.

HECTOR, J. Notes on Birds observed during the voyage to England, in a letter to the President. Tr. N. Z. Inst. viii. p. 199.

Relates chiefly to the species of *Procellariidæ* seen.

HENSHAW, H. W. Report upon the Ornithological Collections made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873, and 1874. Chapter iii. of Wheeler's Rep. Geogr. Explor. W. of 100th Mer. V. Zoology. Washington: 1875, 4to. pp. 133–507, pls. i.–xv.

The total number of species obtained was 296, several of which, found

near the southern frontier of the United States, had not previously been met with inside the limits of the Republic. All these additions are species belonging to Mexican and Guatemalan high lands. [*Troglodytidæ*, *Fringillidæ*, *Tanagridæ*, *Corvidæ*, *Tyrannidæ*, *Falconidæ*, *Muiotiltidæ*.]

Henshaw, H. W. Report on the Ornithology of the portions of California visited during the Field-Season of 1875. In Wheeler's Ann. Rep. Geogr. Explor. W. of 100th Mer., in California, Nevada, Utah, Colorado, Wyoming, New Mexico, Arizona, and Montana. Appendix JJ. Washington: 1876, 8vo, pp. 224–278.

Contains a list with field notes.

Hess, W. Erinnerungen an Sylt. Hanover: 1876, 8vo, pp. 148. (Zool. Gart. 1876, p. 223.)

Heuglin, T. v. Briefliches aus Nordost Afrika. J. f. O. 1876, p. 212.

Contains, *inter alia*, an extract from a work by Dr. H. Couvidou, entitled "Voyage à travers de l'Isthme de Souez," wherein a breeding-place of the Flamingo in Lake Menzaleh is described.

Homeyer, E. F. Deutschlands Säugethiere und Vögel, ihr Nutzen und Schaden. Zool. Gart. 1876, pp. 81–90.

——. Bastard von *Hirundo rustica* und *urbica*. J. f. O. 1876, p. 203.

——. Ueber die Mauser von *Harelda glacialis*. Tom. cit. p. 317.

——. Die Zugstrassen der Vögel. Von J. A. Palmén. *Tom. cit.* p. 387.

A review [*cf.* p. 21, *infrà*].

Hosch, F. Ueber den Sehapparat der Vögel. Zool. Gart. 1876, pp. 421–432.

An essay, illustrated with woodcuts, on the organ of sight in birds.

Hudson, W. H. Note on the Spoonbill of the Argentine Republic. P. Z. S. 1876, p. 15.

Mr. Hudson thinks that there is evidence of another species of Spoonbill in the Argentine Republic besides *Platalea ajaja*.

——. Notes on the Rails of the Argentine Republic. *Tom. cit.* pp. 102–109.

Notes, full of interest, on the habits of Rails of the Argentine Republic, and of *Aramus scolopaceus* and *Parra jacana*. [*Rallidæ*, *Aramidæ*, *Parridæ*.]

Hume, A. O. Novelties? Str. Feath. 1876, pp. 214–216. [*Pycnonotidæ*.]

——. Recently described species. *Tom. cit.* pp. 216–220.

Descriptions of new species by Lord Walden and Mr. Godwin-Austen published in the Ibis, for 1875, and Ann. N. H. 1875, are here reproduced.

HUME, A. O. Catalogue of the Striges, or Nocturnal Birds of Prey, by R. Bowdler Sharpe, &c. *Tom. cit.* pp. 220–223.

A review.

——. A Third List of the Birds of the Tenasserim Provinces. *Tom. cit.* pp. 223–225.

Adds 21 species to former lists, raising the total number of species recorded from Tenasserim to 530.

——. Additions to the Fauna of Sindh. *Tom. cit.* p. 225.

——. *Querquedula falcata* in Upper India. *Ibid.*

——. Additional Notes on the Avifauna of the Andaman Islands. *Tom. cit.* pp. 279–294.

These notes have been made after an examination of numerous specimens collected in the Andamans and submitted to Mr. Hume. Several additions to the fauna are made, and corrections of former lists suggested. [*Strigidæ.*]

——. A First List of the Birds of the Travancore Hills. *Tom. cit.* pp. 351–405.

In this list, 90 species of birds are mentioned, with notes on their measurements, colour of the soft parts, locality, &c. All these particulars are given by Mr. Frank Bourdillon, the collector, who has also supplied a prefatory account of the country where the specimens were collected, its physical geography, &c. Mr. Hume has arranged the paper and added notes, chiefly on the names employed for many of the species. [*Falconidæ, Cypselidæ, Podargidæ.*]

——. On the Identity of *Drymoipus terricolor* and *Drymoipus longicaudatus*. Tom. *cit.* pp. 407–410.

Mr. Brooks's view as to the identity of these birds is confirmed.

——. The Laccadives and the West Coast. *Tom. cit.* pp. 413–483.

The exploration of the Laccadive Islands by Mr. Hume has shown that ornithologically, and otherwise, their fauna and flora possess no peculiar characters. The results of the cruise are thus summarized :—

"1. That the Laccadives are divided from the mainland of India by a deep trough, not less than 13,000 fathoms in depth, and possibly considerably more.

2. That they have no distinctive fauna or flora. There are no mammals, except the common Indian *Mus rufescens*; no land birds, except a very few of the commonest Indian species; and no non-Indian plants, the flora consisting mostly of species common on the sea-coasts of India, and more or less diffused over China, Java, and the Straits, extending in many places to the Malayan Archipelago, Australia, and the South Sea Islands, and in several to the tropics generally.

The paper also contains an account of the expedition and of the birds met with, the part relating to the sea-birds being fuller in details. [*Phaetontidæ.*]

HUME, A. O. Novelties. *Tom. cit.* pp. 484–489. [*Ploceidæ*, *Timeliidæ*, *Fringillidæ*.]

——. Recently described species. Republications. *Tom. cit.* pp. 489–496.

Reproduces the descriptions of various Indian birds published during the last four or five years by Godwin-Austen, Brooks, Jerdon, and Sclater.

——. Notes. *Tom. cit.* pp. 496–507. [*Sylviidæ*, *Pycnonotidæ*, *Timeliidæ*, *Caprimulgidæ*, *Fringillidæ*, *Laridæ*, *Anatidæ*.]

——. Note on *Sturnus nitens*, Hume. *Tom. cit.* p. 512.

HUTTON, F. W. Notes on the Maori Cooking Places at the Mouth of the Shag River. Tr. N. Z. Inst. viii. pp. 103–108.

Describes some of the objects excavated by Mr. Booth in this locality, amongst them being numerous remains of *Dinornis*.

IVANOWITSCH, MILAN. Ueber das Flugvermögen der Vögel. J. f. O. 1876, pp. 147–154.

JESSE, W. Letter on Additions to the Birds of Corsica. Ibis, 1876, pp. 380–382.

JORDAN, D. S. Manual of the Vertebrates of the Northern United States, including the district east of the Mississippi River, and north of North Carolina and Tennessee, exclusive of Marine Species. Chicago: 1876, 12mo. (Bull. Nutt. Orn. Club, i. p. 90.)

KIDDER, J. H. Contributions to the Natural History of Kerguelen Island made in Connection with the United States Transit of Venus Expedition, 1874–75. Bull. U. S. Nat. Mus. ii. No. 3, pp. 122. Washington: 1876.

Though the great part of these contributions relate to other matter, a part (pp. 7–20) is devoted to a description of the nests and eggs, &c., of the birds found breeding on Kerguelen Island. Pp. 85–116 contain an anatomical and historical description of *Chionis minor* (in the compilation of which the author is associated with Dr. E. Coues), here separated as a distinct genus, *Chionarchus*, and with its ally, *Chionis alba*, placed in a group called *Chionomorphæ*.

KJÆRBOLLING, N. [See COLLIN, JONAS.]

KRIEGER, O. v. Ueber Lerchenjagd und Lerchenfang. J. f. O. 1876, pp. 67–76.

Describes the different methods of attracting Larks, and the traps used for their capture.

LAGROIX, A. Ganga unibande, Pterocles arenarius (Temm. et Pallas.), Canard casarca, Anas casarca (Linn.), observés dans les environs de Toulouse. R. Z. (3) iv. p. 389 *et seq.*

——. Le Faucon concolore, Le Canard couronné, et le Traquet obscur, dans le Midi de la France. Bull. Soc. Zool. Fr. 1876, pp. 91–93.

These notes relate to *Falco concolor*, *Anas leucocephala*, and *Saxicola squalida*, Eversm.

Landbeck, C. L. Der gemeine chilenische Colibri (*Trochilus sephanoides*, Less.) als Traubenverwüster. Zool. Gart. 1876, pp. 225–229.

Lawrence, G. N. Note on *Muscipeta incanescens*, Wied. Ibis, 1876, pp. 497 & 498. [*Tyrannidæ.*]

——. Birds of South-western Mexico collected by Francis E. Sumichrast for the United States National Museum. Bull. U. S. Nat. Mus. ii. No. 4, pp. 56.

A full list of 321 species obtained by Prof. Sumichrast at or near Tehuantepec in South-western Mexico. The paper is prefaced by remarks of considerable interest by Sumichrast on the geographical distribution of the birds; he has added notes on the colours of the soft parts of most of the species collected, and also descriptions of the habits of some of them. To Mr. Lawrence, is due the determination of the scientific names.

—— Description of a New Species of Bird of the genus *Pitangus*. Ann. Lyc. N. Y. xi. pp. 288–290.

Layard, E. L. The Birds of South Africa; new edition, thoroughly revised and augmented by R. Bowdler Sharpe. London: 1876, part iii. (August).

This part, the only one issued during the past year, contains an account of the remainder of the *Cuculidæ*, the *Indicatoridæ*, *Capitonidæ*, *Picidæ*, *Psittacidæ*, and part of the *Turdidæ* of South Africa. Three species are figured. [*Cuculidæ*, *Nectariniidæ*.]

——. Notes on some little-known Birds of the new Colony of the Fiji Islands. Ibis, 1876, pp. 137–152.

Contains an account of a visit to the Island of Taviuni, and also notes on several new and interesting Fijian birds. [*Psittacidæ*, *Laniidæ*, *Sturnidæ*, *Meliphagidæ*.]

——. Notes on the Ornithology of Fiji, with Descriptions of new or little known Species. *Tom. cit.* p. 152. [*Laniidæ*, *Turdidæ*.]

——. Description of a new Species of Flycatcher, *Myiagra*, from the Fijis, and some Remarks on the Distribution of the Birds found in those islands. *Tom. cit.* pp. 387–394.

Contains notes on the local distribution of birds in the several islands of the Fiji group, and a tabular list of all the species now known from there, 100 in number. A column of the table is given for each of seven principal islands of the Fijis, and the presence or absence of every species in each one noted. One species is described as new. [*Muscicapidæ*.]

——. Letter containing Remarks on the Rev. S. J. Whitmee's "List of Samoan Birds" (Ibis, 1875, p. 436). *Tom. cit.* pp. 504–506.

Compares Samoan species of *Pachycephala* and *Ptilopus*.

——. Description of a new Species of *Myiolestes* from Fiji. *Tom. cit.* p. 498. [*Laniidæ*.]

LAYARD, E. L. Description of a new Thrush from Taviuni, one of the Fiji Islands. P. Z. S. 1876, p. 420. [*Turdidæ*.]

——. Notes on the Birds of the Navigator's and Friendly Islands, with some additions to the Ornithology of Fiji. *Toc. cit.* pp. 490–506.

Contains the names of, and notes upon, 52 species of birds belonging to Navigator's Islands; 41 species being mentioned as belonging to Tonga, Eooa, and Vavaw, &c., with notes on their reported occurrence in the Friendly Islands. A few notes are added on some Fijian birds, supplementing the author's former papers. One species is described as new. [*Sturnidæ*.]

——. Description of a new Species of the Genus *Merula* from the Fiji Islands. Ann. N. H. (4) xvii. p. 305. [*Turdidæ*.]

LEGGE, W. V. Notes on and Additions to the Ceylonese Avifauna, with a Notice of some apparently new Species. Str. Feath. 1876, pp. 242–247. [*Picidæ*, *Turdidæ*, *Falconidæ*.]

——. Letter containing Notes on certain Accipitres whose occurrence in Ceylon is not mentioned in Sharpe's Catalogue of Accipitres. [*Falconidæ*.]

LLOYD, J. HAYES. Letter on *Pterocles* in Kattiawar, and on other Additions to the Birds of that District.

MANING, F. E. Extract of a Letter from, relative to the Extinction of the Moa. Tr. N. Z. Inst. viii. pp. 102 & 103.

MARCHAND, A. Poussins des Oiseaux d'Europe. R. Z. (3) iv. pp. 432–434. [*Pelecanidæ*, *Ardeidæ*.]

MARSH, O. C. Notice of new Odontornithes. Am. J. Sci. (3) xi. pp. 509–511.

——. Note sur de Nouveaux Odontornithes. J. Zool. v. pp. 304–306.

Describes the sternum and tarso-metatarsus of a new genus and species allied to *Hesperornis*, a tarso-metatarsus of a new species of the latter genus, and a new species of *Ichthyornis*. [*Odontornithes*.]

MARSHALL, G. F. L. A new Indian *Iora*. Str. Feath. 1876, pp. 410–413. [*Timeliidæ*.]

MARSHAM, H. P., & BELL, —. The Correspondence of Robert Marsham and Gilbert White. Tr. Norw. Soc. ii. pp. 133–195.

Contains 20 hitherto unpublished letters that passed between Gilbert White and Robert Marsham; the originals being in the possession of Prof. Bell and the Rev. H. P. Marsham. They contain numerous allusions to birds. Explanatory footnotes by Prof. Newton & Mr. J. E. Harting are added.

MARTIN, L. Ein Kuckuksei im Nest eines kleinen Lappentauchers. J. f. O. 1876, p. 391.

MASTERS, G. Ornithology of the "Chevert." Part. i. P. Linn. Soc. N. S. W. i. pp. 44–64.

The collections made during the voyage of the "Chevert" to the north-east coast of Australia and the southern shores of New Guinea are here described, as far as relates to the species (136 in number) obtained in Northern Australia and the islands in Torres Straits. 10 are described as new. [*Podargidæ, Laniidæ, Sylviidæ, Dicæidæ, Megapodidæ, Laridæ.*]

MERRILL, J. C. Notes on Texan Birds. Bull. Nutt. Orn. Club, i. pp. 88 & 89.

Contains notice of 5 species of birds new to the fauna of the United States, and notes on the breeding habits, previously unknown, of 2 species of N. American birds.

MEVES, W. Ueber den Schnurrlaut der Bekassine. Zool. Gart. 1876, pp. 204–208.

Contains additional notes on the "drumming" of *Scolopax gallinago* and other Snipe.

MEYER, A. B. [illegible] Expedition to the Arfak Mountains, New Guinea. [illegible]

MILNE-EDWARDS, A. Observations sur les Oiseaux dont ossements ont été trouvés dans les cavernes du sud-ouest de la France. In Matériaux pour l'histoire primitive et naturelle de l'Homme, dirigée par E. Cartailhac. Toulouse: (2) vi. (1875) pp. 473.

——. [See GRANDIDIER, A.].

MOSENTHAL, J. DE, & HARTING, J. E. Ostriches and Ostrich Farming. London: 1876. 8vo, pp. 246, pls.

Part I., by Mr. Harting, is a very complete history of the Ostrich, with an account of the other species of *Struthionidæ* compiled from various sources. Part II., by Mr. Mosenthal, describes the new industry of Ostrich-farming for the purpose of maintaining and increasing the supply of the much-valued feathers of this bird.

MÜLLER, ADOLF. Züge aus dem Leben der gemeinen Krähe (*Corvus corone*). Zool. Gart. 1876, pp. 314–319.

——. & MÜLLER, C. Unsere nützlichsten Säugethiere und Vögel. Köln: 1876. (Zool. Gart. 1876, p. 342.)

MÜLLER, J. P. Verzeichniss der im südwestlichen Theile des Kreises Tondern vorkommenden Vögel, nebst einigen Bemerkungen. *Tom. cit.* pp. 287–296.

Gives a list of 94 species, arranged to show the breeding birds, birds of passage, winter visitants, and stragglers. Notes on several species are added.

MULSANT, É., & VERREAUX, É. Histoire Naturelle des Oiseaux-Mouches ou Colibris. ii. Livr. 3 & 4, iii. Livr. 1 2. [See Zool. Rec. xii. p. 42.]

NEHRKORN, A. Die Riddagshäuser Teiche. J. f. O. 1876, pp. 154–162.

Gives a list of birds observed in the vicinity of this lake.

NELSON, E. W. Additions to the Avifauna of Illinois, with Notes on other species of Illinois Birds. Bull. Nutt. Orn. Club, i. pp. 39–44.

NEWTON, ALFRED. A History of British Birds, by the late William Yarrell. 4th ed. Parts 9 & 10. London: 1876. 8vo.

In these two numbers, the British species of *Emberizidæ*, and the greater part of the *Fringillidæ*, are discussed.

——. On the Species of *Hypsipetes* inhabiting Madagascar and the neighbouring Islands. Orn. Misc. ii. pp. 41–52.

A full account of the 4 species found in the district referred to, illustrated, with a plate representing the full form of *H. crassirostris*, and the heads of the other three, to show the different colour of irides.

——. On the Assignation of a Type to Linnæan Genera, with Special Reference to the Genus *Strix*. Ibis, 1876, pp. 94–105.

In this paper, it is maintained that the species in a Linnæan genus which should be selected as the type of that genus, is the one of which the single name, as used by pre-Linnæan writers, was chosen by Linn as the name of the genus to which he referred it. According to this view, the type of the genus *Strix* is *S. stridula*, or the Brown Owl, that being the *Strix* of older authors. [See Zool. Rec. xii. p. 55.]

——. Note on a Dutch Translation of Pliny's Natural History, and on a print of the Dodo contained therein. P. Z. S. 1876, pp. 333 & 334.

——. On some Ornithological Errors in the "Reliquiæ Aquitanicæ." Ann. N. H. (4) xvii. pp. 168–170, 336.

Corrects a number of statements in the Ornithological part of this work. (See T. Rupert Jones, *tom. cit.* p. 263.)

——. & NEWTON, E. On the Psittaci of the Mascarene Islands. Ibis, 1876, pp. 281–289.

The Parrots of Mauritius, Réunion, Rodriguez, and the Seychelles, are discussed in this paper. Seven indigenous species are recognized, of which 4 survive, though one may be said to be expiring; 3 are quite extinct. *Palæornis wardi* is figured. [*Psittaci.*]

NOLL, F. C. Die Erscheinungen des sogenannten Instinctes. Zool. Gart. 1876, pp. 271–278, 317–325, 345–354.

Treats of the migration, &c., of birds.

NORGATE, FRANK. Notes on the Nesting Habits of certain Birds, and Remarks with a View to their Encouragement by the Erection of Nesting Boxes. Tr. Norw. Soc. ii. pp. 195–206.

OATES, EUGENE W. A note on *Pellorneum minor*, Hume, and *P. tickelli*, Blyth. Str. Feath. 1876, p. 406. [*Timeliidæ.*]

OGDEN, J. A. Remarks on *Ptilorhis wilsoni*, Ogden. P. Ac. Philad. 1876, p. 182. [*Paradiseidæ.*]

OUSTALET, E. Mélanges de Mammalogie et d'Ornithologie. R. Z. (3) iv. p. 394 *et seq.*

Consis's chiefly of extracts from Dr. Meyer's papers on New Guinea Ornithology, and short notes translated from Zool. Gart.

PALMÉN, J. A. Ueber die Zugstrassen der Vögel. Leipzig: 1876, 8vo, pp. 292.

A revised and augmented translation of the author's paper, "Om Foglarnes Flyttnings vägar," published in 1874. The routes followed by some 20 Arctic species in their migrations north and south are traced, and, with the results arrived at, shown on an outline map of the northern hemisphere of the old world.

——. Die geographische Verbreitung der Hühner-, Sumpf-, und Wasservögel im faunistischen Gebiete Finnlands. J. f. O. 1876, pp. 40–65.

PARKER, W. K. On the Skull of Ægithognathous Birds. Part ii. P. Z. S. 1876, pp. 256–258.

The abstract of a paper to be printed in the Zool. Trans. It is based upon an examination of the skulls of 51 forms of Passerine birds, in addition to the 31 examined for the first part of the same subject. The remarks in this abstract are chiefly of a general character, but *Thinocorus* is specially referred to as having, like *Turnix*, Ægithognathous features in the structure of its palate.

PELZELN, A. v. Verzeichniss der von Herrn Julius Finger dem kaiserlichen Museum als Geschenk übergebenen Sammlung einheimischer Vögel. Verh. z.-b. Wien, xxvi. pp. 153–162.

The particulars concerning the places of capture, &c., of the specimens in this collection are furnished by Herr Finger himself, the naming and arrangement being by Herr v. Pelzeln, who publishes the catalogue as his third contribution upon the Ornithological Fauna of the Austro-Hungarian Monarchy.

——. Vierter Beitrag zur ornithologischen Fauna der österreichisch-ungarischen Monarchie. *Tom. cit.* pp. 163–166.

——. Ueber eine von Herrn Dr. Richard Ritter von Drasche dem k. k. zoologischen Hofcabinete zum Geschenk gemachte Sendung von Vogelbälgen. *Tom. cit.* pp. 717–720.

Relates chiefly to birds from Celebes, with others from the Moluccas. [*Laniidæ*, *Columbidæ*.]

——. Ueber eine weitere Sendung von Vögeln aus Ecuador. *Tom. cit.* pp. 765–772.

A similar list to that published by the author in 1874. A new species of *Chalybura* is described, but not named.

PRJEVALSKY, N. Mongolia i Strana Tangutov. St. Petersburg: 1876, vol. ii. pt. 2, Ptitsi [*Aves*], pp. 1–176, pls. ix.–xx.

289 species are discussed, from Mongolia and the Tangut country. Two new genera [*Alaudidæ*, *Emberizidæ*] and 20 new species are cha-

racterized [*Caprimulgidæ*, *Turdidæ*, *Sylviidæ*, *Paridæ*, *Fringillidæ*, *Emberizidæ*, *Alaudidæ*, *Phasianidæ*, *Perdicidæ*, *Gruidæ*].

QUERPAT, NÉRÉE. Ornithologie Parisienne, ou Catalogue des oiseaux sédentaires et de passage que vivent à l'état sauvage dans l'enceinte de la ville de Paris. R. Z. (3) iv. pp. 424–431.

RAMSAY, E. P. Catalogue of the Australian Birds in the Australian Museum at Sydney, N. S. W. Part i., *Accipitres*. Sydney: 1876, 8vo. pp. 64.

A catalogue, constructed exactly on the plan of Sharpe's Catalogue of Birds in the British Museum, the portion relating to Australian *Accipitres*, as well as the analytical tables of the genera of Hawks, being copied from that work.

——. Description of a new Species of *Ptilotis* from the Endeavour River, with some Remarks on the Natural History of the East Coast Range, near Rockingham Bay. P. Linn. Soc. N. S. W. i. pp. 9–12. [*Meliphagidæ*.]

RAMSAY, E. P. Description of a new *Trichoglossus*. Tom. cit. p. 30. [*Psittacidæ*.]

——. Characters of a new genus and species of Passerine Bird from the Fiji Islands. *Tom. cit.* p. 41. [*Sylviidæ*.]

——. Description of a new Blackbird (*Merula*). Tom. cit. p. 43. [*Turdidæ*.]

——. Description of a new species of Flycatcher (*Rhipidura*). Tom. cit. p. 43. [*Motacillidæ*.]

——. Description of a new species of *Pachycephala* from Fiji, in the collection of William Macleay, Esq. *Tom. cit.* pp. 65 & 66. [*Laniidæ*.]

——. Description of a supposed new species of *Pachycephala* from New Britain. *Tom. cit.* p. 66. [*Laniidæ*.]

——. Description of a new species of the genus *Lamprolia*, Finsch, from Fiji. *Tom. cit.* pp. 68 & 69. [*Sylviidæ*.]

——. The Avifauna of the Fijian Group. *Tom. cit.* pp. 69–80.

Compiled from a collection of 87 species in the collection of Mr. Macleay, Gray's Hand-list, and Mr. Layard's papers in P. Z. S. for 1875.

——. Description of a supposed new species of Fruit Pigeon, from Malacola, one of the New Hebrides Islands, S.S. *Tom. cit.* p. 133. [*Columbidæ*.]

——. Description of a new species of Plover from North Australia. *Tom. cit.* p. 135. [*Charadriidæ*.]

——. List of Birds met with in North-eastern Queensland, chiefly at Rockingham Bay. P. Z. S. 1876, pp. 114–123.

A continuation of a former paper (*op. cit.* 1875, p. 603), the list of species noted being brought to 197. Full notes are given on the habits, &c., of the Megapodes and of the Australian Cassowary.

RAMSAY, R. WARDLAW. On an undescribed species of Nuthatch and another Bird from Karen-nee. P. Z. S. 1876, p. 677. [*Sittidæ.*]

REICHENOW, A. Osteologie von *Chionis minor* und Stellung der Gattung im system. J. f. O. 1876, pp. 84–89.

Dr. Reichenow concludes, from an examination of the skeleton, that *Chionis* should be placed in the family *Charadriidæ*, near the genera *Glareola* and *Hæmatopus*.

——. *Picus (Campothera) permistus*, sp. n. *Tom. cit.* pp. 95–97.

——. Ueber *Sycobius rubriceps*, sp. n., von W. Afrika. *Tom. cit.* p. 209.

RIDGWAY, ROBERT. Second Thoughts on the genus *Micrastur*. Ibis, 1876, pp. 1–5.

A revision of the author's previous monograph (Zool. Rec. xii. p. 50), suggested by an examination of the specimens of *Micrastur* in the collection of Messrs. Salvin & Godman. [*Falconidæ.*]

——. The genus *Glaucidium*. Tom. cit. pp. 11–17.

In this paper, the author's former monograph (P. Bost. Soc. xvi.) and Mr. Sharpe's review of the genus (Ibis, 1874) are criticised, with special reference to Mr. Sharpe's views. The number of valid American species is reduced from Ridgway, 1873 (8), Sharpe, 1874 (9) to 6, and reasons given for this reduction. One species is figured. [*Strigidæ*].

——. Notes on the Genus *Helminthophaga*. Tom. cit. pp. 166–171.

Contains a diagnostic table of the ten species recognized by the author, and notes on some lately described species.

——. Studies of the American *Falconidæ*. Monograph of the *Polyborí*. Bull. U. S. Geol. Surv. i. pp. 451–473, pls. xxiv.–xxvi.

The *Polyborí* are defined as a group of the sub-family *Falconinæ* of the *Falconidæ*, differential characters being given. Four genera are characterized, and the species contained in them discussed as regards synonymy, distribution, &c. *Polyborus lutosus*, is described as new.

——. Studies of the American *Falconidæ*. Op. cit. ii. pp. 91–182, pls. xxx. & xxxi.

Treats of a number of American *Falconidæ*, both as to the characters of the genera and of their component species. The range of the latter, their synonymy and characters are fully given. [*Falconidæ.*]

——. Ornithology of Guadeloupe Island, based on notes and collections made by Dr. Edward Palmer. *Tom. cit.* pp. 183–195.

An account of a small but interesting collection of birds, wherein it is shown that all the land birds differ, specifically or as varieties, from their representatives on the mainland. 12 species are enumerated, of which 3 are undetermined. [*Sylviidæ*, *Troglodytidæ*, *Fringillidæ*, *Picidæ.*]

Riesenthal, O. v. Die Raubvögel Deutschlands und des an grenzenden Mitteleuropas, Darstellung und Beschreibung der in Deutschland und den benachbarten Ländern von Mitteleuropa vorkommenden Raubvögel. Cassel: 1876, 8vo, atlas, sm. fol.

The illustrations of this work are chromolithographs. Part i. is all as yet seen by the Recorder.

Ronson, C. H. Notes on the Moa Remains in the vicinity of Cape Campbell. Tr. N. Z. Inst. viii. pp. 95–97.

A map accompanying this paper shows the places where Moa bones were found.

Rohweder, J. Beobachtungen über *Salicaria locustella* (Penn.) in Holstein. J. f. O. 1876, pp. 79–84.

——. Zur Fortpflanzungsgeschichte des Staares. *Tom. cit.* p. 375.

Rowley, G. D. Sub-family *Nasiterninæ*. Orn. Misc. i. pp. 152–156.

Contains remarks on these Parrots, prefacing a description of the species of the genus *Nasiterna* by Dr. O. Finsch.

——. *Psittacus erithacus* (the Common Grey Parrot) *Tom. cit.* pp. 164–175.

——. *Tanysiptera riedeli* (Riedel's Kingfisher). *Tom. cit.* pp. 176–180.

——. Falconry. *Tom. cit.* p. 213 *et seq.*

Contains extracts from various early works bearing upon this subject.

——. The Birds of the Fiji Islands. *Tom. cit.* pp. 259–262; *op. cit.* ii. pp. 23–39.

Describes and figures, *inter alia*, some species recently characterized by Mr. E. L. Layard and Dr. Finsch [*Muscicapidæ*, *Sylviidæ*, *Psittacidæ*, *Columbidæ*].

——. *Ammomanes deserti* (Licht.), *Ammomanes isabellina* (Temm.), and Isabelline Birds. *Op. cit.* i. pp. 263–268.

——. *Machærirhynchus nigripectus* (Schlegel). *Op. cit.* ii. pp. 52–59.

Contains notes on the different species of this genus, *M. nigripectus* being figured.

——. Birds in Great Britain. *Tom. cit.* pp. 65–111.

Contains miscellaneous notes on the occurrence of certain birds in Great Britain. [*Falconidæ*, *Emberizidæ*, *Anatidæ*.]

Russ, C. Die fremdländischen Stubenvögel. Hanover: 1876. (Zool. Gart. 1876, p. 264.)

Sachse, ——. Ornithologische Beobachtungen vom Westerwalde. J. f. O. 1876, pp. 279–283.

Salvadori, T. Catalogo di una collezione di Uccelli dell' Isola di Buru, inviata al Museo Civico di Genova dal sig. A. A. Bruijn. Ann. Mus. Genov. viii. pp. 367–386.

A list with notes of 52 species, one being described as new. [*Psittacidæ*.]

SALVADORI, T. Catalogo degli Uccelli raccolti dai sigg. A. A. Bruijn ed O. Beccari durante il viaggio del trasporto da guerra olandese "Surabaia," dal Novembre 1875 al Gennaio 1876. *Tom. cit.* pp. 395–406.

The "Surabaia" in this expedition visited the north coast of New Guinea as far east as Humboldt Bay; 49 species of birds were collected. A Parrot [*Psittacidæ*] is described as new, and a species of *Goura* [*Columbidæ*] provisionally named.

——. Intorno alla supposta femmina del *Dicæum retrocinctum*, Gould. *Tom. cit.* pp. 509–511. [*Dicæidæ.*]

——. On *Sericulus xanthogaster*, Schl., and *Xanthomelus aureus* (Linn.). Ibis, 1876, pp. 267–270. [*Paradiseidæ.*]

——. Letter on *Cymborhynchus malaccensis*, *Ptiladela boyeri*, and *Diphyllodes magnifica*. Tom. cit. p. 277.

——. Letter on Dr. Brüggemann's paper on Celebes Birds, and on *Picus leptorhynchus*, Severtzoff. *Tom. cit.* p. 385. [*Picidæ*, *Columbidæ*, *Rallidæ.*]

——. Letter placing *Tatare? viridis*, Layard, in the genus *Leptornis*. Tom. cit. p. 506.

——. Letter from, containing remarks on some Birds mentioned by Signor D'Albertis as seen by him during his first excursion up the Fly River. P. Z. S. 1876, p. 752.

——. Letter from, addressed to the Secretary of the Zoological Society, concerning the discovery of a supposed new species of *Drepanornis*. Tom. cit. p. 776.

——. Nota intorno al *Fregilupus varius* (Bodd.). Atti Acc. Tor. xi. pp. 481–488.

An account of certain specimens of this probably extinct species, and a description of a specimen existing in the Turin Museum.

SALVIN, OSBERT. On the Avifauna of the Galapagos Archipelago. Tr. Z. S. ix. pp. 447–510.

This paper is chiefly based upon the collections made by Dr. Habel in the Galapagos Islands, which, together with the observations of Mr. Darwin and others, show that 57 species of birds, belonging to 39 genera, are found in these islands. One species is described as new [*Procellariidæ*], and several are figured. [*Fringillidæ*, *Lariidæ*, *Procellariidæ*, *Spheniscidæ.*]

——. *Dendroeca chrysoparia* (the Yellow-cheeked Warbler). Orn. Misc. i. pp. 181–184.

An account of this species, with figures of the three known specimens.

——. Critical Notes on *Procellariidæ*. Part i., Banks's unpublished Drawings. *Tom. cit.* pp. 223–238.

An attempt to identify 16 drawings of Petrels by Sydney [illegible] commonly known as "Banks's Drawings." All but 2 [illegible] with names subsequently proposed by various authors.

SALVIN, OSBERT. Critical Notes on *Procellariidæ*. Part. ii. The new Species of Petrels obtained during the Voyage of the Italian Corvette "Magenta" round the World. *Tom. cit.* pp. 249–257.

Figures of the 5 species described are given, and notes on their nomenclature added.

——. On two Additional Species of Central American *Odontophorinæ*. Ibis, 1876, pp. 379 & 380. [*Perdicidæ*.]

——. On some new Species of Birds from Western Ecuador. *Tom. cit.* pp. 493–506. [*Tyrannidæ*, *Formicariidæ*, *Capitonidæ*, *Psittacidæ*, *Falconidæ*.]

SALZMANN, ——. Zwei Canarienvögel aus einem Ei. J. f. O. 1876, p. 207.

SAUNDERS, HOWARD. On the *Stercorariinæ* or Skua Gulls. P. Z. S. 1876, p. 317.

A monograph of the genus *Stercorarius*, in which the complex synonymy of each species is fully discussed, and the range given. Several changes are made in names usually adopted, but Mr. Saunders gives good reasons for the conclusions he has come to on these points. One South American species, long ago alluded to by Bonaparte under the name of *Lestris chilensis*, but since lost sight of, is here fully recognized. [*Laridæ*.]

——. On the *Sterninæ*, or Terns, with Descriptions of three new Species. *Tom. cit.* pp. 638–672.

Five genera of *Sterninæ* are recognized, out of upwards of 30 that have at various times been proposed in this sub-family. The intricate synonymy of the Terns seems to have been successfully investigated by the author, who has been enabled to assign to their proper species most of the doubtful names that have haunted their nomenclature. As this has been achieved mainly by an examination of type and typical specimens, there is reason to hope that a considerable number of the author's determinations in this paper will be final. [*Laridæ*.]

SCHALOW, H. Materialen zu einer Ornis der Mark Brandenburg in Verbindung mit Alexander Bau bearbeitet. J. f. O. 1876, pp. 1–35, 113–145.

A list of 259 species of birds, with notes on their distribution and abundance or rarity in Mark Brandenburg. The measurements of the eggs of many species are also given.

——. Zur Ornis Persiens. Note di un Viaggio in Persia di F. de Filippi. Milano, 1865. Uebersetzt mit Anmerkungen. *Tom. cit.* pp. 173–189.

[illegible]anslation of De Filippi's "Viaggio," Herr Schalow has added [illegible] to the determination of the species, chiefly derived from [illegible]apers published in the Ibis for 1874.

…l. Notizen über *Otomela* und verwandte Genera. *Tom.* …214.

…mentary notes to the author's former memoir. (J. f. O. 1875, …29.)

——. Notiz über *Otomela phœnicuroides* (Sev.). *Tom. cit.* p. 145.

Refers to the bird obtained in Heligoland, and formerly identified with *Lanius phœnicurus*, Pall. [According to H. Seebohm, Ibis, 1877, p. 164, it is *P. isabellinus*, H. & E.]

Scheitlin, —. Mittheilungen über die Schwanen-kolonie im Weiher des Bürgerspitales. Ber. St. Gal. Ges. 1876, pp. 246–266.

Relates chiefly to the breeding in confinement of *Cygnus olor* and *C. atratus*.

Sclater, P. L. On recent Ornithological Progress in New Guinea. Ibis, 1876, pp. 243–259.

Gives a summary of the contents of some recently published Ornithological papers relating to New Guinea. [See Beccari, Zool. Rec. xii. p. 26; Gould, *tom. cit.* p. 34; Rosenberg, *tom. cit.* p. 50, and Salvadori, *tom. cit.* p. 51, *et anteà*].

——. Further Ornithological News from New Guinea. *Tom. cit.* pp. 357–364.

Contains an abstract of Count Salvadori's most recent papers on New Guinea Birds; an extract from an account published in the "Sydney Morning Herald," of Signor d'Albertis' Expedition up the Fly River; a notice of Mr. Gould's third part of his Birds of New Guinea, &c., and other matter relating to Ornithological discovery in New Guinea.

——. Description of a new Tanager of the genus *Calliste*, and remarks on other recently-discovered species. *Tom. cit.* pp. 407–410.

Gives an account of the additional species of this genus discovered since 1868, one being now described as new. [*Tanagridæ*.]

——. On some Additional Species of Birds from Santa Lucia, West Indies. P. Z. S. 1876, pp. 13 & 14.

Eight species are mentioned in this list, a new genus and two new species being described as new. [*Troglodytidæ*, *Mniotiltidæ*.]

——. Report on the Additions to the Society's Menagerie in January, 1876. *Tom. cit.* p. 255. [*Psittacidæ*, *Rallidæ*.]

——. Exhibition of and Remarks on a Skin of a Female of Anderson's Pheasant. *Tom. cit.* p. 274. [*Phasianidæ*.]

——. Exhibition of and Remarks on a Series of Skins of the Parrots of the Fiji Islands, obtained by Mr. Layard. *Tom. cit.* p. 307. [*Psittacidæ*.]

——. Report on the Additions to the Society's Menagerie in March, 1876. *Tom. cit.* p. 333. [*Falconidæ*.]

SCLATER, P. L. Report on the Additions to the Society's ... in April, 1876, and remarks on the Cassowaries in the ... Collection. *Tom. cit.* p. 413. [*Coliidæ.*]

——. Exhibition of a rare Pacific Parrot, *Coriphilus kuhli*, and remarks on its habitat. *Tom. cit.* p. 421.

——. On the Birds Collected by Dr. Comrie on the South-east coast of New Guinea during the Survey of H.M.S. "Basilisk." *Tom. cit.* pp. 459–461.

Describes a small but interesting collection of 11 species. [*Paradiseidæ, Megapodiidæ.*]

——. Exhibition of, and Remarks on, the Skins of a Male and Female Pheasant (*Lobiophasis bulweri*). Tom. cit. p. 465.

——. Exhibition of a Collection of Birds received from Signor L. M. D'Albertis, and Descriptions of two new Parrots. *Tom. cit.* p. 519. [*Psittacidæ.*]

——. Report on the Additions to the Society's Menagerie in June, July, August, and September, 1876. *Tom. cit.* p. 693, pls. lxvi.–lxviii. [*Corvidæ, Anatidæ.*]

——. Ueber den gegenwärtigen Stand unserer Kenntniss der geographischen Zoologie. J. f. O. 1876, pp. 225–278.

A translation, by Herman Schalow, of Mr. Sclater's address read to Section D. of the British Association at Bristol, August, 1875.

—— & SALVIN, OSBERT. On Peruvian Birds collected by Mr. Whitely. Part ix. P. Z. S. 1876, pp. 15–19, pl. iii.

Sixty-five species were contained in this collection, of which a list with localities is given. Notes are added on several species, and 2 are described as new. [*Tyrannidæ, Formicariidæ, Columbidæ, Scolopacidæ.*]

——. Descriptions of New Birds obtained by Mr. C. Buckley in Bolivia. *Tom. cit.* pp. 253 & 254. [*Cœrebidæ, Tanagridæ, Tyrannidæ, Picidæ.*]

——. Notes on some of the Blue Crows of America. *Tom. cit.* pp. 268–272.

Contains remarks on certain species of *Cyanocitta*, and a description of a species hitherto confounded with *C. beechii* of Western Mexico. Also descriptions of various forms of *C. armillata*. [*Corvidæ.*]

——. On new Species of Bolivian Birds. *Tom. cit.* pp. 352–358. [*Turdidæ, Muiotiltidæ, Tanagridæ, Corvidæ, Tyrannidæ, Cotingidæ, Formicariidæ, Falconidæ.*]

——. A Revision of the Neotropical *Anatidæ*. Tom. cit. pp. 358–412.

Contains a review of the South American *Anatidæ*, giving their synonymy and geographical range, together with a description of each species. 62 species are recognized as coming within the limits of the Neotropical

region, 25 of which are of more northern origin, and migrate southwards in winter.

Sclater, P. L., & Taylor, E. C. Ornithological Notes from Constantinople. Ibis, 1876, pp. 60–65.

Contains notes on a few birds observed during a short visit to Constantinople, and also remarks on the contents of the Museum of the American College at Bebek.

Scott, David. The Proper Specific Name of the Song Sparrow. Am. Nat. x. p. 17. [*Fringillidæ.*]

Scully, J. A Contribution to the Ornithology of Eastern Turkestan. Str. Feath. 1876, pp. 41–205.

A very important paper, based upon a collection of 650 skins made during a twelvemonth's residence in Kashgaria, where the author occupied the position of medical officer to the Kashgar political agency. The species have been determined by Mr. Hume, but the author's notes are very full of information and give details of measurements, colour of soft parts, &c., as well as habits. The author's journey, shown on two maps, is fully described in the form of a diary, wherein mention is made of the birds observed each day. The latter part of the article gives an account of each of the 156 species obtained during the expedition.

Seebohm, Henry. On the Migration of Birds in North-east Russia. Orn. Misc. i. pp. 239–247.

These observations were made in the Valley of the Petchora between April 1 and June 3, and apply to about 45 species of birds visiting that district in the summer months.

——— & Brown, J. A. Harvie. Notes on the Birds of the Lower Petchora. Ibis, 1876, pp. 105–126, 215–230, 289–311, 434–456.

Contains an account of a journey down the Petchora from Ust Zylma to the mouth of the river, description of the country traversed, and full notes on the birds observed. Several interesting species were found breeding, the chief of which were Bewick's Swan, Grey Plover, and Little Stint. [*Scolopacidæ, Motacillidæ, Charadriidæ, Anatidæ.*]

Sharpe, R. Bowdler. Contributions to the Ornithology of Borneo. Part i. Ibis, 1876, pp. 29–52.

A list of 72 species of birds collected in Borneo by Mr. Arthur Everett, whose notes on the date of capture, sex, locality, and colour of soft parts, accompany the name of each species. Mr. Sharpe, besides naming the species, adds notes on their synonymy and references to Salvadori's "Uccelli di Borneo." [*Turdidæ, Pycnonotidæ, Dicæidæ, Dicruridæ, Sturnidæ, Eurylæmidæ, Sylviidæ.*]

———. Descriptions of two new species of South African Birds. *Tom. cit.* pp. 52–54. [*Pycnonotidæ, Sylviidæ.*]

———. Note on a specimen of *Sturnia ulula* shot near Amesbury. P. Z. S. 1876, p. 334.

SHARPE, R. BOWDLER. Description of an apparently new species of Owl from the Solomon Islands. P. Z. S. 1876, p. 673. [*Strigidæ*.]

——. Prof. Steere's Expedition to the Philippines. Nature, xiv. pp. 297 & 298.

A short account of Prof. Steere's expedition to the Philippines, with special reference to the collection of birds made in several previously unvisited islands. 10 new species are described briefly, a fuller account of which is shortly to appear in Tr. L. S. [*Eurylæmidæ*, *Pycnonotidæ*, *Pittidæ*, *Nectariniidæ*, *Dicæidæ*.]

——. A Revision of the Family *Indicatoridæ*. Orn. Misc. i. pp. 192–209.

This family is divided into two genera, *Indicator* and *Prodotiscus*, the former containing 10 and the latter 2 species. All the species are described and their synonymy and range given.

——. On the Geographical Distribution of the Barn-Owls. *Tom. cit.* pp. 269–298; *op. cit.* ii. pp. 1–21.

The distribution of the different species of *Strix* is fully given in this paper, and range traced on maps of the world.

——. On the Geographical Distribution of the genus *Pericrocotus*. Str. Feath. 1876, pp. 205–212.

Fifteen species of this genus are recognized, and details of their range given.

——, & BOUVIER, A. Études d'Ornithologie Africaine. Catalogue d'une collection recuillie à Landana et Cinchoxo (Congo) par M. Louis Petit, pendant les mois de janvier, février, mars, et avril. 1876. Bull. Soc. Zool. Fr. 1876, pp. 36–53. [*Hirundinidæ*.]

——. [See LAYARD, E. L.]

SHELLEY, G. E. A Monograph of the *Cinnyridæ*, or Family of Sun-Birds. Parts i. & ii. London: 1876, 4to.

This work is intended to be completed in 12 parts, of which the first and second appeared in 1876. It is proposed to figure all, or nearly all, the species of *Cinnyridæ*, or *Nectariniidæ*, as it is better to call the family. The plates are well executed by Keulemans, and the text contains a summary of the literature, the life-history so far as known, and descriptions of the sexes and young of each species. The distribution of the species is also carefully attended to.

SNOW, F. H. A Catalogue of the Birds of Kansas. Published by the Kansas Academy of Science, 1875 (Bull. Nutt. Orn. Club, i. p. 47).

STEVENSON, H. Letter on the ferruginous tint on the plumage of Swans. Ibis, 1876, p. 276.

STEVENSON, H. Ornithological Notes for 1875. Tr. Norw. Soc. ii. pp. 206–217.

Contains notes on the rarer birds observed in Norfolk during the year 1875, as well as other ornithological occurrences that seemed worthy of record.

STÖLKER, C. Die Alpenvögel der Schweiz in Photographien von Gebr. Täschler. 1 Serie. St. Fiden bei St. Gallen: 1876. (Zool. Gart. 1876, p. 304.)

——. Ornithologische Beobachtungen (III. Reihenfolge). Ber. St. Gall. Ges. 1876, pp. 267–297.

Contains, *inter alia*, notes on *Pyrrhocorax alpinus* and *Pastor roseus*, with special references to the occurrences of the latter in Switzerland and Germany.

STREETS, T. H. Description of a new Duck from Washington Island. Bull. Nutt. Orn. Club, i. p. 46. [*Anatidæ*].

SUMICHRAST, F. [See LAWRENCE, G. N.]

SWINHOE, R. On the Contents of a Third Box of Birds from Hakodadi, in Northern Japan. Ibis, 1876, pp. 330–335.

Records several species new to the Avi-fauna of N. Japan.

——. Letter on *Porzana exquisita*. Tom. cit. p. 507.

——. Zur chinischen Ornithologie. Zool. Gart. 1876, pp. 24–27, 61–63.

Contains notes on Chinese birds obtained chiefly at Ningpo and Shanghai.

TACZANOWSKI, L. Verzeichniss der Vögel, welche durch die Herren Dr. Dybowski und Godlewski im südlichen Ussuri-Lande und namentlich an der Küsten des japanischen Meeres gesammelt und beobachtet worden sind. J. f. O. 1876, pp. 189–203.

A further contribution to the Ornithology of N. E. Asia. One new species is described. [*Fringillidæ*.]

——. Revue critique de la Faune Ornithologique de la Sibérie orientale. Bull. Soc. Zool. Fr. 1876, pp. 113–151.

In this article, the author has collected all the scattered materials of his subject from the time of Pallas, Steller, and Gmelin, to the most recent work of Prejevalsky. References to all the chief works are given, and the range traced of each species mentioned. Dr. Taczanowski has long had this subject before him, and no one else is so qualified to deal with it.

TAUBER, P. On the Fecundation of the Egg in the Common Fowl. Ann. N. H. (4) xviii. pp. 369–376.

An abstract, sanctioned by the author, of an article in Nat. Tids. (3) x.

TAYLOR, E. C. [See SCLATER, P. L.]

* Misprinted TASCHER, cf. *tom. cit.* p. 511.

THIELE, —. Der Tannenhäher im Harze brütend. J. f. O. 1876, pp. 364–368.

THIENEMANN, W. Einige Mittheilungen über die Zwergtrappe, *Otis tetrax*. Tom. cit. pp. 36–40.

THÜNGEN, C. E. v. Das Rebhuhn: dessen Naturgeschichte, Jagd, und Hege. Weimar: 1876. (Zool. Gart. 1876, p. 224.)

THORNE, G., JR. Notes on the Discovery of Moa and Moa-hunters' Remains at Pataua River, near Whangarei. Tr. N. Z. Inst. viii. pp. 83–94.

Gives details of the discovery of Moa bones in a new locality, 70 miles north of Auckland. 3 plates, giving a map of the locality, sections of the deposit, and of stone implements discovered with the Moa bones, accompany the paper.

TRAVERS, W. T. L. Notes on the Extinction of the Moa, with a review of the discussions on the subject, published in the "Transactions of the New Zealand Institute." *Tom. cit.* pp. 58–83.

Besides a summary of the evidence furnished by various writers on this subject, the author brings forward additional matter contained in two letters addressed by Mr. John White to himself, giving an abstract of the traditions of the Maoris relating to the Moa, as gleaned by him from the natives themselves. With regard to the date of the extinction of the Moa, Mr. Travers arrives at an opinion opposed to that of Dr. v. Haast, and believes that these birds lived at no distant date, during the occupancy by the present race of New Zealand natives.

TRISTRAM, H. B. Notes on a Collection of Birds from the New Hebrides. Ibis, 1876, pp. 259–267.

The birds mentioned in this paper, 27 in number, are from the islands of Aneiteum, Aniwa, and Erromanga. One is described as new. [*Rallidæ*.]

TSCHUSI-SCHMIDHOFN, V. VON. Ornithologische Mittheilungen aus Oesterreich (1875). J. f. O. 1876, pp. 330–332.

——. Die Vögel Salzburgs; Nachträge und Berichtigungen. Zool. Gart. 1876, pp. 333 & 334.

VENNOR, H. G. Our Birds of Prey, or the Eagles, Hawks, and Owls of Canada. With 30 Photographic Illustrations by Wm. Notman. Montreal: 1876, 4to.

The photographs are taken from stuffed specimens. Mr. Vennor supplies notes on the species, and gives particulars of their occurrence in Canada.

VIAN, JULES. Le Starique-Perroquet en Suède. L'appareil costal, auxiliaire puissant de la locomotion aérienne dans les Oiseaux. Le Macareux de Graba en France. Bull. Soc. Zool. Fr. 1876, pp. 1–11.

——. [See ALLEON.]

WALDEN, ARTHUR, VISCOUNT. Letter on Dr. Finsch's views respecting *Artamus leucorhynchus*. Ibis, 1876, pp. 133–136.

——. Notes on the late Colonel Tickell's Manuscript Work, entitled, "Illustrations of Indian Ornithology." *Tom. cit.* pp. 336–357.

In these notes, Colonel Tickell's collection of drawings now in the possession of the Zoological Society are described and criticised, high praise being accorded to them for their fidelity and execution. [*Falconidæ, Picidæ, Sittidæ, Nectariniidæ, Dicæidæ, Timeliidæ.*]

——. Description of a new Species of the Genus *Trichostoma* from the Island of Celebes. *Tom. cit.* pp. 376–379. [*Timeliidæ.*]

——. Letter on the occurrence of *Sterna albigena* near Bombay. *Tom. cit.* p. 385.

WALLACE, A. R. The Geographical Distribution of Animals, with a Study of the Relations of Living and Extinct Faunas as elucidating the past Changes of the Earth's Surface. London: 1876, 2 vols. 8vo, pp. 503 and 607.

The class Aves supplies a large proportion of the material investigated in this work, and the distribution of birds entering into the subjects is examined under the following heads:—(Part i.) The principles and general phenomena of animals. (Part ii.) On the distribution of extinct animals. (Part iii.) Zoological geography: a review of the chief forms of life in the several regions and sub-regions, with the indications they afford of geographical mutations. (Part iv.) Geographical zoology: a systematic sketch of the chief families of land animals in their geographical relations. The book itself is full of details most carefully elaborated, and is doubtless destined to be the standard work on the subject for some time to come.

WALTER, A. Beobachtungen an dem Leben und Trieben des Kuckuks. J. f. O. 1876, pp. 368–373.

WHITE, TAYLOR. Notes on Moa Caves, in the Wakatipu District. Tr. N. Z. Inst. viii. pp. 97–102.

In a note by Captain F. W. Hutton appended to this paper, egg shells of a green colour are described and shown by microscopical examination to belong to *Dinornis*. Two new kinds of *Dinornis* feathers are also described.

WISE, F. *Pterocles coronatus* and *P. lichtensteini*. Str. Feath. 1876, p. 230.

WHARTON, C. BYGRAVE. Notes on the Ornithology of Corsica. Ibis, 1876, pp. 17–29.

A list, with notes on the abundance or rarity, times of arrival, &c., of 112 species of birds observed during eight months' residence in Corsica.

## ACCIPITRES.

### FALCONIDÆ.

*Falconidæ*, see ANDERSON, A.; and for Australian species, see RAMSAY, E. P. The following American genera and their component species described, and their synonymy, range, &c., given, viz.:— *Nisus*, *Geranoaetus*, *Onychotes*, *Herpetotheres*, *Heterospizias*, *Buteogallus*, *Busarellus*, *Thrasaetus*, *Morphnus*, *Gampsonyx*, *Leptodon*, *Regerhinus*, *Antenor*, *Spiziastur*, *Urubitinga*, *Leucopternis*, *Elanoides*; R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 91 *et seq.*

*Accipiter madagascariensis* and skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xxxv. & xxxvi. *A. virgatus* in Burma, J. H. Gurney, Ibis, 1876, p. 278.

*Aquila bifasciata*, notes on this and other Indian species; A. Anderson, P. Z. S. 1876, p. 311. *A. rufo-nuchalis* (the lesser Spotted Eagle of Europe), sp. n., W. E. Brooks, Str. Feath. 1876, p. 269. *A. pennata*, observations on, in the west of France; L. Bureau, Bull. Soc. Zool. Fr. 1876, p. 54.

*Archibuteo*. The changes of plumage of the different species described; J. H. Gurney, Ibis, 1876, p. 370.

*Astur henstì* (pl. xxx.), *A. francesi* (pls. xxxi. & xxxii.) and skeleton (pls. xxxiii. & xxxiv.), *A. morelì* (pl. xxxii.), figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas. *A. rufitorques*, Pealo, is the right name for the Fijian *Astur*; J. H. Gurney, Ibis, 1876, p. 383.

*Asturina*: notes on certain species; J. H. Gurney, Ibis, 1876, p. 480. *A. nitida*, var. *plagiata*, figured; W. H. Henshaw, Rep. U. S. Geogr. Explor. W. of 100th mer. v. Zool. pl. xv. *A. saturata*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 357, Bolivia.

*Bazà ceylonensis*, sp. n., W. V. Legge, Str. Feath. 1876, p. 247, Ceylon. *B. madagascariensis* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xix. xx. & xxi.

*Busarellus nigricollis*. The plumage of the immature bird described; J. H. Gurney, Ibis, 1876, p. 486.

*Buteo*. The American members of this genus reviewed; J. H. Gurney, Ibis, 1876, p. 230. The Old World species also examined; *id. tom. cit.* p. 364. *A. augur*, notes on this species and its allies; *id. tom. cit.* p. 467. *B. hypospodius*, sp. n., *id. tom. cit.* p. 73, pl. iii. New Granada and Venezuela. *B. brachypterus* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xxii. xxiii. & xxvi.a. *B. plumipes*: note on this and other Indian Buzzards, *B. desertorum*, from India, being now considered to be not this species but *B. ferox*; A. O. Hume, Str. Feath. 1876, p. 358 et seq. *B. vulgaris* in North America, C. J. Maynard, Bull. Nutt. Orn. Club, i. p. 2; R. Ridgway, *tom. cit.* p. 32. *B. vulgaris* and *B. lagopus* figured; O. Riesenthal, Raubv. Deutschl. Part i.

*Buteogallus æquinoctialis*. The plumage of the immature bird described; J. H. Gurney, Ibis, 1876, p. 485.

*Buteola*. Note on the species; *id. tom. cit.* p. 477.

*Circus aeruginosus* and *C. melanoleucus*: on the occurrence of these and other *Accipitres* in Ceylon; W. V. Legge, Ibis, 1876, p. 126. *C. aeruginosus* figured; G. D. Rowley, Orn. Misc. ii. pl. xlv. *C. approximans*, Peale, is the name applicable to the Fijian Harrier; J. H. Gurney, Ibis, 1876, p. 384. *C. cinereaceus*; notes on this and other Indian species of *Circus*; A. Anderson, P. Z. S. 1876, p. 314. *C. macroscelus*: a third specimen examined, and the species considered distinct from *C. maillardi*; J. H. Gurney, Ibis, 1876, p. 278. *C. maillardi* and *C. melanoleucus*, notes on; *id. tom. cit.* p. 129. *C. macroscelus* and *C. maillardi* figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xxvii.–xxix.

*Eutriorchis astur* figured; A. Milne-Edwards & A. Grandidier, *l. c.* pl. ix.*b*.

*Falco barbarus* (pts. li. & lii.), *F. candicans* (pts. li. lii. & liv.), *F. islandus* (pt. liii.), and *F. minor* (pt. l.), figured; H. E. Dresser, B. Eur. *F. concolor* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xi., xii. & xii.*a*. *F. babylonicus*: full measurements of a ♂ given and the species figured; A. Anderson, P. Z. S. 1876, p. 311, pl. xxiii. *F. labradorus* figured; H. E. Dresser, Orn. Misc. i. pls. xxiv. & xxv. *F. lathami*: note on the bird described by Tickell under this name; Lord Walden, Ibis, 1876, p. 340. *F. tinnunculus*, notes on; G. D. Rowley, Orn. Misc. i. pp. 135–139. *F. zoniventris* figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pl. x.

*Geranoaetus melanoleucus*. Its changes of plumage described; J. H. Gurney, Ibis, 1876, p. 66.

*Haliaetus leucoryphus* figured; H. E. Dresser, B. Eur. pts. lv. & lvi. *H. vociferoides* and some of its bones figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. ix. & ix.*a*.

*Harpyhaliaetus* = *Urubitornis*, Verr., but *U. solitarius* considered specifically distinct from *H. coronatus*; J. H. Gurney, Ibis, p. 490. The immature plumage of the latter described; *id. tom. cit.* p. 492.

*Leucopternis*: the distinctions between this genus and *Urubitinga* upheld, with notes on several species of the former; J. H. Gurney, Ibis, 1876, p. 469. *L. occidentalis*, sp. n., O. Salvin, Ibis, 1876, p. 496, Ecuador.

*Machær[or]hamphus anderssoni* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xxiv.–xxvi. & xxvi.*a*.

*Micrastur*. A further revision of this genus, and *M. pelzelni* redescribed; R. Ridgway, Ibis, 1876, pp. 1–5.

*Milvus major* = *melanotis* = *govinda*, Sykes; W. E. Brooks, Str. Feath. 1876, p. 272 (but see A. O. Hume, *loc. cit.* note). *M. migrans* figured; H. E. Dresser, B. Eur. pts. li. & lii.

*Nisus* (potius *Accipiter*). Monograph of American species; R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 91 et seq. *N. salvini*, sp. n., *id. tom. cit.* p. 121, Venezuela.

*Pernis apivorus* figured; O. Riesenthal, Raubv. Deutschl. pt. i.

*Poliaetus plumbeus*. Hodgs., figured; A. Anderson, P. Z. S. 1876, p. 777, pl. lxxxii.

*Polybori*. A monograph of this group; R. Ridgway, Bull. U. S. Geol. Surv. i. p. 451 et seq. *P. lutosus*, sp. n., *id. tom. cit.* p. 459, Guadaloupe Island, coast of California. *P. tharus*: a supposed variety figured; P. L. Sclater, P. Z. S. 1876, p. 332, pl. xxv.

*Polyboroides radiatus* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xv. xvi. xvii. & xviii.

*Pandion haliaetus* figured; H. E. Dresser, B. Eur. pts. xlix. & l.

*Spizaetus cirrhatus*. Its changes of plumage described; A. O. Hume, Str. Feath. 1876, p. 356.

*Tachytriorchis newtoni* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xiii. xiii.*a*, xiv. & xiv.*a*.

*Urubitinga*. Notes on certain species; J. H. Gurney, Ibis, 1876, p. 487.

### STRIGIDÆ.

See ANDERSON, A.

*Ascalaphia coromanda*. Eggs with well-marked brown and lilac spots; A. Anderson, P. Z. S. 1876, p. 316.

*Asio accipitrinus* (pt. l.) and *A. otus* (pt. xlix.) figured; H. E. Dresser, B. Eur. *A. capensis-major* (pl. xxxvii.) and *A. madagascariensis* (pl. xxxviii.), with skeleton (pl. xxxviii. *a*), figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas.

*Athene superciliaris* and skeleton figured; *iid. tom. cit.* pls. xxxix. & xxxix.*a*.

*Ephialtes nicobaricus*, sp. n., A. O. Hume, Str. Feath. 1876, p. 283, Nicobar Islands.

*Glaucidium jerdinii* figured; R. Ridgway, Ibis, 1876, pl. i.

*Ninox burmanica* and *N. innominata* seem to be new names suggested for races of *N. scutellata*, the former from Burma and the Nicobars, the latter from Cachar; A. O. Hume, Str. Feath. 1876, p. 285. *N. solomonis*, sp. n., R. B. Sharpe, P. Z. S. 1876, p. 673, pl. lxii. Solomon Islands.

*Scops giu* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii. *S. menadensis* and skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. xl. & xl.*a*.

*Strix*. On the type of the genus; A. Newton, Ibis, 1876, p. 94. On the distribution of the different species; R. B. Sharpe, Orn. Misc. i. pp. 269–298, and ii. pp. 1–21.

*Surnia ulula* near Amesbury; R. B. Sharpe, P. Z. S. 1876, p. 334.

## PSITTACI.

On the anatomy of certain genera, see GARROD, A. H.

*Psittaci* of the Mascarene Islands; A. & E. Newton, Ibis, 1876, p. 281.

*Aprosmictus bernensis*, sp. n., T. Salvadori, Ann. Mus. Genov. viii. p. 371, Buru.

*Ara couloni*, sp. n. (= *Conurus illigeri*, Tsch.), P. L. Sclater, P. Z. S. 1876, p. 255, Peru.

*Charmosyna papuensis* (pt. ii.), *C. josephinæ*, and *C. pulchella* (pt. iii.), figured; J. Gould, B. New Guinea.

*Coracopsis mascarinus*. Its history traced; A. & E. Newton, Ibis, 1876, p. 285. *C. obscura* and *C. nigra* figured, with their complete skeletons and detached bones; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. i.–vi.

*Coriphilus fuhli* discovered on Washington Island; P. L. Sclater, P. Z. S. 1876, p. 421.

*Cyclopsitta suavissima*, sp. n., *id. l. c.* p. 520, pl. liv., Naiabui Mountains, New Guinea.

*Dasyptilus, Deroptyus, Polyteles, Chalcopsitta*, and *Coryphilus*. Notes on anatomy; A. H. Garrod, P. Z. S. 1876, p. 691.

*Lorius solitarius* figured; G. D. Rowley, Orn. Misc. ii. pl. xli.

*Nasiterna*. Remarks on the genus; G. D. Rowley, Orn. Misc. i. p. 152. *N. geelvinkiana*, pl. xviii., *N. pygmæa*, pl. xix., *N. pygmæa*, pl. xx., and *N. pusio*, pl. xxi., figured; O. Finsch, Orn. Misc. i. *N. beccarii*, sp. n., T. Salvadori, Ann. Mus. Genov. viii. p. 396, New Guinea.

*Palæornis icardi* figured; A. & E. Newton, Ibis, 1876, p. 281, pl. vi.

*Pionopsitta*. A list of the species of given, and *P. pyrrhops*, sp. n., described; O. Salvin, Ibis, 1876, p. 496, Ecuador.

*Platycercus*. Notes on the Fijian species, and *P. taviunensis*, sp. n., described; E. L. Layard, Ibis, 1876, p. 141, Taviuni, Fiji. *P. tabuensis*: note on the supposed introduction of this species into Tongataboo, from Fiji; *id. tom. cit.* p. 390.

*Psittacula madagascariensis* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. vii. & viii.

*Psittacus erithacus*, notes on; G. D. Rowley, Orn. Misc. i. p. 164.

*Psitteuteles arfaki*, *P. wilhelminæ*, and *P. placens* figured; J. Gould, B. New Guinea, pt. iii.

*Pyrrhulopsis*. Four species of this genus found in the Fiji Islands; P. L. Sclater, P. Z. S. 1876, p. 308.

*Trichoglossus amabilis*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 30, Ovalau, Fijis. [= *P. aureicinctus*, Layard.] *T. arfaki*: note on, G. D. Rowley, Orn. Misc. ii. p. 33; figured, *id. op. cit.* i. pl. xvi.; remarks on, O. Finsch, *tom. cit.* p. 147. *T. pulchellus* figured; *id. tom. cit.* pl. xvii. *T. aureicinctus* figured; O. Finsch, J. Mus. Godeffr. xii. pl. i. fig. 1; also G. D. Rowley, Orn. Misc. i. pl. xxxvi. *T. muschenbroeki* figured; O. Finsch, Orn. Misc. ii. pl. xliv. *T. subplacens*, sp. n., P. L. Sclater, P. Z. S. 1876, p. 519, Naiabui Mountains, New Guinea.

## PICARIÆ.

### PICIDÆ.

*Brachypternus intermedius*, sp. n., W. V. Legge, Str. Feath. 1876, p. 242, Ceylon (= *B. puncticollis*; A. O. Hume, *l. c.* note).

*Chrysonotus biddulphi* described; Lord Walden, Ibis, 1876, p. 344.

*Colaptes mexicanus*, stirps nova *rufipileus*; R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 191, Guadaloupe Island.

*Hemicercus cordatus*, *H. concretus*, and *H. hartlaubi*, figured; J. Gould, B. Asia, pt. xxviii.

*Hypoxanthus atriceps*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 254, Bolivia and Peru.

*Micropternus phaioceps* breeding in auts' nests; J. Gammie, Str. Feath. 1876, p. 511.

*Picus atratus* figured; Lord Walden, Ibis, 1876, p. 343, pl. ix. *P. leptorhynchus*, Severtz., should stand as a varietal name of *P. leucopterus*; T. Salvadori, Ibis, 1876, p. 386. *P.* (*Campothera*) *maculosus*; its synonymy; and *P.* (*C.*) *permistus*, sp. n., A. Reichenow, J. f. O. 1876, p. 95, Gold Coast, Cameroons, Gaboon. *P. sanctijohannis* figured; W. T. Blanford, East Pers. ii. Zool. pl. ix.

*Sphyrapicus varius*. Notes on its habits; W. Brewster, Bull. Nutt. Orn. Club, i. pp. 63–70.

## Meropidæ.

*Merops viridis* figured; H. E. Dresser, B. Eur. pts. li. & lii.

## Alcedinidæ.

*Ceyx solitaria* figured; J. Gould, B. New Guinea, pt. iii.

*Tanysiptera carolinæ* figured; *id.* l. c. *T. riedeli*, notes on; G. D. Rowley, Orn. Misc. i. p. 176.

## Bucerotidæ.

*Buceros semifasciatus*, Temm., = *fasciatus*, Shaw, juv.; A. Reichenow, J. f. O. 1876, p. 445.

*Bucorvus abyssinicus*. Some peculiarities in its anatomy described; A. H. Garrod, P. Z. S. 1876, p. 60.

## Indicatoridæ.

A revision of the family; R. B. Sharpe, Orn. Misc. i. p. 192 et seq.

*I. barianus* figured; *id. tom. cit.* pl. xxvi.

*Prodotiscus regulus* figured; *id. tom. cit.* pl. xxvi.

## Capitonidæ.

*Capito squamatus*, sp. n., O. Salvin, Ibis, 1876, p. 494, pl. xiv. Ecuador.

*Pogonorrhynchus eogaster*, sp. n., J. Cabanis, J. f. O. 1876, p. 92, Loango. Figured; *id. tom. cit.* pl. ii. p. 1.

COLIIDÆ.

*Colius castaneinotus* figured and its habits described; P. L. Sclater, 1876, p. 413, pl. xxxv. Its anatomy examined; A. H. Garrod, P. Z. S. 1876, p. 416. *C. minor*, sp. n., J. Cabanis, J. f. O. 1876, p. 94, Loango.

CUCULIDÆ.

*Centropus madagascariensis* and its skeleton figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pls. lxvii.-lxx.

*Centhmochares australis* and *C. æreus* figured; R. B. Sharpe, Layard's B. S. Afr. pl. v.

*Coccyzus americanus* and *C. erythrophthalmus* figured; H. E. Dresser, B. Eur. pt. liv.

*Cona reynaudi* (pl. xliii.), *C. serriana* (pl. xlii.), *C. pyrrhopyga* (pl. xlv.), and its skeleton (pl. xlvi.), *C. cristata* (pl. xliv.), *C. verreauxi* (pl. xlvii.), *C. cærulea* (pl. xlviii.), *C. delalandii* (pl. l.), *C. gigas* (pl. li.), and its skeleton (pl. lii.), *C. ruficeps* (pl. liii.), *C. olivacciceps* (pls. liv. & lv.), and its skeleton (pl. lvi.), *C. cursor* (pl. lvii.), *C. coquereli* (pl. lviii.), and its skeleton (pl. lix.). Heads of the above species, pls. xli. & xli.*a*; osteological details, pls. lx., lxi. & lxii.; anatomical details, pls. lxiii. & lxiv.; map of distribution, pl. lxv.; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas.

*Cuculus canorus*. [See GLOEDEN and WALTER.] An egg of this species in the nest of *Podiceps minor*; L. Martin, J. f. O. 1876, p. 391. *C. poliocephalus* figured; A. Milne-Edwards & A. Grandidier, Hist. Nat. Ois. Madag. atlas, pl. lxvi.

*Dasylophus superciliosus* figured; J. Gould, B. Asia, pl. xxviii.

*Leptogrammus cumingi* figured; *id. l. c.*

CAPRIMULGIDÆ.

*Caprimulgus wawini*, Hume, = *C. europæus*; A. O. Hume, Str. Feath. 1876, p. 501.

*Caprimulgus plumipes*, sp. n., N. Prejevalsky, "Mongolia," ii. pt. 2, p. 22, Mongolia.

PODARGIDÆ.

*Batrachostomus punctatus*. Its distinctness from *B. moniliger*, and that of *B. castaneus* from *B. affinis* re-asserted; A. O. Hume, Str. Feath. 1876, p. 376. But *cf.* Lord Tweeddale, Ibis, 1877, p. 388.

*Podargus gouldi*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 45, Gulf of Carpentaria.

CYPSELIDÆ.

*Collocalia unicolor*. Its distinctness as a species re-asserted; A. O. Hume, Str. Feath. 1876, p. 375.

TROCHILIDÆ.

*Avocettinus eurypterus* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

*Boucicria insectivora* (Tsch.). The adult ♂ described; D. G. Elliot, Ibis, 1876, p. 5.

*Calliphlox*. Two species discriminated; *id. tom. cit.* p. 397.

*Catharma*, g. n., type, *Ornismya octhura* Less.; *id. tom. cit.* p. 400.

*Chrysuronia josephinæ* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

*Cyanomyia*. Monograph; D. G. Elliot, Ibis, 1876, p. 311. *C. guatemalensis*, Gould, = *C. cyanocephala*, Less., *id. tom. cit.* p. 314. *C. microrhynchus*, sp. n., *id. tom. cit.* p. 316, Honduras?

*Heliodoxa otero* (Tsch.) and *H. splendens*, Gould, = *H. leadbeateri*, Bourc.; *id. tom. cit.* p. 7.

*Heliothrix*. Three species of this genus are all that can be recognized; *id. tom. cit.* p. 394. *H. barroti* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

*Heliodoxa jacula* figured; *id. op. cit.*

*Heliotrypha* monographed; D. G. Elliot, Ibis, 1876, p. 317. *H. parzudakii*, De Long & Parz., = *H. exortis*, Fraser; *id. tom. cit.* p. 318. *H. squamigularis*, Gould, = *H. barali*, Muls. & Verr.; *id. ibid.*

*Homophania insectivora* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

*Lampropygia* reviewed, and *L. columbiana*, sp. n., described; D. G. Elliot, Ibis, 1876, p. 54.

*Leucippus pallidus*, Tacz., = *L. leucogaster* (Tsch.); *id. tom. cit.* p. 8.

*Mellisuga* (*Cynanthus*) *salvadorii*, Benv., = *Cynanthus cyanurus*; id. *tom. cit.* p. 10. *M.* (*Eriocnemis*) *ridolfii*, Benv., = *Eriocnemis vestita*; id. *tom. cit.* p. 10. *M.* (*Panoplites*) *judith*, Benv., = *Panoplites flavescens*; id. *tom. cit.* p. 10.

*Metallura jelskii* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

*Nodalia barali* figured; *id. l. c.*

*Petasophora*. Six species discriminated; D. G. Elliot, Ibis, 1876, p. 402.

*Pilonia*, g. n. Contains *Lampropygia prunellii* and *L. wilsoni*; E. Mulsant, Hist. Nat. Ois.-mouches, iii. p. 4.

*Polytmus* (*Campylopterus*) *ceciliæ*, Benv., = *Campylopterus lazulus*; D. G. Elliot, Ibis, 1876, p. 10.

*Trochilus sephanoides*. Notes on its habits; C. L. Landbeck, Zool. Gart. 1176, p. 225.

*Urosticte benjamini* figured; E. Mulsant, Hist. Nat. Ois.-mouches, iii.

## PASSERES.

### Pittidæ.

*Brachyurus steerii*, sp. n., R. B. Sharpe, Nature, xiv. p. 297, Dumalon, Mindanao, Philippine Isles.

*Melampitta lugubris* figured; J. Gould, B. New Guinea, pt. ii.

*Pitta maxima* figured; *id. l. c.*

## Meliphagidæ.

*Glycyphila subfasciata* figured; J. Gould, *tom. cit.* pt. iii.

*Meithreptus latior* figured; *id. l. c.*

*Ptilotis flavo-aurita*, sp. n., E. L. Layard, Ibis, 1876, p. 148, Fortuna I., Fiji. *P. frenata* and *P. flavo-striata* figured; J. Gould, B. New Guin. pt. ii. *P. macleayana*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 9, Endeavour River, Australia. *P. procerior*, note on; T. Kleinschmidt, J. Mus. Godeffr. xii. p. 13. *P. xanthophrys*, sp. n., O. Finsch, *tom. cit.* p. 5, Navigator's Island.

*Tatare? viridis*, Layard, should be referred to *Leptornis*; T. Salvadori, Ibis, 1876, p. 506.

## Dicæidæ.

*Dicæum dorsale*, Palawan, *D. hypoleucum*, Basilan, *D. hæmatostictum*, Guimaras, spp. nn., R. B. Sharpe, Nature, xiv. p. 298. *D. retro-cinctum*, Gould, referred to *D. rubricenter*, Less., *Pipra papuensis*, Gm., being synonymous but inappropriate; T. Salvadori, Ann. Mus. Genov. viii. p. 509. *D. trigonostigma*: ♀ and young ♂ described; R. B. Sharpe, Ibis, 1876, p. 42. The ♀ figured; Lord Walden, Ibis, 1876, p. 349, pl. x. fig. 2.

*Prionochilus maculatus*, ♀, described; R. B. Sharpe, Ibis, 1876, p. 43.

*Zosterops flavo-gularis*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 56, Sue, Bet, Warrior and Darnley Islands, Torres Straits, also Cape Grenville *Z. ponapensensis*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 27, Ponapé, pl. ii. fig. 1. *Z. ramsayi*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 56, Palm Isle, Torres Straits. *Z. siamensis* described and figured; Lord Walden, Ibis, 1876, p. 350, pl. x. fig. 1.

## Nectariniidæ.

See Shelley, G. E.

*Æthopyga dabrii* figured; G. E. Shelley, Mon. Cinn. pt. i. *Æ. magnifica*, Negros, *Æ. shelleyi*, Palawan, *Æ. pulcherrima*, Basilan, spp. nn., R. B. Sharpe, Nature, xiv. p. 297.

*Anthodiæta collaris* figured; G. E. Shelley, Mon. Cinn. pt. i.

*Arachnothera dilutior*, sp. n., R. B. Sharpe, Nature, xiv. p. 298, Palawan, Philippine Islands.

*Cinnyris mariquensis*, *C. brasilianus*, *C. zeylonicus*, *C. gutturalis*, *C. amethystinus* (pt. i.), *C. verreauxi*, *C. olivaceus*, *C. notatus*, *C. superbus*, *C. johannæ*, *C. talatala*, *C. albiventris*, *C. afer*, *C. chalybeus*, *C. chloropygius* (pt. ii.), figured; G. E. Shelley, Mon. Cinn.

*Nectarinia* (*Arachnecthra*) *brevirostris* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xiv. *N. formosa* figured; G. E. Shelley, Mon. Cinn. pt. i. *N. seheriæ*, Tick., probably = *N. miles*; Lord Walden, Ibis, 1876, p. 348. *N. talatala* figured; R. B. Sharpe, Layard's B. S. Afr. pl. vii.

*Neodrepanis coruscans* figured; G. E. Shelley, Mon. Cinn. pt. i.
*Promerops cafer* figured; *id. l. c.*

### Cærebidæ.

*Diglossa glauca*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 253, Bolivia.

### Eurylæmidæ.

*Cymbirrhynchus*: the species examined; R. B. Sharpe, Ibis, 1876, p. 48. *C. malaccensis* is distinct from the great billed Tody of Latham; T. Salvadori, Ibis, 1876, p. 277.

*Eurylæmus steerii*, sp. n., R. B. Sharpe, Nature, xiv. p. 297, Basilan, Philippine Islands.

### Timeliidæ.

*Actinodura daflaensis* figured; H. H. Godwin-Austen, J. A. S. B. (n.s.) xlvi. pt. 2, p. 77, pl. iv.

*Alcippe boardilloni*, sp. n., A. O. Hume, Str. Feath. 1876, p. 485, Travancore.

*Bubax*, g. n., A. David, Journ. 3me. Expl. Chine, i. p. 181; type *Garrulax lanceolatus*, Verr., China.

*Chrysomma altirostris*, note on; A. O. Hume, Str. Feath. 1876, p. 504.

*Garrulax albo superciliaris*, Godwin-Austen, = *G. sannio*, Swinh.; H. H. Godwin-Austen, Ann. N. H. (4) xvii. p. 34. *G. nuchalis*, sp. n., *id. op. cit.* xviii. p. 411, Lhota-Nágá Hills, Assam.

*Iora nigro-lutea*, sp. n., G. F. L. Marshall, Str. Feath. 1876, p. 410, Western India.

*Minla macdellii*, sp. n., H. H. Godwin-Austen, Ann. N. H. (4) xvii. p. 33, Nágá Hills.

*Pellorneum minus* and *P. tickelli*: their distinctness re-asserted; E. W. Oates, Str. Feath. 1876, p. 406.

*Pictorrhis altirostris*, Jerdon, rediscovered; H. H. Godwin-Austen, Ann. N. H. (4) xvii. p. 34.

*Pteruthius aralatus*, figured; J. Gould, B. Asia, pt. xxviii.

*Trichostoma finschi*, sp. n., and *T. celebense*, Strickl., described and figured; Lord Walden, Ibis, 1876, p. 378, pl. xi. figs. 1 & 2, Celebes.

*Trochalopterum affine* and *T. variegatum* figured; J. Gould, B. Asia, pt. xxviii. *T. milnii*, sp. n., A. David, Journ. 3me. Expl. Chine, ii. p. 271, China.

*Turdinus guttatus*, Tick., compared with *Timelia leucotis*, Strickl.; Lord Walden, Ibis, 1876, p. 353.

### Hirundinidæ.

*Cotyle riparia* in Sindh; W. T. Blanford, Str. Feath. 1876, p. 507.

*Hirundo rustica*. A hybrid between this species and *H. urbica*

described; E. F. v. Homeyer, J. f. O. 1876, p. 203. *H. serripennis*: notes on, in Pennsylvania; W. Van Fleet, Bull. Nutt. Orn. Club, i. p. 9.

*Psaltidoprocne petiti*, sp. n., R. B. Sharpe & A. Bouvier, Bull. Soc. Zool. Fr. 1876, p. 38, pl. ii. Congo.

*Stelgidopteryx serripennis*, peculiar nesting-site of; Elliott Coues, Bull. Nutt. Orn. Club, i. p. 96.

### Tyrannidæ.

*Anæretes flavirostris*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 355, Bolivia.

*Elainea griseiocularis*, Landbeck, recognized and referred to the genus *Sublegatus*; iid. *l. c.* p. 17.

*Empidonax trailli* and *E. acadicus*, notes on; W. H. Henshaw, Bull. Nutt. Orn. Club, i. p. 14. *E. trailli*, its nest and eggs in Maine; H. A. Purdie, *tom. cit.* p. 75.

*Euscarthmus ocularis*, sp. n., O. Salvin, Ibis, 1876, p. 493, Ecuador.

*Leptopogon triatis*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 254, Bolivia.

*Muscipeta incanescens*, Wied., redescribed from the type; it differs essentially from *Ornithion*, and belongs rather to *Myiobius*. G. N. Lawrence, Ibis, 1876, p. 497.

*Myiodynastes luteiventris* figured; W. H. Henshaw, Rep. U. S. Geol. Explor. W. of 100th mer. v. Zool. pl. xiv.

*Ochthodiæta fusco-rufa*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 354, Bolivia and Peru.

*Ochthœca pulchella*, sp. n., *iid. l. c.* p. 355, Bolivia.

*Pitangus gabbi*, sp. n., G. N. Lawrence, Ann. Lyc. N. York, xi. p. 288, San Domingo.

### Cotingidæ.

*Chirocylla*, subg. n. of *Lathria*, type, *L. uropygialis*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 355, pl. xxxii., Bolivia.

### Formicariidæ.

*Formicivora speciosa*, sp. n., O. Salvin, Ibis, 1876, p. 494, Ecuador.

*Grallaria erythrotis*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 357, Bolivia.

*Thamnophilus melanochrous*, p. 18, pl. iii., Peru, and *T. subfasciatus*, p. 357, pl. xxxiii., Bolivia, *iid. tom. cit.*, spp. nn.

### Laniidæ.

Severtzoff's notes translated; H. E. Dresser, Ibis, 1876, p. 184.

*Colluricincla superciliosa*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 50, Cape Grenville.

*Lalage nigrigularis*, Layard, referred to *Myiolestes*; O. Finsch, P. Z. S. 1876, p. 20.

*Lanius major* and *L. homeyeri* in Pommerania; J. Cabanis, J. f. O. 1876, p. 222. *L. major*, Pall., in S.W. Germany; *id. tom. cit.* p. 214. *L. minor*: its geographical range, &c.; H. v. Berlepsch, *tom. cit.* p. 380.

*Myiolestes compressirostris*, p. 153, *M. macrorrhynchus*, p. 145, and *M. maxima*, p. 498, E. L. Layard, Ibis, 1876, Fiji Islands, spp. nn.

*Nicator virco*, sp. n., J. Cabanis, J. f. O. 1876, p. 333, pl. ii. fig. 2, Loango.

*Otomela*, see SCHALOW, H. *O. phœnicuroides*, Sev., = *Lanius phœnicurus*, Pall., from Heligoland; *id.* J. f. O. 1876, p. 145.

*Pachycare*, g. n., type, *Pachycephala flavo-grisea*, described, and the species figured; J. Gould, B. New Guin. pt. iii.

*Pachycephala citreogaster*, p. 66, New Britain, *P. kandavensis*, p. 65, Kandavu, Fiji Islands, E. P. Ramsay, P. Linn. Soc. N. S. W. i.; *P. robusta*, G. Masters, *tom. cit.* p. 49, Cape York; *P. torquata*, E. L. Layard, Ibis, 1876, p. 146, Fiji Islands: spp. nn.

*Rectes draschii*, sp. n., A. v. Pelzeln, Verh. z.-b. Wien, xxvi. p. 718, Celebes?.

## CAMPEPHAGIDÆ.

*Campephaga strenua* figured; J. Gould, B. New Guin. pt. ii. Distinct from *Ptiladela boyeri*, G. R. Gray; T. Salvadori. Ibis, 1876, p. 277.

*Volvocivora insperata*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 27, Ponapé Island, Seniavin group.

## DICRURIDÆ.

*Irena*. The variability of the length of the tail-coverts in species of this genus examined; R. B. Sharpe, Ibis, 1876, p. 44.

## MUSCICAPIDÆ.

*Machærorhynchus nigripectus* figured, with notes on other species of its genus; G. D. Rowley, Orn. Misc. ii. pl. xliii.

*Myiagra azureicapilla* figured; G. D. Rowley, Orn. Misc. i. pl. xxxv. *M. castaneigularis*, sp. n., E. L. Layard, Ibis, 1876, p. 389, Bua, Fiji Islands. *M. pluto*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 29, Ponapé Isl.

*Pericrocotus*. A list of the species of this genus, with their geographical range; R. B. Sharpe, Str. Feath. 1876, p. 205.

*Rhipidura dryas* figured; J. Gould, B. New Guin. pt. ii. *R. kubarii*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 29, pl. ii. fig. 2, B[illegible] *R. personata*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 4[illegible] Islands.

## EUPETIDÆ.

*Eupetes caerulescens* figured; J. Gould, B. New Guin. pt. iii.

## Turdidæ.

*Catharus mentalis*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 352, Bolivia.

*Copsichus problematicus*, sp. n., R. B. Sharpe, Ibis, 1876, p. 26, Borneo.

*Hypsipetes crassirostris* figured, also heads of *H. madagascarensis*, *H. borbonica*, and *H. olivacea*; A. Newton, Orn. Misc. ii. pl. xlii.

*Merula bicolor*, E. L. Layard, Ibis, 1876, p. 153. *M. vitiensis*, id. Ann. N. H. (4) xvii. p. 305, and *M. ruficeps*, E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 43, Fiji Islands; *M. kessleri*, N. Prejevalsky, "Mongolia," ii. pt. 2, p. 62, pl. x., Chinese prov. Gansu: spp. nn.

*Myiophonus* (*Arrenga*) *blighi* figured; J. Gould, B. Asia, pt. xxviii.

*Orocincla gregoriana*, Nevil [Zool. Rec. x. p. 57], redescribed, A. O. Hume, Str. Feath. 1876, p. 244, note. *O. pectoralis*, sp. n., W. V. Legge, *tom. cit.* p. 244, Ceylon.

*Pinarornis*, g. n., type, *P. plumosus*, sp. n., R. B. Sharpe, Layard's B. S. Afr. pt. iii. p. 230, Zambesi.

*Turdus sibiricus* figured; H. E. Dresser, B. Eur. pt. [illegible]: *T. tempesti*, sp. n., E. L. Layard, P. Z. S. 1876, p. 420, Taviuni, Fiji Islands.

## Pycnonotidæ.

*Andropadus hypoxanthus*, sp. n., R. B. Sharpe, Layard's B. S. Afr. p. 205, Zambesi. *A. flaco-striatus*, sp. n., *id.* Ibis, 1876, p. 53, Macamac, S. Africa.

*Brachypodius immaculatus*, sp. n., *id. tom. cit.* p. 39, Borneo.

*Crateropus huttoni* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xiii. fig. 1. *C. kirkii*, sp. n., R. B. Sharpe, Layard's B. S. Afr. p. 213, Zambesi.

*Criniger theiodes*, sp. n., A. O. Hume, Str. Feath. 1876, p. 214, Forests of Johore, near Singapore.

*Ixus annectens*, Wald., = *I. davidsoni*, Hume; *id. tom. cit.* p. 498.

*Phyllostrephus fulviventris*, sp. n., J. Cabanis, J. f. O. 1876, p. 92, Loango.

*Phyllornis palawanensis*, sp. n., R. B. Sharpe, Nature, xix. p. 297, Palawan, Philippine Islands.

*Pomatorrhinus gravivox* (i. p. 200) and *P. swinhoii* (ii. p. 269), spp. nn., A. David, Journ. 3me. Expl. Chine, China.

## Sylviidæ.

[illegible]*rocephalus agricola* (= *Salicaria capistrata*, Sev.), in S. E. Europe, [illegible]banis, J. f. O. 1876, p. 222. *A. aquaticus* (pts. li. & lii.), *A. agricola* and *A. dumetorum* (pt. liii.), *A. palustris*, *A. schœnobænus*, and *A. streperus* (pts. lv. & lvi.), figured: H. E. Dresser, B. Eur.

*Amytis goyderi* figured; J. Gould, B. New Guin. pt. ii.

*Arundinax blakistoni*, sp. n., R. Swinhoe, Ibis, 1876, p. 332, pl. viii. fig. 1, N. Japan.

*Bradypterus barratti*, sp. n., R. B. Sharpe, Ibis, 1876, p. 53, Macamac, S. Africa; figured, F. A. Barratt, *tom. cit.* pl. iv. *B. cettii* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii.

*Cettia albiventris*, Severtz., = *Bradypterus cettii*; id. Ibis, 1876, p. 89.

*Calamodyta doriæ* figured; R. B. Sharpe, *tom. cit.* pl. ii. fig. 2.

*Daulias golzii* ?, in the Oudh Terai; A. O. Hume, 1876, p. 500. *D. hafizi* figured; W. T. Blanford, East. Pers. ii. Zool. pl. x. fig. 2. *D. luscinia* and *D. philomela* figured; H. E. Dresser, B. Eur. pt. xlvi.

*Drymochæra*, g. n., type, *D. badiceps*, sp. n., O. Finsch, P. Z. S. 1876, p. 19, Viti Levu, Fiji.

*Drymœpus terricolor* = *D. longicaudatus*; W. E. Brooks, Str. Feath. 1876, p. 229 (but *cf.* A. O. Hume, *tom. cit.* p. 407).

*Erithacus hyrcanus* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xv. fig. 1.

*Gerygone flaviventris* = *G. igata*, Q. & G.; O. Finsch, Tr. N. Z. Inst. viii. p. 201. *G. simplex*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 52, Gulf of Carpentaria.

*Herpornis brunnescens*, sp. n., R. B. Sharpe, Ibis, 1876, p. 41, Borneo.

*Orites brunnescens*, Hume, = *O. fulvescens*, Hodgs.; A. O. Hume, Str. Feath. 1876, p. 497.

*Hypolais magnirostris*, Severtz., and perhaps *H. sogdianensis*, Dresser, = *H. languida*, Ehrenb.; H. E. Dresser, Ibis, 1876, p. 79.

*Lamprolia kleinsmithi*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 68, Vanua Levu, Fiji Islands [= *L. minor*, Finsch]. *L. victoriæ* figured; G. D. Rowley, Orn. Misc. ii. pl. xl.

*Lusciniola melanopogon* figured; H. E. Dresser, B. Eur. pts. lv. & lvi.

*Orthotomus borneonensis* figured; R. B. Sharpe, Ibis, 1876, pl. ii. fig. 1.

*Petroeca kleinschmidti* figured; O. Finsch, J. Mus. Godeffr. xii. pl. i. fig. 2.

*Phylloscopus*. Severtzoff's notes on certain species of this genus translated; H. E. Dresser, 1876, p. 81. *P. brehmi*, Homey., *P. brevirostris*, Strickl., and *P. abyssinicus*, Blanf., = *P. rufa* (*collybita*, Vieill., *see* A. Newton); W. E. Brooks, Str. Feath. 1876, p. 275. *P. bonelli* and *P. sibilatrix* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii. *P. brooksi* = *P. schwartzi*, Radde; W. E. Brooks, Str. Feath. 1876, p. 277 (but *cf.* A. O. Hume, *loc. cit.* note).

*Reguloides maculipennis*, Blyth. Note on its identity with *Habrornis chloronotus*, Hodgs.; A. O. Hume, Str. Feath. 1876, p. 505.

*Regulus*. On the nidification of American species; E. Ingersoll, Bull. Nutt. Orn. Club, i. pp. 77–79. *R. calendula*, var. n. *obscurus*; R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 181, Guadaloupe Island.

*Ruticilla erythroprocta*, Gould, = *R. semirufa*, Ehrenb.; H. E. Dresser, Ibis, 1876, p. 77. *R. lugens*, Severtz., = *R. cæruleocephala* (Vig.); *id. tom. cit.* p. 78. *R. mesoleuca* figured; *id.* B. Eur. pt. liv. *R. nigrigularis*, Moore, probably = *R. schisticeps*; A. O. Hume, Str. Feath. 1876, p. 497. *R. alaschanica*, sp. n., N. Prejevalsky, "Mongolia," ii. pt. 2, p. 40, pl. ix. fig. 2, Alashan Desert.

*Salicaria*. Severtzoff's descriptions of Turkestan species translated; H. E. Dresser, Ibis, 1876, p. 83.

*Calliope tschebaiewi*, sp. n., N. Prejevalsky, *l. c.* p. 44, pl. ix. fig. 1, Mongolia.

*Saxicola chrysopygia* (pl. x. fig. 1) and *S. alboнigra* (pl. xi.) figured; W. T. Blanford, East. Pers. ii. Zool. *S. layardi*, sp. n., R. B. Sharpe, Layard's B. S. Afr. p. 236, S. Africa.

*Scotocerca inquieta* figured; *id. tom. cit.* pl. xiii. fig. 2.

*Sericornis brunneo-pygius* [vox hybr.], sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 53, Cape York.

*Suya khasiana*, sp. n., H. H. Godwin-Austen, Ann. N. H. (4) xviii. p. 411, Khási Hills, Assam.

*Sylvia curruca* (pts. xlvii. & xlviii.), *S. rufa* (pt. l.), and *S. salicaria* (pl. liii.) figured; H. E. Dresser, B. Eur. *S. rubescens* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xii.

*Vitia*, g. n., type, *V. ruficapilla*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. i. p. 41, Kandavu, Fiji [= *Drymocœra badiceps*, Finsch].

## Mniotiltidæ.

*Basileuterus euophrys*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 352, Bolivia.

*Dendrœca cærulescens* breeding in Connecticut; C. M. Jones, Bull. Nutt. Orn. Club, i. p. 11. *D. chrysoparia* figured; O. Salvin, Orn. Misc. i. pl. xxiii. *D. palmarum*: geographical variation, and *D. hypochrysea*, sub-sp. n., Atlantic States of N. America; R. Ridgway, Bull. Nutt. Orn. Club, i. p. 81.

*Peucedramus*, g. n., type, *Dendrœca olivacea*; E. Coues, in W. H. Henshaw's Report contained in Wheeler's Geogr. Explor. W. of 100th mer. v. Zool. p. 201.

*Leucopeza*, g. n., type, *L. semperi*, sp. n., P. L. Sclater, P. Z. S. 1876, p. 14, pl. xi. St. Lucia, W. Indies.

*Helminthophaga*. Notes on the species; R. Ridgway, Ibis, 1876, p. 166. *H. leuco bronchialis*, sp. n., W. Brewster, Bull. Nutt. Orn. Club, i. p. 1, pl. i. Massachusetts. *H. chrysoptera* nesting in Massachusetts; J. Warren, *tom. cit.* p. 6.

## Vireonidæ.

*Vireo philadelphiæ* in New England; R. Deane, Bull. Nutt. Orn. Club, i. p. 74.

## Motacillidæ.

[illegible] Severtzoff's notes on Turkestan species translated; H. E. Dresser, Ibis, 1876, p. 176 *et seq.*

*Anthus neglectus*, sp. n., W. E. Brooks, Ibis, 1876, p. 501, N. India (= *A. blakistoni*, Swinh.; *id.* Ibis, 1877, p. 206).

*Motacilla alba* and *M. lugubris* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii.

### TROGLODYTIDÆ.

*Pnoepyga halsueti*, sp. n., A. David, Journ. 3me. Expl. Chine, i. p. 210, China.

*Campylorrhynchus*. On the tarsal envelope of this genus and allies; Elliott Coues, Bull. Nutt. Orn. Club, i. p. 50.

*Salpinctes obsoletus*, var. n., *guadaloupensis*, R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 185, Guadaloupe Island.

*Thryomanes brevicauda*, sp. n. *id. tom. cit.* p. 186, Guadaloupe Island.

*Thryothorus bewicki*, var. *leucogaster*, figured; W. H. Henshaw, in Wheeler's Rep. U. S. Geogr. Explor. W. of 100 mer. v. Zool. pl. i. fig. 1. *T. ludovicianus* in Massachusetts; H. D. Minot, Bull. Nutt. Orn. Club, i. p. 76. *T. mesoleucus*, sp. n., P. L. Sclater, P. Z. S. 1876, p. 14, St. Lucia, West Indies.

*Troglodytes aedon*, var. *parkmanni*. Nesting habits; J. G. Cooper, Bull. Nutt. Orn. Club, i. p. 79.

### SITTIDÆ.

*Dendrophila frontalis*. The Javan only differs from the Himalayan bird in being smaller; Lord Walden, Ibis, 1876, p. 346 (but see Sharpe, Str. Feath. [illegible]5, p. 436).

*Sitta magnifica*, sp. n., R. W. Ramsay, P. Z. S. 1876, p. 677, pl. lxiii., Karen-nee, Burma. *S. rupicola* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xv. fig. 2.

### PARIDÆ.

Severtzoff's notes on Turkestan species translated; H. E. Dresser, Ibis, 1876, pp. 92, 171.

*Ægithalus castaneus* (pts. li. & lii.) and *Æ. pendulinus* (pt. liii.) figured; H. E. Dresser, B. Eur.

*Pœcile affinis*, p. 52, *superciliosa*, p. 53, spp. nn., N. Prejevalsky, "Mongolia," ii. pt. 2, Mongolia.

*Lobophanes dichroides*, sp. n. *id. l. c.* p. 54, Chinese prov. Gansu.

*Leptopœcile sophiæ* figured; J. Gould, B. As. pt. xxviii.

*Macholophus rex*, sp. n., A. David. Journ. 3me. Expl. Chine, ii. p. 275, China.

*Parus camtschatkensis* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii. *P. phaeonotus* (fig. 1) and *P.* (*Cyanistes*) *persicus* (fig. 2) figured; W. T. Blanford, East. Pers. ii. Zool. pl. xvi.

*Psaltria sophiæ*, sp. n., A. David, *l. c.* ii. p. 167.

*Stoliczkana stoliczkæ*, Hume, = *Leptopœcile sophiæ*, Severtz.; Dresser, Ibis, 1876, p. 171.

*Suthora brunnea* figured; J. Gould, B. As. pt. xxviii. *S. cyanophrys*, sp. n., A. David, *l. c.* i. p. 345, China. *S. daflaensis*, sp. n., H. H. Godwin-Austen, Ann. N. H. (4) xvii. p. 32, Dafla Hills. Figured; *id.* J. A. S. B. (n.s.) xlvi. pt. 2, p. 72, pl. iii.

## Fringillidæ.

*Cama[ror]rhynchus variegatus* (pl. xxxv.) and *C. habeli* (pl. lxxxvi.) figured; O Salvin, Tr. Z. S. ix.

*Carpodacus amplus*, R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 187, Guadaloupe Island; *C. leptus*, A. David, *l. c.* i. p. 205, China; *C. rubicilloides*, p. 90, pl. xii., and *dubius*, p. 92, pl. xiii., N. Prejevalsky, *l. c.* Chinese prov. Gansu: spp. nn.

*Chrysomitris dybowskii*, sp. n., L. Taczanowski, J. f. O. 1876, p. 199, Ussuri Land. *C. psaltria* (fig. 2), and var. *arizonæ* (fig. 1), figured; W. H. Henshaw, in Wheeler's Rep. U. S. Geogr. Explor. W. of 100th mer. v. Zool. pl. iv. *C. spinus* figured; H. E. Dresser, B. Eur. pt. xlix.

*Coturniculus passerinus*, var. *perpallidus*, figured; W. H. Henshaw, *l. c.* pl. i. fig. 2.

*Erythrospiza obsoleta* figured; W. T. Blanford, East. Pers. ii. Zool. pl. xvii. *E. sanguinea* figured; H. E. Dresser, B. Eur. pts. l. & li.

*Pyrrhospiza longirostris*, sp. n., N. Prejevalsky, *l. c.*, p. 95, pl. xiv. Chinese prov. Gansu.

*Leucosticte australis* figured; W. H. Henshaw, *l. c.* pls. v. & vi.

*Linota flavirostris* (pt. liii.) and *L. hornemanni* (pts. lv. & lvi.) figured; H. E. Dresser, B. Eur.

*Junco insularis*, sp. n., R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 188, Guadaloupe Island. *J. oregonus*, var. *annectens*, *J. cinereus*, var. *dorsalis*, and *J. cinereus*, figured; W. H. Henshaw, *l. c.* pls. viii., ix. and x.

*Melospiza fasciata* (Gm.) is the proper name for the species usually known as *M. melodia*, Wils.; D. Scott, Am. Nat. x. p. 17.

*Montifringilla blanfordi* and *M. mandellii*, spp. nn.; A. O. Hume, Str. Feath. 1876, p. 487, Native Sikkim. *M. nivalis* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii.

*Passer domesticus*, *P. italiæ* (pts. xlvii. & xlviii.), and *P. simplex* (pts. lv. & lvi.), figured; H. E. Dresser, B. Eur.

*Passerculus princeps* in N. Brunswick; W. Brewster, Bull. Nutt. Orn. Club, i. p. 52. In Connecticut; C. Hart Merriam, *tom. cit.* p. 52.

*Pipilo maculatus*, var. n. *consobrinus*; R. Ridgway, Bull. U. S. Geol. Surv. ii. p. 189, Guadaloupe Island.

*Poospiza belli*, var. *nevadensis* figured; W. H. Henshaw, *l. c.* pl. xi.

*Propasser murrayi* apparently = *Fringalauda sordida*; A. O. Hume, Str. Feath. 1876, p. 504.

*Pyrrhula europæa* and *P. murina* (pt. l.), and *P. major* (pts. li. & lii.) figured; H. E. Dresser, B. Eur.

*Serinus aurifrons*, Tristr., *nec* Blyth, re-named *canonicus*; H. E. Dresser, B. Eur. pt. xlix. Figured, with *C. pusillus*, id. *op. cit.* pts. lv. & lvi.

*Zonotrichia albicollis* figured; G. D. Rowley, Orn. Misc. ii. pl. xlvi. fig. 3. *Z. leucophrys*, varr. *gambeli* and *intermedia* figured; W. H. Henshaw, *l. c.* pl. vii.

## TANAGRIDÆ.

*Buarremon melanops*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 253, Bolivia.

*Calliste*. An account of the species added to the genus since 1868; P. L. Sclater, Ibis, 1876, p. 407. *C. cyanotis* figured; *id. tom. cit.* pl. xii. fig. 2. *C. melanotis*, sp. n., *id. tom. cit.* p. 408, pl. xii. fig. 1, Ecuador. *C. punctulata*, *C. fulvicervix*, and *C. argyrofenges* [*-rophenges*], spp. nn., the two latter figured; P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 353, pl. xxx. Bolivia.

*Chlorospingus calophrys*, sp. n., *iid. tom. cit.* p. 354, Bolivia.

*Malacothraupis*, g. n., type, *M. dentata*, sp. n., *iid. tom. cit.* p. 353, pl. xxxi. Bolivia.

*Pyranga æstiva*, var. *cooperi* figured; W. H. Henshaw, in Wheeler's Rep. U. S. Geogr. Explor. W. of 100th mer. v. Zool. pls. ii. & iii.

## PLOCEIDÆ.

*Estrelda burmanica*, sp. n., A. O. Hume, Str. Feath. 1876, p. 484, Burma.

*Hyphantornis subpersonata*, sp. n., J. Cabanis, J. f. O. 1876, p. 92, Loango.

*Malimbus* (= *Sycobius*). A review of this genus; D. G. Elliot, Ibis, 1876, p. 456. *M. cassini* and *M. rubriceps* figured; *id. tom. cit.* p. 461, pl. xiii. figs. 1 & 2.

*Sycobius* should be superseded by *Malimbus*, an older name, but undefined by its author (!); *id. tom. cit.* p. 456. *S. rubriceps*, sp. n., A. Reichenow, J. f. O. 1876, p. 209, W. Africa.

## EMBERIZIDÆ.

*Emberiza citrinella* and *E. cirlus* figured; G. D. Rowley, Orn. Misc. ii. pl. xlvi. figs. 1, 2, & 4.

*Urocynchramus*, g. n., N. Prejevalsky, "Mongolia," ii. pt. 2, p. 99. Beak of *Emberiza*, tail of *Uragus*. For *Uroc. pylzowi*, sp. n., *id. ibid.* woodcut p. 100, & pl. xv. Mongolia.

*Schœniclus pyrrhulinus*, sp. n., R. Swinhoe, Ibis, 1876, p. 333, pl. viii. fig. 2, N. Japan.

## ALAUDIDÆ.

Severtzoff's notes on Turkestan species translated; H. E. Dresser, Ibis, 1876, p. 181.

*Ammomanes deserti* figured; G. D. Rowley, Orn. Misc. i. p. 263.

*Spizalauda deva* and *S. malabarica*. Their synonymy investigated; W. T. Blanford, Str. Feath. 1876, p. 237.

*Onychospiza*, g. n., N. Prejevalsky, *l. c.* p. 81. Between *Fringillauda*

and *Pyrgilauda*. For *O. taczanowskii*, sp. n., *id. ibid.* woodcut p. 82, & pl. xi. fig. 1, Lake Kuku.

*Alaudula kukunoorensis*, sp. n., *id. l. c.* p. 105, Lake Kuku.

*Otocorys nigrifrons*, sp. n., *id. l. c.* p. 103, Chinese prov. Gansu.

*Pyrgilauda ruficollis*, Blanf., figured; *id. l. c.* pl. xi. fig. 2.

### Sturnidæ.

*Aplonis fortunæ*, sp. n., E. L. Layard, Ibis, 1876, p. 147, Fortuna Island, Fiji. *A. pelzelni*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 32; figured, *tom. cit.* pl. ii. fig. 3. *A. vitiensis*, sp. n., E. L. Layard, P. Z. S. 1876, p. 502, Fiji Islands. *A. zealandicus*, the original specimens obtained in New Zealand by the "Astrolabe" expedition examined; O. Finsch, Tr. N. Z. Inst. viii. p. 201.

*Calornis*. The members of this genus reviewed; R. B. Sharpe, Ibis, 1876, p. 45.

*Fregilupus varius*, note on the specimens of; T. Salvadori, Atti Ac. Tor. xi. p. 481.

*Heteralocha acutirostris* [script. *aucti-*]. Method of preparing its skins described; J. D. Enys, Tr. N. Z. Inst. viii. p. 204. Nesting habits; W. L. Buller, *tom. cit.* p. 192.

*Myiopsar*, g. n., type, *M. cryptopyrrhus*, sp. n., J. Cabanis, J. f. O. 1876, p, 93, Loango.

*Pastor roseus*. Its occurrence in Switzerland and Germany; C. Stölker, Ber. St. Gall. Ges. 1876, p. 274. In Bavaria; A. J. Jäckel, Zool. Gart. 1876, p. 105. Near Delitzsch; — Baw, J. f. O. 1876, p. 101.

*Sturnus faroensis* compared with *S. vulgaris*, Grunnack; J. f. O. 1876, p. 216. *S. humii*: a new name proposed for *S. nitens*, Hume, pre-occupied; W. E. Brooks, Ibis, 1876, p. 500. *S. ambiguus*: new name suggested for this species; A. O. Hume, Str. Feath. 1876, p. 512.

### Artamidæ.

*Artamus leucogaster*, Valenc., = *A. leucorrhynchus* (L.); Lord Walden, Ibis, 1876, p. 133. *A. pelewensis*, sp. n., O. Finsch, J. Mus. Godeffr. xii. p. 41, Pelew Islands.

### Paradiseidæ.

*Diphyllodes gulielmi*, iii., *D. speciosa* and *D. chrysoptera* (pt. ii.), *D. respublica* (pt. iii.), figured; J. Gould, B. New Guinea. *D. magnifica*, Penn., an older name than *D. speciosa*, Bodd.; T. Salvadori, Ibis, 1876, p. 277.

*Drepanornis*. Supposed new species; T. Salvadori, P. Z. S. 1876, p. 776, New Guinea.

*Manucodia comrii*, sp. n., P. L. Sclater, P. Z. S. 1876, p. 459, pl. xlii. Huon Gulf, New Guinea.

*Ptilorrhis wilsoni*. The type specimen has the legs and feet of another species, and perhaps = *P. magnificus*; J. A. Ogden, P. Ac. Philad. 1876, p. 182.

*Sericulus xanthogaster*, Schl., probably = *Xanthomelus aureus* (L.), juv., and belongs to the less typical section *Ptilonorrhynchinæ* of the *Paradiseidæ* ; T. Salvadori, Ibis, 1876, p. 267.

### Corvidæ.

*Corvus americanus*. Permitting ants to remove its parasites ; Abbott M. Frazar, Bull. Nutt. Orn. Club, i. p. 76. *C. capellanus*, sp. n., P. L. Sclater, P. Z. S. 1876, p. 694, pl. lxvi. Persian Gulf. *C. corone* in Switzerland ; A. Girtänner, Zool. Gart. 1876, p. 305. Notes on its habits ; A. Müller, *tom. cit.* p. 314.

*Cyanocitta*. On the proper application of this name ; P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 268, note. *C. armillata* separated into three races, *C. meridana* from Merida, Venezuela, *C. bogotana* from Bogota, and *C. quindiuna* from the Quindiu ranges, N. Granada ; *iid. tom. cit.* p. 271. *C. germana*, sp. n., *iid. tom. cit.* p. 270, Yucatan (= *C. yucatanica*, Dubois ; Zool. Rec. xii. p. 83). *C. mystacalis*, note on its supposed allies ; *iid. tom. cit.* p. 272. *C. ultramarina*, var. *arizonæ* figured ; W. H. Henshaw, in Wheeler's Rep. U. S. Geogr. Explor. W. of 100th mer. v. Zool. pl. xii.

*Cyanocorax atriceps*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 354, Bolivia.

*Garrulus hyrcanus* figured ; W. T. Blanford, East. Pers. ii. Zool. pl. xviii.

*Perisoreus canadensis*, var. *capitalis* figured ; W. H. Henshaw, *l. c.* pl. xiii.

*Picicorvus columbianus*. Its nest and eggs ; C. Bendire, Bull. Nutt. Orn. Club, i. p. 44.

*Pyrrhocorax alpinus*, notes on ; C. Stölker, Ber. St. Gall. Ges. 1876, p. 274.

## COLUMBÆ.

### Columbidæ.

*Columba ænas* figured ; H. E. Dresser, B. Eur. pts. li. & lii. *C. albipennis*, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 18, Peru.

*Chrysæna victor* figured ; G. D. Rowley, Orn. Misc. ii. pl. xxxix. Note on ; T. Kleinschmidt, J. Mus. Godeffr. xii. p. 12.

*Goura beccarii*, ? sp. n., T. Salvadori, Ann. Mus. Genov. viii. p. 405, Humboldt Bay, New Guinea.

*Gymnophaps poecilorrhoa* (Brüggem.) redescribed and figured ; A. v. Pelzeln, Verh. z.-b. Wien, xxvi. p. 720.

*Ptilonopus corriei*, sp. n., E. Ramsay, P. Linn. Soc. N. S. W. i. p. 123, Malacola, New Hebrides. *P. marginalis*, Brügg., and *P. senex*, Brügg., = *P. trigeminus* and *P. geminus*, Salvad., respectively ; T. Salvadori, Ibis, 1876, p. 386. *P. melanocephalus*, var. *celebensis*, Brügg., = *Iotreron melanospila*, Salvad., *P. nuchalis*, Brügg., perhaps = *I. xanthorrhoa*, Salvad., and *P. sulaensis*, Brügg., = *I. chrysorrhoa*, Salvad. ; *iid. tom. cit.* p. 385. *P. nanus* figured ; J. Gould, B. New Guin. pt. ii.

*Turtur orientalis* and *T. senegalensis* (pts. lv. & lvi.), and *T. vulgaris* (pt. l.), figured; H. E. Dresser, B. Eur.

## GALLINÆ.

### Pteroclidæ.

*Pterocles arenarius* and *P. senegallus* in Kattiawar; J. H. Lloyd, Ibis 1876, p. 280. *P. coronatus* in the Kurrachee districts; F. Wise, Str. Feath. 1876, p. 230.

*Syrrhaptes paradoxus* figured; H. E. Dresser, B. Eur. pt. liii.

### Phasianidæ.

*Ithagines sinensis*, sp. n., A. David, Journ. 3me Expl. Chine, i. p. 174, China.

*Lobiophasis bulweri*, ♀, figured; P. L. Sclater, P. Z. S. 1876, p. 465, pl. xlv.

*Numida orientalis*, sp. n., J. Cabanis, J. f. O. 1876, p. 210, Zanzibar.

*Phasianus andersoni*, Elliot, probably = *P. crawfurdi*, Gray; P. L. Sclater, P. Z. S. 1876, p. 274. *P. chrysomelas*, Severtz., = *P. insignis*, Elliot, and *P. persicus*, Severtz., = *P. shawi*, Elliot ?; D. G. Elliot, Ibis, 1876, p. 131. *P. shawi* and *P. chrysomelas* figured; J. Gould, B. As. pt. xxviii. *P. vlangali*, p. 116, pl. xvi., *strauchi*, p. 119, pl. xvii., N. Prejevalsky, "Mongolia," ii. pt. 2, Mongolia, spp. nn.

### Tetraonidæ.

*Lagopus leucurus*: its breeding habits, nest, and eggs; E. Coues, Bull. U. S. Geol. Surv. i. p. 263.

*Tetrao tetrix*: a hybrid between this species and *Bonasa betulina* described; H. E. Dresser, P. Z. S. 1876, p. 345.

### Perdicidæ.

*Perdix sifanica*, sp. n., N. Prejevalsky, *l. c.* p. 124, Chinese prov. Gansu.

*Caccabis magna*, sp. n., *id. l. c.* p. 127, Mongolia.

*Eupsychortyx leucotis* from Central America; O. Salvin, Ibis, 1876, p. 379.

*Francolinus afer* and *F. levaillanti* [script. *le Naillartii*!]. Their habits and some points in their anatomy described; W. T. Black, P. Liverp. Soc. xxx. p. 295. *F. vulgaris* figured; H. E. Dresser, B. Eur. pt. li. & lii.

*Megaloperdix raddei* = *M. caucasica*, Pall.; J. Cabanis, J. f. O. 1876, p. 217.

*Odontophorus cinctus*, sp. n., O. Salvin, Ibis, 1876, p. 379, Veragua.

*Oreotetrax* (*Megaloperdix*). Note on the species of this genus; J. Cabanis, J. f. O. 1876, p. 217.

*Tetraogallus tauricus*, sp. n., H. E. Dresser, P. Z. S. 1876, p. 675, Taurus Mountains, Asia Minor.

*Turnix sylvatica* figured; *id.* B. Eur. pts. liii. & liv.

*Tetrastes severzowi*, sp. n., N. Prejevalsky, *l. c.* p. 130, Chinese prov. Gansu.

### MEGAPODIIDÆ.

*Megapodius assimilis*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 59, Dungeness and Bet Islands, Torres Straits. *M. hueskeri*, sp. n., J. Cabanis & A. Reichenow, J. f. O. 1876, p. 326, New Hanover. *M. macgillivrayi* redescribed and figured; P. L. Sclater, P. Z. S. 1876, p. 460, pl. xliii. New Guinea.

*Talegallus lathami* and *Megapodius tumulus*, their habits described; E. P. Ramsay, P. Z. S. 1876, pp. 116 & 118.

## GRALLÆ.

### RALLIDÆ.

*Aramides ipecaha*. Its habits in the Argentine Republic described; W. H. Hudson, P. Z. S. 1876, p. 105.

*Gallinula garmani*, sp. n., J. A. Allen, Bull. Mus. C. Z. iii. p. 357, Lake Titicaca.

*Porphyrio aneiteumensis*, sp. n., H. B. Tristram, Ibis, 1876, p. 265, New Hebrides. *P. smaragnotus* and *P. veterum* figured; H. E. Dresser, B. Eur. pts. lv. & lvi.

*Porzana erythrops*: its habits in the Argentine Republic described; W. H. Hudson, P. Z. S. 1876, p. 105. *P. exquisita*: its synonymy and range; R. Swinhoe, Ibis, 1876, p. 507. *P. notata* captured at sea off the coast of Uruguay; P. L. Sclater, P. Z. S. 1876, p. 255.

*Rallus rhyti[dor]rhynchus*: its habits in the Argentine Republic described; W. H. Hudson, P. Z. S. 1876, p. 104.

*Schizoptila*, Brügg., = *Gymnocrex*, Salvad.; T. Salvadori, Ibis, 1876, p. 385.

### ARAMIDÆ.

*Aramus scolopaceus*: its habits described; W. H. Hudson, P. Z. S. 1876, p. 102. Its anatomy described; A. H. Garrod, *tom. cit.* p. 275.

### CARIAMIDÆ.

*Dicholophus*: on its osteology and splanchnology; H. Gadow, J. f. O. 1876, p. 445.

### SCOLOPACIDÆ.

*Falcirostra kauffmanni*, Sev., and *F. longipes*, Sev., = *Ibidorrhynchus struthersi*; H. E. Dresser, Ibis, 1876, p. 329.

*Gallinago andina*, Tacz., recognized and compared with *G. frenata*;

P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 19. *G. major* figured; H. E. Dresser, B. Eur. pts. lv. & lvi.

*Limicola platyrrhyncha* figured; *id. op. cit.* pts. li. & lii. *L. sibirica*, sp. n., *id.* P. Z. S. 1876, p. 674, Siberia.

*Scolopax gallinago*, on the "drumming" of; W. Meves, Zool. Gart. 1876, p. 204.

*Totanus fuscus* in breeding plumage in India; J. Cockburn, Str. Feath. 1876, p. 509. *T. haughtoni*, sp. n., J. Armstrong, *tom. cit.* p. 344, District of Rangoon. *T. ochropus* figured; H. E. Dresser, B. Eur. pts. li. & lii.

*Tringa alpina* (pt. xlix.) and young (pts. xlvii. & xlviii.), *T. minuta* (young) and *T. temminckii* (young) (pts. xvii. & xlviii.) figured; H. E. Dresser, B. Eur. *T. minuta* found breeding at the mouth of the Petchora: its eggs figured; H. Seebohm & J. A. H. Brown, Ibis, 1876, p. 294, pl. vii. *T. subarquata* in Massachusetts; W. Brewster, Bull. Nutt. Orn. Club, i. p. 51.

*Tyngites rufescens* figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii.

### Glareolidæ.

*Glareola pratincola* in Sindh; W. T. Blanford, Str. Feath. 1876, p. 507.

### Parridæ.

*Parra jacana*: its habits described; W. H. Hudson, P. Z. S. 1876, p. 103.

### Charadriidæ.

*Dromas ardeola* in the Persian Gulf; A. O. Hume, Str. Feath. 1876, p. 496.

*Ægialitis cantiana* (pt. xlix.), *Æ. curonica* (pts. li. & lii.), and *Æ. hiaticula* (pts. xlvii. & xlviii.) figured; H. E. Dresser, B. Eur. *Æ. mastersi*, sp. n., E. P. Ramsay, P. Linn. Soc. N.S.W. i. p. 135, Rockingham Bay to Cape York.

*Œdicnemus scolopax* (= *Œ. crepitans*, Temm. et auctt.) figured; H. E. Dresser, B. Eur. pts. lv. & lvi.

*Squatarola helvetica*, young figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii. Found breeding on the Petchora: its eggs figured; H. Seebohm & J. A. H. Brown, Ibis, 1876, p. 222, pl. v.

### Thinocoridæ.

*Thinocorus* shown to have "Ægithognathous" characters in its palate; W. K. Parker, P. Z. S. 1876, p. 256.

### Chionididæ.

*Chionarchus*, g. n., type, *Chionis minor*; J. H. Kidder & E. Coues, Bull. U. S. Nat. Mus. iii. No. 3, p. 85.

*Chionis minor* : its osteology examined ; A. Reichnow, J. f. O. 1876, p. 84. Its egg figured ; J. Cabanis, *tom. cit.* pl. i.

### Otididæ.

*Otis macqueeni* and *O. undulata* figured ; H. E. Dresser, B. Eur. pt. liv. *O. tetrax*, a contribution to the history of ; W. Thienemann, J. f. O. 1876, p. 36.

### Gruidæ.

*Grus nigricollis*, sp. n., N. Prejevalsky, "Mongolia," ii. pt. 2, p. 135, pl. xix. Lake Kuku.

### Ciconiidæ.

*Anastomus oscitans*. Its habits and changes of plumage, &c. ; C. T. Bingham, Str. Feath. 1876, p. 212.

### Tantalidæ.

*Tantalus loculator* in Pennsylvania and New York ; J. A. Allen, Bull. Nutt. Orn. Club, i. p. 96.

### Plataleidæ.

*Platalea*. A second species believed to be found in the Argentine Republic ; W. H. Hudson, P. Z. S. 1876, p. 15.

### Ibididæ.

*Falcinellus ridgwayi*, sp. n., J. A. Allen, Bull. Mus. C. Z. iii. p. 355, Lake Titicaca.

### Ardeidæ.

*Ardea cinerea*. Young in down figured ; A. Marchand, R. Z. (3) iv. p. 433, pl. xv.

*Ardetta exilis*, singular food of ; W. Brewster, Bull. Nutt. Orn. Club, i. p. 76.

## ANSERES.

### Phœnicopteridæ.

*Phœnicopterus*. Its breeding described ; T. v. Heuglin, J. f. O. 1876, p. 213.

### Palamedeidæ.

*Chauna derbiana*. Its anatomy examined : A. H. Garrod, P. Z. S. 1876, p. 189.

## Anatidæ.

The neotropical species reviewed; P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 358.

*Anser indicus.* Its young described; A. O. Hume, Str. Feath. 1876, p. 499. *A. rossi* in Oregon; J. A. Allen, Bull. Nutt. Orn. Club, i. p. 52.

*Bernicla ruficollis* figured; H. E. Dresser, B. Eur. pts. li. & lii.

*Branta canadensis* breeding on trees; J. A. Allen, Bull. Nutt. Orn. Club, i. p. 50.

*Chaulelasmus couesi*, sp. n., T. H. Streets, Bull. Nutt. Orn. Club, i. p. 46, Washington Island.

*Chen albatus* figured; G. D. Rowley, Orn. Misc. ii. pl. xlvii.

*Clangula glaucion*, on the breeding of; F. Brüggemann, Zool. Gart. 1876, p. 366.

*Cygnus.* On the ferruginous colour seen in some specimens of Swans; H. Stevenson, Ibis, 1876, p. 276. *C. bewicki* breeding on the Petchora; H. Seebohm & J. A. H. Brown, Ibis, 1876, p. 438. *C. immutabilis*: its cygnets described; J. H. Gurney, P. Z. S. 1876, p. 66.

*Harelda glacialis*, on the moulting of; E. F. v. Homeyer, J. f. O. 1876, p. 317. Figured; H. E. Dresser, B. Eur. pts. xlvii. & xlviii.

*Mareca penelope* figured (2 plates); *id. op. cit.* pts. xlvii. & xlviii.

*Querquedula andium* figured; P. L. Sclater & O. Salvin, P. Z. S. 1876, p. 387, pl. xxxiv. *Q. falcata* in Upper India; A. O. Hume, Str. Feath. 1876, p. 225.

*Sarcidiornis melanonota* and *S. carunculata.* Both figured and their differences pointed out; P. L. Sclater, P. Z. S. 1876, p. 694, pls. lxvii. & lxviii.

*Spatula clypeata*, note on the habits of; F. Brüggemann, Zool. Gart. 1876, p. 195.

## Laridæ.

*Anous caruleus* (Bennett) is the oldest name for *A. cinereus*, Gould; H. Saunders, P. Z. S. 1876, p. 671. *A. tenuirostris*, *A. melanogenys*, and *A. leucocapillus*: their distinctions pointed out on a plate containing figures of the head and neck of each species; *id. tom. cit.* p. 670, pl. lxi.

*Gygis microrrhyncha*, sp. n., *id. tom. cit.* p. 608 (cut of head and one of *G. candida*), Marquesas Island.

*Hydrochelidon leucoptera* (pts. xlvii. & xlviii.) and *H. nigra* (pt. liv.) figured; H. E. Dresser, B. Eur.

*Larus faliginosus* figured; O. Salvin, Tr. Z. S. ix. pl. lxxxvii. *L. fuscus*: its occurrence in India doubted; A. O. Hume, Str. Feath. 1876, p. 502. *L. leucopterus* figured; H. E. Dresser, B. Eur. pt. xlix.

*Stercorarius chilensis* (Bp.) redescribed and figured; H. Saunders, P. Z. S. 1876, p. 323, pl. xxiv. *S. crepidatus* (Gm.) and *S. parasiticus*

(L.) are the proper names for Richardson's Skua and Buffon's Skua respectively; *id. tom. cit.* pp. 326, 330. Both species figured; H. E. Dresser, B. Eur. pts. li. & lii., & lv. & lvi.

*Sterninæ*. A review of this sub-family; H. Saunders, P. Z. S. 1876, p. 638.

*Sterna albigena*: on its occurrence on the Bombay coast; Lord Walden, Ibis, 1876, p. 384. *S. cassini*, Scl., = *S. hirundinacea*, Less. (p. 647); *S. tibetana*, sp. n. (p. 649), Tibet and Lake Baikal; *S. elegans*, a name to be restored, the species being distinct from *S. galericulata*, Licht., which = *S. maxima*, Bodd. (p. 653); *S. eurygnatha*, sp. n. (p. 654, with cut of head), Sta. Catarina, Brazil, to Trinidad; *S. maxima*, found on the W. coast of Africa and the Straits of Gibraltar (p. 656); H. Saunders, P. Z. S. 1876. *S. dougalli* and *S. minuta* figured; H. E. Dresser, B. Eur. pts. lv. & lvi. *S. nigrifrons*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 62, Warrior Reef, Torres Straits.

*Sternula inconspicua*, sp. n., G. Masters, P. Linn. Soc. N. S. W. i. p. 63, Mud Bay, Cape York. *S. placens* figured; J. Gould, B. New Guinea, pt. iii.

## Procellariidæ.

Notes on Banks's drawings relating to birds of this family; O. Salvin, Orn. Misc. i. p. 223.

*Œstrelata magentæ*, *Œ. arminjoniana*, *Œ. trinitatis*, and *Œ. defilipiana*, figured: *id. tom. cit.* p. 249, pls. xxx.–xxxiii. *Œ. phæopyga*, sp. n., *id.* Tr. Z. S. ix. p. 507, pl. lxxxviii. fig. 1, Galapagos Islands.

*Procellaria affinis*, Buller, probably = *Œstrelata mollis*; O. Finsch, Tr. N. Z. Inst. viii. p. 202. *P. bullocki*, notes on; G. D. Rowley, Orn. Misc. ii. p. 101 *et seq.* *P. tethys* figured; O. Salvin, Tr. Z. S. ix. pl. lxxxviii. fig. 2.

*Puffinus elegans* figured; O. Salvin, Orn. Misc. i. pl. xxxiv.

## Pelecanidæ.

*Haliæus verrucosus* figured; J. Cabanis, J. f. O. 1876, pl. i.

*Phalacrocorax africanus* (pt. liv.) and *P. pygmæa* (pts. li. & lii.) figured; H. E. Dresser, B. Eur.

*Plotus anhinga*: its anatomy examined; A. H. Garrod, P. Z. S. 1876, p. 335.

*Sula bassana*: young in down figured; A. Marchand, R. Z. (3) iv. p. 432, pl. xiv.

## Phaethontidæ.

*Phaethon indicus*, a new name suggested for a bird from the Laccadives, doubtfully referred to *P. athereus*; A. O. Hume, Str. Feath. 1876, p. 481.

### Podicipididæ.

*Centropelma micropterum*: its habits described on Lake Titicaca; S. W. Garman, Bull. Mus. C. Z. iii. p. 359.

### Colymbidæ.

*Colymbus arcticus* (pts. lv. & lvi.) and *C. septentrionalis* (pt. liv.) figured; H. E. Dresser, B. Eur.

### Alcidæ.

*Mormon grabæ* distinct from *M. arctica*; J. Vian, Bull. Soc. Zool. Fr. 1876, p. 4.

*Phaleris psittacula*: on its occurrence in Sweden, with figure of skeleton; *id. l. c.* p. 1, pl. i.

### Spheniscidæ.

*Eudyptes schlegeli*, sp. n., O. Finsch, Tr. N. Z. Inst. viii. p. 204, Macquarie Islands.

*Spheniscus mendiculus* figured; O. Salvin, Tr. Z. S. ix. pl. lxxxix.

### Tinamidæ.

*Rhynchotus rufescens*. Its myology examined; E. Alix, J. Zool. v. p. 411.

## STRUTHIONES.

### Struthionidæ.

*Diatryma*, g. n. Type, *D. gigantea*[*-eum*], sp. n., based upon a tarso metatarsus from the Eocene of New Mexico. E. D. Cope, P. Ac. Philad. 1876, p. 10, and J. Zool. v. p. 264.

### Casuariidæ.

*Casuarius*. List of six species living in the Zoological Society's Gardens; P. Z. S. 1876, p. 414. *C. australis*: habits, &c., described; E. P. Ramsay, P. Z. S. 1876, p. 119.

### Apterygidæ.

*Apteryx oweni*: on its occurrence at high altitudes in New Zealand; W. L. Buller, Tr. N. Z. Inst. viii. p. 193.

### DINORNITHIDÆ.

*Dinornis*. [See HUTTON, ROBSON, THORNE, TRAVERS, and WHITE.]

## ODONTORNITHES.

*Lestornis*, g. n., O. C. Marsh, Am. J. Sci. (3) xi. p. 509, and J. Zool. v. p. 304. Very nearly allied to *Hesperornis*, but the sternum has 5 pits on each side for rib-attachment, and essentially no posterior emarginations. A large tuberosity on the inner side of upper half of tarso-metatarsus. Type, *L. crassipes*, sp. n., *id. ibid.* Upper cretaceous beds of W. Kansas.

*Hesperornis gracilis*, sp. n., *id. tomm. citt.* pp. 510 & 305, Upper cretaceous beds of W. Kansas.

*Ichthyornis* (?) *victor*, sp. n., *id.* Am. J. Sci. (3) xi. p. 511, same locality.

# REPTILIA.

BY

A. W. E. O'Shaughnessy.

## GENERAL ANATOMY.

Beauregard, H. Recherches sur les réseaux vasculaires de la chambre postérieure de l'œil des Vertébrés. Ann. Sci. Nat. (6) iv. Art. i.

o In Reptiles, pp. 70–87, pl. iv.

Claus, C. Beiträge zur vergleichenden Osteologie der Vertebraten. 1. Rippen und unteres Bogensystem. 2. Verschiebungen des Darmbeines und der Sacralregion der Wirbelsäule von Amphibien. SB. Ak. Wien, lxxiv. pp. 785–818, pls. i.–iii. figs. 1–12.

Fürbringar, P. Untersuchungen über die vergleichende Anatomie der Schulter-muskeln. iv. Sauria und Crocodilia. Morphol. JB. i. pp. 636–816, pls. xxiii.–xxvii.

Hoffmann, C. K. Ueber den Bau der Retina bei Amphibien und Reptilien. Niederl. Arch. Zool. iii. pp. 1–46, pls. i. & ii.

——. Beiträge zur Kenntniss des Beckens der Amphibien und Reptilien. *Tom. cit.* pp. 143–194, pls. x. & xi., and 15 woodcuts.

——. Broun's Klassen und Ordnungen des Thier-Reichs. vi. Abth. 2. Leipzig & Heidelberg [in progress].

Nos. 8–13 of the present section of this work, pp. 241–400, pls. xviii.–xxxii., are occupied with the continuation of the anatomy of the *Amphibia* [Zool. Rec. xi. p. 83].

Rüdinger, —. Ueber den Aquæductus Vestibuli des Menschen und des *Phyllodactylus europæus*. Z. Anat. Entwickel. ii. pp. 214–230, pls. ix. & x.

Seeley, H. G. Resemblances between the Bones of Typical living Reptiles, and the Bones of other Animals. J. L. S. xii. pp. 155–195.

Solger, —. Beiträge zur Kenntniss der Nasenwandung und besonders der Nasenmuscheln der Reptilien. Morphol. JB. i. p. 467, pl. xv

SPENGEL, J. Die Segmentalorgane der Amphibien. Vorläufige Mittheilungen. Verh. Ges. Würzb. (n.f.) x. pp. 89–92.

## GEOGRAPHICAL DISTRIBUTION.

WALLACE, A. Geographical Distribution of Animals. 2 vols. London: 1876, 8vo.

The geographical distribution of the families and genera of Reptiles and Amphibians is treated collectively as a section, in chap. xix. of this work, vol. ii. pp. 392–423.

In discussing the means of Dispersal and Migration of the various classes of animals, Mr. Wallace remarks (vol. i. p. 29) that Reptiles, exclusive of turtles and sea-snakes, being scarcely more fitted than Mammals for traversing seas and oceans, are generally wanting in oceanic islands which possess no indigenous Mammals; this rule is however subject to exceptions among the lizards, which apparently have some unknown means of passing over the ocean (probably in the egg state), as they are found to inhabit many islands where there are neither Mammals nor snakes. Snakes entirely cease at 60° N. Lat., and at 6000 feet elevation in the Alps. Lizards, though also essentially tropical, go sometimes farther north than snakes, and ascend higher, reaching 10,000 feet in the Alps. Amphibians extend much farther north; Frogs to within the arctic circle; their eggs are no doubt carried certain distances by aquatic birds, but salt water is fatal to them, and deserts and oceans constitute the most effectual barriers to their dispersal.

Further remarks on the possible mode of transport of Reptiles to remote distances are made, vol. i. pp. 400–401, where the author treats of the points of similarity between the fauna of the Australian region and that of South America.

Describing first in detail the faunæ of the six great geographical regions (Neotropical, Nearctic, Palæarctic, Ethiopian, Oriental, and Australian), the author refers successively to the Reptiles in their subordinate relation to each fauna, and afterwards, vol. ii. pp. 372–423, collects his results and tabulates them under the heads of the different families.

## FAUNÆ.

*Europe.*

LATASTE, F. Catalogue des Batraciens et Reptiles des environs de Paris, et distribution géographique des Batraciens et Reptiles de l'Ouest de la France. Act. Soc. L. Bord. xxx. (and separately, Bordeaux: 1876, 8vo, pp. 27).

——. Essai d'une Faune Herpétologique de la Gironde. *Tom. cit.* (and separately, Bordeaux: 1876, 8vo, pp. 352, pls. xl.).

*Africa.*

W. PETERS' account of the Reptiles collected by Dr. Buchholz in Western Africa is continued in MB. Ak. Berl. 1876, pp. 117–123, pl. figs. 1 & 2.

*Asia.*

Eastern Persia. An account of the Journeys of the Persian Boundary Commission, 1870–71–72, edited by Sir F. J. Goldsmid, London: 1876, 2 vols. 8vo. Vol. ii. The Zoology and Geology, by W. T. BLANFORD, Reptilia and Amphibia, pp. 304–432, pls. xix.– xxviii.

The complete systematic account of the Reptilian fauna of Persia is now published, descriptions of the new species having already appeared. It adds largely to the number of Reptiles hitherto known to exist in Persia. No Crocodiles have yet been found. Lizards are by far the most abundant; on the semi-desert plains, *Eremias*, *Phrynocephalus*, and *Agama* prevail, *Acanthodactylus* being only met with in the South; a huge Uromasticid (*Centrotrachelus*) lives in burrows at the edge of the Sistin and Karmán desert, a second on the shores of the Persian Gulf, and a true *Uromastix* inhabits Mesopotamia. In hilly parts, *Stellio* and *Ophiops* prevail. Geckos and Scincoids are less numerous. Of Snakes, the prevailing forms are *Psammophis* and *Zamenis*, and, in Northern Persia especially, *Tropidonotus hydrus*. The only common poisonous Snake is *Echis carinatus*. All those obtained belong to the *Viperidæ*, but poisonous *Colubridæ* undoubtedly exist.

A. STRAUCH has described the Reptilia and Amphibia collected by Col. Prejevalsky in Mongolia, in N. PRJEVALSKY'S "Mongolia i Strana Tangutov," St. Petersburg: 1876, 8vo, vol. ii. pt. 3, pp. 1–55, pls. i.–viii. Twenty-four species are described (14 new).

W. T. BLANFORD, Ann. N. H. (4) xvii. pp. 292 & 293, criticises that portion of Wallace's work (*supra*) which deals with the Reptilian fauna of India. The same author's remarks "On some of the Specific Identifications in Dr. Günther's Second Report on Collections of Indian Reptiles obtained by the British Museum" [Zool. Rec. xii. p. 95], P. Z. S. 1876, pp. 635–637, refer to *Cabrita brunnea*, *Ophiops jerdoni*, Blyth, and *Hemidactylus coctæi*. This author also describes the Lizards of a collection made in Western Sind, in the early part of 1875; five species are added to the Indian fauna, three of them being new [the diagnoses of these were printed in 1875, and referred to in Zool. Rec. xii. p. 95]: J. A. S. B. (n. s.) xlv. pt. 2, pp. 18–26, pls. i. & ii.

*New Guinea and Northern Australia.*

W. PETERS in his report on the Reptiles collected in the voyage of the "Gazelle," notices and describes a number of species from this region. MB. Ak. Berl. 1876, pp. 528–535.

W. MACLEAY states that large collections of *Reptilia* were made in New Guinea by the "Chevert" expedition; all the Snakes he believes are new, and with one exception venomous. P. Linn. Soc. N. S. W. i. p. 38.

*America.*

Cope, E. D. On the Distribution of *Batrachia* and *Reptilia* in North America. P. Am. Ass. xxiv. pt. 2, pp. 197—201 (abstract).

The primary divisions of Sclater and Huxley are redefined, and the mixture of South American families and genera in the North American fauna regarded as sufficient ground for separating it as a primary division from Europe-Asia; the sub-divisions adopted are six. The author finds that on the whole the North American fauna is peculiar in its Salamanders, "Old World" in its Frogs and most of its Turtles, and South American in most of its Snakes and Lizards, and some of its Turtles.

——. Check-List of North American *Batrachia* and *Reptilia*. Bull. U. S. Nat. Mus. 1875, No. 1, pp. 101.

——. 1. On the *Batrachia* and *Reptilia* of Costa Rica. 2. *Batrachia* and *Reptilia* collected by J. Bransford in Nicaragua. 3. Reptiles brought by J. Orton from the middle and upper Amazon, and Western Peru. J. Ac. Philad. (n.s.) viii. pp. 93–154, 155–157, 159–183.

Plates xxiii.–xxviii. illustrate the above series of papers, which form a very extensive contribution to American herpetology. The new genera and species will be recorded below.

Cope, E. Synopsis of the Reptiles and Batrachians of Arizona; with critical and field notes, and an extensive synonymy. In Wheeler's Rep. Geogr. Explor. W. of 100th mer., v. Zoology (Washington: 1875, 4to), chap. v. pp. 585–633, pls. xvi.–xxiv.

83 species (with numerous sub-species) are discussed, the term "Arizona" now including the western half of New Mexico and a considerable part of Sonora. 9 other species from Arizona are included in Dr. Yarrow's synopsis (*infrâ*). The region, being dry, is poor in *Batrachia*, but rich in *Ophidia* and *Sauria*, the species of the two latter groups (34 and 36) preponderating in number over those of any other portion of the United States.

Yarrow, H. C. Report upon the Collections of Batrachians and Reptiles made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873 & 1874. In Wheeler's Rep. *l. c.* chap. iv. pp. 509–584, pls. xvi., xviii., xix., xx., xxiii.–xxv.

87 species (17 *Batrachia*, 26 *Ophidia*, 35 *Lacertilia*, and 3 *Testudinata*) are discussed, including one new genus of *Ophidia* and 6 new species. An extraordinary mimicry of colour of surrounding objects, both by serpents and lizards, is noted (p. 512).

D. Jordan's "Manual of the Vertebrates of the Northern U. S." (Chicago: 1876, 8vo), contains a systematic index to the *Reptilia* and *Batrachia* (pp. 157–198).

F. Bocourt supplements his accounts of the Reptiles of Mexico

already published in the "Mission Scientifique" [Zool. Rec. x. p. 75; xi. p. 74], by descriptions of a number of new or rare species of different groups obtained in the isthmus of Tehuantepec, and presented by Sumichrast to the Paris Museum. J. Zool. v. pp. 386–412.

S. Garman, in a Report on the collections made during the exploration of Lake Titicaca, enumerates 5 Reptiles and 6 Batrachians (one described as new). Bull. Mus. C. Z. iii. pp. 276–278.

*West Indies.*

J. Gundlach has published a Catalogue of Cuban Reptiles. An. Soc. Esp. iv. pp. 347–368.

The herpetological collection made by Dr. Gundlach in the Island of Puertorico, consisted of 19 species, of which only two, *Clemmys decussata* and *Typhlops lumbricalis* (*richardi*) belong to Cuba, the majority being found also in Hayti and the Lesser Antilles. Two Snakes peculiar to the island had already been described, whilst of the genus *Anolis* two are new. A large Lizard (*Metopocerus* ?) is stated to inhabit the Island of Mona. W. Peters, MB. Ak. Berl. 1876, pp. 704–712, pls. i. & ii.

*Galapagos Islands.*

Steindachner, F. Die Schlangen und Eidechsen der Galapagos Inseln. Festschrift z.-b. Ges. Wien, 1876, 4to, pp. 303–330, pls. i.–vii.

Following upon Dr. Günther's account of the *Testudinata* of these islands, the present monograph is intended to complete our knowledge of the Reptilian fauna of the Archipelago. This consists, besides the Tortoises, of one Snake, four *Iguanidæ*, and one Gecko, the total number being eleven species. The author dismisses as improbable the supposition that the Snake, *Dromicus chamissonis*, Wiegm., a species found in Peru and Chili, was conveyed from the continent to these islands in ancient times.

Interesting details respecting the Tortoises of the Galapagos Islands, are given in a letter from Commander Cookson. P. Z. S. pp. 520–526.

## CHELONIA.

Anderson, J. On the Cloacal Bladders and on the Peritoneal Canals in Chelonia. J. L. S. xii. pp. 434–444.

*Testudo ibera*, Pall., retained as distinct from *T. græca*. W. T. Blanford, Eastern Persia, ii. p. 306.

*Emys orbicularis*, L. The Linnæan name (1766) restored in place of *Emys europæa*, Schn. (1783); found nowhere in Persia except on the shores of the Caspian. *Id. tom. cit.* p. 308.

*Clemmys caspia*, Gm. *Emmenia grayi*, Gthr., is referred to under this name as being really the species intended by Gmelin; the generic distinction made by Gray does not, however, hold good. The oldest name

for the European and Levantine form appears to be *E. leprosa*, Schweigger; but if *E. sigroz*, D. & B., from Spain and N. America, is a good species, this will be *E. leprosa*, and the Levantine form must take Gray's name, *C. vulgaris*. Id. *l. c.* pp. 310–312.

*Emys grayi*, Dum. & Bocourt, altered to *E. umbra*. F. Bocourt, J. Zool. v. p. 26.

*Emys hamiltoni* occurs as far west as Futtehgurh. J. Anderson, P. Z. S. 1876, p. 751.

(*Rhinoclemmys*) *Chelopus mexicanus*, Gray, described by F. Bocourt, *l. c.* p. 2.

*Chelopus gabbi*, p. 153, and *funereus*, p. 154, spp. nn., E. D. Cope, J. Ac. Philad. (n.s.) viii. Costa Rica.

F. Bocourt gives a synoptical table of the species of *Cinosternum*, which he makes equivalent to Agassiz's sub-family *Cinosternoides*, the division into three genera not being based on permanent characters. This is followed by diagnoses of 10 well-established species already known, and description of *C. rostellum*, sp. n., Guanajuato. J. Zool. v. pp. 388–399.

*Cinosternum henrici*, Lec., figured, from Arizona; H. C. Yarrow, in Wheeler's Rep. Geogr. Explor. W. of 100th mer. v. pl. xvi. figs. 1–3. *C. flavescens*, Ag., figured; E. Coues, in Wheeler's Rep., *l. c.* pl. xvii. figs. 1–3.

*Euchelymys subglobosa*, sp. n. ? (? = *sulcifera*, Gray), G. Krefft, Ann. Mus. Genov. viii. p. 390, New Guinea.

(*Heptathyra*) *Cyclemys aubrii*, Dumér., described and figured by Peters, MB. Ak. Berl. 1876, p. 117, pl. figs. 1 & 2. It cannot be united with *C. frenatus*, as was done by Gray.

*Trionyx sinensis*, Wiegm., described and figured by Strauch, in Prejevalsky's "Mongolia," ii. pt. 3, p. 5, pl. i. fig. 1.

*Emyda dura*. Note on the Plastron of the Gangetic Mud-Turtle (*Emyda dura* of Buchanan Hamilton); J. Anderson, J. L. S. xii. pp. 514–516, woodcut.

## CROCODILIA.

*Alligator* (*Jacare*) *punctulatus*, var. n. *chiaparius*. Five specimens forming a new variety of this species, obtained by F. Sumichrast in the valley of Tonala, Chiapas, establish the existence of alligators in the region intermediate between the United States and tropical S. America. F. Bocourt, J. Zool. v. p. 340, and Ann. Sci. Nat. (6) iii. Art. No. 12.

## SAURIA.

The following observations on geographical distribution occur in Wallace's work (*supra*) ii. pp. 403 & 404:—The Oriental region is one of the poorest both in families and peculiar genera, the Neotropical being the richest. Nearctic: 7 families, none peculiar (3 peculiar genera, *Chirotes*, *Ophisaurus*, and *Phrynosoma*). Palæarctic: 12 families,

2 peculiar (*Ophiomoridæ* and *Trogonophidæ*), 6 peculiar or very characteristic genera (*Trogonophis*, N. Africa, *Psammodromus*, S. Europe, *Hyalosaurus*, N. Africa, *Scincus*, N. Africa, *Phrynocephalus*, Siberia, Tartary, Afghanistan). Ethiopian: 13 families, 1 peculiar (*Chamæsaurus*), 21 peculiar or characteristic genera (*Zonuridæ* 9, *Sepidæ* 2, *Geckotidæ* 7, *Agamidæ* 3). Oriental: 8 families, none peculiar; 28 peculiar genera (*Scincidæ* 6, *Acontiadidæ* 2, *Geckotidæ* 5, *Agamidæ* 16). Australian: 11 families, 3 peculiar; about 40 peculiar genera, about half belonging to *Scincidæ*. Only 3 families, of almost universal distribution, are common to the Australian and Neotropical regions. Neotropical: 15 families, 6 peculiar; more than 50 peculiar genera.

The distribution of the *Lacertilia* shows marked specialization in each of the great tropical regions, indicating that they obtained their original stock at very remote periods.

### Amphisbænidæ.

*Phractogonus scalper*, sp. n., A. Günther, P. Z. S. 1876, p. 678, woodcut, Angola.

*Amphisbæna occidentalis*, sp. n., E. D. Cope, J. Ac. Philad. (n.s.) viii. p. 176, Peru.

### Varanidæ.

*Monitor indicus*, Daud. *Tupinambis indicus*, Daud., is not to be confounded, as hitherto, with *M. dracæna*, but = *Varanus chlorostigma*, D. & B. W. Peters, MB. Ak. Berl. 1876, p. 530.

### Teidæ.

*Amiva eutropia*, Cope, = *A. festiva*, Licth.; *A. gabbiana*, sp. n., from Costa Rica. E. D. Cope, J. Ac. Philad. (n.s.) viii. p. 117, pl. xxviii. fig. 3.

*Cnemidophorus armatulus*, sp. n., *id. l. c.* p. 164, Peru.

*Centropyx altamazonicus*, sp. n., *id. l. c.* p. 162, Moyobamba.

*Dicrodon calliscelis*, sp. n., *id. l. c.* p. 163, Peru.

*Neusticurus ecpleopus*, sp. n. (the characters of the head scuta of this genus are those of the *Ecpleopidæ*), id. *l. c.* p. 161, Peru.

### Lacertidæ.

*Zootoca danfordi*, sp. n., A. Günther, P. Z. S. 1876, p. 817, Asia Minor.

*Zootoca faraglionensis*. J. v. Bedriaga, on the Faraglione Lizard; reply to Dr. Eimer, and discussion of the sources of coloration in Lizards. Heidelberg: 1876, 8vo, 21 pp.

*Lacerta brandti*, De F. The type redescribed and figured by Blanford, Eastern Persia, ii. p. 382, pl. xxv. fig. 1.

*Lacerta princeps*, Blanf. (1874), redescribed and figured. *Id. tom. cit.* p. 384, pl. xxiv.

On *Podarces* (*Eremias*), with table of species, pp. 23–27. *Podarces*

(*Eremias*) *pylzowi*, p. 28, pl. vi. fig. 1, *quadrifrons*, p. 34, pl. iv. fig. 2, *planiceps*, p. 39, pl. iv. fig. 3, *brachydactyla*, p. 41, pl. vi., and *przewalskii*, p. 43, pl. 7, Alashan Desert, *P.* (*E.*) *kessleri*, p. 36, pl. v., Chinese province Gansu, and *P.* (*E.*) *intermedia*, p. 28, note, Aralo-Caspian Desert, spp. nn., A. Strauch, in Prejevalsky's Mongolia, ii. pt. 3.

*Eremias variabilis*, David, was probably *E. argus*, Peters; *id. tom. cit.* pp. 1 & 32.

*Eremias persica*, Blanf. (1874), described and figured; Blanford, Eastern Persia, ii. p. 370, pl. xxviii. fig. 1.

*Eremias velox*, Pall. Specimens obtained in Persia doubtfully referred to this species, the young of which is certainly *Aspidorhinus gracilis*, Eichw., p. 374; *E. fasciata*, Blanf. (1874), described and figured, p. 374, pl. xxv. fig. 3. *Id. l. c.*

*Acanthodactylus micropholis*, Blanf. (1874), redescribed and figured, p. 383, pl. xxvi. fig. 2; and *A. cantoris*, Gthr., noticed, with figures of head, p. 387, pl. xxviii. figs. 3, *a–b*. *Id. l. c.*

*Mesalina watsonana*, Stol., = *M. pardalis*, which is added to the fauna of India. *Id. l. c.* p. 377, and J. A. S. B. (n.s.) xlv. pt. 2, p. 26.

*Ophiops mizolepis*, Stol., found in Persia; the sub-genus *Chondrophiops* is untenable. *Id.* Eastern Persia, ii. p. 369, pl. xxv. fig. 2.

### Gymnophthalmidæ.

*Epaphelus*, g. n. Allied to *Gymnophthalmus*; without eyelids. Toes 4–5. Nostril in a single plate; no supra-nasals; one loreal. Fronto-nasals distinct. One large supra-ocular, and one large supra-orbital; fronto- and inter-parietal confluent; parietals distinct. Scales large, smooth, and sub-equal. Meatus auditorius open. Type, *E. sumichrasti*, sp. n., Tehuantepec. E. D. Cope, J. Ac. Philad. (n.s.) viii. p. 115.

*Blepharosteres*, Stol., does not differ from *Ablepharus* in a total absence of eyelids, as supposed by its author; W. T. Blanford, *tom. cit.* p. 394, note.

*Ablepharus bivittatus*, Mén., pl. xxvii. figs. 2 & 2 *a*, and *A. pusillus*, Blanf., 1874, = *A. brandti*, Str., described and figured, p. 391, pl. xxvii. fig. 1. *Id. l. c.*

### Cercosauridæ.

*Chalcidolepis*, g. n. Dorsal scales smooth, in uninterrupted transverse annuli, sub-equal. Toes 5-5, clawed. An inter-fronto-nasal, 2 pre-frontals, a frontal, 2 fronto-parietals, 2 parietals separated by an inter-parietal. Tympanum distinct, nostril in single nasal. No femoral pores. Teeth compressed, with a principal cusp and a denticle on each side. Type, *C. metallicus*, sp. n., p. 116, pl. xxiv. fig. 5, Costa Rica. E. D. Cope, J. Ac. Philad. (n.s.) viii.

*Cercosaura* (*Pantodactylus*) *quadrilineata*, sp. n., O. Böttger, Ber. senck. Ges. 1876, p. 141, pl., Brazil.

*Lepidosoma carinicaudatum*, sp. n., *id. l. c.* p. 160, Maranon.

(*Poroidogaster*) *Lepidophyma smithi*, sp. n., F. Bocourt, J. Zool. v. p. 342, Tehuantepec and Western Guatemala.

### Zonuridæ.

*Gerrhonotus bocourti*, Mexico, p. 297, and *rhombifer*, p. 298, W. Peters, MB. Ak. Berl. 1876, Chiriqui, spp. nn.

### Chalcidæ.

*Allodactylus*, g. n. Muzzle prominent, depressed, almost trenchant. Ear-opening present. Limbs 4, the anterior with 3, the posterior with 4 toes, without denticulations. Body rounded, somewhat flattened beneath. Tail conical, pointed at the end. Scales smooth. Type, *A. detistii*, sp. n., pl. x. figs. 1–13, Japan. F. Lataste & Trémeau de Rochebrune, J. Zool. v. pp. 237–243.

### Scincidæ.

Lataste, F. Note sur les canaux prétendus aérifères qui se voient dans les écailles ossifiées des Scincoïdiens. Mém. Soc. Biol. May 13, 1876.

*Coloscincus*, g. n. All the legs monodactyle; otherwise as in *Anomalopus*. *C. truncatus*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 532, fig. 1, Peale Island, Moreton Bay.

*Mabuia alliacea*, sp. n., E. D. Cope, J. Ac. Philad. (n.s.) viii. p. 115, pl. xxviii. fig. 1, Costa Rica.

*Euprepes 7-taniatus*, Reuss. (*E. affinis*, De F.). Persian specimens described, and head shields figured. W. T. Blanford, *tom. cit.* p. 388, pl. xxvii. fig. 3.

### Sepidæ.

*Zygnopsis brevipes*, Blanf. [Zool. Rec. xi. p. 78], figured; *id. tom. cit.* pl. xxvii. figs. 4 & 4*a*.

*Hemipodium persicum*, Steind. There is a specimen in the British Museum [pointed out by the Recorder]. *Id. tom. cit.* p. 394.

### Geckotidæ.

*Phyllodactylus inæqualis* and *microphyllus*, spp. nn., E. D. Cope, J. Ac. Philad. (n.s.) viii. pp. 174 & 175, Peru.

*Hemidactylus*. A species characterized and figured without name, from Baluchistan, being the only one obtained; W. T. Blanford, *tom. cit.* p. 343, pl. xxii. fig. 1.

*Hemidactylus persicus*, Anders., from Sind; *id.*, J. A. S. B. (n.s.) xlv. pt. 2, p. 18.

*Ptyodactylus homolepis*, Blanf.: description reprinted; *id. l. c.* p. 19.

*Gymnodactylus*. A new species from Sind, noticed but not named; *id. l. c.* p. 20.

*Gymnodactylus brevipes*, Blanf. (1874), p. 344, pl. xxii. fig. 2, and *G.*

*heterocercus*, Blanf. (1874), p. 345, pl. xxii. fig. 3, described and figured. *G. geckoides*, Spix, confirmed as a Persian species on account of a specimen from Shiraz pointed out by the Recorder, p. 348. *Id.* Eastern Persia, ii.

*Bunopus tuberculatus*, Blanf., redescribed and figured; *id. l. c.* p. 348, pl. xxii. fig. 4.

*Pristurus rupestris*, Blanf. (1874), redescribed and figured; *id. l. c.* p. 350, pl. xxiii. fig. 1.

*Ceramodactylus doriæ*, Blanf. (1874), redescribed and figured; *id. l. c.* p. 352, pl. xxiii. fig. 2.

*Teratoscincus keyserlingi*, Str., noticed; *id. l. c.* p. 354.

*Agamura cruralis*, Blanf. (1874), redescribed and figured, p. 355, pl. xxiii. fig. 3; *Gymnodactylus persicus*, Dum., identified with recent specimens and found to be an *Agamura*, p. 358, pl. xxiii. fig. 4. *Id. l. c.*

*Stenodactylus orientalis*, Blanf., description reprinted; *id.*, J. A. S. B. (n.s.) xlv. pt. 2, p. 21.

## Iguanidæ.

*Basiliscus plumifrons*, p. 125, pl. xxv. fig. 1, Costa Rica, *guttulatus*, p. 156, Panama, E. D. Cope, J. Ac. Philad. (n.s.) viii., spp. nn.

*Anolis pulchellus*, D. & B., redescribed, p. 706, and *A. gundlachi*, p. 705, and *krugi*, p. 707, spp. nn., Portorico; W. Peters, MB. Ak. Berl. 1876.

*Anolis microtus*, Cope, p. 119, pl. xxiv. fig. 2; *insignis*, Cope, p. 120, pl. xxiv. fig. 1; *trochilus*, Cope, p. 121, pl. xxviii. fig 4 (head), redescribed and figured. *A. pachypus*, p. 122, pl. xxiv. fig. 3, *oxylophus*, p. 123, pl. xxiv. fig. 4, & pl. xxviii. fig. 5, spp. nn., Costa Rica. E. D. Cope, *l. c.*

*Scytonyctenus*, g. n. Anolid; posterior teeth with three cusps, the median larger; rostral plate produced into a flexible appendage. Type, *S. laevis*, sp. n., *id. l. c.* p. 165, Peru.

*Anolis bocourti*, *trachyderma*, and *bombiceps*, id. *l. c.* pp. 167 & 168, Peru, spp. nn.

*Enyalius caerulescens*, sp. n., *id. l. c.* p. 169, Peru.

*Hyperanodon peltigerus*, sp. n., *id. l. c.* p. 170, Peru.

*Microlophus heterolepis*, Wiegm., recharacterized, and *M. inguinalis*, sp. n. (*lessoni*, var., D. & B.), *id. l. c.* pp. 171 & 172, Peru.

*Aneuporus*, Boc., must yield to the prior *Craniopeltis*, Pet.; *id. l. c.* p. 173.

*Euphryne obesa* abundant in Utah and New Mexico. Description of a peculiar animal excretion supposed to be the excrement of this Lizard, but attributed to *Neotoma* [*Mamm.*]. E. D. Cope, in Wheeler's Rep. v. p. 559.

*Crotaphytus collaris*, Say, noticed, *l. c.* pp. 565 & 598.

*Proctotretus multiformis*, sp. n., Cope, J. Ac. Philad. (n.s.) viii. p. 173, Peru.

*Sceloporus melanorrhinus*, sp. n., F. Bocourt, J. Zool. v. p. 341, and Ann. Sci. Nat. (6) iii. No. 12, Tehuantepec. *S. siniferus* has 2 scales on the angular keel of muzzle, whereas *S. squamosus* has only one.

*Sceloporus jarrovii*, p. 569, pl. xxiii. figs. 2, 2 *b–d*, Arizona, *tristichus*,

p. 571, New Mexico, *smaragdinus*, p. 572, pl. xxiv. fig. 2, Utah and Nevada, spp. nn., E. D. Cope, in Wheeler's Rep. v.; *S. consobrinus*, Bd. & Gir., var. from Sonora, p. 574, *S. clarki*, Bd. & Gir., var. from Sonora, p. 575, pl. xxiii. figs. 1 & 1*a*, *id.* l. c. *S. jarrovii* renamed *yarrowi*; id. *tom. cit.* p. 595.

[*Liocephalus.*] *Tropidurus* (*Craniopeltis*) *grayi*, Bell, fully described and figured, p. 310, pl. ii. fig. 1; *T.* (*Craniopeltis*) *pacificus*, sp. n., and var. n. *habeli*, from the Galapagos Islands, p. 313, pl. ii. figs. 2 & 3. F. Steindachner, Festschr. z.-b. Ges. Wien, 1876.

[*Oreocephalus.*] *Amblyrrhynchus cristatus*, Bell, p. 316, and [*Trachycephalus*] *Conolophus subcristatus*, Gray, p. 322, described and figured with osteological details, pls. iii.–vii.; *id. l. c.*

*Phrynosoma planiceps*, Hallow, figured; Yarrow, in Wheeler's Rep. v. pl. xxiv. fig. 1. *P. douglassi*, Gray, noticed by Coues, *l. c.* p. 59.

## Agamidæ.

*Amphibolurus imbricatus*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 529, N. Australia.

*Calotes versicolor*, Daud., found in Baluchistan; W. T. Blanford, Eastern Persia, ii. p. 313.

*Agama lessonæ*, De F., = *Trapelus ruderatus*, Oliv.: the distinctness of this species from the Egyptian *T. mutabilis*, Merr., discussed. *Id. l. c.* p. 315.

*Trapelus megalonyx*, Stol., = *Agama agilis*, Oliv.; *id.* J. A. S. B. (n.s.) xlv. pt. 2, p. 22.

*Trapelus rubrigularis*, Blanf., description reproduced; *id. l. c.* p. 23.

*Stellio nuptus*, De Fil., added to the Indian fauna and noticed; *id. l. c.* p. 25. Also described and figured, p. 317, pl. xix. fig. 1, and var. n. *fuscus*, characterized, p. 319; *id.* Eastern Persia, ii.

*Stellio liratus*, Blanf. (1874), redescribed and figured, *id. tom. cit.* p. 320, pl. xx. fig. 2. It is perhaps identical with *S. melanura*, Blyth; *id.* J. A. S. B. (n.s.) xlv. pt. 2, p. 25.

*Stellio caucasicus*, Eichw., p. 322, pl. xx. fig. 1, and *S. microlepis*, Blanf. (1874), p. 326, pl. xix. fig. 2, described and figured; *id.*, Eastern Persia, ii.

*Phrynocephalus olivieri*, D. & B., p. 327, *P. persicus*, De Fil., p. 329, and *P. maculatus*, Anders., p. 331, noticed; *id. l. c.*

*Uromastix microlepis*, Blanf. (1874), redescribed with note on Theobald's proposed family *Uromasticidæ*; id. *l. c.* p. 334.

*Centrotrachelus asmussi*, Strauch, described and figured, p. 337, pl. xxi., and *C. loricatus*, id. (1874), described, p. 340; *id. l. c.*

*Phrynocephalus przewalskii*, p. 10, pl. ii. fig. 1, and *versicolor*, p. 18, pl. iii. fig. 2, Alashan Desert, *affinis*, p. 13, pl. ii. fig. 2, and *frontalis*, p. 15, pl. iii. fig. 1, Chinese province Ordos, *vlangali*, p. 20, pl. iii. fig. 3, Kuku Lake, spp. nn., A. Strauch, in Prejevalsky's "Mongolia," ii. pt. 3.

*Chlamydosaurus kingi*. Notes on the Frilled Lizard of Queensland, and on the discovery of a fossil species on the Darling Downs; G. Bennett, P. R. S. Tasm., 1876, pp. 56–58.

## OPHIDIA.

Geographical distribution:—Of the 25 families of Snakes, 6 are found in the Nearctic region, 10 in the Palæarctic, 13 in the Australian, 16 in the Neotropical, 17 in the Ethiopian, and no less than 22 in the Oriental. The only regions that possess altogether peculiar families of this class are the Ethiopian (3) and the Oriental (2).

The distribution of the genera peculiar to or highly characteristic of the several regions is as follows:—Nearctic, 9 (4 *Crotalidæ*, 1 *Pythonidæ*, 4 *Colubridæ*); Palæarctic, 2 peculiar (*Colubridæ* and *Crotalidæ*); Ethiopian, 25, belonging to 11 families (*Colubridæ* 4, *Lycodontidæ* 5, *Elapidæ*, 3); Oriental, 50, belonging to 15 families (*Colubridæ* 5, *Uropeltidæ* 5, *Homalopsidæ* 12, *Lycodontidæ* 6, *Amblycephalidæ* 3, *Elapidæ* 8, *Crotalidæ* 4); Australian, 16 (*Elapidæ* 11, *Pythonidæ* 4); Neotropical, about 24 (*Colubridæ* 10, *Pythonidæ* 6, *Dipsadidæ*, *Scytalidæ*, *Amblycephalidæ*, *Elapidæ*, and *Crotalidæ*). A. Wallace, Geogr. Distr. ii. pp. 386 & 387.

Tomes, C. On the Development and Succession of the Poison-fangs of Snakes. Phil. Tr. clxvi. pp. 377–386, pl. xxxvii.

Abstract of this paper in P. R. Soc. xxiv. pp. 259–261.

Jan, G., & Sordelli, F. Iconographie Générale des Ophidiens. 45e–48e livr. Paris: 4to, 24 pls.

These livraisons contain the following figures:—

Livr. 45e. *Naia nigricollis*, Reinh., pl. i. fig. 1, *haje*, L., fig. 2, *tripudians*, Merr., fig. 3. *Vipera berus*, L., pl. ii. fig. 1, and varieties *prester*, *concolor*, and *lymnæa*, figs. 2–6, *ammodytes*, L., pl. iii. fig. 1, *aspis*, L., figs. 2–7, *atrops*, L., pl. iv. figs. 1 & 2, *nasicornis*, Sh., figs. 3 & 4, *cerastes*, H., pl v. fig. 1, *cornuta*, Schl. (*Cerastes lophophrys*, D. & B.), fig. 2, *avicennæ*, Alp. (*Echidna atricauda*, D. & B.), figs. 3 & 4, *lebetina*, Forsk. (*Echidna mauritanica*, Guich.), pl. vi. fig. 1, *elegans*, Daud., fig. 2, *arietans*, Merr., figs. 3 & 4.

Livr. 46e. *Crotalus durissus*, L., pl. i. figs. 1 & 2, *adamanteus*, Pal. Beauv. (*rhombifer*, Latr.), pl. ii., *horridus*, L., pl. iii. figs. 1 & 2, *lugubris*, Jan, var. *multimaculata*, fig. 3, *miliarius*, L., var. *tergeminus*, Say, fig. 4, *cerastes*, Hallow., fig. 5, *miliarius*, L. (*edwardsi*, Bd. & Gir.), fig. 6.

*Trigonocephalus piscivorus*, Lac., pl. iv. figs. 1–4, *contortrix*, L., pl. v. fig. 1, *hypnale*, Merr., figs. 2 & 3, *blomhoffi*, Boie, figs. 4 & 5, *halys*, Pall., pl. vi. fig. 1, *rhodostoma*, Reinw., fig. 2.

*Bothrops lanceolatus*, Merr., pl. vi. fig. 3, and Livr. 47e, pl. i. fig. 1.

Livr. 47e. *Bothrops bilineatus*, Neuw., pl. i. figs. 2 & 3, *atrox*, L., pl. ii. figs. 1–4 (var. *dirus*, Jan, and young var. *tessellatus*, Neuw.), *jararaca*, Neuw., pl. iii. figs. 1 & 2, *pictus*, Tsch., fig. 3, *formosus*, Schl., pl. v. fig. 1, *nummifer*, Rüpp., fig. 2, *alternatus*, D. & B., pl. vi. fig. 1, *schlegeli*, Berthold, fig. 2.

Livr. 48e. *Oligodon propinquus*, Jan, pl. i. fig. 1, *sublineatus*, D. & B., fig. 2, *subgriseus*, D. & B., fig. 3, *subpunctatus*, D. & B., fig. 4.

*Chilorrhina villarsi*, De Fil., fig. 5.

*Proxyuna jani*, Bianc., pl. ii. fig. 1.

*Oxyrrhina maculata*, Jan, figs. 2–4.

*Stenorrhina degenhardti*, Berthold, var. *ocellata*, Jan, fig. 5, var. *quinquelineata*, Jan, fig. 6.

*Rhinochilus lecontii*, Bd. & Gir., pl. iii. fig. 1.

*Heterodon platyrrhinus*, Latr., fig. 2, *dorbigniі*, D. & B., figs. 3 & 4, *sequicinctus*, D. & B., fig. 5.

*Xenodon* (*Liosophis*) *gigas*, D. & B., fig. 6.

*Periops hippocrepis*, L., pl. iv. fig. 1, *algira*, Jan, fig. 2, *neglectus*, Jan, figs. 3–5.

*Spilotes corais*, Cuv., fig. 6, & pl. v. fig. 1, *melanurus*, D. & B., pl. v fig. 2, *poecilostoma*, Neuw., figs. 3 (*Dipsas dieperinckі*, Schl.) & 4.

*Coryphodon constrictor*, L., pl. vi. fig. 1, var. *flaviventris*, Say, fig. 2.

*Zamenis dahlі*, Fitz., fig. 3, *florulentus*, G. St. H., fig. 4, *viridiflavus*, Wagl., figs. 5 & 7, var. *persica*, Jan, fig. 6.

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E. D. Cope, J. Ac. Philad. (n.s.) viii.—1. On the Reptilian fauna of Costa Rica, based chiefly on the collections made by W. Gabb & Dr. von Patten; 2. On the Reptiles collected by J. Orton in the Middle and Upper Amazon and Western Peru,—describes and figures a large number of Snakes from these and other American regions. The copious notes and redescriptions of species already known to science are too numerous to be severally recorded. The new species of *Ophidia*, 26 in number, are referred to below.

*Typhlops persicus*, Blanf. (1874), figured; W. T. Blanford, Eastern Persia, ii. pl. xxvii. figs. 5 *a* & *b*.

*Stenostoma phenops*, sp. n., E. D. Cope, *l. c.* p. 128, Tehuantepec.

*Platyplectrurus hewstoni*, sp. n., R. H. Beddome, P. Z. S. 1876, p. 701, Wynad, elevation 2700 feet.

*Catostoma psephotum*, sp. n., E. D. Cope, *l. c.* p. 146, Costa Rica.

*Aspidura guentheri*, sp. n., W. Ferguson, P. Z. S. 1876, p. 819, Ceylon.

*Cyclophis* (*Ablabes*, Gthr.) *modestus*, Martin: specimens described, with remark that *Tyria argonauta*, Eichw., is distinguished by having two præ-oculars. W. T. Blanford, *l. c.* p. 404.

*Cyclophis* (*Ablabes*, Strauch) *collaris*, Ménétr., description of specimen from Teheran. *Id. l. c.* p. 405.

*Cyclophis* (*Eirenis*, Jan) *fasciatus*, description of specimen. *Id. l. c.* p. 406.

*Cyclophis persicus*, Anders. (1872), figured; *id. l. c.* pl. xxviii. figs. 1*a* & *b*.

*Lygophis poecilostomus*, sp. n., E. D. Cope, *l. c.* p. 180, Peru.

*Rhadinea fulvivittis*, sp. n., *id l. c.* p. 139, Orizaba, Vera Cruz.

*Geagras redimitus*, sp. n., *id. l. c.* p. 141, Tehuantepec.

*Tantilla bimaculata*, Mazatlan, *rubra*, Tehuantepec, *canula*, Yucatan, pp. 143 & 144, *T. capistrata*, p. 181, Peru, spp. nn., *id. l. c.*

*Contia pachyura*, p. 145, *calligaster*, p. 146, pl. xxviii. fig. 12, Costa Rica, spp. nn., *id. l. c.*

## OPHIDIA.

tain[illegible]eographical distribution:—Of the 25 families of Snakes, 6 are found *Gy[illegible]* Nearctic region, 10 in the Palæarctic, 13 in the Australian, 16 in *ophippicus*, [illegible]ical, 17 in the Ethiopian, and no less than 22 in the Oriental. Wheeler's Rep[illegible] that possess altogether peculiar families of this class . *Chilopoma* [illegible] Mu[illegible] and the Oriental (2).

Rep. *l. c.* p. 543. Teeth s[illegible]ora peculiar to or highly characteristic of bone a little stouter than the [illegible] Nearctic, 9 (4 *Crotalidæ*, 1 *Pythonidæ*, interspace; not grooved. Cephalic s[illegible] *Colubridæ* and *Crotalidæ*); Ethio- and one loreal, which enters the orbit[illegible]dæ 4, *Lycodontidæ* 5, *Elapidæ*, prominent lateral and posterior borders. [illegible]ubridæ 5, *Uropeltidæ* 5, entire; sub-caudal scutella divided. General [illegible] slight tendency to the form of rostral shield seen in *Phimophis*, *Crota-* the lateral head-shields are suggestive of *Cyclophis æstivus*. Type, *Ch. rufipunctatum*, sp. n., *id. l. c.* p. 544, pl. xx. fig. 1, S. Arizona.

*Tropidonotus orientalis*, Gthr., noticed by A. Strauch in Prejevalsky's Mongolia, ii. pt. 3, p. 48.

*Tropidonotus validus*, Kenn., pl. xxi., and *Eutænia cyrtopsis*, Kenn., pl. xx. figs. 2 & 2*a*, figured in E. Cones' Synopsis in Wheeler's Rep. Geogr. Explor. W. of 100th mer., v.

*Eutænia*. Synopsis of Cope's new arrangement, pp. 545–555; remarks on *E. vagrans*, B. & G., *ornata*, Bd., and *sirtalis*, L. (*dorsalis*, B. & G. and *marciana*, B. & G., pp. 551–555, 613–616. *E. cyrtopsis*, Kenn., figured, pl. xx. figs. 2 & 2*a*. Wheeler's Report, v.

*Elaphis Aione*, Pall., noticed by Strauch in Prejevalsky's Mongolia, *l. c.* p. 46.

*S[illegible]rosophis* (*Loxodon*, Jan) *microlepis*, Jan. Notice of the spe[illegible] which appears to be a *Zamenis* or *Periops*, in which the divisions of the head-scales has been carried farther than in *Z. diadema* and its allies. *Loxodon* has been applied to a species of elephants. W. T. Blanford, *op. cit.* p. 411.

*Spilotes chrysobronchus*, sp. n., E. D. Cope, J. Ac. Philad. (n.s.) viii. p. 136, pl. xxviii. fig. 11, Costa Rica.

*Zamenis*. Notices of *Z.* (? *Periops*) *diadema*, Schl., p. 412, *ventrimaculatus*, Gray, p. 414, *caspius*, Iwan, *dahli*, D. & B., *ravergieri*, Ménétr., p. 417; W. T. Blanford, *op. cit.*

*Zamenis spinalis*, Peters, noticed and figured by Strauch in Prejevalsky's Mongolia, *l. c.* p. 46, pl. viii.

*Drymobius heathi*, sp. n., E. D. Cope, *l. c.* p. 179, Peru.

*Herpetodryas holochlorus*, sp. n., *id. l. c.* p. 178, Maranon.

*Thrasops pustulatus*, Buch. & Pet., = *T. flavigularis*, Hallow.; W. Peters, MB. Ak. Berl. 1876, p. 119.

*Dendrophidium melanotropis*, sp. n., Cope, *l. c.* p. 134, pl. xxvi. fig. 1, Costa Rica.

*Cyclophis vernalis*, De Kay, found in Rocky Mountains' region; Yarrow, *l. c.* p. 539.

*Dromicus chamissonis*, Wiegm., var. *dorsalis*, fig. 1 (= *Herpetodryas dorsalis*, Gthr., *olim*), and var. *habeli*, Stein., fig. 2: the snake of the

*Oxyrhina maculata*, Jan, figs. 2–4.

*Stenorrhina degenhardti*, Berthold, var. *ocellata*, Jan, fig. 5, var. *quinquelineata*, Jan, fig. 6.

*Rhinochilus lecontii*, Bd. & Gir., pl. iii. fig. 1.

*Heterodon platyrrhinus*, Latr., fig. 2, *dorbignii*, D. & B., fig. pt. 3, *sequicinctus*, D. & B., fig. 5.

*Xenodon* (*Liosophis*) *gigas*, D. & B., fig. 6. *atus*, Peters, and *T.*

*Periops hippocrepis*, L., pl. iv. fig. 1, *algir* recently obtained from figs. 3–5. . Zool. v. pp. 21–23.

*Spilotes corais*, Cuv., fig. 6, & pl. xxviii. fig. 9, and *saturatus*, p. 133, fig. 2. *poecilostoma*, Neuw., figs. ? the generic name retained for species *Coryphodon constrictor*, L. not *Ahatullæ*), *L. ortoni*, p. 177, Middle *Zamenis dahli*. Pope, *l. c.*

*Leptognathus gracilis*, sp. n., W. Macleay, P. Linn. Soc. N. S. W. i. p. 15, Queensland.

*Dipsas rhinopoma*, Blanf. (1874), figured; W. T. Blanford, *l. c.* pl. xxviii. figs. 2 *a* & *b*.

*Leptognathus argus*, pl. xxvii. fig. 1, and *pictiventris*, pl. xxviii. figs. 7 & 8, p. 130, Costa Rica, spp. nn., Cope, *l. c.*

*Trimorphodon collaris*, sp. n., *id. l. c.* p. 131, Orizaba, Vera Cruz.

*Loxocemus sumichrasti*, sp. n., F. Bocourt, J. Zool. v. p. 344, and Ann. Sci. Nat. vii. (6) iii. Art. vii. Tehuantepec.

*Liasis amethystinus*, Schn. W. Peters figures the head and throat of a var. *timoriensis*; MB. Ak. Berl. 1876, pl. figs. 2 & 3.

*Xiphosoma annulatum*, pl. xxviii. fig. 6, Costa Rica, and *ruschenbergeri*, Panama, p. 129, spp. nn., Cope, *l. c.*

*Eryx jaculus*, L. Notice of this species, the Asiatic examples of which seem always to have the scales of the tail less strongly keeled than the African; W. T. Blanford, *l. c.* p. 401.

*Naia annulata*, sp. n., W. Peters, MB. Ak. Berl. 1876, p. 119, W. Africa.

*Crotalus*. Apparent decrease in numbers on the western plains, p. 513. Cope's synopsis and list of species reduced from 18 to 15. *Caudisona pyrrhus*, Cope, figured, pl. xxii. Yarrow, in Wheeler's Report, *l. c.* pp. 529–536.

On the capture of Rattle-snakes and their pretended association with marmots and owls; A. Trécul, CR. lxxxiii. p. 603.

*Trigonocephalus blomhoffi*, Boie, noticed by Strauch in Prejevalsky's Mongolia, ii. pt. 3, p. 52.

*Halys pallasi*, Gthr., redescribed; W. T. Blanford, *l. c.* p. 430.

*Lachesis stenophrys*, sp. n., Cope, *l. c.* p. 152, Costa Rica.

*Bothrops microphthalmus*, sp. n., *id. l. c.* p. 182, Peru.

*Bothriopsis proboscideus*, sp. n., *id. l. c.* p. 150, pl. xxviii. fig. 13, & pl. xxvii. fig. 3, Costa Rica.

*Bothriopsis*. *Bothriechis*, *Porthidium*, and *Bothriopsis*, Cope, are not natural sub-divisions; synopsis and comparative characters of *B. lansbergii*, Schl., *brachystoma*, Cope, and *nasutus*, Boc. F. Bocourt, J. Zool. v. pp. 24–26.

*Vipera euphratica*, Martin, *mauritanica*, D. & B., Strauch, = *obtusa*,

Dwigubsky. - A specimen, identified with the type in the British Museum, described; W. T. Blanford, *l. c.* p. 428.

## BATRACHIA.

PARKER, W. K. On the Structure and Development of the Skull in the *Batrachia*. Part 2. Phil. Tr. clxvi. pp. 601–669, pls. liv.–lxii., sixty-five figures of skull of *Rana*, *Bufo*, *Dactylethra capensis*, and *Pipa monstrosa*.

### BATRACHIA SALIENTIA.

LATASTE, F. Mémoire sur les brosses copulatrices des Batraciens Anoures. Ann. Sci. Nat. (6) iii. Art. x. 10 pp. 1 pl.

MOQUIN-TANDON, G. Recherches sur les premières phases du développement des Batraciens Anoures. *L. c.* Art. iii 50 pp. 2 pls.

F. KNAUER communicates observations on the reproduction of *Bufo vulgaris* and *Rana temporaria*, preliminary to a more extensive paper on the subject of the reproduction of reptiles. Verh. z.-b. Wien, xxvi. (1877), pp. 73–75.

LATASTE, F. Sur la position de la fente branchiale chez le tétard du *Bombinator igneus*. Act. Soc. L. Bord., xxxi. livr. 2.

The author has discovered that in *Bombinator igneus*, *Alytes obstetricans*, and *Pelodytes punctatus*, the spiraculum of the tadpole is situated on the inferior surface and in the median line, not on the side of the body, as was hitherto supposed to be the case.

*Spea stagnalis*, sp. n., E. D. Cope, in Yarrow's Report, *l. c.* p. 525, pl. xxv. figs. 6–8, N. W. New Mexico.

*Rana onca*, sp. n., *id. l. c.* p. 528, pl. xxv. figs. 1–3, Utah.

*Cyclorrhamphus culeus*, sp. n., Garman, Bull. Mus. C. Z. iii. p 276, pl. i. Titicaca.

*Cystignathus typhonius*, Daud., from Puerto Rico, is not different from South American examples; its development described. W. Peters, MB. Ak. Berl. 1876, p. 709.

*Alytes obstetricans*. Memoir on its habits and mode of reproduction; A. de L'Isle, Ann. Sci. Nat. (6) iii. Art. vii. 50 pp.

*Cranopsis*, g. n. No ostia-pharyngea, tympanum, or vomerine teeth; cranial integument entirely occupied by a rugose ossification; parotoid glands present; fingers and toes distinct, the latter palmate. *Peltopharyne*, Cope, without auditory apparatus. Type, *C. fastidiosus*, sp. n., E. D. Cope, J. Ac. Philad. (n.s.) viii p. 96, pl. xxiii. fig. 1, Costa Rica.

*Crepidius*, g. n. No ostia-pharyngea, membranum tympani, or vomerine teeth; parotoid gland present; cephalic derm not occupied by ossification: digits enclosed in the skin, the longest median toe projecting; inner digits rudimental. Type, *C. epioticus*, sp. n., *id. l. c.* p. 97, pl. xxiii. fig. 2, Costa Rica.

*Ollotis*, g. n. No ostia-pharyngea or membranum tympani; parotoid glands present; digits free; cranial derm without ossification. Type, *O. caerulescens*, sp. n., *id. l. c.* p. 98, pl. xxiii. fig. 3, Costa Rica.

*Bufo auritus*, sp. n., *id. l. c.* p. 99, pl. xxiii. fig. 4, Costa Rica, and *B. coccifer*, Cope, figured, fig. 5.

*Bufo pictus*, sp. n., *id.* in Yarrow's Report, *l. c.* p. 522, pl. xxv. figs. 4 & 5, Utah, &c.

*Bufo olivaceus*, Blanf. (1874) figured by Blanford, Eastern Persia, ii. pl. xxviii. fig. 3.

*Bufo raddii*, sp. n., Strauch, in Prejevalsky's Mongolia, ii. pt. 3, p. 53, Chinese province of Ordos and Alashan Desert.

Notice of *Trypheropsis chrysoprasinus*, Cope, from Costa Rica, a generic form which represents *Hylorana*, and of an undescribed species from Vera Paz; E. D. Cope, P. Ac. Philad. (n.s.) viii. p. 114, pl. xxiii. fig. 12.

*Hemiphractus*. On a skeleton of *Hemiphractus*; confirmation of Espada's formation of separate group *Hemiphractina*. P. Brocchi, C. R. lxxxiii. pp. 664–666.

*Polypedates reticulatus*. Notes on the mode of propagation and provision for safety of the ova in this and other Ceylonese Tree-frogs; A. Günther, Ann. N. H. (4) xvii. pp. 376–379. Supplemented by a letter from W. Ferguson; *op. cit.* xviii. p. 356.

*Ixalus fergusoni* and *hypomelas*, spp. nn., A. Günther, *op. cit.* xvii. pp. 379 & 380, Ceylon.

*Chiromantis guineensis*, Bchhlz. Its egg-deposit figured; W. Peters, *l. c.* pl. ii.

*Hyperolius olivaceus*, p. 120, and *fimbriolatus*, p. 121, River Ogowé W. Africa, *fuscicentris* and *vittiger*, p. 122, Liberia, spp. nn., *id. l. c.*

*Hylodes cerascinus*, sp. n., E. D. Cope, *l. c.* p. 112, pl. xxvi. fig. 4, Costa Rica.

*Hylodes martinicensis*, Tsch. Further details respecting its development which is compared with *Pipa*; W. Peters, *l. c.* pp. 709–713, pl. i. figs. 1–9.

*Phyllobates hylaeformis* [*hylif-*], sp. n., E. D. Cope, *l. c.* p. 107, pl. xxiii. fig. 8, Costa Rica.

*Lithodytes podiciferus*, p. 107, pl. xxiii. fig. 9, *muricinus*, p. 108, pl. xxiii. fig. 11, *habenatus* and *melanosticlus*, p. 109, pl. xxiii. fig. 10, *megacephalus*, p. 110, pl. xxiii. fig. 11, *gulosus*, p. 112, Costa Rica, *diastema*, p. 155, Panama. *Id. l. c.* spp. nn.

*Hyla gabbi* and *uranochroa*, p. 103, fig. 4, pl. xxvii. *nigripes*, p. 104, pl. xxiii. fig. 7, *elaeochroa*, p. 105, pl. xxvi. fig. 3, spp. nn., Costa Rica. Several sub-species characterized under *H. punctariola*, Peters. *H. striata*, Peters, = *H. polytaenia*, Cope, p. 106. *Id. l. c.*

*Chlorophilus* (*Hyla*, Wied.) *triseriatus* abundant in Colorado, not hitherto found so far westward. Yarrow, *l. c.* p. 523.

*Dendrobates talamancae*, Cope, described and figured; Cope, *l. c.* p. 102, pl. xxiii. fig. 6.

Notes on various species of Ceylonese Frogs and their spawn; (W. Ferguson) Ceylon Observer, July 15, 1876.

## Batrachia Gradientia.

*Exaretus*, g. n. Maxillarum margines densissimis subtilissimisque denticulis armati. Lingua cordata, medio et apice anteriore adhærens. Pedum anteriorum digiti quatuor, posteriorum sex. Type, *E. caucasicus*, sp. n., high regions of the Caucasus. Waga, R. Z. (3) iv. p. 326, pl. xiii.

*Salamandra maculata*. Note on the land Salamander; J. B. Schnetzler, Bull. Soc. Vaud. (2) xiv. pp. 440–442.

*Salamandra* (?) *ventralis*, sp. n., L. Provancher, Nat. Canad. vii. (1875) p. 251, Yamaska.

*Desmodactylus pinchoni*, sp. n., Armand David, J. A. S. North China Branch, vii. p. 226, Setchuan.

*Triton*. A. Van Hasselt, "Bijdrage tot de Natuurlijke Geschiedenis des Water-Salamanders," Versl. Ak. Amst. (2) x. pp. 209–219.

*Triton helveticus* is crested, but the crest varies according to locality. F. Brüggemann, Arch. f. Nat. (2) 1876, pp. 19–27.

*Triton* (*Cynops*) *orientalis*, sp. n., Armand David, *l. c.* p. 226, Tchikiang.

J. Erber contributes observations on *Siren lacertina* in captivity; Verh. z.-b. Wien, xxvi. (1877), p. 114.

*Sieboldia davidiana*, sp. n., A. David, *l. c.*, Setchuan.

*Axolotl*. On the metamorphosis into *Amblystoma*, Marie von Chauvin, Z. wiss. Zool. xxvii. pp. 522–535; supplement on the same subject by Siebold, *tom. cit.* pp. 536–540.

On the reproduction of *Amblystoma*, observed in the Paris Menagerie: Blanchard, CR. lxxxii. p. 716.

On the reproduction of *Proteus anguineus*; F. E. Schulze, Z. wiss. Zool. xxvi. pp. 350–354, pl. xxii.

# PISCES.

BY

A. W. E. O'Shaughnessy.

## Anatomy and Physiology.

Beauregard, H. Recherches sur les réseaux vasculaires de la chambre postérieure de l'œil des Vertébrés. Ann. Sci. Nat. (6) iv. Art. i.

[In Fishes, pp. 87–119, pl. v.]

Jaeger, J. Ueber die Funktion der Kiemenspalten. Württ. nat. JH. 1876, pp. 95–99.

Fritsch, G. Ueber den feineren Bau des Fischgehirnes. MB. Ak. Berl. 1876, pp. 26–29.

Moreau, A. Recherches expérimentales sur les fonctions de la vessie natatoire. Ann. Sci. Nat. (6) iv. Art. ix. 85 pp. pls. xiii. & xiv.

Tomes, C. On the development of the Teeth of Fishes (*Elasmobranchii* and *Teleostei*). Phil. Tr. clxvi. pp. 257–268, pl. xxxi.

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A. W. Malm describes and figures cases of hermaphroditism in *Scomber* and *Clupea*) ; Œfv. Ak. Förh. 1876, pl. v.

Ricci, on the form and structure of the stomach of fishes; Rend. Acc. Nap. August, 1875.

Heincke, on change of colours in fishes, especially in *Syngnathus* and *Gobius* ; Schr. Ver. Schlesw.-Holst. i. p. 255.

## Classification.

T. H. Huxley draws up the following scheme of the morphology of the *Ichthyopsida*, based upon the characters of the skull, the nature of the olfactory and respiratory organs, and the development or non-development of an opercular fold of the integument :—

I. Holocrania.—a. Amphirrhina : *a. Pneumatocœla*—1. Operculata ; 2. Inoperculata. *b. Apneumatocœla*—1. Operculata ; 2. Inoperculata.

B. Monorrhina: 1. Operculata; 2. Inoperculata. II. Entomocrania — 1. Operculata; 2. Inoperculata.

The stages of subordinate differentiation are as follows:—

Apodal or pedate. When pedate, the limb skeleton constructed upon the type of the archipterygium, the ichthyopterygium, or the chiropterygium. When the limb is an ichthyopterygium, it is either *unibasal*, *tribasal*, or *multibasal*.

The Chondrocranium is constructed upon either the 'amphistylic,' the 'hyostylic,' or the 'autostylic' plan.

In a tabular view, the stages of general differentiation are indicated on a vertical line from which horizontal lines are drawn; those of subordinate differentiation of the skull and limbs, on a horizontal line from which vertical lines are drawn, P. Z. S. 1876, pp. 24–58.

## Geographical Distribution.

The distribution of the families of Fishes, with the range of such genera as inhabit fresh-water, is discussed by A. R. Wallace in "The Geographical Distribution of Animals" (London: 1876, 2 vols. 8vo), vol. ii. chap. 20, pp. 424–467.

## Faunæ.

### *Arctic.*

C. Lütken, in "Korte Bidrag til Nordisk Ichthyographi," gives a preliminary revision of the northern species of *Cottidæ*. This is prefaced by important remarks on the growing need of some complete critical and descriptive work on Arctic Ichthyology, no longer to be met by a re-edition of Otto Fabricius' book on the fauna of Greenland. His ultimate hope is to produce such a work; and, in the meantime, he will publish his results on the different families, in an abridged form, to meet the present requirements of more precise data concerning such northern types and representatives. Vid. Medd. 1876, pp. 355–388.

### *Europe.*

R. Sievers, in "Bidrag till kännedom om Hogland's fisk-fauna," Medd. Soc. Fenn. i. pp. 60–64, enumerates 19 species from that Finnish locality, with local names. See also O. M. Reuter, *tom. cit.* p. 129.

Collett, R. Norges Fiske, med Bemærkninger om deres Udbredelse. Christiania: 1875, 8vo, 240 pp. 2 pls., map.

The first enumeration ever made of the fishes of Norway, with notes on their geographical distribution. In a systematic table at the end of the list, pp. 225–236, the author separates four different ichthyological districts of Norway. The new discoveries are *Cottunculus microps*, g. & sp. nn., *Cottus lilljeborgi*, which has been found recently by Lütken at the Färoe Islands; *Motella septentrionalis* [Zool. Rec. 1875, p. 122], *Lycodes esmarkii* (possibly founded upon very old specimens of *L. vahli*,

Reinh.), *L. sarsi* [Zool. Rec. 1871, p. 102], and *Gobius orca* and *scorpioides* [Zool. Rec. 1874, p. 100], recently found by Winther in Denmark. The different forms of *Salmo* and *Coregonus* are referred to a few species only. Descriptive and geographical details, with observations bearing upon the identification and synonymy of the different species contribute to make this a work which will be constantly consulted by the student of northern fishes.

Gervais, H., & Boulart, R. Les Poissons : Synonymie, Description, Mœurs, Frai, Pêche, Iconographie des espèces composant plus particulièrement la Faune Française. i. Poissons d'eau douce. Paris : 1876, 8vo, 232 pp., 60 chromotype pls., and 56 vignettes.

A work for popular use on the fishes of France : contains an appendix on those of Italy ; also a preface on classification, by P. Gervais.

A. Günther has drawn up a list of Fishes of the Mediterranean which are identical with West Indian and Japanese Fishes. Of 29 Japanese species, 18 are also West Indian, and 22 Mediterranean. J. Linn. Soc. xii. p. 108.

F. Brito Capello gives a third short appendix to the Catalogue of Fishes of Portugal ; J. Sci. Lisb. 1876, pp. 165 & 166.

Trois has compiled a Catalogue of the Fishes of the Adriatic with reference to the collection in the Venetian Institute ; they number 261, and are arranged tabularly, with particulars of size, spawning-time, &c. Atti Ist. Venet. i. p. 559.

*Western Africa.*

W. Peters gives an account of the fishes collected by the late Dr. Buchholz in Western Africa (MB. Ak. Berl. 1876, pp. 244–252), including *Pantodon*, a remarkable new genus of *Malacopterygii abdominales* (p. 195).

Reichenow describes a *Ctenopoma* and a *Trachynotus* from the coast of Loango, collected during the German Expedition. SB. nat. Fr. 1875, pp. 146–148.

*Mauritius and the Seychelles.*

W. Peters enumerates 189 fishes collected by Dr. K. Möbius, describing several new species ; MB. Ak. Berl. 1876, pp. 435–447.

*Asia.*

Bleeker, P. Atlas Ichthyologique des Indes Orientales Néerlandaises. Livrns. 30–32, pls. ccexlix.–ccclxxx. Amsterdam : 1876, fo. [see Zool. Rec. xii. p. 107].

Parts 30 & 31 (vol. vi.) contain the continuation of the *Percoidei*, pp. 41–121 ; part 32 (vol. vii.) new pagination, contains the text of the *Percoidei Spariformes*, *Pristipomatini*, *Dipterygonotini*, and *Lutjanini*, pp. 1–48. With these parts, the following plates have been issued :– *Percoidei*, pls. lxxi.–lxxxviii., *Chætodontoidei*, pls. i.–xviii., *Trachichthyoidei* (*Berycidæ*) pls. i.–vi.

DAY, F. On some of the Fishes of the Deccan. J. L. S. xii. pp. 562–565.

Critical notes on a number of species, with special reference to identification with Col. Sykes' descriptions: two or three are described as new.

——. The Fishes of India. London: 1876, 4to, part 2, pp. 169–368, pls. xli.–lxxviii. [See Zool. Rec. xii. p. 107.]

This part is occupied with the families *Berycidæ*, *Cyrtidæ*, *Polynemidæ*, *Sciænidæ*, *Xiphiidæ*, *Trichiuridæ*, *Acanthuridæ*, *Carangidæ*, *Stromatidæ*, *Coryphænidæ*, *Scombridæ*, *Uranoscopidæ*, *Trachinidæ*, *Pseudochromidæ*, *Batrachidæ*, *Pediculati*, *Cottidæ*, *Cataphracti*, *Gobiidæ*, *Callionymidæ*, *Cepolidæ*, *Blenniidæ*, *Rhynchobdellidæ*, *Sphyrænidæ*, *Atherinidæ*, *Mugilidæ*, *Aulostomatidæ*, *Centriscidæ*, and *Ophiocephalidæ*. Entire figures of about 240 species are given.

——. On the Introduction of Trout and Tench into India. J. L. S. xii. pp. 562–565.

——. On the Fishes of Yarkand. P. Z. S. 1876, pp. 781–807.

On the collection of fishes made by Stoliczka during Forsyth's expedition. Several are described as new, and the author discusses the relations to those of the contiguous Asiatic regions.

K. KESSLER has described the Fishes collected by Col. Prejevalsky in Mongolia, in N. PREJEVALSKY'S "Mongolia i Strana Tangutov," St. Petersburger 1876, 8vo, vol. ii. pt. 4, pp. 1–36, pls. i.–iii. Seventeen species are described (13 new, and one new genus).

*Polynesia.*

GÜNTHER, A. Die Fische der Südsee (v.). J. Mus. Godeffr. xi. pp 129–168, pls. lxxxiv.–c.

Contains the *Carangidæ*, *Nomeidæ*, *Coryphænidæ*, *Scombridæ*, *Trachinidæ*, *Malacanthidæ*, *Pediculati*, and *Cottidæ*.

MURRAY, J. Preliminary Report on Vertebrates obtained in the Cruise of H.M.S. "Challenger." P. R. Soc. xxiv. pp. 537–544.

A preliminary report on the fishes, giving a tabulated list of the specimens, with their numbers and localities, and the depth from which they were obtained in the dredgings and trawlings during the years 1873–1875.

STEINDACHNER, F. Ichthyologische Beiträge (v.). SB. Ak. Wien, lxxiv. pp. 203–240.

On new or rare fishes from the Atlantic, Indian, and Pacific Oceans.

*Australia.*

W. MACLEAY states that the fishes collected during the "Chevert" Expedition number about 800, being principally from Northern Australia: P. Linn. Soc. N. S. W. i. p. 38. They are described by himself and G. Alleyne, *l. c.* pp. 261–280, 321–358 (with figures).

A. Günther publishes notes on several species of S. Australian and Tasmanian fishes, with descriptions of some that are new; Ann. N. H. (4) xvii. p. 390.

*New Zealand.*

Hutton, F. W. Contributions to the Ichthyology of New Zealand. Tr. N. Z. Inst. viii. pp. 209–218.

All the new species, save one, were recorded last year.

Günther, *l. c.*, publishes notes on some New Zealand species, and a few that are new.

*America.*

Jordan's Manual of the Vertebrates of the Northern U. S. of America (Chicago: 1876, 8vo) contains, pp. 199–316, a systematic key or guide to the fishes, exclusive of the marine species, the classification followed being that of Gill.

Part 3 of the United States Commission of Fish and Fisheries (Washington: 1876) contains Report of the Commissioner for the years 1873–1875, pp. vii.–xlv., and Appendices A–E, pp. 1–758.

Steindachner, F. Ichthyologische Beiträge (v.). SB. Ak. Wien, lxxiv. pp. 176–202.

On new or rare fishes from the west coast of the northernmost part of North America.

Gill enumerates the fishes collected by J. Bransford in the Isthmus of Panama; there are several new species, and representatives of *Platypœcilus* and *Piabucina*, genera not hitherto found in the isthmus. P. Ac. Philad. 1876, pp. 335–339.

Steindachner, SB. Ak. Wien, lxxii. pp. 29–96 (Ichthyologische Beiträge, iii.), describes a large number of species, chiefly from Lower California and Panama. He states (p. 88) that Magdalena Bay is the northernmost point of the tropical boundary line for fish on the western coast of America. It possesses many species which properly belong to the neighbourhood of Panama; and the coast from thence northwards to Monterey Bay exhibits a very interesting transition from the tropical fish fauna to that of Western America. San Diego is the most southern point for *Embiotoca* in any considerable numbers and for northern species of *Atherinichthys*; on the other hand, species of *Labridæ*, *Serranus*, *Xenichthys*, and *Albula* found at San Diego unite it to the tropical fauna.

The same author has described a number of new species of fishes of different families from Panama, giving also complete notices of many known species; *op. cit.* lxxii. pp. 551–590, pls. i.–vi., viii. & ix. figs. 1 & 2, and pl. x.

In Ichthyologische Beiträge (v.), *op. cit.* lxxiv. pp. 49–203, pls. i.–xv., he writes: 1. On the fish fauna of Panama, Acapulco, and Mazatlan; pp. 49–73. 2. On new species, chiefly *Characinidæ* and *Siluridæ*, from

the Amazons ; pp. 73–166. 3. On some marine fishes from the coast of Brazil ; pp. 167–176.

The same author also gives descriptions of new and rare fishes from the mountain waters of the Upper Andes of Peru, *op. cit.* lxxii. pp. 590–605 ; and notices of Amazon species, two being new (*Siluridæ*), *l. c.* pp. 605–610, pls. xi.–xiii.

He has also issued Part iii. of "Die Süsswasserfische des südöstlichen Braziliens" (*Characinidæ* and *Siluridæ*) ; op. cit. lxxiv. pp. 559–664, pls. i.—xiii.

Four new species of *Pyrrhulina* are described by the same author in "Beiträge zur Kenntniss der Characinen des Amazonenstromes" ; *op. cit.* lxxii. pp. 6–24, pls. i. & ii.

COPE, E. D., & YARROW, H. C. Report upon the Collections of Fishes [freshwater] made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona during the years 1871-1874. In Wheeler's Rep. Geogr. Explor. W. of 100th mer., v. Zoology (Washington : 1875, 4to), chap. vi. pp. 639–700, pls. xxvi.–xxxii.

The descriptions of some of the new species were published by Cope in 1874.

*Cuba.*

POEY, F. Enumeratio Piscium Cubensium. Pts. 2 & 3. An. Soc. Esp. v. pp. 131–216, 373–404, pls. vii.–x.

Completes the list of Cuban fishes. [See Zool. Rec. xii. p. 108.]

The same writer describes new species in Ann. Lyc. N. York, xi. pp. 58–70.

*The Bermudas.*

G. BROWNE-GOODE has compiled a Catalogue of the Fishes of the Bermuda Islands. Bull. U. S Nat. Mus. No. 5, pp. 1–82, Washington : 1876. The marine fauna is much more tropical in character than the land fauna and flora, the majority of the fishes being those of the West Indian region. Four marine species and one inhabiting brackish water are at present known to be peculiar to the group. They were described by Goode, Günther, and Matthew Jones in 1874. An account of the fisheries is given, and personal observations accompany many of the species. The number catalogued is 75, but an appendix contains important additions. [The Recorder may remark that in a subsequent collection he has observed a great many species not in this list.]

## PALÆICHTHYES.

### DIPNOI.

HUXLEY, T. On the Position of the Anterior Nasal Apertures in Lepidosiren. P. Z. S. 1876, pp. 180 & 181.

Demonstrates the external position of the anterior nostrils in *Lepidosiren*, as in *Ceratodus*.

## GANOIDEI.

HUXLEY, T. Contributions to Morphology. Ichthyopsida, No. 1. On *Ceratodus forsteri*, with Observations on the Classification of Fishes. P. Z. S. 1876, pp. 24–58.

1. The anterior nares of *Ceratodus* cannot be said to open into the cavity of the mouth, inasmuch as they lie outside the premaxillary portion of the upper lip, and are not enclosed by the maxillary portion of that lip. The position of the anterior nares on the under face of the snout is an embryonic feature retained in the *Dipnoi*, the Selachians, and probably many early *Ganoidei*. A comparison of the nasal apertures and passages is made with those of *Scyllium*, *Cestracion*, and *Chimæra*.

2. Internal structure of *Ceratodus*; the brain, the skull, and the pectoral limb.

3. Taxonomy of *Ceratodus*, and remarks on the classification of fishes [see *suprà*]. Günther's group *Palæichthyes* is objected to, on the ground that it brings into undue prominence the differences between the *Teleostei* and the other 'hyostylic' fishes, and that it is better to retain the Müllerian groups as equivalent assemblages.

WILDER, B. G. Notes on the North American Ganoids, *Amia*, *Lepidosteus*, *Acipenser*, and *Polyodon*. P. Am. Ass. (1875) 1876, pp. 151–196, 3 pls.

A lengthy memoir on the physiological characters, the brain, heart, and respiratory organs of Ganoid fishes, with sketch of a provisional arrangement of Vertebrates according to cerebral and cardiac characters. Section ii. of this paper "On the transformations of the tail of the Garpike (*Lepidosteus*)," pp. 153–166, is of special interest.

*Neoceratodus blanchardi*, g. & sp. nn., F. Castlenau, J. Zool. v. p. 132; = *Ceratodus forsteri*, juv., *id. l. c.* p. 343.

Notes on *Ceratodus*, by the same, communicated by Gervais; C. R. lxxxiii. p. 1034.

On the habits of living *Ceratodi* in captivity; E. P. Ramsay, P. Z. S. 1876, p. 698.

On their habits in their native conditions and on their colours when alive; Schmeltz, J. Mus. Godeffr. viii. p. 138.

## CHONDROPTERYGII.

BALFOUR, F. On the development of the Spinal Nerves in Elasmobranch Fishes. Phil. Tr. clxvi. pp. 175–196, pls. xvi.–xviii.

——, On the origin and history of the Urino-genital Organs of Vertebrates. J. Anat. Phys. x. pp. 17–48.

Deals especially with these organs in the *Selachia*.

BALFOUR, F. On the development of Elasmobranch Fishes. *Tom. cit.* pp. 377–411, pls. xv. & xvi., pp. 517–570, pls. xxi.–xxvi., and pp. 672–688; *op. cit.* xi. pp. 128–172, pls. v. & vi.

HIS, W. Ueber die Bildung der Haifisch-embryonen. Z. Anat.-Entwickel. ii. pp. 108–124, pl. vii.

HUBRECHT, A. Bronn's Klassen und Ordnungen des Thier-Reichs. vi. Abth. i. Leipzig & Heidelberg [in progress].

Pisces, Nos. 1 & 2, contain Introduction and commencement of the anatomy of the *Elasmobranchii*, pp. 1–48, pls. i.–vii.

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VIAULT, F. Recherches histolgiques sur la structure des centres nerveux des Plagiostomes. Arch. Z. expér. v. pp. 441–528, pls. xix.–xxii.

WILDER, B. G. Note on the development and homologies of the Anterior Brain-mass with Sharks and Skates. Am. J. Sci. (3) xii. pp. 103–106.

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*Chimæra monstrosa*, L., figured and described from Cuba by Poey, An. Soc. Esp. v. p. 378, pl. xiii.

*Platypodon perezi*, sp. n., p. 390, pl. xiv. figs. 2 & 3, Cuba; *P.* sp. without specific name, p. 392, pl. xiv. figs. 4 & 5; and *P.*? (*Isogomphodon*) *maculipinnis*, Poey, p. 393, fig. vi.: *id. l. c.*

*Hypoprion longirostris*, sp. n., *id. l. c.* p. 394, pl. xiv. figs. 8 & 9, Cuba.

[*Lamna*] *Oxyrhina spallanzanii*?, Bon. & Dum., doubtfully described and figured from Cuba; *id. l. c.* p. 381, pl. xiv. fig. 1.

*Squalus maximus*. Observations on the Concarneau specimen; P. & H. Gervais, C. R. lxxxii. p. 1237, and J. Zool. v. pp. 319–327, pls. xiii.–xv.

*Isistius brasiliensis*, Q. & G., found in the Indian Ocean; Peters, MB. Ak. Berl. 1876, p. 853.

*Raia*. A revision and synopsis of the species of Skates from the eastern coast of the United States, with general remarks on the spiracles and "claspers," the reproductive function of which as intromittent organs was determined by L. Agassiz. S. Garman, P. Bost. Soc. xvii. pp. 170–181.

*Raia eatoni*, sp. n., Günther, Ann. N. H. (4) xvii. p. 390, Kerguelen's Land.

*Torpedo oculata*. The development of the egg described through all its stages; A. Schultz, Arch. mikr. Anat. xi. p. 569.

# TELEOSTEI.

## ACANTHOPTERYGII.

### PERCIDÆ.

BLEEKER, P. Systema Percarum revisum. Parts 1 & 2. Arch. Néerl. xi. pp. 247–340.

A revised arrangement of the genera of Percoid Fishes.

*Paralabrax*, Gir., is based upon a character which fails in both the typical species. Girard overlooked the very thin 7th-branchiostegal ray in *P. clathratus*, which Gill separated in 1861 as *Atractoperca*. Remarks on *Serranus nebulifer* and *clathratus*. Steindachner, SB. Ak. Wien, lxxii. p. 29.

*Siniperca matsaki* (Guich.), sp. n., Sauvage, Ann. Sci. Nat. (6) i. art. v. China.

*Percalabrax pœcilonotus* and *spilonotus* (Guich.), spp. nn. *id. l. c.*, China.

*Pseudolates cavifrons*, g. & sp. nn., Alleyne & Macleay, P. Linn. Soc. N. S. W. i. p. 262, pl. iii. Torres Straits ?.*

*Centropomus unionensis*, Bocourt, redescribed; Steindachner, SB. Ak. Wien, lxxiv. p. 49.

*Aprion microdon*, sp. n.?, *id. l. c.* p. 206, Sandwich Islands.

*Callanthias allporti*, sp. n., Günther, Ann. N. H. (4) xvii. p. 390, Tasmania. (The genus is new to the Antarctic fauna.)

*Serranus*. The diagnoses of the following species (the plates of which have already appeared) are printed in Bleeker's Atlas Ichthyol. vi. pt. 30:—*Epinephelus urodelus*, Forsk., and *miniatus*, Forsk., p. 41, *cyanostigma*, K. v. H., p. 42, *argus*, Bl. Schn., p. 43, *formosus*, Sh., p. 44, *leopardus*, Lac., and *hoedti*, Blkr., p. 45, *undulosus*, Q. G., and *amblycephalus*, Blkr., p. 46, *waandersi*, Blkr., p. 47, *angularis*, C. V., and *variolosus*, C. V., p. 48, *lanceolatus*, Bl., p. 49, *maculatus*, Bl., p. 50, *pantherinus*, Lac., and *jansenii*, Blkr., p. 51, *macrospilus*, Blkr., p. 52, *corallicola*, K. v. H., and *bontoides*, Blkr., = *howlandi*, Gthr., p. 53, *stellans*, Rich., p. 54, *merra*, Lac., p. 55, *gilberti*, Rich., p. 56, *fusco-guttatus*, Rüpp., = *dispar*, Gthr.†, and *microdon*, Blkr., p. 57, *polyphecadion*, Blkr., p. 58, *goldmanni*,* Blkr., p. 59, *polypodophilus*, Blkr., and *sexfasciatus*, K. v. H., p. 60, *summana*, Forsk., p. 61, *rhyncholepis*, Blkr., and *caruleo-punctatus*, Bl., p. 62, *hœveni*, Blkr., p. 63, *ongus*, Bl., p. 64, *dictiophorus*, Blkr., p. 65, *nebulosus*, C. V., and *fasciatus*, Forsk., p. 66.

*Serranus gigas*, Brünn., ? = *S. mentzeli*, C. V., very plentiful and of large size at Rio Janeiro; Steindachner, *op. cit.* lxxiv. p. 175.

*Serranus panamensis*, sp. n., *id. op. cit.* lxxii. p. 551, pl. i. fig. 1, and *S. albo-maculatus*, Jen., figured, pl. i. fig. 2.

* This is clearly nothing but *Lates calcarifer*, Bl.; its occurrence in Australian waters was pointed out by Günther in 1870.—REC.

† These species are quite distinct in the British Museum collection.—REC.

Gill, p. 42, *H. mazatlanum*, Steind., = *Orthostoechus maculicauda*, Gill, p. 43, *H. caudimacula*, C. V., fully described, pp. 43–46; *H. brevirostrum*, Gthr., = *H. scudderi*, Gill, p. 46: Steindachner, *op. cit.* lxxii.

*Scolopsis*; synopsis of species, pp. 1–3. Diagnoses of *S. margaritifer*, K. v. H., p. 3, *leucotænia*, Blkr., and *inermis*, Schl., p. 4, *trilineatus*, Kn., and *cancellatus*, C. V., p. 5, *ciliatus*, Lac., p. 6, *bilineatus*, Bl., p. 7, *vosmeri*, Bl., and *torquatus*, C. V. [= *vosmeri*, Day], p. 8, *personatus*, C. V., p. 9, *taniopterus*, C. V., *bimaculatus*, Rüpp., p. 10, *monogramma*, K. v. H., p. 11; Bleeker, *op. cit.* vii. pt. 32.

*Scolopsis affinis*, sp. n., Peters, MB. Ak. Berl. 1876, p. 832, New Ireland and New Britain.

*Cæsio*; synopsis of species, p. 35. Diagnoses of *C. erythrogaster*, K. v. H., p. 36, *lunaris*, Ehr., and *xanthonotus*, Blkr., p. 37, *pisang*, Blkr., p. 38, *cærulaureus*, Lac., and *chrysozona*, K. v. H., p. 39, *digramma*, Blkr., p. 40; Bleeker, *op. cit.* vii.

*Pterocæsio*, g. n., for *Cæsio multiradiatus*, Steind.; *id. l. c.* p. 41.

(*Erythrichthys*) *Dipterygonotus leucogrammicus*, Blkr., ? = *Smaris balteatus*, C. V.; *id. l. c.* p. 42.

(*Gerres*). The following are figured by Bleeker, *op. cit.* vi. (pt. 31):—*Diapterus poeti*, pl. (Perc.) lxxvii. fig. 1, *acinaces*, Blkr., fig. 2, *kapas*, Blkr., fig. 3, *oyena*, fig. 5, *macracanthus*, pl. lxxviii. fig. 1, *filamentosus*, fig. 3, *abbreviatus*, fig. 4, *macrosoma*, fig. 5 (pls. ccclxi. & ccclxii. of the entire work).

*Eucinostomus productus*, sp. n., Poey, Ann. Lyc. N. York, xi. p. 59. This = *Diapterus lefroyi*, G. Browne-Goode [Zool. Rec. xi. p. 91], with two anal spines; G. Browne-Goode, Bull. U. S. Nat. Mus. No. 6, Catalogue of Fishes of the Bermudas, p. 39. [The Recorder has lately seen another species from the Bermudas with only two anal spines, and very different in shape from the present.]

*Gerres cheverti*, p. 272, pl. vii. fig. 1, and *longicaud*[*at*]*us*, pl. vii. fig. 2, Cape Grenville, *carinatus*, p. 273, fig. 4, Darnley Island, *bispinosus*, fig. 3, Hall Sound, New Guinea, Alleyne & Macleay, *l. c.* spp. nn.

*Gerreomorpha*, g. n., with characters of *Gerres*, but having 10 dorsal spines, for *G. rostrata*, sp. n., *iid. l. c.* p. 274, pl. viii. fig. 3, Torres Straits.

*Pentaprion longimanus*, Blkr., figured by Bleeker, *op. cit.* vi. (Perc.) pl. lxxviii. fig. 2.

## Squamipinnes.

Bleeker, P. Notice sur les genres et les espèces des Chétodontoïdes de la sous-famille des Taurichthyiformes (*Chætodon*, *Heniochus*, *Chelmo*). Versl. Ak. Amst. (2) x. pp. 308–320.

The author rehabilitates the genera *Microcanthus*, Sw., *Megarotodon*, Guich., *Coradion* and *Citharædus*, Kp. (the latter as a subgenus of *Chætodon*, which he prefers to call *Tetragonopterus*). He further proposes *Chelmonops*, g. n. (for *Chætodon truncatus*, Kner.), p. 311; *Hemitaurichthys*, g. n. (for *Chæt. polylepis*, Blkr.), p. 312; and the following new subgenera:—*Hemichætodon* (type, *Chætodon capistratus*, Bl.), *Chætodontops* (*Ch. collaris*, Bl.), *Lepidochætodon* (type, *Ch. unimaculatus*, Bl.),

p. 313; *Oxychætodon* (type, *Ch. lineolatus* Q. G.); and *Gonochætodon* (type, *Ch. triangulum*, K. v. H.), p. 314. He also gives a nominal list of the species, which he estimates at rather more than 70.

The following figures of *Chætodontidæ* are issued by Bleeker, Atl. Ichthyol. vi. pts. 31 & 32, (Chætod.), pls. i.–xvi., pls. cccIxiii.–cccIxxviii. of the entire work. *Toxotes microlepis*, Gthr., pl. i. fig. 1, *Ephippus argus*, Cuv., fig. 2, *Toxotes oligolepis*, Blkr., fig. 3, *jaculator*, fig. 4, *chatareus*, fig. 5; (*Holacanthus*) *Acanthochætodon nicobaricusis*, pl. iii. fig. 1, *Taurichthys varius*, C. V., fig. 2, *monoceros*, Blkr., fig. 3, *Harpochirus punctatus*, Cant., fig. 4, *Harches orbis*, Cant., fig. 5, *Taurichthys chrysostomus*, pl. iv. fig. 4, *Prognathodus longirostris*, fig. 5, *Taurichthys macrolepidotus*, pl. v. fig. 1, *Acanthochætodon imperator*, fig. 2, *Holacanthus bispinosus*, Gthr., pl. vi. fig. 1, *melanospilus*, fig. 2, *nox*, fig. 3, *Chætodontoplus chrysocephalus*, fig. 4, *Holacanthus diacanthus*, Gthr., fig. 5, *Chætodontoplus melanosoma*, pl. vii. fig. 1, *Chelmon rostratus*, Cuv., fig. 2, *Holacanthus bicolor*, C. V., fig. 3, *Chætodontoplus dimidiatus*, fig. 4, *mesoleucus*, Lac., fig. 5, *Acanthochætodon annularis*, pl. viii. figs. 1 & 2, *striatus*, fig. 3, *semicirculatus*, fig. 5, *Holocanthus tibicen*, C. V., fig. 4, *vrolikii*, Blkr., pl. ix. fig. 1, *xanthometopon*, Blkr., fig. 2, *navarchus*, C. V., fig. 3, *lamarckii*, Lac., *Acanthochætodon lepidolepis*, Blkr., pl. x. fig. 1, *Holocanthus sexstriatus*, K. v. H., fig. 2, *Tetragonopterus Oxychætodon*) *falcula*, pl. xi. fig. 1, *T.* (*Chætodontops*) *collaris*, fig. 2, *T.* (*Lepidochætodon*) *kleinii*, fig. 3, *T.* (*Linophora*) *auriga*, fig. 4, *Holacanthus trimaculatus*, Lac., fig. 5, *Tetragonopterus* (*Gonochætodon*) *triangulum*, pl. xii. fig. 1, *T.* (*Chætodontops*) *fasciatus*, fig. 2, *T. punctato-fasciatus*, fig. 3, *Acanthochætodon imperator*, fig. 4, *Tetragonopterus* (*Rhabdophorus*) *semion*, fig. 5, *Coradion melanopus*, pl. xiii. fig. 1, *Tetragonopterus* (*Citharœdus*) *ornatissimus*, fig. 2, *T.* (*Rhabdophorus*) *speculum*, fig. 3, *Megaprotodon strigangulus*, fig. 4, *T.* (*Lepidochætodon*) *unimaculatus*, fig. 5, *Tetragonopterus* (*Chætodontops*) *melanotus*, pl. xiv. fig. 1, *T.* (*Rhabdophorus*) *bennetti*, fig. 2, *T. octo-fasciatus*, fig. 3, *T.* (*Linophora*) *rafflesi*, fig. 4, *Coradion chrysozonus*; Kp., fig. 5, *Tetragonopterus* (*Rhabdophorus*) *trifasciatus*, pl. xv. fig. 1, *T.* (*Oxychætodon*) *lineolatus*, fig. 2, *T. miliaris*, fig. 3, *Parachætodon ocellatus*, fig. 4, *T.* (*Chætodontops*) *selene*, fig. 5, *T.* (*Linophora*) *vagabundus*, pl. xvi. fig. 1, *T.* (*Rhabdophorus*) *ephippium*, fig. 2, *T.* (*Linophora*) *xanthurus*, fig. 3, *Hemitaurichthys polylepis*, fig. 4, *Tetragonopterus* (*Citharœdus*) *meyeri*, fig. 5.

*Chætodon zoster*, Benn. In spite of a different radial formula, Peters has recognized this species in K. Möbius' collection from Mauritius; MB. Ak. Berl. 1876, p. 437.

*Chætodontoplus*, g. n., for *Holacanthus septentrionalis*, Schl.; Bleeker, Arch. Néerl. xi. p. 307.

*Acanthochætodon*, g. n., for *H. annularis*, Lac.; *id. l. c.* p. 308.

*Pomacanthus*. Bleeker argues that the appellation *Chætodon*, Art., should more properly be applied to this genus, as the only *Chætodontidæ* included by Artedi under the latter name, are *Pomacanthi* of modern authors. He has also come to the conclusion that *P. arcuatus*, L., and *P. aureus*, Bl., are distinct species. *L. c.* pp. 178–185.

*Scorpis vinosa*, sp. n., Alleyne & Macleay, *l. c.* p. 277, pl. ix. fig. 2, Darnley Island.

*Scorpis californiensis*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 47, San Diego.

*Toxotes squamosus*. Description of specimens; Hutton, *l. c.* p. 210.

## Mullidæ.

*Brachymullus*, g. n., for *Upeneus tetraspilus*, Gthr.; Bleeker, Verh. Ak. Amst. xv. (1875) and Arch. Néerl. xi. p. 333.

## Sparidæ.

The following are figured by Bleeker, Atl. Ichthyol. vi. pt. 30:—

*Lethrinus ornatus*, C. V., (Perc.) pl. lxxii. fig. 4, *callopterus*, pl. lxxiii. fig. 3, *lutjanus*, C. V., pl. lxxvi. fig. 5, *Sparus datnia*, Blkr., pl. lxxvii. fig. 4, *Pimelepterus lembus*, C. V., (Chætod.) pl. ii. fig. 1, *waigiensis*, Q. G., fig. 2, *oblongior*, C. V., fig. 3, *cinerascens*, Day, fig. 4.

*Pachymetopon squamosum*, sp. n., Alleyne & Macleay, *l. c.* p. 275, pl. ix. fig. 1, New Guinea.

*Sargus kotschii*, sp. n., Indian Ocean and Persian Gulf, p. 203, and *S. auricentris*, Peters ?, Mauritius, p. 204, Steindachner, *op. cit.* lxxiv.

*Puntazzo*, g. n., for *Chrysophrys puntazzo*, C. V., renamed *annularis*; Bleeker, Arch. Néerl. xi. p. 284.

*Lethrinus laticaud[at]us* and *papuensis*, spp. nn., Alleyne & Macleay, *l. c.* p. 276, pl. viii. fig. 2, New Guinea.

*Chrysophrys hasta*, Bl., *Sparus schlegeli*, Blkr., p. 2, pl. i., *datnia*, Blkr., p. 5, pl. ii., and *hasta*, Blkr., Schn., p. 9, pl. iii., are redescribed and figured as distinct species, with an attempt to fix their synonymy, by Bleeker, Versl. Ak. Amst. (2) xi. pp. 1–12. [Günther arranges them as varieties of *C. hasta*.]

*Sparus* (*Chrysophrys*) *heterodus*, sp. n., Peters, *l. c.* p. 833, River Congo.

## Cirrhitidæ.

*Paracirrhites forsteri*, (Perc.) pl. lxxi. fig. 5, and *amblycephalus*, pl. lxxii. fig. 1, *Oxycirrhites typus*, pl. lxxiii. fig. 2, *Cirrhitichthys oxycephalus*, pl. lxxv. fig. 1, and *polyactis*, pl. lxxvi. fig. 1, figured by Bleeker, Atl. Ichthyol. vi. pt. 30.

*Chilodactylus allporti*, Gthr., = *spectabilis*, Hutt.; A. Günther, Ann. N. H. (4) xvii. p. 393.

*Holoxenus*, g. n. Body compressed, covered like the fins with loose skin, which is either finely granular or provided with minute scales. The greater part of the spinous dorsal forms a separate fin, some of the posterior spines being continuous with the soft fin; three anal spines; caudal rounded; pectoral rays simple, not prolonged or thickened; eye small; mouth of moderate width, with bands of villiform teeth; gill opening very wide; four gills with a cleft behind the fourth; pseudobranchiæ. Type, *H. cutaneus*, sp. n. One of the most singular of the Tasmanian fishes, forming a passage between the *Cirrhitidæ* and *Scorpænidæ*. Id. *ibid.*

## Scorpænidæ.

Bleeker, P. Mémoire sur les espèces insulindiennes de la famille des Scorpénoïdes. Verh. Ak. Amst. xvi. 100 pp. 5 pls.

The same author, in a preliminary list of the genera of *Scorpænidæ*, enumerates as new genera *Parascorpæna* (type, *S. picta*, K. v. H.), *Parapterois* (type, *Pterois heterurus*, Blkr.), p. 296, *Paracentropogon* (type, *Tetrarage longispinis*, C. V.), p. 297, *Cottapistus* (type, *Prosopodasys cottoides*, C. V.), p. 298, and *Gnathanacanthus* (type, *G. goetzi*, Blkr., sp. n. ♀, not yet described, D. ¼ A. ⅓), p. 299; Versl. Ak. Amst.(2) ix. pt. 3.

*Sebastes marinus*, L., and *S. viviparus*, Kr. R. Collett (Norges Fiske, p. 19) still regards these forms as belonging to one species; on the other hand, Lütken (Vid. Medd. 1876, pp. 358–363), after giving an historical account of the views of different ichthyologists on this question, states that from an examination of 20 specimens of each form, during which he never had any difficulty in referring the examples to one or other category, he has come to the conclusion that the two species are perfectly distinct; he also finds that they have a different distribution, *S. viviparus* being not only more littoral but less arctic in its range than *S. marinus*. The opinion formed by Gray and Günther is thus confirmed. Lütken thinks that the Linnæan name should be adopted instead of that of *S. norwegicus*.

*Sebastes alporti*, Cast., = *S. percoides*; A. Günther, Ann. N. H. (4) xvii. p. 392.

*Tetraroge darnleyensis*, sp. n., Alleyne & Macleay, *l. c.* p. 278, pl. vi. fig. 1, Darnley Island.

*Hemitripterus acadianus*, Penn., recorded from the north of Japan; Steindachner, SB. Ak. Wien, lxxii. p. 613.

## Teuthidæ.

*Teuthis studeri*, sp. n., Peters, *l. c.* p. 834, New Britain.

## Berycidæ.

The following figures are issued by Bleeker, Atl. Ichthyol. vi. pt. 30 (pls. cccl.–cccl x. of the entire work):—*Holocentrum violaceum* (Trachichth.) pl. i. fig. 2, *Myripristis melanostigma*, Blkr., fig. 3, *Holocentrum diadema*, Lac., pl. ii. fig. 1, *M. adustus*, Blkr., fig. 2, *H. caudimaculatum*, Rüpp., fig. 3, *Monocentris japonicus*, C. V., fig. 4, *Myripristis bleekeri*, Günth., fig. 5, *Rhynchichthys brachyrrhynchus*, Blkr., pl. iii. fig. 1, *H. melanopterus*, Blkr., fig. 2, *spiniferum*, Rüpp., fig. 3, and *rubrum*, Rüpp., fig. 4, *M. violaceus*, Blkr., fig. 5, *H. tiereoides*, Blkr., pl. iv. fig. 1, *M. microphthalmus*, Blkr., fig. 2, *H. operculare*, C. V., fig. 3, *M. parvidens*, C.V., fig. 4, *M. trachyaeron*, Blkr., fig. 5, *H. melanospilus*, Blkr., pl. v. fig. 1, *punctatissimum*, C. V., fig. 2, *macrolepis*, Blkr., fig. 3, *pahudi*, Blkr., fig. 4, *cornutum*, Blkr., fig. 5, *argenteum*, C. V., pl. vi. fig. 1, and *binotatum*, Q. G.,

fig. 2, *M. murdjan*, Rüpp., fig. 3, *H. pœcilopterus*, Blkr., fig. 4, *H. sammara*, C. V., fig. 5.

*Rhynchichthys*, C. V. F. Day remarks that this genus probably consists of the young of *Holocentrum*, and that his *R. ornatus* (P. Z. S. 1868) is perhaps the fry of *H. rubrum*; Fishes of India, p. 170.

*Holocentrum andamanense*, Day, figured; *id. tom. cit.* pl. xli. fig. 3.

## Polynemidæ.

*Polynemus sexfilis*, Playf., is not identical with *P. sexfilis*, Gthr. (Catal.), and, if not *P. kuru*, may be renamed *P. playfairi*; Day, Fishes of India, p. 178. Figures of *P. heptadactylus*, C. V., pl. xlii. fig. 5, and *sexfilis*, Gthr. (? C. V.), pl. xliii. fig. 1; *id. l. c.*

## Sciænidæ.

*Umbrina januaria*, Steindachner, SB. Ak. Wien, lxxiv. p. 170, Rio Janeiro, and *U. panamensis*, id. *op. cit.* lxxii. p. 559, pl. ix. fig. 1, Panama, spp. nn.

*Umbrina undulata*, Gir., recharacterized; *id. op. cit.* lxxii. p. 49.

*Umbrina sinuata*, sp. n., Day, Fishes of India, p. 182, pl. xlvi. fig. 1, Kurrachee.

*Umbrina dussumieri*, C. V., figured; *id. op. cit.* pl. xliii. figs. 2 & 3.

*Sciæna bleekeri*, p. 185, pl. xlv. fig. 4, Bombay, and *S. osseus*, p. 193, pl. xlvi. fig. 3, Malabar, spp. nn., *id.* op. cit. *S. dussumieri*, Day, *nec* C. V., renamed *S. glaucus*, and figured; *id. l. c.* p. 192, pl. xlvi. fig. 2.

*Sciæna miles*, Blkr., pl. xliii. fig. 5, *vogleri*, Blkr., pl. xlv. fig. 1, *sina*, C. V., pl. xliv. fig. 2, *coitor*, H. B., pl. xliv. fig. 3, *axillaris*, C. V., pl. xliii. fig. 6, *albida*, C. V., pl. xliv. figs. 4 & 6, *aneus*, Bl., pl. xlv. fig. 5, *belengeri*, C. V., pl. xliv. fig. 5, figured; *id. op. cit.*

*Sciænoides microdon*, Blkr., pl. xlv. fig. 2, *biauritus*, Cantor, pl. xlvii. fig. 1, *brunneus*, Day, pl. xlv. fig. 6, figured; *id. op. cit.*

*Otolithus argenteus*, C. V., figured; *id. op. cit.* pl. xlv. fig. 3.

*Otolithus californiensis*, p. 59, and *magdalenæ*, p. 62, spp. nn., Steindachner, SB. Ak. Wien, lxxii., San Diego and Magdalena Bay.

*Corvina stearnsi*, p. 50, San Diego, California. *C. macrops*, p. 52, pl. ii., (*Homoprion*) *furthi*, p. 54, pl. iii., and (*Homoprion*) *acutirostris*, p. 56, pl. iv., Panama, spp. nn., *id. l. c.*

*Corvina subæqualis*, sp. n., Poey, Anu. Lyc. xi. p. 58, Cienfugos ?, D. $10\frac{1}{25}$. Said to be closely allied to *Diapterus lefroyi*, Browne-Goode [which is, however, a *Gerres*, and has D. $\frac{9}{10}$].

## Xiphiidæ.

*Xiphias gladius*, L. More specimens have been obtained, confirming Hector's statement of its occurrence in New Zealand waters; T. F. Cheeseman, Tr. N. Z. Inst. viii. p. 219, and Hutton, *l. c.* p. 211.

*Histiophorus herscheli*, Gray. Description of specimen caught in Dunedin Harbour; Hutton, *l. c.*

*Histiophorus brevirostris*, Playf. ?, figured; Day, *op. cit.* pl. xlvii. fig. 3.

### TRICHIURIDÆ.

*Trichiurus muticus*, Gray, figured; Day, *op. cit.* pl. xlvii. fig. 5.

*Lepidopus caudatus*, Euphras. C. H. Robson has studied the habits of the "Frost-fish" or "Hiku," and finds that it comes on shore deliberately, and not in pursuit of prey or to rid itself of a parasite; Tr. N. Z. Inst. viii. p. 218. Recorded from Tasmania for the first time; M. Allport, Pr. R. Soc. Tasm. 1875, p. 86.

### ACRONURIDÆ.

*Acanthurus auro-lineatus*, sp. n., Day, *op. cit.* p. 204, pl. xlviii. fig. 3, Coromandel.

*Acanthurus monroviæ*, sp. n., Steindachner, *op. cit.* lxxiv. p. 208. The second species from West Africa.

*Acanthurus plagiatus*, sp. n., Peters, MB. Ak. Berl. 1876, p. 439, Mauritius.

### CARANGIDÆ.

*Caranx boops*, C. V., pl. xlix. fig. 2, *calla*, C. V., pl. xlix. fig. 5, *oblongus*, C. V., pl. l. fig. 1, *leptolepis*, C. V., pl. li. fig. 4, figured by Day, *op. cit.*

*Caranx nigripinnis*, sp. n., *id. l. c.* p. 225, pl. li. fig. 5, Madras and Andamans.

*Caranx melanostethus*, Day, = *C. præustus*, Benn. & Blkr., = *C. ire*, C. V.; Günther, J. Mus. Godeffr. xi. p. 134.

*Caranx gymnostethoides*, Blkr., ? = *gymnostethus*, C. V., and figured by Day, *op. cit.* pl. xlviii. fig. 6. The latter, however, is *C. ferdau*, Forsk., and is figured, pls. lxxxvii. & lxxxviii., as are also *hippos*, L., pl. xxxiv., *ascensionis*, C. V., pl. lxxxv., *melampygus*, C. V., pl. lxxxvi., and *ciliaris*, Bl., pl. lxxxix.; A. Günther, *l. c.*

*Caranx furthi*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 562, Panama.

*Seriola hippos*, sp. n., Günther, Ann. N. H. (4) xvii. p. 392, Sydney.

*Seriola mazatlana*, sp. n., Steindachner, *op. cit.* lxxiv. p. 56.

*Seriola dumerili*, Risso, figured; Günther, J. Mus. Godeffr. xi. pl. xc. fig. A.

*Seriolichthys bipinnulatus*, Q. & G., figured; *id. l. c.* pl. xc. fig. B.

*Neptomenus*, Gthr., = *Seriolella*, Guich.; *id.* Ann. N. H. (4) xvii. p. 394.

*Seriolella porosa*, Guich. Specimen agreeing with description, from New Zealand; Hutton, Tr. N. Z. Inst. viii. p. 211.

*Platystethus huttoni*, sp. n., Günther, Ann. N. H. (4) xvii. p. 395, New Zealand.

*Chorinemus moadetta*, C. V., pl. li. B, fig. 1, and *toloo*, C. V., pl. li. A, fig. 3, figured by Day, *op. cit.*

*Trachynotus bailloni*, Lac., pl. li. A, fig. 4, and *T. russelli*, pl. li. B, fig. 3, figured by Day, *op. cit.* They are both the same species; Günther, J. Mus. Godeffr. xi. p. 139.

*Trachynotus kennedyi*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 75, fig. 9, Magdalena Bay, Lower California. It = *T. ovatus*, L.; Günther, J. Mus. Godeffr. xi. p. 139.

*Trachynotus augustus*, sp. n., Reichenow, SB. nat. Fr. 1875, p. 147, Loango.

*Anomalops palpebratus*, Bodd., figured by Günther, *op. cit.* pl. cxi. A. and by Bleeker (*Heterophthalmus catoptron*, Blkr.), Atl. Ichthyol. (Trachichth.) pl. i. fig. 1.

*Gazza argentaria*, Forsk., figured by Günther, *op. cit.* pl. xci. B.

*Psenes*, C. V.: *Cubiceps indicus*, Day, and *C. multiradiatus*, Gthr., = *P. javanicus*, C. V., and ? = *P. cyanophrys*, C. V., belong to this genus. The name *P. guamensis* adopted for a specimen with D $^{9}/_{32}$, figured, pl. cxi. C; Günther, *op. cit.* p. 145.

*Psenes javanicus*, C. V., pl. li. C, fig. 1, and *indicus*, pl. liv. fig. 2, figured by Day, *op. cit.* [as separate species].

*Paropsis signata*, Jen., description supplemented; Steindachner, SB. Ak. Wien, lxxii. p. 77.

*Psettus* (*Parapsettus*, subg. n.) *panamensis*, sp. n., *id. l. c.* p. 72, fig. 10, Panama.

*Psettus falciformis*, Lac., figured by Day, *op. cit.* pl. li. A, fig. 6.

*Zanclus cornutus*, Cuv. (Chætod.) pl. iv. figs. 1 & 2, *canescens*, Gthr., fig. 3, figured by Bleeker, *op. cit.*

*Platax vespertilio*, Cuv. (Chætod.) pl. xvii. fig. 1, and pl. xviii. figs. 2 & 3, *teira*, Cuv., *pinnatus*, Blkr. (juv.), pl. xviii. fig. 1, *melanosoma*, fig. 4, figured; *id. l. c.*

*Equula splendens*, Cuv., pl. lii. fig. 3, *daura*, Cuv., pl. lii. fig. 4, *blochi*, C. V., pl. lii. fig. 5, *brevirostris*, C. V. (*nec* Blkr.), described, p. 241, *lineolata*, C. V., pl. li. C, fig. 3, *insidiatrix*, C. V., pl. li. C, fig. 5, *ruconius*, H. B., pl. li. C, fig. 4, figured by Day, *op. cit.*

## Coryphænidæ.

*Coryphæna hippurus*, L. Sexes differentiated, and confusion in synonymy discussed; F. Poey, An. Soc. Esp. v. p. 133.

*Coryphæna immaculata*, Poey, *nec* Agassiz, *nec* Gronow, renamed *concolor*; id. *l. c.* p. 134.

*Coryphæna equisetis*, L., figured; Günther, *op. cit.* pl. xciii. A.

*Taractes*, Lowe. Very small fishes, imperfectly known, and thought to be the young of *Brama*; diagnosis of specimens considered to be *B. orcini*, C. V. *Id. l. c.* p. 148.

## Scombridæ.

*Scomber diego*, Ayres, = *S. colias*, Gm.; Steindachner, SB. Ak. Wien, lxxii. p. 81.

*Thynnus thunnina*, C. V., p. 150, pl. xcv., and *T. germo*, Lac. (*T. pacificus* and *argentivittatus*, C. V., p. 151, pl. xcvi., described and figured; Günther, *op. cit.*

*Pelamys orientalis*, Schleg., = *P. chilensis*, C. V., p. 253, figured, pl. lvi. fig. 1; Day, *op. cit.*

*Cybium kuhli*, C. V., pl. lvi. fig. 2, *interruptum*, C. V., pl. lvi. fig. 3, *guttatum*, Bl., Schn., pl. lv. fig. 1, and pl. lvi. fig. 4, figured by Day, *op. cit.*

*Cybium solandri*, C. V. Notice of this rare fish, no example of which has been known in collections, with reproduction of Parkinson's figure and sketch by Garrett of a specimen found 300 miles to the north of Hervey Island; Günther, *op. cit.* p. 153, pls. xciv. A & B.

*Echeneis*. C. Lütken gives a synopsis of this genus, founded upon an examination of the species in the Copenhagen Museum; he divides it into two groups having the rank of subgenera and redescribes five species; *E. sphyrænarum* = *E. lineata*, Menz., juv., *E. squalipeta*, Dodd, = *E. remora*, juv. Vid. Medd. 1875, p. 26.

## Trachinidæ.

*Bembrops*, g. n. Snout remarkably depressed, spatuliform, and of considerable length, head completely scaly above and on the sides; in other respects like a *Bembras* or *Platycephalus*: for *B. caudimacula*, sp. n. Steindachner, *op. cit.* lxxiv. p. 212, Nagasaki.

*Uranoscopus* (*Upselonphorus* [*Hypselophorus*]) *sexspinosus*, sp. n., *id. l. c.* p. 167, pl. xiii. fig. 1, Rio Janeiro.

*Uranoscopus inermis*, C. V., = *Ichthyscopus* (Sw.) *inermis*; Day, *op. cit.* p. 261, pl. lv. fig. 2.

*Anema monopterygium*. Hutton's opinion that two species are confounded under this is not endorsed, after renewed examinations; the filament in the mouth is sometimes lost. A. Günther, Ann. N. H. (4) xvii. p. 394.

*Leptoscopus huttoni*, Haast, = *L. macropygus*, and *L. robsoni*, Hect., = *L. angusticeps*, Hutt. juv.; *id. l. c.* p. 394. *L. angusticeps* ? = *Crapatalus novæ-zelandiæ*, Gthr.; Hutton, *l. c.* p. 212.

*Percis allporti*, sp. n., Günther, *l. c.* p. 394, Tasmania.

*Percis tetracanthus*, Lacép., figured; *id.* J. Mus. Godeffr. xi. pl. xciii. B.

*Sillago gracilis*, sp. n., Alleyne & Macleay, P. Linn. Soc. N. S. W. i. p. 279, pl. vi. fig. 2, New Guinea.

*Eleginus chilensis*, Gay, and *Aphritis undulatus*, Jen., = *E. maclovinus*, C. V.; Steindachner, SB. Ak. Wien, lxxii. p. 65.

*Cottoperca*, g. n., closely allied to *Bovichthys*, but with head and body covered with ctenoid scales; opercle ending in a spine. *C. rosenbergi*, sp. n. (D. $\frac{7}{23}$, A. 21), *id. l. c.* p. 69, pl. v. fig. 5, west coast of Patagonia.

*Pseudochromis polyacanthus*, Bikr., figured by Günther, *op. cit.* pl. xcviii. A.

*Opisthognathus maculatus*, sp. n., Alleyne & Macleay, *l. c.* p. 280, pl. ix. fig. 3, Palm Island.

*Notothenia hassleriana*, p. 69, fig. 6, and *longipes*, p. 70, fig. 7, from Magellan Straits, spp. nn., *N. tessellata*, p. 72, fig. 8, and *cornucola*, Rich. (= *virgata* and *marginata*, Rich.), p. 73, redescribed; Steindachner, SB. Ak. Wien, lxxii.

*Notothenia antarctica*, Kerguelen's Land, and *squamiceps*, Magellan Straits, Peters, MB. Ak. Berl. 1876, p. 837, spp. nn.

*Notothenia maoriensis*, Haast, *N. coriiceps*?, Hutt., *nec* Rich., described, Hutton, *l. c.* p. 212.

*Stigmatonotus*, g. n. (Pseudochr.). Body elliptical, moderately compressed; mouth deeply cleft, præoperculum toothed, operculum armed, suborbital unarmed, narrow, with large pores; a band of small pointed teeth in the jaws, on the vomer and the palatine bones; scales etenoid, lateral line incomplete; a long dorsal fin with fewer spines than rays; anal spines 3, ventrals $\frac{I}{5}$, somewhat before the pectorals; gill opening wide; branchiostegals, 6; gills $3\frac{1}{2}$; free thread-like pseudobranchiæ; lower pharyngeals separated. Type, *S. australis*, sp. n. (D. $\frac{I}{17}$, A. $\frac{3}{8}$, Ll. 46); Peters, *l. c.* p. 838, fig., Dirk-Hartog Island, W. Australia, in 3 fath.

## Malacanthidæ.

*Malacanthus hoedti*, Blkr., figured by Günther, *op. cit.* pl. xcviii. B.

## Batrachidæ.

*Thalassophryne punctata*, p. 169, Bahia, *amazonica*, and *nattereri*, p. 161, Rio Negro and Amazon, Steindachner, *l. c.* lxxiv. spp. nn.

## Pediculati.

*Antennarius marmoratus* (*A. lioderma*, Blkr.), pl. c. A, *hispidus*, Bl., Schn., pl. xcix. A, *striatus*, Sh., pl. xcix. B, *bigibbus*, Lac., pl. cv. B, figured, and a series of figures of *A. commersoni*, p. 163, pls. c.–cvi., representing the very numerous nominal species which are found to be merely colour-varieties of this one; Günther, *op. cit.*

## Cottidæ.

*Blepsias cirrhosus*, Pall., found at Puget Sound and San Francisco, redescribed; Steindachner, SB. Ak. Wien, lxxiv. p. 176.

*Nautichthys oculo-fasciatus*, Gir., redescribed and figured; *id. l. c.* p. 178, pl. xiv. fig. 1.

Lütken remarks that the sexual differences are perhaps greater and more frequent in this than in any other family of fishes. In a preliminary notice of the Arctic and Boreal species, he gives an account of these variations in the case of each; Vid. Medd. 1876, pp. 355–387.

[*Cottus*] *Phobetor ventralis*, C. V., has been [illegible] under different names, and is now found to have a vast circ[illegible]r range. *Cottus pistilliger*, Pall., is referred to it, the 'pistils' described by Pallas being the spinous semi-cruciform scales of part of the sides in *C. tricuspis*, Reinh. Annelids were found in its stomach, as stated previously by Fabricius, and remarks are made on the differences of the sexes. *Id. l. c.* pp. 363–366, and Steindachner, SB. Ak. Wien, lxxii. p. 613.

R. Collett has found small Crustaceans in the stomach, and confirms Lütken's observation of the preponderance of the females; Norges Fiske, p. 30.

*Cottus filamentosus*, Sauv., from the Sandwich Islands, is perhaps a second species of *Phobetor*; Lütken, *l. c.*

*Ptyonotus*, Gthr. (*Triglopsis*, Gir.), a genus which rests only upon the height of its second dorsal, a character found in the males of many Cottoids (e. g., *C. quadricornis*) cannot be separated from *Cottus*; id. *l. c.* p. 366.

*Cottus pachypus*, Gthr., = *scorpioides*, Fabr.: a new diagnosis and notice of this species, which is perfectly well established, and was recognized by Reinhardt; *id. l. c.* p. 368.

*Cottus scorpius*, Fabr. Malmgren's assertion of the identity of *C. grænlandicus*, C. V., and *C. scorpius*, is confirmed by Collett (Norges Fiske, p. 24) and Lütken, *l. c.* p. 370, who, however, retains the first name as designating a distinct variety, although it is not always possible to distinguish between specimens from Greenland and from Denmark, p. 371. *B. porosus*, C. V., = *C. scorpius*, as stated by Malmgren; *id. l. c.*

*Cottus quadricornis*, L. Lütken confirms Peters' determination of specimens from the eastern coast of Greenland as identical with this species in the Baltic; *l. c.* p. 375.

*Cottus lilljeborgi*, sp. n., Collett, Norges Fiske, p. 25, pl. i. figs. 4 & 5, Norway. Two more individuals recently procured from the Färoe Islands; further remarks on its characters and distinctions from *C. bubalis*; it must be one of the smallest species of Cottoids: Lütken, *l. c.* p. 376.

*Cottunculus*, g. n. Head extremely large, high and broad ovate, operculum unarmed, body short and thin, compressed posteriorly, scaleless, head with scattered pointed needle-like spines, lateral line invisible, eyes very small. Type, *C. microps*, sp. n., R. Collett, Norges Fiske, p. 20, pl. i. figs. 1–3, Hammerfest.

*Uranidea wheeleri*, Cope, figured in Wheeler's Rep. Geogr. Explor. W. of 100th mer. v. chap. 6, pl. xxxii. figs. 3 A, B.

*Triglops pleurostictus*, Cope (1865), = *T. pingeli*, Reinh.; Lütken, *l. c.* p. 378.

*Centridermichthys uncinatus*, Rich. Notice and redescription; Lütken, *l. c.* p. 379, and Collett, *l. c.* p. 31.

*Icelus furciger*, Malm., = *I. hamatus*, Kr.; Collett, *l. c.* p. 35, and Lütken, *l. c.* p. 380.

*Artedius pugetensis*, sp. n., Steindachner, SB. Ak. Wien, lxxiv. p. 181, pl. xiv. fig. 2, Puget Sound. Note on *A. notospilotus* and *lateralis*, Gir.

*Platycephalus tentaculatus*, Rüpp. (= *P. longiceps*, C. V. & Klunz.), figured, pl. cvii. A & B, with remarks on the distinctness of *P. nematophthalmus*, Gthr., p. 166. *P. variolosus*, sp. n., Navigator Islands, p. 167, pl. cix. A. Günther, J. Mus. Godeffr. xi.

*Platycephalus tuberculatus*, C. V., pl. lx. fig. 5, and *macracanthus*, Blkr., pl. lix. fig. 3, figured; *P. scaber*, Gthr., = *P. rodericensis*, C. V., p. 275: Day, *op. cit.*

*Platycephalus ransonneti*, sp. n., Steindachner, *l. c.* p. 209, Singapore.
*Trigla* (*Lepidotrigla*) *strauchi*, sp. n., *id. l. c.* p. 214, Hakodadi.
*Trigla kumu*, var. n *dorso-maculata*, id. *l. c.*, p. 216, China.

## Cataphracti.

*Agonus*. Lütken remarks that of the numerous attempted divisions of this genus, *Agonopsis* may be retained on account of the possession of teeth on the palate and vomer; Kröyer overlooked the palatal teeth. *A. chilocusis*, Jen., = *A. niger*, and differs from the other members of *Agonus* in being antarctic, p. 381. *A. malarmoides*, Deslongch., = *A. decagonus*, Bl. (*A. spinosissimus*, Kr.). *A. cataphractus*, Fabr., also = *A. decagonus*; it being a mistake to suppose that the former occurs at Greenland, p. 382. Table of local variation in characters of *A. cataphractus* in Iceland, Denmark, and Färoe, p. 384. Vid. Medd. 1876.

*Siphagonus*, g. n. A curious new form, with the snout produced into a long Syngnathoid tube, chin prominent, with barbel. *S. barbatus*, sp. n., Steindachner, *l. c.* p. 188, pl. v. Behring's Straits and Nagasaki, Japan.

*Hypsagonus* (Gill) *swani*, sp. n., *id. l. c.* p. 192, pl. iv. Puget Sound.

*Anoplagonus*, Günth., = *Aspidophoroides*, and *Asp. monopterygius*, Lac., has a lateral line and teeth on the vomer; *A. olriki*, sp. n., p. 386, fig., Greenland. Lütken, *l. c.*

## Discoboli.

*Liparis pulchellus*, Ayres, and *L.* (*Neoliparis*, subg. n.) *mucosus*, Ayres, redescribed; Steindachner, SB. Ak. Wien, lxxii. pp. 81 & 82.

## Gobiidæ.

*Gobius brevirostris*, Gthr., pl. lxiii. fig. 5; *ocellatus*, Day, pl. lxi. fig. 7; *masoni*, Day, pl. lxi. fig. 6; *cyanosmos*, Blkr., pl. lxi. fig. 5; *bleekeri*, Day, pl. lxii. fig. 5; *madraspatensis*, Day, pl. lxii. fig. 3; *neilli*, Day, pl. lxii. fig. 4; (*Euctenogobius*) *cristatus*, Day, pl. lxii. fig. 8; *tentacularis*, Blkr., pl. lxiv. fig. 4; *acutipinnis*, C. V., pl. lxi. fig. 2; *striatus*, Day, pl. lxii. fig. 6; *planifrons*, Day, pl. lxiii. fig. 9; *semidoliatus*, C. V., pl. lix. fig. 6; *melanosoma*, Blkr., pl. lxiv. fig. 1, figured; and *G. sexfasciatus*, p. 285, pl. lix. fig. 4; *griseus*, pl. liii. fig. 3; *zonalternans* [1], p. 289, *melanosticta*, p. 290, pl. lxiii. fig. 2; *magniloquus* and *planiceps*, p. 296, Madras: spp. nn. Day, Fishes of India.

*Gobius æneo-fuscus*, Ptrs., var. n. *guineensis*, Peters, MB. Ak. Berl. 1876, p. 248, Camaroon River.

*Gobius papuanus*, sp. n., *id. l. c.* p. 839, New Guinea.

*Gobius oxypterus*, Blkr., redescribed as the type of *Ptptogobius*, Blkr.; Bleeker, Versl. Ak. Amst. (2) ix. p. 292.

*Gobius diadema*, sp. n., Steindachner, *op. cit.* lxxiv. p. 232, Hongkong.

*Microgobius*, g. n., F. Poey, An. Soc. Esp. v. p. 168. Most nearly allied to *Gobionellus*, but with a free tongue, having no bright tubercles at the base. *M. signatus*, sp. n., *id. l. c.* p. 169, pl. viii. fig. 3, Cuba.

*Latrunculus*, Gthr., and *Crystallogobius*, Gill. R. Collett, in a paper of special interest, describes minutely the curious group of Gobioids which have the body completely transparent. He shows that *L. albus*, Parn., *L. stuwitzi*, Düb. & Kor., and *L. pellucidus*, Nardo, are all one species, which should be called by the last name, *L. albus* being the male and *L. stuwitzi* the young fish. In many respects, these fishes are very remarkable. They live only one year, being the first instance of *annual* Vertebrates. *L. pellucidus* spawns in June and July, the eggs are hatched in August, the young are half-grown in September, full-grown in October to December. In this stage, the sexes are quite alike; both have very small teeth and feeble jaws. In April, the males begin a transformation, the small teeth are lost and replaced by very long and strong teeth of quite a different kind, the jaws becoming long and strong, and the body much thicker. The teeth of the females remain unchanged. In this stage, Parnell described the species from males. In July and August, all the adults die off, and in September only the fry are to be found. The males of *Crystallogobius nilssoni* do not change their teeth, which are strong from the commencement. The author has obtained many specimens of this very rare species in Christiania Fjord, and describes the female for the first time; it has the first dorsal, the ventrals, and the pectorals almost entirely wanting, and the ovaria extend backwards along the anal; the teeth are absent. Forh. Selsk. Chr. 1876, No. 6, pp. 1–41, pls. i. & ii. figs. 1–14.

*Apocryptes madurensis*, Day (*nec* Blkr., renamed *bleekeri*), p. 300, pl. lxiv. fig. 3, India to Malay Archipelago, and *A. batoides*, p. 301, pl. lxvi. fig. 3, Moulmein, spp. nn., Day, *op. cit.* *A. serperaster*, Rich., figured, *id. l. c.* pl. lxvi. fig. 2.

*Apocryptichthys*, g. n., separated from *Apocryptes* as having no posterior canines above the symphysis of the lower jaw, whilst the præmaxillary teeth are very elongate; eyes prominent, and larger than in the *Amblyopina*; dorsal fins distinct. For *A. cantoris*, Day (1870); *id. op. cit.* p. 302, pl. lxii. fig. 7.

*Apocryptes brachypterus*, Blkr., and *A. variegatus*, Peters, redescribed as species of *Gobiopterus*, Blkr.; Bleeker, Versl. Ak. Amst. (2) ix. pt. 3, 1876.

*Gobiosoma multifasciatum*, sp. n., Steindachner, *op. cit.* lxxiv. p. 231, Antilles.

*Latrunculodes*, g. n. for *Gobius nilssoni*, Düb. & Kor. (1844) (see Forh. Selsk. Chr. 1874, p. 151), R. Collett, Norges Fiske, p. 60.

*Gillichthys mirabilis*, Coop., noticed by Steindachner, *l. c.* p. 195.

*Sicydium.* Bleeker redescribes the known species from the Indian Archipelago under the generic names *Sicyopterus*, Gill, *Microsicydium*, Blkr. (*S. gymnauchen*, Blkr.), *Sicyopus*, Gill (*S. zosterophorum*, Blkr., and *balinense*, Blkr.); Versl. Ak. Amst. (2) ix. pt. 3, pp. 271–289.

*Sicydium fasciatum*, Day, figured; Day, *op. cit.* pl. lxiv. fig. 7.

*Periophthalmus.* 'Mud-skippers.' Details of habits; *id. op. cit.* p. 303.

*Boleophthalmus* has the eyes still more prominent in life than afterwards; *id. op. cit.* p. 305. *B. tenuis*, p. 305, pl. lxv. fig. 1, Kurrachee,

common in Sind, and *B. glaucus*, p. 306, pl. lxv. fig. 3, Andamans, *id. op. cit.*, spp. nn.

*Eleotris.* Bleeker revises the Indo-pelagic species which belong to his subfamily '*Eleotriformes*' [for the genera, see Zool. Rec. xi. p. 97]. Descriptions of 41 species are reprinted. *Belobranchus taniopterus*, Blkr., = *E. belobrancha*, C. V., p. 54; *E. leuciscus*, Blkr., and *tæniopterus*, Blkr., belong to *Asterrhopteryx*, p. 78. Versl. Ak. Amst. (2) xi. pp. 14–110.

*Eleotris macrodon*, Blkr., p. 311, pl. lxv. fig. 3; *porocephalus*, C. V., p. 332, pl. lxvii. fig. 1; *ophiocephalus*, C. V., p. 312, pl. lxvii. fig. 2; *cavifrons*, Blyth, p. 313, pl. lxv. fig. 6; *scintillans*, Blyth, p. 314, pl. lxv. fig. 8, figured; and *E. canarensis*, p. 313, pl. lxix. fig. 2, Mangalore; *lutea* and *litoralis*, p. 313, Andamans: spp. nn. Day, *op. cit.*

*Atherina danius*, H.B., perhaps belongs to *Eleotris*; id. *l. c.* p. 316.

(*Amblyopus*) *Gobiodes anguillaris* (*A. hermanniannus*, C. V.), p. 317, pl. lxvii. fig. 4, *cirratus*, Blyth (*A. brachygaster*, Gthr.), p. 318, pl. lxix. fig. 4, *buchanani*, Day, p. 318, pl. lxvii. fig. 5, *subicundus*, H.B. (*A. hermannianus*, Gthr.), p. 319, pl. lxvii. fig. 6, noticed and figured; and *G. tenuis*, sp. n. (? *A. roseus*, C. V.), p. 319, pl. lxix. fig. 3, Sind. Day, *op. cit.*

*Callionymus fluviatilis*, id. *op. cit.* p. 322, Calcutta; *C. picturatus*, Peters, *l. c.* p. 840, Sallawatty: spp. nn.

## Cepolidæ.

*Cepola abbreviata*, C. V., figured by Day, *op. cit.* p. 324, pl. lxviii. fig. 4.

## Heterolepidina.

*Ophiodon*, Gir. Steindachner establishes the identity (already presupposed by Günther) of *Oplopoma*, Gir., with this genus, and shows that *O. pantherinus*, Gir., = *O. elongatus*, Gir. The species recharacterized. SB. Ak. Wien, lxxii. p. 63.

## Blenniidæ.

*Blennius marmoreus*, sp. n., Poey, An. Soc. Esp. v. p. 172, Cuba.

*Blennius brevipinnis*, Gthr., redescribed and figured; Steindachner, SB. Ak. Wien, lxxii. p. 84, fig. 11.

*Blennius* (*Hypleurochilus*) *gentilis*, Gir., sexes described, p. 198; *B. striatus*, p. 63, Panama, and *B.* (*Hypleurochilus*) *patensis*, p. 219, Peru, spp. nn.; *id. op. cit.* lxxiv.

*Blennius leopardus*, pl. lxviii. fig. 6, and *B. steindachneri*, Day, pl. lxx. fig. 1, figured by Day, *op. cit.*

*Petroscirtes bipunctatus*, pl. lxxi. fig. 3, Calicut, and *lienardi*, pl. lxix. fig. 8, Sind, p. 327, spp. nn., and *P. variabilis*, Cantor, p. 327, figured, pl. lxix. fig. 7; Day, *op. cit.*

*Petroscirtes elegans*, Steindachner, *l. c.* lxxiv. p. 217, Nagasaki.

*Salarias tridactylus*, Bl., Schn., p. 330, pl. lxx. fig. 3, *lineatus*, C. V.,

p. 332, pl. lxx. fig. 8, *bilitonensis*, Blkr., p. 334, pl. lxxi. fig. 1, *unicolor*, Rüpp., p. 334, pl. lxx. fig. 6, *kirki*, Gthr., with D. 15, pl. lxix. fig. 6, figured; *S. andersoni*, p. 331, Galle, *striolatus*, p. 333, Andamans, *albo-guttatus* (? *S. textilis*, Q. & G.), p. 331, Andamans, spp. nn. Day, *op. cit.*

*Salarias gigas*, sp. n., Steindachner, *op. cit.* lxxiv. p. 220, Peru.

*Cremnobates marmoratus* and *fasciatus*, spp. nn., *id. l. c.* p. 222, pl. xii. fig. 6, & p. 224, Antilles.

*Clinus bimaculatus*, p. 228, Antilles, *ocellatus*, p. 230, pl. xii. fig. 5, Bahamas, *id. l. c.* spp. nn.

*Clinus despicillatus*: the urogenital apparatus described; A. Günther, Ann. N. H. (4) xvii. p. 403.

*Tripterygium elegans*, sp. n., Peters, MB. Ak. Berl. 1876, p. 441, Mauritius.

*Myxodes versicolor*, pl. viii. fig. 1, and *lycodes*, p. 173, *varius*, p. 174, pl. viii. fig. 2, spp. nn., F. Poey, An. Soc. Esp. v., Cuba.

*Blakea*, g. n. for *Myxodes elegans*, Coop.; differs from *Myxodes* chiefly in having vomerine teeth arranged like those of the jaws, in two series. Steindachner, *op. cit.* lxxiv. p. 196.

(*Xiphogadus*) *Xiphasia*, Sw. Figure of *X. setifer*, pl. lxxiii. fig. 1, and remarks on the supposed identity of *X. trachyparia*, Blkr., with the species of Elliot & Jordon, with which the author does not agree, p. 337; Day, *op. cit.*

### Mastacembelidæ.

*Mastacembelus unicolor*, C. V., p. 339, pl. lxxii. fig. 3 [2], *zebrinus*, pl. lxxii. fig. 3, figured by Day, *op. cit.*

### Sphyrænidæ.

*Sphyræna megalolepis*, sp. n., Peters, *l. c.* p. 842, New Ireland.

*Sphyræna acutipinnis*, sp. n., Day, *op. cit.* p. 342, pl. lxxix. fig. 1, Sind.

### Atherinidæ.

*Atherinops*, g. or subg. n., for *Atherinichthys affinis*, Ayr., indicated by Steindachner, SB. Ak. Wien, lxxii. p. 89.

*Atherina melanostigma*, sp. n., Day, *op. cit.* p. 345, Madras.

*Zanteclo*, Castelnau, is probably *Atherinichthys nigrans*, Rich.; A. Günther, Ann. N. H. (4) xvii. p. 396.

### Mugilidæ.

*Mugil*. Remarks on the Cuban species. *M. brasiliensis*, Agass., described and figured, p. 61, pl. vii.; *M. gaimardianus*, Desmar., described as a distinct species (? *M. brasiliensis*, Günth.) and figured, p. 64, pl. viii. figs. 1 & 2; and *M. trichodon*, sp. n., p. 66, pl. viii. figs. 4–6, Cuba (adipose eyelid developed): F. Poey, Ann. Lyc. New York, xi.

*Mugil mexicanus*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 86, figs. 12 & 12*a*, Acapulco.

*Mugil rodericensis*, sp. n., Günther, Ann. N. H. (4) xvii. p. 397, Rodriguez. *Mugil suppositus*, Day, = *speigleri*, Blkr., p. 348, pl. lxxiv. fig. 1; *engeli*, Day, = *longimanus*, Gthr., = *cunnesius*, C.V., p. 349, pl. lxxiv. fig. 3; *carinatus*, C.V., pl. lxxiv. fig. 2; *belanak*, Blkr., pl. lxxiv. fig. 5; *cunnumboo*, Day, = *pæcilus*, Day, p. 351, pl. lxxv. fig. 4; *kelaarti*, Gthr., pl. lxxv. fig. 1; *nepalensis* = *subviridis*, Gthr., = *dussumieri*, C. V., p. 352, pl. lxxiv. fig 4; *cunnesius*, Day, = *japonicus*, Schleg., = *cephalotus*, C. V., = *oeur*, Forsk., p. 353, pl. lxxv. fig. 3; *hamiltoni*, Day, pl. lxxv. fig. 5; *cascasia*, H. B., p. 355, pl. lxxv. fig. 6; *borneensis*, Blkr., pl. lxxvi. fig. 1; *ceylonensis*, Gthr., = *buchanani*, Blkr., p. 358; *oligolepis*, Blkr., pl. lxxvi. fig. 2, figured; *M. jerdoni* (*sundanensis*, Day, *nec* Blkr.), p. 352, and *olivaceus*, p. 357, spp. nn., India. Day, *op. cit.*

*Myxus cacutiens*, sp. n., Günther, *l. c.*, Rodriguez.

### Gasterosteidæ.

*Gasterosteus stenurus*, sp. n., K. Kessler, in Prejevalsky's "Mongolia," iii. pt. iv. p. 6, pl. iii. fig. 6, Dalai Nor.

### Fistulariidæ.

*Aulisicops spinescens*, Peters, = *Aulorhynchus flavidus*, Gill; Steindachner, *op. cit.* lxxiv. p. 201.

### Centriscidæ.

*Centriscus scolopax*, L., from Tasmania; A. Günther, Ann. N. H. (4) xvii. p. 395.

### Gobiesocidæ.

*Sicyases punctulatus*, sp. n., Poey, An. Soc. Esp. v. p. 166, Cuba.

*Crepidogaster hectoris*, sp. n., Günther, *l. c.* p. 396, Cook's Strait.

### Psychrolutidæ.

*Neophrynichthys*, g. n., for *Psychrolutes latus*, Hutt., distinguished by the presence of a well-developed first dorsal, in consequence of which the *Psychrolutidæ* should be removed to the *Cotto-scombriformes*, after the *Batrachidæ*. Günther, *l. c.* p. 396.

### Ophiocephalidæ.

*Ophiocephalus*, details of habits, p. 362; *O. diplogramme*, Day (juv.), = *serpentinus*, C. V., = *micropeltes*, C. V., p. 365, pl. lxxvii. fig. 4; *O. striatus*, Bl., stomach and cœcal appendages figured, p. 366; synonymy of *O. gachua*, p. 367, and *O. punctatus*, pl. lxviii. fig. 1, var.: Day, *op. cit.*

### Labyrinthici.

[*Colisa*] "Nidification du poisson arc-en-ciel"; P. Carbonnier, Bull. Soc. Acclim. (3) iii. pp. 11–22.

[*Osphromenus*] The *Gourami* and his nest; *id.* C. R. lxxxiii. p. 1114.

*Sandelia*, Cast., = *Spirobranchus*, C. V.; description of specimens of *S. bainsi*, Cast. Günther, Ann. N. H. (4) xvii. p. 67.

*Ctenopoma nigro-pannosum*, sp. n., Reichenow, SB. nat. Fr. 1875, p. 147, Loango.

## ACANTHOPTERYGII PHARYNGOGNATHI.

### Pomacentridæ.

*Pomacentrus obscuratus*, p. 143, and *niveatus*, p. 144, spp. nn., Poey, An. Soc. Esp. v., Cuba.

*Pomacentrus melanochir*, p. 384, *dimidiatus*, p. 385, spp. nn., Bleeker, Versl. Ak. Amst. (2) x. Indian Archipelago.

*Paraglyphidodon oxycephalus*, sp. n., *id. l. c.* p. 387, Timor.

(*Heliastes*) *Chromis lepidolepis*, p. 389, *insulindicus*, p. 390, spp. nn., *id. l. c.*, Timor and Amboyna.

### Labridæ.

*Labrichthys*. The New Zealand species referred to *L. psittacula* is probably the adult *L. celidota*, Forst. Günther, Ann. N. H. (4) xvii. p. 398.

*Trochocopus unicolor*, sp. n., *id. ibid.*, Sydney.

*Neolabrus fenestratus*, Steind., = *Malapterus reticulatus*, C. V., which belongs to the *Julidina*, not the *Labrina*; Steindachner, SB. Ak. Wien, lxxii. p. 612.

*Platyglossus semicinctus*, Ayr., description of the female; Steindachner, *l. c.* lxxiv. p. 199.

*Julis melanochir*, Blkr., with a different coloration, at Acapulco; *id. op. cit.* lxxii. p. 92.

*Chærojulis arangoi*, sp. n., Poey, An. Soc. Esp. v. p. 151, pl. vii. fig. 1, Cuba.

*Novacula* (*Xyrichthys*) *carneoflava*, sp. n., Peters, *l. c.* p. 843, Dana Islands.

*Coris bleekeri*, sp. n., A. Hubrecht, Ann. N. H. (4) xvii. p. 214, Ceram.

*Pseudoscarus superbus*, Poey & Gthr., = *Scarus vetula*, Bl., Schn.; *P. quadrispinosus*, C. V., a distinct species, has been confounded by Günther with *P. chloris*; and examination of specimens has shown that *P. cæruleus*, Bl., is not the adult of another species. G. Browne-Goode, Cat. Fish. Bermudas, pp. 33–35.

*Pseudoscarus maculiceps*, sp. n., Peters, MB. Ak. Berl. 1876, p. 443, Mauritius.

*Scarus oxybrachius*, Poey, figured, An. Soc. Esp. v. pl. vii. fig. 2.

*Odax vittatus*, Sol., supplementary description; Hutton, *l. c.* p. 214.

### Chromidæ.

*Geophagus (Satanoperca) crassilabris*, sp. n., Steindachner, *l. c.* lxxiv. p. 65, pl. vii., Panama.

## ANACANTHINI.

### Lycodidæ.

*Lycodes esmarki*, sp. n., R. Collett, Norges Fiske, p. 95, Norway (? = old examples of *L. vahli*, Reinh. & Esmark).

### Gadidæ.

*Calloptilum punctatum*, Hutt., is a *Bregmaceros*; Günther, Ann. N. H. (4) xvii. p. 398.

### Ophidiidæ.

*Dinematichthys consobrinus*, sp. n., Hutton, Tr. N. Z. Inst. viii. p. 217, New Zealand.

### Pleuronectidæ.

*Hippoglossina*, g. n. Eyes on the left side, cleft of mouth long, teeth small, single-rowed, none on palate; dorsal beginning over the eye, and anal rays, excepting the hindermost, simple; interorbital space very narrow, ridge-like; lateral line with strong curve; ventrals detached from anal, a small spine before anal. *H. macrops*, sp. n., Steindachner, *l. c.* lxxiv. p. 61, pl. iii. Mazatlan.

*Citharichthys panamensis*, sp. n., *id. op. cit.* lxxii. p. 90, Panama.

*Solea (Achirus) melanosticta*, sp. n., Peters, *l. c.* p. 845, Bougainville Island.

*Solea tubifera*, sp. n., *id. l. c.* p. 444, Mauritius.

*Solea panamensis*, sp. n., Steindachner, *op. cit.* lxxiv. p. 58, pl. ii.

*Solea (Achiropsis) nattereri*, sp. n., *id. l. c.* p. 158, Rio Negro.

*Ammotretus rostratus*, Gthr., from New Zealand; Hutton, *l. c.* p. 215.

*Synaptura punctatissima*, sp. n., Peters, MB. Ak. Berl. 1876, p. 249, pl. fig. 2, Victoria, W. Africa.

*Synaptura dicholepis*, sp. n., *id. l. c.* p. 844, New Hanover.

## PHYSOSTOMI.

### Siluridæ.

Steindachner, SB. Ak. Wien, lxxiv. pp. 559–694, pls. i.–xiii., describes species of the groups *Pimelodina*, *Ariina*, *Doradina*, and *Hypostomatina*.

Remarks on those Indian genera of Siluroids which have the air-

vessel enclosed in bone, and those in which it is free. Day, P. Z. S. 1876, p. 794.

*Lophiosilurus*, g. n. Head very large, broad and extremely depressed; cleft of mouth very wide, with prominent lower jaw; teeth in the intermaxillary and lower jaw, none on vomer or palatal bones; a barbel at the angle of the mouth, four on the lower jaw; nostrils small, far apart; branchiostegal membranes separate, attached to isthmus in front only; dorsal and adipose fins very little elevated, the first with a short strong spine, the last separated from the caudal. *L. alexandri*, sp. n., Steindachner, *l. c.* p. 154, pl. xv. Amazons.

*Silundia sykesi* (? = *Ageniosus childreni*, Sykes), p. 569, Deccan, & *S. gangetica*, p. 570, Bengal and Burma, spp. nn., Day, J. L. S. xii.

*Platystoma parahybæ*, Steindachner, *l. c.* p. 640, pl. ix. Brazil; *P. luetkeni*, id. *op. cit.* lxxii. p. 609, pl. xiii. Amazons: spp. nn.

*Pimelodus* (*Pseudorrhamdia*) *brasiliensis*?, p. 608, pl. vii., *hartti*, p. 611, (*Rhamdia*) *parahybæ*, p. 615, Brazil, (*Pseudorrhamdia*) *wesselii*, p. 614, Essequibo, (*Rhamdia*) *kneri*, p. 631, Marabitanos, *cayabæ*, p. 633, Cayaba, spp. nn.; descriptive and critical remarks on other species: Steindachner, *op. cit.* lxxiv. pp. 598–632. *Pimelodus* (*Pseudorrhamdia*) *chagresi* [*anus*], sp. n., *id. op. cit.* lxxii. p. 584, Panama.

*Pimelodus altipinnis*, Stein., redescribed and figured; *id. l. c.* p. 605, pl. xi.

*Pimelodus pictus*, p. 144, *agassizi*, p. 147, *id. op. cit.* lxxiv. Amazons, spp. nn.

*Pimelodus* (*Pimelodina*, g vel subg. n.) *flavipinnis*, sp. n., *id. l. c.* p. 150, pl. xiii. fig. 2, Amazons.

*Rhamdia bransfordi*, sp. n., Gill, P. Ac. Philad. 1876, p. 337, Panama.

*Pirinampus agassizi*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 607, pl. xii. Parà.

*Conorrhynchus glaber*, sp. n., *id. op. cit.* lxxiv. p. 637, pl. viii. Brazil.

*Arius grandoculis*, id. *l. c.* p. 644, pl. xi. Brazil; *A. alatus*, p. 569, pl. vi., *brandti*, p. 571, pl. iii. *kessleri*, p. 574, pl. v., *planiceps*, p. 576, pl. iv., *fuerthi*, p. 579, *hypophthalmus*, p. 581, pl. x., *id. op. cit.* lxxii. Panama: spp. nn.

*Ælurichthys panamensis*, Gill (*A. nuchalis*, Gthr.), described and figured, p. 564, pl. ii. figs 1–4; *A. pinnimaculatus*, sp. n., p. 565, pl. viii. figs. 1–3, Panama: *id. op. cit.* lxxii.

*Pseudauchenipterus jequitinhonæ*, p. 647, pl. vi. figs. 1 & 1 *a*, *affinis*, p. 651, *striatulus*, p. 656, pl. v. Brazil, *glaber*, p. 655, Demerara, spp. nn.; *id. op. cit.* lxxiv.

*Wertheimeria*, g. n. Head broad, depressed, long, with greatly lengthened cephalic buckler; gill-opening extending beneath the head; gill-membranes confluent with isthmus in the middle under the throat; dorsal short, one spine and six rays; barbels six, cylindrical; teeth in intermaxillary and lower jaw brittle; palate toothless; eye small, covered with membrane, over the cleft of the mouth and behind the posterior nostrils; ventral vertically behind dorsal. *W. maculata*, sp. n., *id. l. c.* p. 660, pl. x. Rio Jequitinhonha.

*Centromochlus* (*Glanidium*) *albescens*, Ltk., redescribed, and *C. intermedius*, sp. n., from Marabitanos, Para; Steindachner, *l. c.* p. 664.

*Arges peruanus*, sp. n., *id. op. cit.* lxxii. p. 601, pl. ix. figs. 3–6, Peru.

*Callichthys adspersus*, sp. n., *id. op. cit.* lxxiv. p. 135, pl. xi. fig. 2, Amazons.

*Corydoras agassizi*, p. 138, pl. xii. fig. 2, *eques*, p. 140, fig. 3, *elegans*, p. 141, *nattereri*, p. 143, pl. xi. fig. 1, *id. l. c.*, Amazons, spp. nn.

*Plecostomus angulicauda*, p. 672, pl. xii., *affinis*, p. 685, *microps*,* p. 688, pl. xiii., *johni*, p. 691, Brazil, spp. nn. *P.* (*Hypostomus*) *emarginatus*, C. V., = *P. horridus*, Kn., ♀, p. 688. Other species described or noticed. *Id. l. c.* pp. 672–691.

*Chætostomus jelskii*, sp. n., *id. op. cit.* lxxii. p. 603, Peru.

*Harttia*, g. n. Body elongate, very strongly depressed, as in *Loricaria*; adipose fin wanting, as also the lateral toothed ridges on either side of the lateral line of *Loricaria*; teeth in both jaws; mouth inferior. A link between *Loricaria* and the *Hypostomidæ*. *H. loricari*[*i*]*formis*, sp. n., *id. op. cit.* lxxiv. p. 668, pl. figs. 2, *a*, *b*, Rio Parahyba.

*Loricaria bransfordi*, sp. n., Gill, P. Ac. Philad. 1876, p. 338, Panama.

*Exostoma*. On the distinction between the known species, and *E. stoliczkæ*, sp. n., from head-waters of Indus; Day, P. Z. S. 1876, pp. 782 & 783.

## Characinidæ.

Steindachner continues his descriptions [Zool. Rec. xii. p. 125]. SB. Ak. Wien, lxxiv. pp. 559–694, pls. i.–iv.

*Erythrinus kessleri*, sp. n., p. 596, Bahia; *E. longipinnis* and *brevicauda*, Gthr., = *salmoneus*, Grow., ♂. *Id. l. c.*

*Pyrrhulina semifasciata*, p. 7, pl. i. figs. 1 & 2, *brevis*, p. 11, figs. 3 & 4, *nattereri*, p. 13, pl. ii. fig. 5, *guttata*, p. 15, pl. ii. fig. 6; *id. op. cit.* lxxii., Amazon River, spp. nn.

*Curimatus* (*Anodus*) *pristigaster*, p. 73, pl. vi., *bimaculatus*, p. 76, *macrolepis*, p. 81, *kneri*, p. 83; *id. op. cit.* lxxiv., Amazons, spp. nn.

*Leporinus muelleri*, p. 105, pl. ix. fig. 5, *agassizi*, p. 107, pl. ix. fig. 4, *trifasciatus*, p. 112, *nattereri*, p. 114; *id. l. c.* Amazons, spp. nn.

*Piabucina panamensis*, sp. n., Gill, P. Ac. Philad. 1876, p. 336, Panama.

*Piabina peruana*, sp. n., Steindachner, *op. cit.* lxxii. p. 596, Peru.

*Tetragonopterus alosa*, Günther, Ann. N. H. (4) xvii. p. 399, Peru; *T. jelskii*, p. 590, and *maximus*, p. 593, pl. vii., Steindachner, *l. c.* Peru; *T. agassizi*, p. 89, pl. viii. fig. 2, *tabatingæ*, p. 91, *multiradiatus*, p. 92, Amazons, *gibbosus*, p. 562, pl. i. fig. 1, *bahiensis*, p. 571 (? = *T. maculatus*, juv. var.), *doceanus*, p. 572, *jenynsi*, p. 22, pl. ii. figs. 1 & 2, South eastern Brazil, *id. op. cit.* lxxiv.; spp. nn.

*Tetragonopterus compressus*, Gthr., = *T. orbicularis*, Val., p. 565, *T. microstoma*, Hensel, ? = *T. maculatus*, L., p. 568, the latter figured, pl. i. fig. 2; *T. rutilus*, Jen., p. 17, var. n. *jequitinhonæ* described and figured

* Dr. Steindachner has since informed the Recorder that this species = *granosus*, C.V., which comes from Rio Janeiro, and not from Cayenne.

pl. ii. figs. 1–3; *T. fasciatus*, Cuv. (= *T. obscurus*, Hensel), p. 578, figured, pl. i. fig. 3; *id. l. c.*

*Luetkenia*, g. n. Habit of *Tetragonopterus*, with belly compressed and cutting as in *Chalcinus*; mouth small, like *Tetragonopterus*; teeth in intermaxillary and mandible, uniserial, compressed, many-pointed; dorsal above ventral; anal long; nostrils behind one another; gill opening wide; membranes not confluent nor grown to the isthmus. *L. insignis*, sp. n., *id. l. c.* p. 86, pl. viii. fig. 1, Amazons.

*Brycon ferox*, p. 583, pl. iv. figs. 1 & 1 *a*, and *B. insignis*, p. 587, pl. iv. figs. 2 & 2 *a*; *id. l. c.*, South-eastern Brazil, spp. nn.

*Brycon reinhardti*, Ltk., redescribed and figured, p. 585, pl. iii. figs. 3 & 3 *a*; *Megalobrycon* and *Chalcinopsis*, Kn., = *Brycon*; *B. striatulus*, Kn., = *chagrensis*, Kn., p. 32. *Id. l. c.*

*Bryconops* (*Creatochanes*) *melanurus*, Bl. Steindachner redescribes and figures this species which he considers as a *Bryconops*, its position in *Tetragonopterus* being arbitrary; *op. cit.* lxxii. p. 19, pl. ii. fig. 7.

*Creagrutus nasutus*, sp. n., Günther, Ann. N. H. (4) xvii. p. 400, Peru.

*Chalcinus angulatus*, Spix (= *C. nematurus*, Kner, and *Triportheus flavus*, Cope), p. 96, *brachypomus*, C. V., p. 97, *culter*, Cope, p. 100, and *elongatus*, Gthr., p. 102, noticed; *C. kneri*, sp. n., p. 98, pl. xii. fig. 4, Amazons. *Id. op. cit.* lxxiv.

*Paragoniates*, g. n. Body elongate, strongly compressed, with cutting ventral edge (not toothed); dorsal short, behind the middle of the body; anal very long; maxillary teeth uniserial, pointed; the larger anterior in the mandible and all the intermaxillary teeth with 1–2 short accessory points; cleft of mouth extremely long; scales large; lateral line weakly developed (only anteriorly). *P. alburnus*, p. 117, pl. viii. fig. 3, *P. muelleri*, p. 120, Amazons, and *P. microlepis*, p. 591, Rio Janeiro, *id. l. c.* spp. nn.

*Xiphorrhamphus jenynsi*, Gthr. & Steind., *X. hepsetus*, Cuv., redescribed and figured, p. 593, pl. iii. fig. 4; *X. macrolepis*, sp. n., p. 594, Brazil. *Id. l. c.*

*Xiphostoma tædo*, Cope, = *X. maculatum*, C. V., p. 131; *X. longipinne* [*-na*, vel *-nis*], sp. n., p. 132, Amazons. *Id. l. c.*

*Nannostomus* (Gthr., redefined) *trifasciatus*, p. 123, pl. ix. fig. 2, *eques*, p. 126, pl. ix. fig. 3, *unifasciatus*, p. 127, pl. ix. fig. 1, *anomalus*, p. 129, spp. nn., *id. l. c.* Amazons.

*Distichodus abbreviatus*, sp. n., Peters, *l. c.* p. 845, Congo.

## Heteropygii.

F. Putnam. Notes on the Mammoth Cave fishes. P. Bost. Soc. xvii. pp. 222–225.

## Cyprinidæ.

*Pantosteus*, g. n., E. D. Cope, in Wheeler's Rep. Geogr. Explor. W. of 100th mer. v. chap. vi. p. 673. *Catostomina*: for *Minomus platyrrhynchus*,

Cope, figured, pl. xxix. figs. 3 & 3 a, *M. jarrovii*, Cope, figured, pl. xxix. figs. 2 & 2 a, *P. virescens*, sp. n., p. 675, Pueblo, and *P. delphinus* and *bardus*, Cope.

*Catostomus fecundus*, sp. n., Cope & Yarrow, *l. c.* p. 678, pl. xxxii. figs. 1 & 1 *a*, Utah.

*Moxostoma trisignatum* (? *Catostomus*, adult), sp. n., Cope, *l. c.* p. 679, Colorado.

*Barbus* (*Barbodes*) *dobsoni*, sp. n., Day, J. L. S. xii. p. 574, Deccan.

*Thynnichthys cochinensis*, sp. n., Günther, Ann. N. H. (4) xvii. p. 401, Cochin.

*Schizothorax biddulphi*, id. *l. c.* p. 400, Yarkand; *S. punctatus*, p. 785, *microcephalus*, p. 787, *irregularis* (? = *edeniana*, M'Clell.), p. 787, Day, P. Z. S., 1876, Yarkand: spp. nn.

*Ptychobarbus laticeps*, p. 789, Kashgar, *longiceps*, p. 790, Yarkand, Day, *l. c.*, spp. nn.

*Schizopygopsis przewalskii*, p. 11, pl. i., Koko Nor, *pylzovi*, p. 13, Chinese province Kansu, Kessler, in Prejevalsky's "Mongolia," ii. pt. 4, spp. nn.

*Megagobio*, g. n., *id. l. c.* p. 15. Allied to *Rhinogobio* and *Saurogobio*. For *M. nasuta*, sp. n., *id. l. c.* p. 16, pl. ii. fig. 1, River Hoang-Ho.

*Ceratichthys biguttatus*, Kirt., figured, from Southern Utah, pl. xxix. fig. 1; *C. physignathus*, p. 651, Pueblo, and *sterletus*, p. 652, pl. xxvii. figs. 3 & 3 *a*, San Ildefonso, spp. nn.: Cope, *l. c.*

*Hyborrhynchus siderius*, p. 670, pl. xxxi. figs. 6 & 6 *a*, Arizona, *nigellus*, p. 671, Colorado, spp. nn., *id. l. c.*

*Campostoma aikeni*, sp. n., *id. l. c.* p. 672, Colorado.

*Rhinichthys maxillosus*, Cope, figured; *id. l. c.* pl. xxvii. figs. 1 & 1 *a*.

*Apocope henshawii*, Cope, pl. xxviii. figs. 2 & 2 a, *vulnerata*, Cope, pl. xxvi. figs. 4 & 4 a, *ventricosa*, Cope, pl. xxviii. figs. 1 & 1 *a*, figured; *A. couesi*, sp. n., Yarrow (*Rhinichthys henshawii*, Cope, var.), p. 648, pl. xxvii. figs. 2 & 2 *a*, Arizona: Cope & Yarrow, *l. c.*

*Squalius mongolicus*, p. 21, pl. ii. fig. 2, Dalai Nor, and *chuanchicus*, p. 23, River Hoang-Ho, Kessler, *l. c.*, spp. nn.

*Alburnellus amœnus*, Abbott, Am. Nat. viii. p. 334, Delaware; *A. simus*, p. 649, pl. xxxi. figs. 2 & 2 a, *jemezanus*, p. 650, pl. xxxi. figs. 3 & 3 *a*, Cope, *l. c.* New Mexico: spp. nn.

*Hypsilepis iris*, sp. n., *id. l. c.* p. 653, pl. xxxi. figs. 4 & 5, New Mexico.

*Gila*, Bd. & Gir., and *Clinostomus*, B. & G., united, p. 656; *Gila phlegethontis*, Cope, pl. xxvii. figs. 4 & 4 *a*; and *G. tænia*, Cope, figs. 5 & 5 *a*, figured; many known species noticed; and *G. ardesiaca*, p. 660, pl. xxx. figs. 1 & 1 *a*, locality unknown, *gula*, p. 661, pl. xxx. figs. 2 & 2 *a*, New Mexico, *nigra*, p. 663, pl. xxx. figs. 3 & 3 *a*, Arizona, *seminuda*, p. 666, pl. xxxi. figs. 1 & 1 *a*, Southern Utah, spp. nn.: *id. l. c.*

*Siboma atraria*, Gir., var. n. *longiceps*, id. *l. c.* p. 668, pl. xxix. fig. 4, Nevada.

*Myloleucus parovanus*, Cope, figured; *id. l. c.* pl. xxviii. figs. 3 & 3 *a*.

*Opsaridium buchholzi*, sp. n., Peters, MB. Ak. Berl. 1876, p. 251, fig. 4, Ogowé River.

*Plagopterinæ*. The basin of the Colorado river is the habitat of this small group, composed of *Plagopterus*, *Lepidomeda*, and *Meda*. *Plagopterus argentissimus*, Cope, pl. xxvi. figs. 3 & 3 *a*; *Lepidomeda vittata*, Cope, pl. xxvi. figs. 2 & 2 *a*, and *L. jarrovii*, Cope, figs. 1 & 1 *a*, figured; Cope & Yarrow, *l. c.*

*Misgurnus cestoideus*, sp. n., Kessler, *l. c.* p. 34, pl. iii. fig. v. Dalai Nor.

*Diplophysa dalaica*, p. 24, fig. i., *nasalis*, p. 27; fig. 2, *intermedia*, p. 28, fig. 3, and *costata*, p. 29, fig. 4, spp. nn., *id. l. c.*, Dalai Nor.

*Nemachilus robustus*, p. 32, Chinese prov. Kansu, and *zaidamensis*, p. 34, Zaidam, spp. nn., *id. l. c.*

*Diplophysa*, Kessler, ? = *Nemachilus*, p. 793; *N. yarkandensis* and *tenuis*, p. 796, Yarkand, *gracilis*, p. 798, head-waters of Indus, spp. nn.: Day, P. Z. S. 1876.

## Cyprinodontidæ.

*Pantodon*, g. n. Body similar in form to *Haplochilus*, with upper surface of head flat, and cleft of the mouth very wide and ascending; body and head as far as the interorbital region covered with cycloid scales, lateral line distinct with curve towards the lower surface; margin of the upper jaw formed in the middle by the single immovable intermaxillary, laterally by the maxillary consisting of a single piece; pointed teeth on the intermaxillary, maxillary, mandible, vomer, palatal, and pterygoid bones, on the sphenoid, the tongue, and the upper and lower pharyngeals; gill-opening very wide; gill-membranes touching one another and covering the isthmus; gill-covers consisting only of the operculum and the præoperculum; eleven branchiostegal rays, gills four, that of the first arch formed of a single row of gill-laminæ; infraorbital ring complete; pseudo-branchiæ none; fins naked, a short dorsal beginning in the middle of the tail, above the end of the moderately long anal; first and last ray of pectoral undivided; the middle rays, which are in small number, branched; ventral fins elongate, consisting of one articulated undivided and five branched rays; caudal fin elongate, with two articulated undivided rays above and below; stomach horse-shoe shaped, with cœcal sac; a single pyloric appendage; intestine short; swimming-bladder of thin membrane, simple, without auditory ossicles; generative organ with a duct. Type, *P. buchholzi*, sp. n., Peters, *l. c.* p. 196, pl. figs. 1–4, Victoria River.

*Cynolebias*, g. n. Cyprinodont: bones of each mandibulary firmly united; dorsal and anal many-rayed, the latter fin the longest and beginning before the dorsal; a band of pointed teeth in both jaws, before which is a row of unequal large canines; ventral small, a very little distance before the anal; gill-openings wide, separate. *C. porosus*, sp. n., Steindachner, SB. Ak. Wien, lxxiv. p. 172, pl. x. fig. 3, Pernambuco.

*Cyprinodon martæ*, sp. n., *id. op. cit.* lxxii. p. 610, Sta. Marta, at mouth of Magdalen River.

*Fundulus parvipinnis*, Gir., males described; *id. op. cit.* lxxiv. p. 201, pl. x. figs. 1 & 2.

*Haplochilus floripinnis*, Cope, figured in Wheeler's Rep. *l. c.* pl. xxviii. figs. 4 A & B.

*Riculus poeyi*, sp. n., Steindachner, *l. c.* p. 165, Para.

*Bicnlus cylindraceus*, Poey, figured; Poey, An. Soc. Esp. v. pl. viii. fig. 4.

*Orestias bairdi*, *ortoni*, and *frontosus*, spp. nn., Cope, J. Ac. Philad. viii. pp. 185–187, Titicaca.

*Platypœcilus mentalis*, sp. n., Gill, P. Ac. Philad. 1876, p. 335, Panama.

*Protistius*, Cope (1874), belongs to the *Cyprinodontidæ*; Cope, *l. c.* p. 185.

## Scombresocidæ.

*Belone hians*, C. V., described from Acapulco; Steindachner, *op. cit.* lxxii. p. 92.

*Belone pacifica*, p. 93, Panama and Acapulco, and *amazonica* (? = *microps*, Gthr.), p. 94, River Amazon, *id. l. c.*, spp. nn.

*Belone teniata*, Gthr., = *B. guianensis*, Schomb., undescribed, and Günther is wrong in referring the figure so-named by Schomburgk to *B. truncata*, Les.; *id. l. c.* p. 96.

## Sternoptychidæ.

*Maurolicus australis*, Hect., = *M. amethystino-punctatus*, Cocco, from the Mediterranean; Günther, Ann. N. H. (4) xvii. p. 399. It is a *Gonostoma*; Hutton, Tr. N. Z. Inst. viii. p. 215.

## Scopelidæ.

*Scopelus hectoris*, sp. n., Günther, Ann. N. H. (4) xvii. p. 399, Cook's Strait.

## Stomiatidæ.

*Idiacanthus*, g. n. Head of *Stomias*; body long, riband-like, much lower than the head, scaleless; dorsal fin very long, only the hindmost rays articulated, close together and united by a membrane, the anterior ones very slender, almost membranous, simple, separate, standing behind a curved pointed spine; anal equally long, the posterior rays similar to those of the dorsal, the anterior simple, separate, very slender, and situated either behind the root of a single spine, or between a pair of spines; no pectorals; ventral composed of six articulated branched rays, situated on the belly behind the first third of the total length; a series of phosphorescent dots on lower surface of head and body; gill-opening very wide; branchiostegals numerous; gills four; no pseudobranchia. Remarkable by the absence of the pectoral fins, the other fins being present. Type, *I. fasciola*, sp. n., D. ⁸⁄₇₀, A. 41. Two specimens found in the waters to the north of Australia and of New Guinea. The syngnathoid characters of the dorsal and anal rays might suggest incomplete development, but the condition of the head and the ventral and

caudal fins is against such a conclusion. Peters, MB. Ak. Berl. 1876, pp. 846–848.

*Stomias boa*, Risso. A specimen exhibiting no differences from this species found in the Pacific Ocean; *id. l. c.* p. 846.

*Exocœtus*. Lütken (Vid. Medd. 1876, pp. 389–408, pl. x.) has made a particular study of this genus, which, originally consisting of two species, has been increased to the number of fifty, with ten doubtful. He finds that several characters not unimportant for the grouping of the species have been quite overlooked; one, for instance, drawn from the pectoral fin, affords a means of subdividing the greater part of the genus, thus:—A. *2nd ray of pectoral entire*. B. *2nd ray of pectoral deeply cleft*. The species which range themselves in these two groups are about equal in number. *When the 2nd pectoral ray is cleft, the 3rd is always the longest ray*, pp. 398 & 399. He publishes a preliminary abstract from a forthcoming monograph of the genus, giving (pp. 392–394) 'Conspectus sectionum generis Exocœti,' but without the names of any of the new species which will appear in the complete work. Remarks and corrections in respect of known species are added. *E. georgianus*, Val., is wrongly ranged by Günther in the section with short pectorals, and takes its place with *E. evolans* and *obtusirostris*, differing, however, in the possession of barbels, p. 394. Remarks on the comparative characters for distinguishing the two last named species, p. 395. *E. comatus*, Mitch., figured, pl. x. fig. 1, and *E. furcatus*, Mitch., fig. 2 (head); *E. nuttallii*, Les., is the young of the latter, p. 400.

*Exocœtus exiliens*. Remarks on the flight of this fish, from close observation; G. Browne-Goode, Fishes of Bermudas, p. 65.

## Salmonidæ.

Stewart, J. On the Introduction and Acclimatization of the Salmon [into New Zealand]. Tr. N. Z. Inst. viii. pp. 205–209.

R. Collett finds only three species of *Salmo* in Norway, viz., *S. salar*, L., *S. eriox*, L. (*eriox*, *trutta*, and *fario*, L.), and *S. alpinus*, L., pp. 155–162. To *Coregonus lavaretus*, L., he refers also the following species:—*C. maræna*, Bl., *C. widegreni*, Malmgr., *C. lapponicus*, Gthr., *C. gracilis*, Gthr., and perhaps *C. maxillaris* and *humilis*, Gthr.; his reasons for this are given in the article on *C. lavaretus*, p. 166. Norges Fiske.

*Salmo schiffermuelleri*, Bl. The results of L. Fitzinger's observations upon this species, in his "Bericht über die an den Seen des Salzkammergutes, Salzburgs, und Berchtesgadens gepflogenen Nachforschungen über die Natur des Silberlachses" (SB. Ak. Wien, lxxii. pp. 235–240), lead inevitably to the conclusion that it is a hybrid, the fact being ascertained that reproductive organs exist only in a rudimentary condition in the young stage, degenerating into adipose tissue in the adult. This is also the opinion of the fishermen. With respect to the two forms of which it will prove to be the union, although without having obtained the certainty which would be afforded by successful artificial impregnation, the author is able to make a shrewd guess, viz., that, if

not *Trutta lacustris* and *T. fario lacustris*, these must be ♀ *Salmo salvelinus* and ♂ *T. lacustris*.

*Salmo virginalis*, Gir., p. 685, *spilurus*, Cope, and *pleuriticus*, Cope, p. 693, noticed, with synopsis of species in the Rocky Mountains region; Cope, in Wheeler's Report, *l. c.* pp. 683–694.

*Coregonus williamsoni*, Gir., described from Provo River, Lake Utah; *id. l. c.* p. 682.

## Mormyridæ.

*Mormyrus grandisquamis*, sp. n., Peters, *l. c.* p. 250, pl. fig. 3, Ogowé River, W. Africa.

## Osteoglossidæ.

W. Peters, *l. c.* p. 200, proposes to reconstruct this family, making it consist of three groups, *Hyodontes* (the family *Hyodontidæ*), *Pantodontes*, and *Osteoglossina*. The second of these is founded upon *Pantodon*, g. n. [vide suprà, *Cyprinodontidæ*].

*Osteoglossum guentheri*, sp. n., Castelnau, J. Zool. v. p. 131, founded on a young specimen procured in the same localities as *O. leichardti*, Gthr. These fishes, as well as the *Ceratodus*, are called 'Barramundi' by the natives.

## Clupeidæ.

*Engraulis panamensis*, sp. n., Steindachner, SB. Ak. Wien, lxxii. p. 589, Panama.

*Chatoessus breviceps*, sp. n., Peters, MB. Ak. Berl. 1876, p. 848, New Hanover.

*Alausa vulgaris*. An interesting supplement to Barfurth's paper on the food and habits of Salmon and Trout, in which he showed that during spawning-time they entirely discontinue feeding. Observations undertaken with respect to the Shad ('maifische') during its sojourn in the Rhine, have led to the same result; the food, moreover, of this fish consists mainly of *Temora velox*, Lilj., and other marine *Entomostraca*, and the writer has found that the eggs taken by Barfurth for those of *Ascaris* are principally those of *Temora*, and the supposed encysted nematode embryos are spermatophores of the same. Max Weber, Arch. f. Nat. (2) xlii. pp. 169–177.

*Pristigaster* (*Odontognathus*) *panamensis*, sp. n., Steindachner, *op. cit.* lxxiv. p. 72, Panama.

## Muræniдæ.

Blanchère, H. de la. Génération de l'Anguille. Bull. Soc. Acclim. (3) iii. pp. 489–494.

J. Duigan adduces instances to show that Eels live in waters having no access to the sea: Tr. N. Z. Inst. vii. p. 221.

*Neoconger perlongus*, sp. n., F. Poey, Ann. Lyc. N. York, xi. p. 67, pl. ix. figs. 3 & 4, Matanzas.

*Muræenichthys breviceps*, sp. n., Günther, Ann. N. H. (4) xvii. p. 401, Tasmania.

*Ophichthys* (*Sphagebranchus*) *anguiformis*, sp. n., Peters, *l. c.* p. 849, Atlantic.

*Muræna longicauda*, sp. n. ?, *id. l. c.* p. 850, Atlantic.

*Muræna panamensis*, sp. n., Steindachner, *l. c.* p. 67, Panama.

(*Muræna*) *Gymnothorax umbrosus*, pl. ix. figs. 1 & 2, and *G. polygonius*, pl. x. Cuba, spp. nn., F. Poey, *l. c.* p. 67.

*Gymnothorax virescens*, p. 178, pl. ix. fig. 1, *versipunctatus*, p. 199, pl. x. and *flavo-scriptus*, p. 200, pl. ix. fig. 2, spp. nn., *id.* An. Soc. Esp. v., Cuba.

## LOPHOBRANCHII.

*Syngnathus blainvillianus*, Eyd. & S., from New Zealand; Günther, Ann. N. H. (4) xvii. p. 402.

*Syngnathus picturatus*, *linea*, and *marmoreus*, p. 374, *ascendens*, p. 375, spp. nn., Poey, An. Soc. Esp. v., Cuba.

*Hippocampus planifrons*, sp. n., Peters, MB. Ak. Berl. 1876, p. 851, N.W. Australia.

## PLECTOGNATHI.

*Monacanthus melas*, sp. n., Tasmania, and *M. brunneus*, Castelu., *bis* [Zool. Rec. xii. p. 126], renamed *M. dæmeli*, or *M. dæmeli*, sp. n., Sydney; Günther, Ann. N. H. (4) xvii. p. 402.

*Balistes polylepis*, sp. n., Steindachner, *l. c.* p. 69, Magdalena Bay.

*Tetrodon fuerthi*, sp. n., *id. l. c.* p. 70, Panama.

*Chilomycterus orbitosus*, sp. n., F. Poey, Ann. Lyc. xi. p. 69, Cuba.

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Huxley, T. H. On the Nature of the Craniofacial Apparatus of *Petromyzon*. J. Anat. Phys. x. pp. 412–429, pls. xvii. & xviii.

Ewart, J. C. Note on the Abdominal Pores and Urogenital Sinus of the Lamprey. *Tom. cit.* pp. 488–493.

## LEPTOCARDII.

*Amphioxus*. Considered in its general relations to other animal types, and separated as a distinct order under the name of *Entomocrania*; T. H. Huxley, J. L. S. xii. pp. 216–223 [cf. *anteà*, p. 2].

On its spinal nerves; F. Balfour, J. Anat. Phys. x. pp. 689–692. On some points in its structure, and their bearing on the morphology of

Vertebrata; E. Ray Lankester, Q. J. Micr. Sci. xv. p. 257. On its mode of oviposition; A. Milnes-Marshall, *tom. cit.* pp. 502–505.

*Branchiostoma belcheri*, Gray, and *B. caribbeum*, Sundv., separated; Peters, MB. Ak. Berl. 1876, p. 324.

*Epigonichthys*, g. n. Dorsal fin rayed, elevated; no caudal or anal fins, anal aperture median; otherwise as in *Branchiostoma*. For *E. cultellus*, sp. n., *id. l. c.* pp. 322–327, pl. figs. 1–4. Further particulars by Studer, who procured the specimen; *l. c.* p. 353.

# MOLLUSCA.

BY

PROF. EDUARD VON MARTENS, M.D., C.M.Z.S.

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## THE GENERAL SUBJECT.

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——. Monographia Pneumonopomorum viventium, accedente fossilium enumeratione. Supplementum tertium, Monographiæ Auriculaceorum parte secunda auctum. Pt. 2, pp. 241–479.

——. Novitates conchologicæ. I. Land-Conchylien.

Vol. iv. is concluded with pts. 48 & 49, pp. 145–171, pls. cxxxv.–cxxxvii., and vol. v. commenced with pts. 50 & 51, pp. 1–28, pls. cxxxviii.–cxlii.

Pini, N. Molluschi terrestri e d'acqua dolce viventi nel territorio di Esino. Bull. mal. Ital. (2) ii. pp. 67–205, with 2 pls.; also published separately. Milano: 1876, 8vo, 146 pp. and 2 pls.

Rabl, C. Ueber die Entwicklungsgeschichte der Malermuschel. Jen. Z. Nat. x. (also separately published, Leipzig: 1876, 8vo, 86 pp. and 3 pls.).

Reeve, L. *Conchologia iconica.

Parts 324–331, issued in 1876, contains the genera *Pupa*, *Pupina* and allies, *Gastrochæna*, *Teredo*, *Xylophaga*, *Navea*, *Fistulana*, *Rissoa*, *Siliquaria*, *Cyrena*, and *Sphærium*.

Simroth, H. Ueber die Sinneswerkzeuge unserer einheimischen Weichthiere. Z. wiss. Zool. xxvi. pp. 227–349, pls. xv.–xxi.

Strobel, P. Saggio sui rapporti esistenti fra la natura del suolo e la distribuzione die molluschi terrestri e d'acqua dolce. Atti Soc. Ital. xix. fasc. 1, 26 pp.

Vest, W. Ueber *Adacna*, *Monodacna*, and *Didacna*. JB. mal. Ges. iii. pp. 289–317, pl. x.

Watson, R. B. Note sur les Coquilles terrestres communes à Madère et à d'autres contrées. J. de Conch. xxiv. pp. 216–232.

Weinkauff, H. C. [See Küster.]

Weinland, D. F. Die Weichthierfauna der schwäbischen Alb. J. H. Ver. Württ. 1876; also separately, Stuttgart: 1876, 126 pp., 1 pl.

Wiegmann, F. Beitrag zur Entwicklungsgeschichte der Reibeplatte und des Kiefers bei den Landschnecken. JB. mal. Ges. iii. pp. 193–235, pls. v. & vi.

Woods, J. E. Tenison. On some new Tasmanian Marine Shells, and a new reversed Tasmanian *Helix*. Pr. R. Soc. Tasm. 1876, pp. 3–34.

## Anatomy and Physiology.

The histological structure of the skin of the terrestrial and freshwater Gastropods is discussed by Leydig in a very elaborate paper, Arch. f. Nat. xlii. pp. 209–264, pls. ix.–xxvi. Vibratile cilia are found in the aquatic species nearly on all parts of the surface, with some exceptions; in the terrestrial snails chiefly on the under side of the foot, but with certain intervals, and also near the mouth and respiratory orifice; the epithelium of land-snails consists only of one layer of cells, some of which are cylindric or cylindriform, and covered by a very fine cuticular stratum; intercellular passages (channels) are found within the epithelium, and, perhaps give issue to the contents of the mucous and pigmental glands, the structure and distribution of which are carefully examined; mucous glands are wanting in the parts of the animal always covered by the shell. The mucous glands are not uniform in the same animal, some contain small spindle- or grindstone-shaped bodies, others are connected with the end of a nerve; the "mucous pore" at the hinder end of the foot in *Arion* is composed of many distinct mucous glands, and may be compared with the byssal gland of some Bivalves. The pigmental glands pass by degrees into calcareous glands filled with a deposit of fine-grained calcareous matter; these are most abundant in the edge of the mantle in the shell-bearing snails. Besides these glands, the corium of snails also exhibits distinct blood-vessels, though in small numbers; it is chiefly composed of rather spongy supports of conjunctive tissue, the cavities between which communicate freely with those of the blood-vessels. The internal shell of *Limax* consists of a homogeneous cuticle, which is more or less calcified, and is situated under the corium of the back, and above a cushion exhibiting microscopical rods and vibratile cilia; this may, perhaps, be compared with the "rosette-shaped" bodies of the *Annelides*, and be in near relation to the renal system; but here the author is careful not to draw any final conclusions. The external shell of the land-snails is composed of (1) a homogeneous cuticle, (2) a calcareous layer, and (3) a homogeneous lamella of colourless substance, and exhibits in most species a distinct microscopical sculpture outside, and in some also inside, which is described pp. 49–52, for some of the more common species. The author maintains his former assertion that the shell of the *Pectinibranchia* is originally a secretion of the epithelium, whereas in the *Pulmonata* it takes its origin within the skin itself, and only afterwards becomes free.

H. v. Iherino gives an account of the physiology and histology of the central nervous system of *Helix pomatia*. Abh. Ges. Götting. xxj.

Kollmann has published several observations on the circulation in Bivalves, Cephalopods, and *Aplysia*. In the last, all arteries are, according to him, closed at the end; the blood passes from them into the interstitial holes or lacunæ of the body, like the serum or lymph of the Vertebrates, and is pressed from thence to the gill; true veins are altogether wanting. In the Bivalves, there are capillaries and veins,

but these are in open communication with intestinal lacunæ, and water can be introduced from without by a cleft in the foot into this system of veins and lacunæ. In the Cephalopods, there are no lacunæ, but only sinuses, that is to say, wide expansions of the veins, clothed by their proper membrane. Z. wiss. Zool. xxvi. pp. 87–102.

H. SIMROTH has published an extensive treatise on the organs of sense of the *Mollusca*, chiefly from observations made on the genera *Paludina*, *Neritina*, *Planorbis*, *Limnæa*, *Helix*, *Arion*, and *Cyclas*. He describes the epithelial cilia and the peculiar terminal corpuscles from different parts of the body, the eyes and otolithes, and their nerves, &c., and comes finally to the conclusion, that a common sense for mechanical and chemical functions, including feeling, smelling, and tasting, is spread over the whole surface of the body, but that the sense of smelling is more specialized in the feelers, and that of tasting in the front part of the buccal cavity of the land-snails, whereas in the aquatic species there is no such specialization. Z. wiss. Zool. xxvi. pp. 227–337 and 347, pls. xv.–xxi.

H. v. IHERING has published a treatise on the auditory organs of the *Mollusca* (suprà), in which he comes to the conclusion that in most divisions the lower forms exhibit numerous small otoconia, the higher having large otolithes.

The auditory organ, acoustic nerve, and otocyst of *Pterotrachea* are fully described by C. CLAUS, Arch. mikr. Anat. xii. (1875) pp. 103–118, pl. x.

The acoustic nerve comes from the supra-pharyngeal ganglion, and not from the pedal, in *Dentalium*; LACAZE-DUTHIERS, Arch. Z. expér. iii. pp. xx. & xxi.

H. SIMROTH opposes the view of VON IHERING that the pulmonary sac of the aquatic Pulmonates or Pulmobranchs is morphologically quite different from that of the terrestrial *Pulmonata*; he rather regards the former as a lower degree of the latter, and discusses the phylogenetic origin of the pulmonary sac generally. Z. wiss. Zool. xxvi. pp. 337–347.

D. WEINLAND has observed that the copulation of *Clausilia biplicata* (Mont.) is not simultaneously reciprocal as in other *Helicidæ*: Weichthierf. d. Alb. p. 89.

The colouring fluid in *Murex brandaris* (L.) and *trunculus* (L.), the purple of ancient Greeks and Romans, has been the subject of interesting chemical and spectroscopical experiments by A. & G. NEGRI. The fluid of both species is originally pale yellow, but assumes, on contact with atmospheric air, a violet colour, that of *M. brandaris* (L.) only under the influence of light, so that it can be called "photographical," that of *M. trunculus* also in darkness. The chemical nature of the colouring matter is near that of indigo. The fluid secreted by the mantle of several species of *Aplysia* is first brown, becoming violet in the air; this also has been examined chemically and spectroscopically by the authors. The green colour of *Elysia viridis* (Mont.) and *Stiliger souleyeti* is due to chlorophyll contained in their body. Atti Soc. Rom. (2) iii. pp. 394–449, with coloured plates representing spectroscopical views, the changes of colour in the fluid of these Mollusks, and the modifications

produced by acids. The same also in Atti Univ. Genov. iii.; and an abstract, by A. Issel, containing a part of the coloured illustrations, in "Rivista maritima," Sept. 1876.

## Embryology.

A short recapitulation of our knowledge concerning the development of the *Mollusca* is given by W. K. Brooks, P. Bost. Soc. xviii. pp. 225–232; he thinks that the *Lamellibranchia* deviate more from the typical larval form than the *Gastropoda*, although the latter are more highly developed, and that for making out the phylogeny of the *Mollusca* we must compare the larval form provided with a velum (*veliger*) with other classes of the animal kingdom; he endeavours to show a homology between this larval form and the *Polyzoa*.

E. Ray Lankester has published in full his observations and views on the development of *Pisidium*, *Aplysia*, *Pleurobranchidium*, *Tergipes*, *Polycera*, *Neritina*, *Limax*, and *Limnæus* in Phil. Tr. 1875, 48 pp., 12 pls. (see Zool. Rec. xi. p. 117, and xii. p. 138).

Fol's observations on the embryology of the Pteropods [see Zool. Rec. xii. p. 137] are fully published in Arch. Z. expér. 1875.

Bobretzky, from observations made on *Nassa*, *Fusus*, *Natica*, &c., by cutting sections after hardening the embryo in chromic acid, comes to the same conclusions as H. Fol [Zool. Rec. xii. p. 137], in opposition to E. Ray Lankester, that the opening formed by the invagination of the primitive embryonal layers becomes afterwards the mouth of the animal; Arch. mikr. Anat. xii. pp. 95–169. O. Bütschli, however, has observed in *Paludina vivipara*, that this opening becomes the vent, as E. Ray Lankester has already stated, and that the mouth is formed at the same time as the so-called shell-gland by invagination of the ectoderm. Z. wiss. Zool. xxvii. pp. 518–521; and Arch. mikr. Anat. xii. pp. 95–169.

The first stages of development in the genus *Unio* have been again observed by C. Rabl; he comes to conclusions which somewhat differ from those given by W. Flemming [see Zool. Rec. xii. p. 139], as he describes a true invagination, by which the primary intestinal tube is formed; the development of this tube is soon stopped, and it becomes quite rudimentary in the parasitical stage, when the young animal is fixed to the skin of fishes; the long byssal filament and the strong marginal teeth in the shell of the young animal are likewise adaptations to this parasitical life. The author finds his observations fully agreeing with Häckel's theory of the germinal layers (Keimblätter) and expatiates on the homologies of the individual organs with those of other *Mollusca* and *Molluscoidea*. Jen. Z. Nat. x. 86 pp. and 3 pls.

W. Flemming discusses some statements made by E. Ray Lankester, Rabl, and Häckel, concerning the embryology of the *Unionidæ*, and compares them with his own results, declining in most cases a final decision. Z. wiss. Zool. xxvi. pp. 355–360.

H. v. Ihering makes some observations on the first development of *Cyclas* [*Sphærium*], denying the formation of a Gastrula-form in it, and

also the existence of a vascular system as indicated by Leydig in the embryo; he also treats upon the supposed "phylogeny" of the *Mollusca*. Z. wiss. Zool. xxvi. pp. 414–433.

E. RAY LANKESTER maintains the correctness of his observations against Fol, Ihering, Rabl, and Bobretzky, adding some new, upon the embryology of *Cyclas*, which develops the shell-gland at an early period in comparison with *Pisidium*, and upon the Gastrula-stage in *Limnæus*. According to him, the blastopore does not become the permanent mouth, either in *Limnæus* or in *Paludina*: in the former, it is closed, or nearly so, in the further course of development; in the latter, it is transformed into the anus. Q. J. Micr. Sci. (2) xvi. pp. 320–327, & 377–385, pls. xxiv. & xxv. [see also Ann. N. H. (4) xviii. p. 77].

The development of the jaw and radula in very young animals before and after hatching, has been observed by F. WIEGMANN [son of the well-known herpetologist, who died in 1840], in various species of *Arion*, *Limax*, *Helix*, *Vitrina*, and *Pupa*. The median tooth is always wanting in the first rows of the radula, and the jaw is at first manifestly composed of two lateral parts which afterwards become united in the median line. Numerous measurements show the relative growth in the various species. JB. mal. Ges. iii. pp. 193–235, pls. v. & vi.

### *Anomalies and Restoration of Parts.*

A scalarid specimen of *Helix aspersa* observed to have frequently broken the extremity of its spire, and to have formed an internal septum, just as *Bulimus* [*Stenogyra*] *decollatus* does normally; the liver was much diminished. In one instance, the animal was entirely denuded by accident, and, after the shell was replaced, it survived. P. LATASTE, J. de Conch. xxiv. pp. 242–246.

*Helix pomatia* restores the upper whorls, when these are crushed and dislocated. WEINLAND, Weichthierf. d. schw. Alb, p. 66.

A list of different anomalies of land- and freshwater- shells found near Esino, in Lombardy, is given by PINI, Moll. terr. di Esino, pp. 127–129.

Several varieties and abnormal forms of *Limnæa stagnalis* and *L. palustris* described and figured by H. STERKEL, Verh. Ver. Hamb. ii. 19 pp., 2 pls.

## GEOGRAPHICAL DISTRIBUTION.

### *a.* LAND AND FRESHWATER MOLLUSCA.

A. R. WALLACE gives an outline of the geographical distribution of the terrestrial (and freshwater) Mollusca in his "Geographical Distribution of Animals," vol. ii. pp. 512–529 and 534 & 535, and some instances of means for their passive dispersal, vol. i. p. 31. Probable transportation by floating cocoa-nuts; Liardet, P. Z. S. 1876, p. 99.

P. STROBEL discusses the influence of soil on the distribution of terrestrial *Molluscs*, with special reference to those observed by him in

Tyrol, Italy, and the Argentine States; he urges the beneficial influences of limestone, moisture, and rich vegetation for most of the land-shells, but in different degrees, and concludes that those species which are chemically indifferent, hygrophilous, and live on plants on the ground, are most apt to be acclimatized; whereas those which live on rocks and prefer calcareous dry ground, are the most characteristic for any country, that is to say, geographically most limited. Atti Soc. Ital. xiv. fasc. i. pp. 1–26.

W. Kobelt publishes some observations on the geographical distribution of terrestrial *Mollusca* in Ber. senck. Ges. 1876.

P. Fischer distinguishes and characterizes the following malacological provinces of Europe:—(1) Septentrional or Germanic, comprising the larger part of Great Britain, Germany, and Russia, with all Denmark, Norway, and Sweden. (2) Occidental or Atlantic [Celtic], Ireland, Wales, and Cornwall, the western half of France, Asturias, and Portugal. (3) Meridional or circum-Mediterranean, all the shores of the Mediterranean Sea. (4) Central or Pontic, Danube and shores of the Black Sea. (5) Oriental or Caspian, shores of the Caspian Sea. The species of land- and freshwater-shells characteristic of these are indicated. J. de Conch. xxiv. pp. 69–84, with a coloured map.

## 1. *Northern and Central Europe.*

Notes on the occurrence of some rare and local [British] shells in unrecorded localities by W. G. Blatch. Q. J. Conch. 1876, pp. 129–131; *Zonites excavatus* var. *citrina*, *Helix aspersa* var. *exalbida*, *H. costiana*, *fusca*, *Clausilia rolphi*, and *C. rugosa* var. *albida*.

*Scilly Islands.* 19 species of land-shells, some of them thinner and more fragile than on the mainland, enumerated by W. H. Hatcher, *loc. cit.* pp. 138 & 139.

*Jersey.* 37 species of terrestrial and 12 of freshwater Mollusks observed by E. Dupery, Ann. N. H. (4) xviii. pp. 344 & 345.

*Scandinavia.* The species of *Arion* and *Limax* reviewed by Malm, Œfv. Ak. Förh. xxxiii. No. 1, pp. 76–80. Some notes on the *Mollusca* of the Swedish province Jemtland, by P. Olsson, *op. cit.* No. 3, p. 151.

*Germany.* S. Clessin has commenced a popular treatise on the land and freshwater Mollusks (title *supra*), with descriptions and woodcuts of every species. Parts 1 & 2, containing introduction, and most of the terrestrial genera, were published in 1876.

*Norderney.* Notes on the few land-shells (13 species) of that island from published works and manuscripts collected by F. Buchenau, Abh. Ver. Brem. iv. (1875) pp. 551 & 552.

*Hamburgh.* Notes on some land-shells, species of *Clausilia*, and *Segmentina eleazini* (Westerlund), by O. Semper, Verh. Ver. Hamb. ii. pp. 246–250.

*Holstein.* 58 terrestrial and 39 freshwater species of Mollusks observed in the northern part of Holstein by M. W. Fack. Schr. Ver. Schlesw. Holst. i. (1875) pp. 273–276. Further notes concerning this

fauna by H. v. Heimburg, Nachr. mal. Ges. 1876, pp. 133–135, and S. Clessin, Verh. Ver. Hamb, ii. pp. 252–266.

*Westphalia and Lippe-Detmold.* 110 species (46 freshwater, and 64 terrestrial) observed in these provinces by B. Farwick, JB. Westfäl. Prov.-ver. (1875) 1876, pp. 49–57; including *Ancylus depressus* (Desm.), *Bithynia troscheli* (Paasch), *Amphipeplea glutinosa* (Müll.), *Limnæus glaber* (Müll.), *Succinea arenaria* (Bouch.), *Helix candidula* (Stud.), *obvoluta* (Müll.), *personata* (Lam.), *Azeca tridens* (Pult.), *Pupa doliolum*, *frumentum*, and *secale* (Drap.), *Clausilia ventricosa* (Drap.), *pumila* (Ziegl.), and *Daudebardia brevipes* (Drap.).

*Lorraine.* Some notes concerning the land-shells of the department des Vosges, by Collin, P. v. Mal. Belg. iv. (1875) p. lxxxi.

*Alsace.* M. P. Hagenmüller has enumerated 91 terrestrial and 49 freshwater species observed by himself, Bull. Soc. Colmar, 1871 & 1872, p. 235; F. Meyer critically discusses this list, Nachr. mal. Ges. 1876, pp. 104–106 and 113–123; L. Morelet makes some additions to it concerning several contested species, and especially *Helix aspersa* (Müll.), which he has observed near Colmar and on the dyke of the Rhine, J. de Conch. xxiv. (1877), pp. 240 & 241.

Notes on the conchological fauna of the mountain ranges *Rhön* and *Schwarzwald* by F. Sandberger, Nachr. mal. Ges. 1876, pp. 150 & 151.

J. E. Daniel gives a list of 105 land- and freshwater-shells found near *Heidelberg*. [The author appears not to be acquainted with the German literature on the subject, for example, Kreglinger's and Gysser's pamphlets of the *Mollusca* of that district, published in 1863 & 1864. He is also wrong in supposing *H. naticoides* (Drap.) to live in Switzerland, and in expecting it in Baden; this species is limited to the Mediterranean province. The occurrence of *Testacella* at Heidelberg is very doubtful, no German conchologist having found it in Germany. Concerning *Helix bidens*, occurring in the fossil, but not recent state, in Western Germany, and *Clausilia itala*, very probably introduced from Upper Italy, *cf.* the statements quoted in Zool. Rec. vii. p. 120, and x. p. 167.]

*Suabia.* D. Weinland has published a treatise on the land- and freshwater-shells found in the chain of Jurassic limestone called the "Schwäbische Alb," in Würtemberg; he has accurately explored the environs of Urach, and gives many very interesting notes on the occurrence and habits of several species, some of which are mentioned *infrà*; he enumerates 70 terrestrial and 4 freshwater species, and distinguishes among the former 28 inhabitants of woods, 14 of hedges and borders of wood, and 32 of meadows, and 8 adhering to rocks; 22 form a peculiar mountain fauna, 34 are common to mountain and plain, and of 15 of these only deteriorated or stunted forms are to be found on the mountains. JH. Ver. Württ. 1876.

*Alps.* Notes on the hypsometrical distribution of the land- and freshwater-shells in the Alps of Piedmont and Savoy, taken from the works of Mortillet and Stabile, distinguishing 6 zones:—(1) Zone of *H. carthusiana*, below 1000 metres, comprising also all freshwater shells; (2) Zone of *H. obvoluta*, 1200–1500 mètres; (3) Zone of *H. fontenillii*, 1200–1500

mètres: (4) Zone of *H. sylvatica*, 1200–1500 mètres; (5) Zone of *H. glacialis*, 2000–2500 mètres; comprising also *H. zonata*, *H. arbustorum* var. *alpestris*, *Zonites petronella*, and three species of *Vitrina*. P. Fischer, J. de Conch. xxiv. pp. 65–67.

Five species of *Pisidium*, all new, from the lakes of Switzerland, 20–66 fathoms, are described by S. Clessin, Bull. Soc. Vaud. xiv. pp. 234–243, pl. iii. They are all distinguished by small size, feeble hinge, and rather large summits; the latter circumstance indicating that they remain a long time within the gills of their parents.

*Carinthia*. 6 species of slugs observed by R. Latzel, JB. Mus. Kärnt. xii. p. 117. 67 species of terrestrial- and 3 of freshwater-shells observed in the valley "Kanalthal," in Carinthia, by T. Ressmann, Nachr. mal. Ges. pp. 128–133.

The geographical limits between *Helix fœtans* [*ichthyomma*] and *planospira* in Styria, one excluding the other, observed by H. Tschapeck, Nachr. mal. Ges. 1876, p. 21.

## 2. *Southern Europe and Northern Africa.*

W. Kobelt continues to treat critically upon several groups of land- and freshwater-shells, especially of the genera *Helix* and *Unio* from Southern Europe, Northern Africa, and Asia Minor, in the continuation of Rossmässler's Iconography, vol. iv., and his review of the known Italian species of *Helix*, section *Campylæa*, in JB. mal. Ges. iii., treating especially of *H. cingulata* (Stud.) and *frigida* (Jan.), pp. 344–352.

*Lombardy*. 81 species of terrestrial and 22 of freshwater *Mollusca* observed in the territory of Esino, province Como, and described by N. Pini (*suprà*). 98 terrestrial and 36 freshwater species observed in the valleys of the Oglio, Scalve, and Borlezza, and in Val Camonica, provinces of Brescia and Bergamo, by G. B. Adami, Atti Soc. Pad. v. pt. 1, with peculiar attention to the elevations in which they have been found; amongst those occupying the highest regions are:—*Arion cinctus*, Val d'Avio, 2600 mètres; *Helix arbustorum* var. *bettæ*, Pizzo Tornello, 2677 mètres; *H. frigida* var. *hermesiana*, and *Pomatias canestrinii*, sp. n., above 2000 mètres; *Vitrina diaphana*, Passo del Venevecolo, 2500 mètres; *V. pellucida*, Monte Tonale, 2700 mètres; *Hyalina petronellæ* (Charp.) and *fulva*, Presolana, 2100 mètres; *viridula* (Mke.) Val d' Avio, 2300 mètres. 52 terrestrial and 46 freshwater species from Castel Goffredo, near Mantua, enumerated by J. Anselmo, Bull. mal. Ital. (2) i. pp. 167–183.

*Pyrenees*. 47 terrestrial and 6 aquatic species inhabiting the Valley of Cauterets are enumerated, and their distribution in height indicated as follows:—(1) Zone of *Helix carthusiana*, up to 1000 mètres, including nearly all aquatic species; (2) Zone of *H. aspersa*, 1000–1200 mètres; (3) Zone of *H. limbata*, 1200–1500 mètres; (4) Zone of *A. nemoralis*, 1500–2000 mètres; (5) Zone of *H. carascalensis*, above 2000 mètres; besides the said species only *H. nubigena* and *Limnæa limosa* var. *glacialis* occur in this zone. P. Fischer, J. de Conch. xxiv. pp. 51–65. *Pomatias crassilabris* (Dupay) ascends to the fourth and *Pupa pyrenæ-*

*aria* (Boubée) to the fifth zone; *Id. l. c.* pp. 156–158. A pamphlet entitled "Mollusques de la haute vallée d'Ambus (Pyrénées)," by Pagot, 1875, has not been seen by the Recorder.

*Spoleto.* 41 terrestrial and 12 freshwater shells, enumerated by DANTE PAGANETTI. Bull. mal. Ital. (2) ii. pp. 233–240.

*Naples.* List of 36 species, found at the Botanical Gardens by V. CESATI, *op. cit.* i. pp. 125–128 (1875).

*Sicily.* 201 terrestrial and 56 freshwater species, enumerated by L. BENOIT, *loc. cit.* pp. 129–163.

*Sardinia.* 39 terrestrial and 10 freshwater species, enumerated by G. B. ADAMI, *op. cit.* ii. p. 219–222.

*Greece.* Some new species of *Helix* and *Clausilia* from Bœotia, Attica, Eubœa, and Messene, collected by H. Blanc, are described by E. v. MARTENS, J B. mal. Ges. 1876, pp. 338–343, pl. xii.

*Azores.* Specimens from these islands of *Arion* (*Prolepis*) *fuscus* (Müll.), *Limax gagates* (Drap.) in several varieties, and *Limax agrestis* (L.), all European species, in the Stockholm Museum. MALM. Öfv. Ak. Förh. xxxiii. No. 1, pp. 73–89.

## 3. *Northern Asia.*

*Siberia.* A species of *Physa*, found by Skutsberg during Prof. Nordenskiöld's expedition near Cape Schaitanskoi, in the region of dwarf birch trees, is considered to be the most northern freshwater-shell hitherto found; H. CROSSE, J. de Conch. xxiv. p. 155. [This cape is situated a little below 72° N. lat., but Middendorff has long ago observed *Physa hypnorum* in the peninsula Taimyr, 78° 30' N. lat.] 6 new species of land-*Mollusca* and 11 of freshwater-shells found on the shores of the Yenisei River, between 61° and 71° N. lat., are described by WESTERLUND & CROSSE, Nachr. mal. Ges. 1876, pp. 97–104.

*Transcaucasia.* A number of land- and freshwater-shells sent by Sievers are examined, and the new species described by A. MOUSSON, J. de Conch. xxiv. pp. 24–61 & 137–148; they make up the number of known species from that country to 160, about a fourth of which (37) are distributed over a large part of Europe. 79 species collected in the same country by A. Schneider, some new, are enumerated by E. v. MARTENS, J B. mal. Ges. iii. pp. 364–370.

*Khiva.* Two species of terrestrial Mollusks from the eastern shore of the Caspian Sea, already known from Samarcand, and 6 freshwater species from salt lakes and the dry bed of the Amu Darja, already known from the Caspian Sea and Lake Aral, indicated by E. v. MARTENS, J B. mal. Ges. iii. pp. 334–337, pl. xii.

*Lake Baikal.* 25 species of freshwater-snails have been collected by B. DYBOWSKI & W. GODLEWSKI, 20 are operculated and *Pectinibranchia*, the rest being *Pulmonata*. There are 8 genera, hitherto only known from this lake, viz., *Choanosphabus* among the latter, and *Benedictia* and *Limnorea*, gg. nn., (*infrà*) among the former; the rest of the species belong to *Hydrobia*, *Valvata*, and *Ancylus*. No species of

*Limnæa* or *Planorbis* has been found, nor any representative of marine fauna. Mém. Ac. Pétersb. (7) xx. No. 8, 73 pp. and 8 pls.

*Japan.* Terrestrial shells, new or little known, described or discussed by Kobelt, JB. mal. Ges. iii. pp. 30–37, pl. i., by E. v. Martens, *loc. cit.* pp. 357–363 (Review of the *Clausiliæ*; *Pseudohyalina minuscula*, a North American species, lives also in Japan, *l. c.* p. 359) and by E. Smith, Q. J. Conch. 1876, No. 8, pp. 118–121.

*China.* 53 freshwater-shells from the Yangtsekiang described and figured by Heude in his "Conchyliologie fluviatile de la province de Nanking."

## 4. *Africa.*

*Madeira.* Out of 179 species of land- and freshwater-*Mollusca* found in this island, 146, or nearly four-fifths, live nowhere else; the probability that the rest have been introduced is discussed and asserted positively for 6, probably in recent time for 6 others, rather probably in past ages for 7 more, and doubtfully, perhaps without human agency, for 4 more. Watson, J. de Conch. xxiv. pp. 217–232; an extract in Nachr. mal. Ges. 1876, pp. 136 & 137.

*Western Africa.* 38 species of terrestrial- and 8 of freshwater-Mollusks collected by the late Prof. Buchholz on the Gold Coast and near the Camgroon River, including several new, enumerated and described by E. v. Martens, MB. Ak. Berl. 1876, pp. 253–274, with 5 pls.; some are figured from drawings of the living animals.

*St. Helena.* Some notes on its land-shells, most of them introduced, by Watson, J. de Conch. xxiv. pp. 308–311. *Bulimus (auris-vulpina?)*, living specimens found.

*Tristan d'Acunha.* 1 *Zonites*, 1 *Pupa*, 1 *Limax* found by Willemoës-Suhm, P. R. Soc. xxiv. p. 584.

*Comoro Islands.* The known land- and freshwater-shells enumerated and some new, collected by J. M. Hildebrandt, in Joanna, described by E. v. Martens, JB. mal. Ges. iii. pp. 250–253, pl. ix. figs. 4–6.

*Madagascar and Mauritius.* Notes on some land- and freshwater-shells by A. Morelet, J. de Conch. xxiv. pp. 85–91, pl. iii.

## 5. *Tropical Asia.*

*Nicobar Islands.* The known species enumerated, and some new ones, found by A. de Rœpstorf, described by O. A. Mörch, J. de Conch. xxiv. pp. 353–367. There are in all 35 terrestrial species (19 of which are inoperculate, 16 operculate); also 1 freshwater species (*Planorbis*) is mentioned.

*Cambodia.* 56 species of freshwater-Mollusks enumerated, the new ones described, and the general characters of this fauna, identical with that of Siam, Annam, and Burma, pointed out, by H. Crosse & P. Fischer, J. de Conch. xxiv. pp. 313–342. 29 of these, including a new genus, *Locanopsis*, have been already described and figured by Deshayes & Jullien, N. Arch. Mus. x. (1874) pp. 116–162, pls. v.–viii.

### 6. *Australia and Polynesia.*

*Aru Islands.* 20 land shells enumerated by TAPPARONE-CANEFRI, Ann. Mus. Genov. vi. 1874, pp. 561–563.

*Australia and the Solomon Archipelago.* New land- and freshwater shells described by BRAZIER, P. Linn. Soc. N. S. W. i. pp. 1–9, 17–20. 28 South Australian species of *Helix* enumerated by G. E. ANGAS, Q. J. Conch. 1876, pp. 134 & 135. Several species of slugs found at Sidney mentioned by HEYNEMANN, J. Mus. Godeffr. xii. (1875) p. 159.

*Polynesia* generally. A. GARRETT gives in a letter some observations on the distribution of land-shells; each island has peculiar species, only *Stenogyra juncea* (Gould) and *Vertigo pediculus* (Mouss.) are spread over almost all the islands. Generally there are more species on the smaller than on the larger islands [?]. The Fiji group possesses several very peculiar forms, as *Eurypus*, *Charis*, *Placostylus*. Verh. Ver. Hamb. ii. pp. 59–61.

*Fiji Islands.* 11 new species of land-shells (3 operculate, and 8 inoperculate) described and figured by E. A. LIARDET, P. Z. S. 1876, pp. 99–101, pl. v., with some general remarks on the conchological fauna.

### 7. *Tropical and South America.*

*Haiti.* Some new land- and freshwater-shells by D. WEINLAND, Mal. Bl. xxiii. pp. 170–173 and 230–234, pl. ii.

*Trinidad.* Additions to its fauna of land- and freshwater-shells by R. J. LECHMERE-GUPPY, P. Sc. Ass. Trinidad, 1872, 9 pp.

*Costa Rica and Guatemala.* On land-shells collected by Carmiol & Salvin (some new), E. v. MARTENS, JB. mal. Ges. iii. pp. 253–261, pl. ix. figs. 7 & 8.

*Argentine States.* A list of 89 land- and freshwater-*Mollusca*, 30 terrestrial, 24 freshwater Gastropods, and 35 freshwater Bivalves, by A. DÖRING, Period. Zool. Argent. i. pt. 2, pp. 113–120. The same author continues his notes on some terrestrial *Mollusca*, discussing the genera *Succinea*, *Simpulopsis*, *Bulimus* (infrà), and some species of *Helix*; Bol. Ac. Cordova, ii. pp. 300-339. Abstract in Mal. Bl. xxiii. pp. 39–42; the diagnoses of the new species from 1875 [Zool. Rec. xii. pp. 180 & 181, 187 & 188] are copied, Nachr. mal. Ges. 1876, pp. 3–8.

### 8. *North America.*

A list of 25 land- and 93 freshwater-shells, including 39 species of *Unio*, found at Davenport, Iowa, is given by W. H. PRATT, P. Davenp. Ac. i. pp. 165–167.

On identical species of *Limnæidæ* in Europe and North America: WEINLAND, Weichthierf. d. schw. Alp. pp. 40 & 41, footnote.

## *b.* MARINE MOLLUSCA.

A. WALLACE gives an outline of the geographical distribution of all

the families of marine *Mollusca* in his general work on the Geographical Distribution of Animals, ii. pp. 504–512 and 530–539, and hints on their means of dispersal, i. p. 30.

The late R. von WILLEMOËS-SUHM, in a preliminary report on the deep-sea dredgings on board the "Challenger," says, "There are scarcely any fine shells; if they come up at all, they are small and of ordinary appearance, like *Arca*, *Nucra*, *Pleuronectia*, *Trochus*, *Fusus*, etc. *Dentalium* goes to great depths, and was, either alive or dead, nearly always found when great quantities of mud were brought up by the dredge." P. R. Soc. xxiv. p. 578.

"Pteropods, Heteropods, and pelagic Gastropods occur everywhere in the surface-waters of the ocean; their [dead] shells make up a large portion of some deposits in shallow water; deeper than 1500 fathoms, they become more and more rare." J. MURRAY, in a preliminary report on work done on board the "Challenger," P. R. Soc. xxiv. p. 536.

## 1. *Arctic Sea and Northern Atlantic.*

*Spitzbergen.* 2 species of Pteropods, 12 Gastropods, and 10 Bivalves collected by A. E. Eaton, and determined by J. G. JEFFREYS, Ann. N. H. (4) xviii. pp. 499 & 500.

Some marine shells from the Polar Sea indicated by the late T. v. Heuglin, "Reisen nach dem Nordpolarmeer." 1874, p. 229; critical notes concerning two of them by MÖRCH, J. de Conch. xxiv. p. 369.

Notes on Arctic species of the genus *Neptunea* and *Sipho* by KOBELT, JB. mal. Ges. iii. pp. 61–76; on some other species, *id. l. c.* pp. 371–373.

New or little known species of shells, dredged in considerable depths of the North Atlantic on the "Valorous" expedition, are described by J. G. JEFFREYS, Ann. N. H. (4) xviii. pp. 424–436 and 490–499. A general account of the *Mollusca* observed and collected during the same cruise in the North Atlantic and Davis' Straits is given by the same author, P. R. Soc. 1876, pp. 187–202. He enumerates 52 species, which are Greenlandic and European, but not American; only 3 Greenlandic and American, not European; 5 Greenlandic alone, not North American nor European; and 39 North American and European, but not Greenlandic: 33 species are added to the fauna of Greenland.

## 2. *North Sea, Channel, and Baltic.*

*Norway.* Contributions to its fauna by H. FRIELE & G. HANSEN, Forh. Selsk. Christ. 1875 (Nudibranchs), and by the former, *op. cit.* 1876 (rare deep-sea shells).

*Northumberland.* 125 species of shells, dredged off the coast of Durham and North Yorkshire, from 17–45 fathoms, 21 of them new for this district, enumerated by G. S. BRADY & D. ROBERTSON, Rep. Brit. Ass. 45th meeting, pp. 192–195.

*Holland.* 22 species of marine *Mollusca* observed in the zoological station at the Helder are enumerated by P. P. C. HOEK, in "Eerste

Jaarverslag omtrent de oölogisch station der nederlandsche dierkundige Vereeniging." Ned. T. D. iii. pp. 41–47.

The shells of the littoral zone in *Jersey* are enumerated by E. Dufrey; Ann. N. H. (4) xviii. p. 338–344.

*Mactra subtruncata* (Daccosta) found in the Baltic Sea in the stomach of *Platessa*; Wiechmann, Nachr. mal. Ges. 1876, p. 18.

### 3. *Mediterranean and Caspian Seas.*

Aradas & Benoit have concluded their work on the living sea-shells of Sicily, bringing up the number of species to 936 by minute distinction; some new species. Kobelt gives critical remarks on it in JB. mal. Ges. iii. pp. 281–284.

Several additions to the Mediterranean fauna given by the Marchese Monterosato (*supra*); the shells have been found in coral masses at Sciacca, Southern Sicily.

78 species from depths of 150–200 mètres at Messina, enumerated by G. Seguenza, Bull. mal. Ital. (2) ii. pp. 62–65.

*Caspian Sea.* The researches made by O. A. Grimm in various depths prove that this sea is not so very poor in animal life as hitherto supposed. He distinguishes the following zones:—

1. Littoral, to 8 mètres: *Neritina litorata*, *Dreyssena*, *Cardium edule*, *Hydrobia caspia*.
2. From 8 to 16 mètres: *Dreyssena polymorpha* prevailing.
3. From 16 to 30 mètres: *Cardium edule* prevailing.

   In both these, there are several species of *Cardium*, *Dreyssena caspia*, *Hydrobia caspia*, and *Lithoglyphus caspius*.
4. From 30 to 36 mètres: *Dreyssena caspia* and *Hydrobia caspia*.
5. From hence to 216 mètres: *Hydrobia caspia*, *Lithoglyphus caspius*, and *Dreyssena rostriformis*.
6. Below 216 mètres: *Rissoa dimidiata*.

Grimm, "Kaspiskoe more i ego fauna," St. Petersburg: 1876, 8vo, pp. 122–168.

### 4. *Tropical Atlantic.*

Recent shells from the *Cape de Verde Islands* [indicated Zeitsch. Rec. xii. p. 147] more fully described and figured by E. v. Martens, JB. mal. Ges. iii. pp. 236–243.

*West Indies.* The known species of *Riccidæ*, *Cerithiidæ*, *Planaxidæ*, *Turritellidæ*, and *Littorinidæ* enumerated, their arrangement in genera and sub-genera amended, and some new added by Mörch, Mal. Bl. xxiii. pp. 45–58 & 87–143. The *Scalidæ* [*Scalariidæ*] are discussed by the same author in J. Ac. Philad. viii. pp. 189–207, pl. xxix.

### 5. *Indian Seas.*

*Red Sea.* The known species of *Strombidæ*, 18 in number, including *Terebellum*, are enumerated, with full synonymy and indication of their

geographical distribution by Issel & Tapparone-Canefri, Ann. Mus. Genov. viii. pp. 337–366. The known species of *Murex* 21, *Ocinebra* 2, *Tritonium* 16, *Purpura* 2, *Ranella* 9, *Fasciolaria* 2, *Cancellaria* 2, *Latirus* 6, *Turbinella* 1, *Pyrula* 2, *Pleurotoma* 9, *Pallia* 1, *Fusus* 6, enumerated and discussed by Kobelt, JB. mal. Ges. iii. pp. 38–50.

Rumph's authority for the habitat of shells in the Indian Seas extends only to those species which he himself described and figured, and not to those added by Schynvoet; these can easily be found out by consulting the text of his work, "Amboinsche rariteitkamer." Martens, Nachr. mal. Ges. 1876, pp. 71 & 72.

*Ars. Islands.* The species collected by E. Beccari are enumerated by Tapparone-Canefri, Ann. Mus. Genov. vi. (1874) pp. 548–568.

*New Caledonia.* Notes on some sea-shells by P. Fischer, J. de Conch. xxiv. pp. 148–151; also by Souverbie, *loc. cit.* pp. 376–381.

## 6. *Australia and Antarctic Seas.*

A large number of new *Tasmanian* species, among which a new genus of *Elysiidæ* by J. E. T. Woods, P. R. Soc. Tasm. 1876, pp. 2–18, and in a subsequent number (October, 1876).

*New Zealand.* 177 species of marine *Mollusca* observed at Otago, are enumerated by F. W. Hutton (& G. H. F. Ulrich) in Report on the Geology and Goldfields of Otago, 1875, pp. 134–139.

*Kerguelen Island.* 1 Cephalopod, 1 terrestrial and 6 marine Gastropods, and 5 Bivalves, some new, collected by the American expedition, and determined by W. H. Dall, Bull. U. S. Mus. No. 3, pp. 42–48.

## 7. *Pacific.*

*Aleutian Islands?* Some species of sea-shells found at Unimak mentioned by A. L. Pinart in "Voyage à la côte Nord-Ouest de l'Amérique," i., Histoire naturelle, 1875.

The locality *Caraccas*, so often mentioned by Cuming, is on the coast of Ecuador, 0.30° S. lat.; Martens, Nachr. mal. Ges. 1876, pp. 68 & 69.

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## *Pre-historic Existence.*

Several land- and freshwater-shells from a recent tufa-formation near Seeburg, in Würtemberg, including a remarkable variety of *Limnæa ovata* (Drap.); Weinland, Weichthierf. d. schw. Alb, pp. 120 & 121, pl. iv. fig. 8.

Shells of *Cardium edule*, *Melania tuberculata*, and *Melanopsis cariosa*, found in the "chotts" of the Province Constantine and the Regency of Tunis; therefore these must have been lagoons of brackish water; P. Fischer, J. de Conch. xxiv. pp. 257 & 258.

Some terrestrial shells from the "löss" formation in Turkestan, identical with recent ones, indicated by E. v. Martens, JB. mal. Ges. iii. p. 365.

Shells of *Succinea obliqua* and *avara*, *Helicina occulta*, *Pupa fallax*, and *Helix striatella* found in a yellow loam or clay, which in all respects corresponds very closely with the "löss" of the valley of the Rhine, near Davenport, Iowa; W. H. Pratt, P. Davenport Ac. i. p. 97.

Tertiary Tasmanian shells; P. R. Soc. Tasm. 1876, pp. 21–42.

*Panopæa glycimeris* (Born.) = *abbrevandi* (Menard de la Groie) found in sub-fossil state in Southern France; E. Dumas, Rév. Montp. iv. (Sept. 1875), and J. de Conch. xxiv. pp. 135, 136 & 189.

Shells found in ancient mounds in Illinois and Iowa, including *Unio*, *Cassis madagascariensis* [?], *Pirula perversa*, and *Dolium*; Pratt, P. Davenp. Ac. i. pp. 42, 105, 112, 113, 119 & 136.

## *Acclimatization, &c.*

G. B. Adami has tried to introduce 17 species of land- and freshwater-Mollusks at Edolo, Val Camonica, from other parts of Upper Italy; 4 of these soon disappeared, the rest survived; Moll. terr. e fluv. di Brescia e Bergamo, p. 91. Acclimatization of *Helix nemoralis*, at Burlington, New Jersey, 1857–1865, succeeded, that of *lapicida* failed; Weinland, Weichthierf. d. schw. Alb, p. 59.

C. Müller has given some notes concerning the immigration of *Dreyssena polymorpha* (Pall.) in Bavaria. Abh. Ver. Regensb. xxviii. 1874.

*Madeira.* Land-shells of recent introduction, see *anteà*, p. 13.

*Balea perversa* (L.) passes the winter in clefts of the bark of trees, and revives with a thaw, as early as January; a similar revival has also been observed in *Cionella lubrica* (Müll.) which passes the winter on the ground. Fack, Schr. Ver. Schlesw. Holst. i. (1875) pp. 277 & 278. The same habits observed in *Helix fruticum*; Weinland, Weichthierf. d. schw. Alb, p. 55.

*Potamides layardi* (H. Ad.) living in salt lakes of the great Indian desert; Blanford, J. A. S. B. (n. s.) xlv. pt. 2, p. 94.

Species of *Planorbis* and *Physa* found [alive ?] in a salt marsh, Northern Kansas; Parry, P. Davenport Ac. i. p. 39.

## *General Classification.*

H. v. Ihering (JB. mal. Ges. ii. pp. 97–148) gives a preliminary account of an extensive work on the nervous system and the "phylogeny" of the *Mollusca*. Rejecting generally the systems founded on a single character, as, for example, the separation of the sexes, and the respiratory organs by Cuvier, and the radula by Troschel, he establishes a new system based on the arrangement of the nervous system, in the following manner:—

Vermes. Phylum Amphineura. Four longitudinal trunks of nerves, the two ventral connected by several transverse commissures. In-

cludes the *Chitonidæ* with *Chætoderma* (Lovén) and *Neomenia* (Tullberg),* but as a distinct "class."

Molluska (*sic*). Phylum 1. Acephala (Cuv.) = *Lamellibranchia* (Blainv.).

Phylum 2. Solenoconchæ (Lacaze-Duthiers).

Phylum 3. Arthrocochlides (new), corresponding partly to the *Prosobranchia* (M.-Ed.). Cerebral, pedal, commissural, and visceral ganglions are present, and their commissures form an anterior and a posterior ring round the pharynx; the arteria pedalis never lying between both rings.

First "class." Chiastoneura (new). A supra-intestinal ganglion depending from the dextral commissural ganglion, but situated on the left side, and giving nerves to the left half of the body; a sub-intestinal ganglion depending from the left commissural ganglion, situated on the right side, and giving nerves to the right side of the body.

Ord. 1. Zeugobranchia: Fissurellidæ, Haliotidæ, and Pleurŏtomaridæ.

Ord. 2. Anisobranchia.

Suborder 1. *Patelloidea* (*Docoglŏssa*, Troschel).

Suborder 2. *Rhipidoglossa* (Troschel, part): Trochidæ.

Suborder 3. *Tænioglossa* (Troschel, part): Littorinidæ, Cyclostomidæ, Melaniidæ, Turritellidæ, &c.

Second "class." Orthoneura (new). The visceral nervous system forms a simple noose round the intestine, the nerves remaining limited to the side of the body in which they have their origin.

Ord. 1. Rostrifera (Gray, part).

Suborder 1. *Rhipidoglossa* (Troschel, part): Neritacea, Helicinacea, and Proserpinacea.

Suborder 2. *Ptenoglossa* (Troschel); Janthinidæ, Solariidæ, and Scalariidæ.

Suborder 3. *Tænioglossa* (Troschel, part): Ampullariidæ, Valvatidæ, Capuloidea, Sigaretina, Cypræidæ, Cerithiacea, Alata.

Ord. 2. Proboscidifera (Gray), with three suborders Tænioglossa (Troschel, part), Toxoglossa, and Rhachiglossa (Troschel).

Ord. 3. Heteropoda (Lam.)

Phylum 4. Platycochlides (new). Central part of the nervous system consisting either of a simple mass, or of cerebral, pedal, and visceral ganglions; arteria pedalis situated between the visceral and pedal ganglions, if the former is separated from the cerebral ganglion. Sexes mostly united.

First "class." Ichnopŏda (new).

Ord. 1. Protocochlides (new). Only a dorsal ganglion. No radula; Rhodopidæ, Tethydæ, Melibidæ.

* For *Neomenia*, see Zool. Rec. xii. p. 544 (*Vermes*).—Rec.

Ord. 2. PHANEROBRANCHIA (new). Rest of the *Nudibranchia*.

Ord. 3. SACCOGLOSSA (new). Ascoglossa (Bergh, MS.). The teeth of the radula, after being worn out, are preserved in a peculiar sac in the buccal cavity beneath the front of the radula. Limapontiidæ, Elysiidæ, Phyllobranchidæ, Pleurobranchidæ, Hermæidæ, Lophocercidæ.

Ord. 4. STEGANOBRANCHIA (new). [Tectibranchia, Cuvier, 1817, = Pomatobranchia, Schweigger]; Runcinidæ, Siphonariidæ, Pleurobranchidæ, Aplysiidæ, Bullidæ, &c.

Ord. 5. BRANCHIOPNEUSTA (new). The pulmonary sac is homologous with the branchial cavity of other Mollusks. Eyes sessile; Amphibolidæ, Gadiniidæ, Limnæidæ, Auriculaceæ.

Ord. 6. NEPHROPNEUSTA (new). Pulmonary sac morphologically homologous with the last part of the kidney or cloaca; eyes apical; = Stylommatophora (A. Schmidt). Helicidæ, Limacidæ, &c.

Second class: PTEROPODA (Cuv.).

Third class: CEPHALOPODA (Cuv.).

Critical observations on this system; E. R. Lankester, Ann. N. H. (4) xviii. p. 77.

## *Popular Works, Bibliography.*

W. KOBELT has published a popular treatise on Conchology, "Illustrirtes Conchylienbuch," Nürnberg: 1876. The first part treats of the *Cephalopoda*, *Pteropoda*, *Heteropoda*, and the *Muricidæ*, *Pyramidellidæ* [*Pir-*], and *Tritoniidæ* of the *Gastropoda*, and is illustrated with 10 pls.

A catalogue of the published works (books, pamphlets, and papers published in periodicals, 223 in number) of I. LEA, from 1817–1876, has been issued at Philadelphia, 1876. 22 pp.

A bibliographical note on the "Museum Boltenianum," and on the prices at which some shells of it were sold in 1819; O. SEMPER, Verh. Ver. Hamb. ii. pp. 121–125.

## CEPHALOPODA.

Interesting observations on living Cephalopods, chiefly *Octopus*, their moving, fighting and copulation, made in the aquarium of the zoological station at Naples; KOLLMANN, Z. wiss. Zool. xxvi. pp. 1–23.

Observations concerning the chromatophores in young specimens of *Loligo*, stating that the contraction is active and the expansion passive; M. P. HARTING, Niederl. Arch. Zool. ii. pt. 4 (1875 ?), pp. 13–30, pl. 1, figs. 6–19: extract in Ann. N. H. (4) xvii. pp. 174 & 175.

*Eledone*, sp., from 350 fathoms, shore of Brazil; Willemoes-Suhm, P. R. Soc. xxiv. p. 578.

*Spirula reticulata* (Owen), the entire animal from the stomach of a *Mucrorse* captured in a depth of 300–400 fathoms, China Sea; *id.* Z. wiss. Zool. xxvi. p. lvi.

# GASTROPODA.

## *PECTINIBRANCHIA.*

### Muricidæ and Purpuridæ.

*Murex brandaris* (L.), *trunculus* (L.), and *erinaceus* (L.). On their purple fluid; Negri, Atti Acc. Rom. (2) iii. pp. 394–430 [see *suprà*, p. 6].

*Murex rota* (Sow.); operculum described by Kobelt, JB. mal. Ges. iii. p. 43. *M. kuesterianus* (Tapparone-Canefri) = *trunculus* (L.) var., subfossil on the shores of the Red Sea; *id. ibid.*

*Murex hoplites*, sp. n., P. Fischer, J. de Conch. xxiv. p. 236, pl. viii. fig. 3, Goree, W. Africa, allied to *saxatilis* (L.).

*Murex fenestratus* (Chemn.), Tapparone-Canefri, Bull. mal. Ital. (2) ii. p. 241, Mauritius.

*Murex* (*Pteronotus*) *zonatus*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 4, Tasmania.

*Murex sofiæ*, *diadema*, and *hybridus*, spp. nn., Aradas & Benoit, Conch. viv. Sic., Mediterranean. The first probably an exotic *Hindsia*, the second a young *Latiaxis*; Kobelt, JB. mal. Ges. iii. p. 282.

The Red Sea species of *Murex* and *Ocinebra*, 23, discussed; *id. l. c.* pp. 38–50.

*Typhis arcuatus*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 4, Tasmania.

*Trophon heuglini*, sp. n., Mörch, J. de Conch. xxiv. p. 369, Polar Sea.

[*Coralliophila*?] *Pseudomurex meyendorffi* (Calcara) and *bracteatus* (Brocchi). Monterosato maintains the distinctness of the genus and the variability of the species; Bull. mal. Ital. 1875, pp. 2 & 3.

*Rhizochilus* (*Coralliophila*) *squamosissimus*, sp. n., E. Smith, Ann. N. H. (4) xvii. p. 404, Rodriguez Island.

*Purpura propinqua*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 7, Tasmania.

### Buccinidæ.

*Neptunea despecta* (L.) and *turtoni* (Bean): critical remarks on them from Arctic specimens; Kobelt, JB. mal. Ges. iii. pp. 66–70.

*Sipho glaber* (Verkrüzen, MS.), sp. n., and *islandicus* (Chemn.), *gracilis* (Dacosta), *curtus* (Jeffr.), discussed; *id. l. c.* pp. 165–174, pl. iii. figs. 2 & 3, pl. iv. figs. 1–3, radula of the first, pl. iii. fig. 2 a.

*Sipho verkruezeni*, sp. n., *id. l. c.* p. 70, pl. ii. fig. 1, Porsanger-fjord, Arctic Norway. *S. tortuosus* (Reeve) and *ebur* (Mörch) from the same locality: *id. l. c.* pp. 72 & 74, pl. ii. fig. 2, and pl. iii. figs. 1 & 2.

*Fusus* (*Siphonofusus*) *pfaffi*, sp. n., Greenland and Spitzbergen, *F.* (*S.*) *productus* (Beck, MS.), sp. n., Cape North, Northern Pacific; Mörch, J. de Conch. xxiv. pp. 369 & 371.

*Siphonalia pulchra* and *castanea*, spp. nn., J. E. T. Woods, *l. c.* p. 11, Tasmania.

*Pisania luctuosa*, sp. n., Tapparone-Canefri, Bull. mal. Ital. (2) ii. p. 242, Mauritius.

*Cominella tenuicostata*, sp. n., J. E. T. Woods, *l. c.* p. 7, Tasmania.

*Buccinum undatum* (L.). E. S. Morse has observed in the harbour of Eastport that the male specimens are much smaller [about 21–25 mm. in length] than the females [40–45 mm.]; as these animals live there on a ledge partly exposed at low tide, hid away in rocks and concealed in the cracks and crevices, only males of small size can work their way out and unite with the females in such restricted quarters. P. Bost. Soc. xviii., pp. 284–287.

*Buccinum groenlandicum* (Chemn.): its radula, somewhat different from that of *B. undatum*; Hogg, P. R. S. xxv. p. 201.

*Buccinum parculum* (Verkrüzen), sp. n., Norway, and note on *B. finmarkianum* (Verkrüzen, 1875); Kobelt, JB. mal. Ges. iii. p. 176, pl. ii. figs. 3 & 4, and p. 175.

*Buccinum fusiforme* (Kien.) var. *ventricosum* (Kien.): more living specimens found on the shores of Provence; Monterosato, Bull. mal. Ital. 1875, p. 4.

*Buccinum inflatum*, sp. n., Aradas & Benoit, Conch. viv. Sic., Palermo. Probably = *humphreysianum* (Benn.); Kobelt, JB. mal. Ges. iii. p. 283.

*Canidia* (H. Adams) and *Clea* (H. Adams): operculum unguiculate, radula resembling that of *Buccinum*, both are therefore to be placed among the *Buccinida*; the known species enumerated. Brot, J. de Conch. xxiv. pp. 343–351, pl. xii. figs. 1–4.

*Canidia tenuicostata* and *bocourti*, spp. nn., *id. l. c.* p. 351, pl. xii. figs. 5 & 6, Phexaburi, Siam.

*Canidia fusiformis* (note on the living animal, proboscis prominent, 2–3 mm., foot pointed behind), and *C. scalariua*, *jullieni*, *bizonata*, and *broti*, spp. nn., Deshayes & Jullien, N. Arch. Mus. x. (1874) pp. 151–158, pl. viii. figs. 18–28; operculum of the first, pl. vii. figs. 30–32, Cambodia.

## Nassidæ.

*Nassa limata* (Chemn.) var. n. *conferta*, and *semistriata* (Brocchi) var. n. *recidiva*, recent shells dredged near the Cape Verde Islands; Martens, JB. mal. Ges. iii. pp. 239 & 246, pl. ix. figs. 3 & 10.

*Nassa corniculum* (Olivi) is a true *Nassa*; and an inaccurate figure of it caused Gray to refer it to *Columbella*, and H. & A. Adams to establish for it the sub-genus *Amycla*; id. *l. c.* p. 249.

[*Nassa*] *Buccinum tinei* (Maravigna) figured by Aradas & Benoit; Conch. viv. Sic.

## Olividæ.

*Oliva*. Weinkauff continues Küster's monograph of this genus in the new edition of Chemnitz, following chiefly Ducros' synopsis, and giving full descriptions and synonymy. The species not figured in Reeve's Conchol. Icon. are the following: *bifasciata* (Küster), p. 38, pl. v. fig. 11, and pl. x. figs. 8 & 9; *maria* (Ducros), p. 43, pl. xi. figs. 3

& 4; *timorensis* (Ducros), p. 45, pl. xi. figs. 10 & 11; *graphica* (Marrat), p. 46, pl. xvi. figs. 9 & 12; *O.* (*Olivancillaria*) *deshayesiana* (Ducros), p. 51, pl. xviii. figs. 1 & 2.

*Ancillaria marginata*, var. n. *tasmanica*, J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 7.

## Fasciolariidæ and Turbinellidæ.

*Fasciolaria*. Kobelt gives a monograph of this genus in Küster's new edition of Chemnitz; among the species described and figured, the following are not figured in Reeve's Conchol. Icon. nor in the Proc. Zool. Soc.: *F. hegemanni* (Dunker), p. 139, pl. xxviii. fig. 5, Natal; *crocata* (Philippi, *nec* Reeve), p. 146, pl. xxx. fig. 1, Yucatan, Guiana; *ponderosa* (Jonas), p. 135, pl. xiii. n, probably an extreme variety of *trapezium* (L.). The species of *Fasciolaria* and *Fusus* known from the Red Sea discussed by the same, JB. mal. Ges. iii. pp. 40–50.

*Turbinella*: Kobelt has completed his monograph of this genus, including *Leucozonia*, *Peristernia*, and *Lathirus*, in Küster's new edition of Chemnitz; the species not figured in Reeve's Conch. Icon. nor in the P. Z. S. are the following: *T. caledonica* (Petit, 1851), p. 91, pl. xxii. figs. 13 & 14, New Caledonia; *infracincta*, sp. n., p. 92, pl. xxii. figs. 16 & 17, locality unknown; *chlorostoma* (Nuttall), p. 103, pl. xxv. figs. 2 & 3, Sandwich Islands; *lobbecki*, sp. n., p. 104, pl. xxv. figs. 4 & 5, locality unknown; *sutoris*, sp. n., p. 106, pl. xxv. figs. 10 & 11, locality unknown; *decorata* (A. Adams), p. 107, pl. xxv. figs. 12 & 13, New Zealand; *zealandica* (A. Ad. ?), p. 108, pl. xxv. figs. 14 & 15, New Zealand; *deshayesi*, sp. n., p. 109, pl. xxvi. figs. 4 & 5, Mauritius; *forskali* (Tapparone-Canefri), p. 110, pl. xxvi. figs. 6 & 7, Red Sea; *microstoma*, sp. n., p. 111, pl. xxvi. figs. 8 & 9, Mauritius; *pulchella* (Reeve) var., p. 113, pl. xxvi. figs. 12 & 13, Zanzibar; *wagneri* (Anton) var. *samoensis*, p. 113, pl. xxvi. figs. 14 & 15, Samoa Islands. *Charax maderensis* (Watson, 1873) is referred to this genus, p. 94. The same author enumerates the known species, with indications of their habitat, JB. mal. Ges. iii. pp. 16–29, and discusses the Red Sea species, *l. c.* pp. 40–48.

*Turbinella crosseana* (Souverbie, 1875) described; Souverbie, J. de Conch. xxiv. p. 382, pl. xiii. fig. 1, probably from Mauritius.

## Mitridæ.

*Mitra zonata* (Maryatt): one specimen found in the Adriatic, near Lesina; Stossich, Boll. soc. Adriat. No. 6, 1875, with woodcut. Further Mediterranean localities; Monterosato, Bull. mal. Ital. 1875, p. [illegible].

*Mitra scrobiculata* (Brocchi) ? = *gambiana* (Dohrn), dredged in the recent state near the Cape Verde Islands; Martens, JB. mal. Ges. iii. p. 241, pl. ix. fig. 2.

*Mitra fusus*, *brevicula*, and *adumbrata*, spp. nn., Souverbie, J. de Conch. xxiv. pp. 376–379, pl. xiii. figs. 3–6, New Caledonia.

*Mitra franciscana* and *granatina* (), spp. nn., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 5, Tasmania.

*Turricula* (*Costellaria*) *rawsoni*, sp. n., Mörch, J. de Conch. xxiv. p. 373, West Indies.

### Volutidæ.

*Voluta musica*, var. n. *polypleura*, Crosse, J. de Conch. xxiv. p. 163, pl. v. fig. 6, locality unknown.

### Columbellidæ.

*Columbella xavieriana* and *miltostoma*, sp. n., J. E. T. Woods, P. R. Soc. Tasm., 1876, p. 6, Tasmania.

### Marginellidæ.

*Marginella tyermani*, Corisco Bay, W. Africa, *perla*, locality unknown, *præcallosa* (Higgins, MS.), locality unknown, *warreni*, 50° N. lat., 64° W. long., and *callosa*, Red Sea, spp. nn., and *M. calculus* (Redfield) = *guttata* (Swains., *nec* Dillwyn), very different from *phrygia* (Sow.); Marrat, Q. J. Conch. 1876, pp. 136 & 137. *M. stanislas*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 5, Tasmania.

### Conidæ.

*Conus*. An alphabetical list of 76 species published since 1858 has been published in French by H. C. Roeters van Lennep.

*Conus pauluccie*, Mauritius, *superscriptus*, Madagascar, *baccatus* and *reflectus*, locality unknown, spp. nn., Sowerby, P. Z. S. 1876, pp. 752–754, pl. lxxv. figs. 3–6.

*Conus* (*Rhizoconus*) *sophiæ*, sp. n., Brazier, P. Linn. Soc. N. S. Wales, i. 1876, p. 7, Solomon Archipelago.

*Conus omaicus*, *nussatella*, and *genuanus*. On the etymology of these names; Martens, Nachr. mal. Ges. 1876, p. 7.

*Conus rhododendron* (Couth.) from Baker and Malden Islands, Polynesia; Schmeltz, Verh. Ver. Hamb. ii. pp. 217 & 218.

*Conus carmeli*, sp. n., and *macleayana*, new name for *tasmanicus* (Ten., *nec* Sow.), J. E. T. Woods, *l. c.* p. 6, Tasmania.

### Pleurotomidæ.

The systematic arrangement of the genera given by Bellardi (Bull. soc. mal. Ital. 1875, p. 16) is criticized and compared with his own by H. C. Weinkauff, JB. mal. Ges. iii. pp. 1–10.

Weinkauff has continued his monograph of *Pleurotoma* in Küster's "Systematisches Conchylien-cabinet." The species not yet figured in the work of Reeve or the P. Z. S., or new, are the following:—*P.* (*Surcula*) *kaderlii* (Lischke), p. 51, pl. xi. fig. 5, Japan; *reniери* (Phil.), p. 65, pl. xiii. figs. 11 & 12, Mediterranean; *versicolor*, sp. n., p. 74, pl. xv. fig. 8,

locality unknown; *radaliformis*, sp. n., p. 91, pl. xviii. figs. 7 & 9, locality unknown; *P.* (*Clavus*) *nigro-zonata*, sp. n., p. 60, pl. xiii. fig. 2, new name for *vidua* (Reeve, *nec* Hinds); *dunkeri*, sp. n., p. 75, pl. xvi. fig. 2, locality unknown; *polygonalis*, sp. n., p. 100, pl. xxi. figs. 7 & 9, Zanzibar. *P.* (*Drillia*) *perteliana*, sp. n., p. 57, pl. xii. figs. 7 & 8, locality unknown; *lobrestiana* (Monterosato) = *crispata* (Philippi, *nec* Jan.), p. 63, pl. xiii. figs. 8 & 9, Mediterranean; *schillingi*, sp. n., p. 78, pl. xvi. figs. 7 & 9, Zanzibar; *japonica* (Lischke, 1869) = *latifasciata* (Sow., 1870), p. 91, pl. xix. fig. 8, Nagasaki and Hongkong; *appeli*, sp. n., p. 95, pl. xx. fig. 5, locality unknown; *intertincta* (Edg. Smith), p. 104, pl. xxii. fig. 8, China; *denseplicata* (Dunker, 1871), p. 107, pl. xxiii. figs. 7 & 9, Bass' Straits; *maesta* (Carpenter), p. 134, pl. xxx. figs. 5 & 8, Lower California. *P.* (*Clavatula*) *tripartita* (Edg. Smith), p. 120, pl. xxvi. figs. 12 & 13, Southern Africa. *P.* (*Clionella* ?) *penicillata* (Carpenter), p. 125, pl. xxviii. figs. 1 & 4, Lower California. *P.* (*Crassispira*) *berandiana* (Crosse), p. 95, pl. xx. figs. 7 & 9, Port Jackson; *cerithoidea* (Carpenter) = *maura* (Kien., *nec* Sow.), p. 97, pl. xxi. figs. 4 & 6, Mazatlan; *cinerea*, sp. n., p. 104, pl. xxiii. figs. 1–3, West Indies; *clionelliformis*, sp. n., p. 106, pl. xxiii. fig. 5, locality unknown; *zebroides*, sp. n., p. 112, pl. xxiii. fig. 8, West Indies. *P.* (*Gemmula*) *graëffii* (Weinkauff, 1875), p. 71, pl. iii. figs. 9 & 10, Fiji Islands; *monilifera* (Pease, 1870), p. 73, pl. xv. figs. 7 & 9, Oahu. *P. variegata* (Reeve, *nec* Kien.), renamed *picturata*, p. 66, pl. xiv. figs. 1–3, Indian Seas; *gruneri* (Philippi, 1848), p. 66, pl. xiv. figs. 7–9; *peascana* (Dunker), p. 69, pl. xv. figs. 1–3, Indian Seas.

*Pleurotoma emendata* (Monterosato): operculum very thin, eyes on the tip [?] of very short tentacles; Monterosato, Poche note, &c., p. 14.

*Pleurotoma scalata* (Souverbie, 1874) = *Cithara melanostoma* (Garrett, 1875); P. Fischer, J. de Conch. xxiv. p. 150.

*Pleurotoma philipineri*, sp. n., J. E. T. Woods, *l. c.* p. 8, Tasmania.

*Drillia incrusta* [*-tata*], *minuta*, and *weldiana*, spp. nn., J. E. T. Woods, *l. c.* pp. 8 & 9, Tasmania.

*Mangelia sancte-gallæ* and *desalesi*, spp. nn., *id. l. c.* pp. 9 & 10, Tasmania.

*Daphnella tasmanica* and *varix*, spp. nn., *id. l. c.* p. 10, Tasmania.

*Cytharella*; new name proposed by Monterosato for *Pleurotoma bertrandi* (Payr.) and allied species, *Raphitoma* (Bellardi) having for type the *Pleurotoma hystrix* (Jan.), which belongs to *Defrancia*. Bull. mal. Ital. 1875, p. 6.

O. Semper enumerates a number of recent exotic species described under the generic names *Clavatula* and *Clathurella*, which agree with *Glyphostoma* (Gabb, see Zool. Rec. ix. p. 133) in the presence of numerous plaits on the pillar lip in full-grown specimens: they are, *Clav. spurca*, *cinerea*, *candida*, and *argillacea* (Hinds), *Pleur. montrouzieri* (Souv.) and *apiculata* (Montrouz.), *Cluth. rosco-tincta* (Montrouz.) and *obesa* (Garrett); Verh. Ver. Hamb. ii. pp. 199–203.

*Conopleura* (Hinds), only one species known; *P. maravignæ* not belonging to this genus; O. Semper, JB. mal. Ges. iii. p. 161–164, and Verh. Ver. Hamb. ii. pp. 209–212.

*Bela kobelti*, sp. n., Verkrüzen, Nachr. mal. Ges. 1876, p. 17, Vadsö; also Kobelt, JB. mal. Ges. iii. p. 178, pl. iv. fig. 5. Note on *B. gigas*, (Verkrüzen, 1875); Kobelt, *l. c.* p. 180.

### Cancellariidæ.

*Admete undato-costata* (Verkrüzen, 1875) = *viridula* (Müll.), var.; Kobelt, JB. mal. Ges. iii. p. 372, pl. iv. fig. 6.

### Cerithiopseoidæ.

*Cerithiopsis albosutura* [!], sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 12, Tasmania.

### Cassididæ and Ranellidæ.

*Cassis*. The known species enumerated, with indication of their geographical occurrence: *id. l. c.* pp. 77–82.

*Cassis* (*Casmaria*) *thomsoni*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 8, Sydney Heads, Australia.

*Triton*. Kobelt continues the monograph of this genus in Küster's new edition of Chemnitz. Among the species described and figured by him the following are not found in Reeve's 'Conchologia Iconica,' nor in the P. Z. S.: *T. dunkeri* (Lischke, 1868), p. 227, pl. lxiv. fig. 1; *loebbecki* (Lischke, 1868), p. 228, pl. lxiv. figs. 2 & 3, and *tenuiliratus* (Lischke), p. 230, pl. lxv. figs. 4 & 5, all three from S. Japan. *T. nobilis* (Conrad, 1849) is maintained with doubt as a distinct species from the West Indies, analogous to the Eastern *T. tritonis* (L.) = *variegatus* (Lam.), it is figured by Reeve as a variety, fig. 3 A, and occurs also near the Canarian Islands, and very rarely in the Mediterranean, where it was named *T. seguenzæ* by Aradas & Benoit; Kobelt, *l. c.* p. 224, pl. lxiii. fig. 1.

*Tritonium pachycheilos* [*-chilos*] and *mauritianum*, spp. nn., Tapparone-Canefri, Bull. mal. Ital. (2) ii. p. 243, Mauritius.

*Epidromus bednalli*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 6, S. Australia.

*Ranella*, the known species enumerated, with indication of their geographical occurrence; Kobelt, *l. c.* pp. 323–334.

*Ranella lævigata* (Lam.) = *marginata* (Gmel.), described from a recent specimen dredged near the Cape Verde Islands; Martens, JB. mal. Ges. iii. p. 236, pl. ix. fig. 9. *R. paulucciana*, sp. n., Tapparone-Canefri, Bull. mal. Ital. (2) ii. p. 244. *R. epitrema*, sp. n., J. E. T. Woods, Pr. R. Soc. Tasm. 1876, p. 5, Tasmania.

The 27 Red Sea species of *Tritonium*, *Persona*, and *Ranella*, discussed by Kobelt, *l. c.* pp. 38–50.

### Cypræidæ.

*Cypræa aurora* [*aurantium*] found on the S.E. Coast of Viti Levu; Schmeltz, J. Mus. Godeffr. xii. p. 175.

*Cypræa sophiæ*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 7, Solomon Archipelago.

### Naticidæ.

*Natica affinis* (Gmel.) = *clausa* (Brod.), with var. *occlusa* (S. Wood) and var. n. *vittata*, from Greenland, animal described; Jeffreys, Ann N. H. (4) xviii. p. 318.

*Natica lemniscata* (Phil.) from the Cape Verde Islands; Martens, JB. mal. Ges. iii. p. 244.

*Natica* (*Bulbus*) *flava* (Gould); Kobelt, JB. mal. Ges. iii. p. 372, pl. iii. fig. 4, Magerö, Arctic Norway.

*Haliotinella* (Montr.) [see *infrâ*, p. 36, among the *Pleurobranchidæ*].

### Velutinidæ.

*Pilidium radiatum* (Sars, as *Capulus*, 1850), circumpolar, animal described; Jeffreys, Ann. N. H. (4) xvii. p. 321.

### Strombidæ.

The 18 known species of the Red Sea, with full synonymy and indications of geographical distribution, enumerated by Issel & Tapparone-Canefri, Ann. Mus. Genov. viii. pp. 337–366; those of Polynesia, by J. D. E. Schmeltz, Verh. Ver. Hamb. ii. pp. 213 & 214.

### Xenophoridæ.

*Xenophora crispa* (König), var., = *mediterranea* (Tiberi), recent shells dredged at the Cape Verde Islands; Martens, JB. mal. Ges. iii. p. 238, pl. ix. fig. 1.

### Trichotropidæ.

*Torellia vestita* (Jeffr.) figured by Friele, Förh. Selsk. Chr. 1876, pl. Norway.

### Struthiolariidæ.

*Struthiolaria mirabilis* (Smith) = *costulata* (Martens); radula different from that of all other *Taenioglossa* in having 4 marginal teeth on each side instead of 2, so that each series of the radula contains 13 teeth instead of 7. G. Schacko, JB. mal. Ges. iii. pp. 317–323, pl. xi. [The radula of the typical species of *Struthiolaria* from New Zealand is as yet unknown; it will be very interesting to know whether it agrees with that of the Kerguelen species; if not, the latter must become a new genus.] The synonymy of the known species, which has been much confused by Reeve, is corrected by Paulucci, Bull. mal. Ital. (2) 8. pp. 223–232.

## Cerithiidæ.

*Cerithium uncinatum* (Sow., *nec* Gmelin) from the West Indies, renamed *antillarum* (Dunker, MS.), *C. floridanum*, Florida, *rawsoni* (Krebs, MS.), Barbados ?, *alabastrum*, *alabastrulum*, and *oryza*, St. Thomas, spp. nn., Mörch, Mal. Bl. xxvi. pp. 112, 114, 120 & 121.

*Cerithium eriense* (Val.) living in the Mediterranean; Aradas & Benoit, Conch. viv. Sic., and Kobelt, JB. mal. Ges. iii. p. 282 [?].

*Cerithidea minor* [sic !] and *pupoidea*, spp. nn., Mörch, Mal. Bl. xxvi. pp. 92 & 93, West Indies.

*Lampanella*, new subgenus (not defined) of *Pyrazus*, including *minimus* (Gmel.) = *Cerithium septemstriatum* (Say), *nigrescens* (Menke), *zonalis* (Brug.), and *eriensis* (Val.); *id. l. c.* pp. 93–95.

*Bittium galactis*, sp. n., *id. l. c* p. 95, St. Thomas, West Indies. *B.* (*Platygyra*) *alabastrulum* and *cinereo-flavum*, spp. nn., *id. l. c.* p. 101, St. Thomas.

*Triforis benoitianus*, sp. n., Aradas & Benoit, *l. c.*, Mediterranean; = *perversa* (L.) var., Kobelt, JB. mal. Ges. iii. p. 289. *T. tasmanica*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 23, Tasmania.

## Planaxidæ.

*Planaxis nucleola*, sp. n., Mörch, Mal. Bl. xxvi. p. 126, St. Croix, West Indies.

*Diala tessellata* (Woods, 1875) = ? *Ataba phasianella* (Angas), J. E. T. Woods, Pr. R. Soc. Tasm. 1876, p. 27.

## Turritellidæ.

*Turritella tasmanica*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 12, Tasmania.

## Melaniidæ.

*Melania*. A. Brot has continued his monograph of this genus in Küster's new edition of Chemnitz, pt. 249 (vol. i.) pp. 129–192, pls. xix.–xxiv. The species not figured before or with corrected synonymy are:— *M. salomonis*, sp. n., p. 132, pl. xvi. fig. 4, Salomon Islands; *blosseville-liana* (Lesson), p. 133, pl. xvii. fig. 6, New Guinea; *perplicata*, new name for *anthracina* (Reeve, *nec* V. d. Busch), p. 134, pl. xvi. fig. 6, locality unknown; *maculata* (Born), p. 135, pl. xvi. fig. 7, locality unknown; *erosa* (Lesson), p. 167, pl. xx. fig. 3, New Guinea; *punctata* (Lam.) = *albescens* (Lea), p. 168, pl. xx. fig. 4; *monile* (Mousson), p. 173, pl. xx. fig. 7, Moluccas; *labbecki*, sp. n., p. 185, pl. xxi. fig. 9, Japan, *distinguenda*, sp. n., = *pyramis* (Reeve, *nec* Bens.), fig. 51, p. 190, pl. xxi. fig. 15 Borneo. Many other species, more or less known, are described and figured, and their synonymy given.

*Melania rodericensis*, E. Smith, Ann. N. H. (4) xvii. p. 404, Rodriguez Island, near *faciolata* (Oliv.) [*tuberculata*, Müll.]; *M. niponica*, id. Q. J.

Conch. 1876, p. 123, Japan; *M. reiniana*, Brot, JB. mal. Ges. iii. p. 277, pl. viii. figs. 4 & 5, Japan; *M. jullieni* and *flava*, Deshayes & Jullien, N. Arch. Mus. x. (1874) pp. 143 & 145, pl. vii. figs. 7–9, and pl. viii. figs. 8–15, Cambodia: spp. nn.

*Melania*: three species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. 153.

*Melania sargi* (Crosse & Fischer, 1875), J. de Conch. xxiv. p. 385, pl. xi. fig. 4, Guatemala.

*Lithasia plicata*, sp. n., Wetherby, P. Cincinn. Soc. i. (1875) p. 12, pl. ii. fig. 1, Green River, Tennessee.

*Angitrema parva*[*-um*] and *cingulata*[*-um*], spp. nn., *id. l. c.* pl. i. figs. 2 & 5, Stone River, Tennessee.

*Goniobasis plicato-striata*, sp. n., *id. l. c.* pl. i. fig. 3, Stone River.

*Aneulosa umbilicata*, sp. n., *id. l. c.* pl. i. fig. 4, Stone River.

*Canidia* and *Clea*; see *Buccinidæ* [suprà, p. 22].

## Littorinidæ.

*Littorinopsis* (Beck, MS.), new subgenus of *Littorina*, not defined; type, *L. subangulata* (Lam.), including also *irrorata* (Say), *flava* (Brod.), *nebulosa* (Lam.), and *angulifera* (Lam.); Mörch, Mal. Bl. xxvi. pp. 135–137.

*Littorina floccosa* (Beck, MS.), new name for *L. ziczac* (Chemnitz, Desh.) = *lineata* (Orb., Philippi); *id. l. c.* p. 138.

*Littorina riisei*, sp. n., *id. l. c.* p. 140, Cuba.

*Cremnoconchus* (Blanf.), the four known species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. cxlvi.

*Modulus convexior*, *pisum*, *canaliculatus* (Beck, MS.), and *krebsi*, spp. nn., Mörch, Mal. Bl. xxvi. pp. 129–131, West Indies.

*Fossarus tasmanicus* and *bulimoides*, spp. nn., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 20, Tasmania.

## Rissoellidæ.

*Jeffreysia nitida* (Sars) figured by Friele, Förh. Selsk. Chr. 1876, Norway.

## Rissoidæ.

*Rissoa*. 85 species figured by Sowerby in the continuation of Reeve's "Conchologia Iconica," pts. 328–331. *R. supra-costata*, fig. 38, Britain [? = *parva* (Dacosta)], var., and *crebrisulcata*, fig. 56, locality unknown, are apparently new.

*Rissoa peloritana*, *nicolasiana*, *scintiana*, and *alleryana* [cf. Zool. Rec. xi. p. 144], spp. nn., Aradas & Benoit, Conch. viv. Sic., Mediterranean.

*Rissoa dimidiata* (Eichwald) found in recent state in deep water of the Caspian Sea; Grimm, Kaspinskoe more i ego fauna, i. p. 156, pl. vi. fig. 16.

*Rissoa gradatula*, sp. n., Mörch, Mal. Bl. xxvi. p. 53, St. Thomas, West Indies.

*Rissoa* (*Alvania*) *emaciata*, sp. n., Mörch, *l. c.* p. 54, West Indies.

*Rissoa chilostoma*, *aguevi*, *cyclostoma*, *melanura*, *angeli*, *R.* (*Setia*) *sienna*, *R.* (*Cingula*) *atkinsoni*, and *R.* (*Ceratia*) *maccoti*, spp. nn., J. E. T. Woods, P. R. Soc. Tasm. 1876, pp. 24–26, Tasmania.

*Alvania fasciata*, new name for *Dunkeria fasciata* of the same author, *l. c.* p. 24.

*Eatoniella* substituted for *Eatonia* (Zool. Rec. xii. p. 165), which is pre-occupied; Dall, Bull. U. S. Mus. No. 3, p. 42.

*Rissoina*. The known species from the West Indies examined and reduced from 31 to 8–10; H. Krebs, P. Sc. Ass. Trinid. 1873, 12 pp. *R. multicostata* (Schwartz v. Mohrenstern, *nec* Orb.) renamed *krebsi*; Mörch, Mal. Bl. xxiii. p. 50, West Indies.

*Rissoina supra-costata* (Garrett, 1875) = *montrouzieri* (Souverbie, 1862), and *terebra* (Garrett, 1875) = *incerta* (Souverbie, 1862); P. Fischer, J. de Conch. xxiv. p. 150. *R. flindersi*, *st.* [*sancta-*] *clara*, and *concatenata*, spp. nn., J. E. T. Woods, *l. c.* pp. 26 & 27, Tasmania.

*Rissoina* (*Zebia*) *vitrinella*, sp. n., Mörch, Mal. Bl. xxiii. p. 45, St. Thomas, West Indies.

*Zebinella*, new subgenus of *Rissoina*, containing the ribbed and spirally striate species; type, *decussata* (Montagu). Also *R.* (*Z.*) *signifer*, sp. n., New Providence, Bahama Islands. *Id. l. c.* pp. 47 & 48.

*Phosinella*, new subgenus of *Rissoina*. Shell reticulated, aperture deeply sinuate; operculum with a styliform and toothed apophysis. *R. sagraiana* (Orb.), *pulchra* (C. B. Ad.), *cancellata* (Phil.), *labrosa*, *fenestrata*, and *bicollaris* (Schwartz v. M.), *privati* (Folin). *Id. l. c.* pp. 51 & 52.

*Pachydrobia*, g. n. "Testa imperforata, oblongo-ovata, Rissoæformis, crassiuscula; spira mediocris; sutura impressa; anfractus sat numerosi, mediocriter convexi, ultimus ventre planatus; apertura semicircularis; peristoma sinuosum, incrassatum, continuum, marginibus callo valido junctis. Operculum subulatum, tenue, corneum, paucispiratum, apice antico." Freshwater. *P. paradoxa*, sp. n., Crosse & Fischer, J. de Conch. xxiv. pp. 320 & 321, pl. x. fig. 3, Mekong River. [*Melania parva* (Lea) apparently also belongs to this genus.]

*Hydrobia vitrea* (Drap.) var. *quenstedti* (Wiedersh.); several varieties in form, dead shells found in an open fountain. Weinland, Wiercht. schwäb. Alb, pp. 104–111, pl. iv. figs. 9–13. [*Cf.*, Zool. Rec. x. p. 147, and xi. p. 145]. Anatomy of the same by Rougement, Études s. l. faune des eaux privés de lumière, 1876, 4to, with pl.

*Hydrobia caspia* (Eich.), Caspian Sea, redescribed, pp. 150–153, pl. vi. fig. 15; *H. spica* (Eichw.), figured, fig. 13; *H. stagnalis* (L.), specimens from the Caspian Sea described, p. 153, pl. vi. fig. 12: Grimm, Kaspinskoe more i ego fauna, i.

*Hydrobia martensiana* and *maxima*, spp. nn. (12 and 31 mm. in height); Dybowski, Mém. Ac. Pétersb. (7) xxii. pp. 25 & 27, pls. i. figs. 18–27, viii. figs. 17–20, Lake Baikal.

*Amnicola petterdiana* and *simsoniana*, spp. nn., Brazier, P. Linn. Soc. N. S. W. i. p. 19, Tasmania.

*Amnicola parcula* (Hutton), Hanley & Theobald, Conch. Ind. pt. viii. pl. cli. figs. 8 & 9.

*Tricula montana* (Benson) figured; *iid. tom. cit.* pl. clv.

*Limnorea*, g. n. Shell and operculum as in *Hydrobia*, all seven plates of the radula denticulated at the edges; no basal denticle in the median plate.

Subg. n. *Leucosia*. Shell smooth: *L. angarensis* (Gerstfeldt, as *Hydrobia*), and varr. nn. *elata* and *pulla*, *L. stiedæ*, *godlewskii*, and var. *pulchella*, *flori*, and *oviformis*, spp. nn.

Subg. n. *Ligea*. Shell sculptured: *L. carinata*, *carinato-costata*, *turriformis*, *costata*, *wrzesniowskii*, *contabulata*, *dathiersi*, and *ciliata*, spp. nn., all from Lake Baikal, some of them in depths of 300–350 mètres. Dybowski, Mém. Ac. Pétersb. (7) xxii. No. 8, pp. 33–51, pls. iii., iv., & vi.

As all three names are pre-occupied in *Crustacea*, E. v. Martens proposes *Baicalia* for the genus, *Liobaicalia* and *Trachybaicalia* for the subgenera; JB. mal. Ges. iii. p. 182.

*Lithoglyphus caspius* (Krynicki) figured by Grimm, Kaspinskoe more i ego fauna, i. p. 157, pl. vi. fig. 10.

*Jullienia*, new subgenus of *Lithoglyphus*, characterized by the expanded peristome. Type: *Melania flava* (Desh.) from Cambodia. Crosse & Fischer, J. de Conch. xxiv. p. 323.

*Lacunopsis*, g. n. "Testa depressa, solida, Neritiformis, epidermide vestita; spira brevissima, conoidea vel convexa et obtusissima; ultimo anfractu maximo, convexo, basi plano, angulo submarginali circumdato; apertura minima, semilunari; margine dextro crassiusculo, paulo expanso, in angulum posteriorem, prælongatum, obliquum desinente; columella lata, plana vel concaviuscula, septiformi, acuta." *L. jullieni*, *monodonta*, and *tricostatus* [*-a*], spp. nn., Deshayes & Jullien, N. Arch. Mus. x. (1874), pp. 147–151, pl. vii. figs. 10–22, Cambodia, freshwater. It is considered as a subgenus of *Lithoglyphus* by Crosse & Fischer, J. de Conch. xxiv. p. 323.

*Benedictia*, g. n. Shell like that of *Paludina*, aperture rather large; operculum spiral; radula with a broad triangular median plate and simple lateral hooks; several basal toothlets on the median plate of the two species; male organ not within the right feeler. *B. baicalensis* (Gerstfeldt) and *lianæoides* (Schrenck, both as *Paludina*), and *B. fragilis*, sp. n., Lake Baikal; Dybowski, *l. c.* pp. 4–24, pls. i. figs. 1–17, v. figs. 1–16, vii. figs. 17–19, viii. figs. 1–8.

## Paludinidæ.

*Paludina turbinata* [nec Morelet, 1862], *jullieni*, *frauenfeldi*, *lamarcki*, *sphæricula*, *moreleti*, *vignesi*, *chalanguensis*, *obscurata*, and *speciosa*, spp. nn., Deshayes & Jullien, N. Arch. Mus. x. (1874) pp. 131–142, pls. vi. figs. 13–18, vii. figs. 23–29, and viii. figs. 1–7, Cambodia.

*Vivipara costæ* (Heldreich) distinguished from *vivipara* [*listeri*, Forbes]; Mousson, J. de Conch. xxiv. p. 47, pl. iv. fig. 1, Asia Minor and Armenia.

*Mekongia*, subg. n. of *Paludina*, for *P. jullieni* (Desh.), characterized by the narrow aperture; Crosse & Fischer, J. de Conch. xxiv. p. 316.

*Bithinia hyalina*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 9, N. S. Wales.

*Bithinia costigera* (Beck), figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. cli. fig. 10.

### Valvatidæ.

*Valvata alicna* and *sibirica* (Middendorff, MS.), spp. nn. (= *cristata* var. *frigida*, Westerlund, 1878), Westerlund, Nachr. mal. Ges. 1876, pp. 101 & 102, Yenisei River, 63° and 60°–68° N. lat..

*Valvata grubii*, sp. n., and *baicalensis* (Gerstfeldt), Lake Baikal, Dybowski, Mém. Ac. Pétersb. (7) xxii. p. 28; radula of both figured, pls. ii. figs. 1–10, viii. figs. 9–16.

*Heterocyclus* (Crosse; see Zool. Rec. ix. p. 163) is a fluviatile shell, near *Valvata*; *V. papoidea* (Say) belongs perhaps to this genus; Crosse, J. de Conch. xxiv. pp. 99–101.

### Ampullariidæ.

*Ampullaria schrammi*, sp. n., Crosse, J. de Conch. xxiv. p. 102, French Guiana.

*Ampullaria tasmanica*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 45, Tasmania.

### Vermetidæ.

*Vermetus segucnzianus* [*-zanus*], sp. n., Aradas & Benoit, Conch. viv. Sic., Mediterranean.

*Siliquaria*, 13 species figured by Sowerby in the continuation of Reeve's Conch. Icon. pts. 328 & 329.

### Cæcidæ.

*Parastrophia asturiana* (Folin, 1870; Zool. Rec. vii. p. 143) and *Spirolidium mediterraneum* (Costa) are the young state of *Cæcum trachea* and *glabrum* (Mont.) respectively; Monterosato, Poche note, &c., p. 12.

### Capulidæ.

*Capulus crystallinus* (Gould) lives parasitically on a sea-star, *Linckia lævigata* (Lam.) at Ovalau; Schmeltz, J. Mus. Godeffr. pt. xii. p. 160.

### Scalariidæ.

*Scalaria loveni* (A. Adams); Kobelt, JB. mal. Ges. iii. p. 371, pl. iv. fig. 4, Magerö, Arctic Norway.

*Scalaria celesti*, sp. n., Aradas & Benoit, *l. c.* Mediterranean; = *frondosa* (S. Wood), Kobelt, JB. mal. Ges. iii. p. 282.

*Scalaria similima*, new name for *principalis* (Sow., *nec* Pallas [already named *ducalis* by Mörch, Mal. Bl. 1875, p. 148], *fischeriana* for *unicostata* (Sow., *nec* Orb.), *microsoma* for *attenuata* (Sow., *nec* Pease),

*Jeffreysia* for *Constantia elegans* (A. Ad.) = *japonica* (Nyst, *nec* Dunker), [the author quotes for illustration Reeve's Conch. Icon. Scal. fig. 122, which probably = *japonica* (Dunker) and widely differs from *Constantia elegans*, A. Ad., J. Conch. 1868], *carpenteri* for *raricostata* (Carpenter, *nec* Lam.); Tapparone-Canefri, J. de Conch. xxiv. pp. 152–154.

*Scalaria formosa*, new name for *S. pulcherrima* (Monterosato, 1872, *nec* Sow., 1844), Monterosato, Poche note, &c., p. 12.

[*Scalaria*] *Scala krebsi*, *swifti*, *novemcostata*, *centiquadra*, *gradatella* (Mörch, see Zool. Rec. xi. p. 147), and *foliacco-costata* (Orb.), *soluta* (Dunker), *echinaticosta* (Orb.) var. n. *blandi*, *turricula* (Sow.), *unifasciata* (Sow.), *eburnea* (Potiez & Mich.), all from the West Indies, described and figured by Mörch, J. Ac. Philad. viii. pp. 189–207, pl. xxix.

*Cirsotrema kieneri*, new name for *Scalaria decussata* (Kiener, *nec* Lam., *nec* Sow., *nec* Pease); Tapparone-Canefri, J. de Conch. xxiv. p. 155.

*Psychrosoma*, new name for subg. *Opalia* (Carpenter, *nec* H. & A. Adams); *Scalaria* (*Ps.*) *goufdi*, new name for *Opalia borealis* (Gould, *nec* Beck), *crosseana* for *bullata* (Carpenter, nec *Scal. bullata*, Sow.), *erronea* for *morchi* (Sow., *nec* Angas); *id. l. c.* pp. 154 & 155.

*Hoplopteron*, g. n. Shell imperforate, turreted, glossy, whorls contiguous, the upper smooth, the lower bearing on each side a triangular flat wing; mouth simple, with contiguous peristome; pillar simple. *H. terquemi*, sp. n., 1.15 mm. long, found in sand dredged in the China Sea; P. Fischer, J. de Conch. xxiv. pp. 232–235, pl. ix. figs. 1–8.

## Solariidæ.

*Solarium fallaciosum* (Tiberi), living animal; Monterosato, Poche note, &c., p. 13.

*Seguenzia*, g. n. Shell globular or conical, glossy, without epidermis, exquisitely sculptured; a deep and large notch on the upper part of the last whorl; pillar abruptly notched below and exhibiting a small tooth-like process. *S. formosa*, *elegans*, and *carinata*, spp. nn., Atlantic, 700–1400 fathoms; J. G. Jeffreys, P. R. S. xxv. pp. 200–201, woodcut, and Ann. N. H. (4) xvii. pp. 319 & 320.

## Pyramidellidæ.

*Odostomia silvestri* and *teresiana*, spp. nn., Aradas & Benoit, Conch. viv. Sic., Mediterranean.

*Odostomia torcula*, sp. n., Mörch, J. de Conch. xxiv. p. 372, St. Thomas, West Indies.

*Odostomia dense-costata* (Garrett, 1873) = *interstriata*, Souverbie (1866); P. Fischer, J. de Conch. xxiv. p. 150, Polynesia.

*Turbonilla macleayana*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 23, Tasmania.

*Syrnola michaeli*, sp. n., *id. l. c.* p. 22, Tasmania.

*Aclis ventricosa* (Jeffr.) figured from specimens found in Norway;

Friele, Förh. Selsk. Chr. 1876. *A. tristriata*, sp. n., J. E. T. Woods, *l. c.* p. 22, Tasmania.

*Mathilda quadricarinata* (Brocchi) = *Turritella squamosa* (Borson), new localities; Monterosato, Bull. mal. Ital. 1875, p. 3.

*Mathilda coronata*, sp. n., *id.* Poche note, &c., p. 12, Sciacca, Sicily.

*Partheala tasmanica*, sp. n., Woods, *l. c.* p. 22, Tasmania.

*Styloptygma tasmanica*[-cum], id. *l. c.* p. 23, Tasmania.

*Elusa bifasciata*, sp. n., *id. l. c.* p. 22, Tasmania.

### Eulimidæ.

*Eulima conus* (Eichwald), Caspian Sea, redescribed by Grimm, Kaspinskoe more i ego fauna, i. p. 154, pl. vi. fig. 14.

*Jopsis gabbi*, sp. n., Mörch, J. de Conch. xxiv. p. 371, Porto Rico. The existence of a sutural band confirms the position of this genus in the *Eulimidæ*; see also Gabb, P. Ac. Philad. x. p. 272, and Tr. Ac. Philad. xv. (1873), p. 227.

*Subeulima lamberti* (Souverbie, 1875), redescribed and figured; Souverbie, J. de Conch. xxiv. p. 380, pl. xiii. fig. 2, New Caledonia.

### Stiliferidæ.

*Stilifer ovoideus*, within tubercles of the skin of *Asteridæ* at Mauritius; no radula found. Troschel, SB. Ver. Rheinl. 1876, p. 82.

*Scalenostoma apiculatum*, sp. n., Souverbie, J. de Conch. xxiv., p. 383, Mauritius.

## *SCUTIBRANCHIA.*

### Neritidæ.

*Nerita peloronta* (L.). Etymology of this name; Martens, Nachr. mal. Ges. 1876, p. 70.

*Neritopsis radula* (L.) and *interlirata* (Pease). Habitat discussed; the fossil genera *Peltarion*, *Cyclidia* (Rolle, 1862), and *Scaphanidia* (Müller, 1851) are its opercula. Semper, Verh. Ver. Hamb. ii. pp. 205 & 206.

*Neritina liturata* (Eichwald), from the Caspian Sea, redescribed, differs also in the radula from *N. fluviatilis* (L.); Grimm, Kaspinskoe more i ego fauna, i. pp. 147–150, pl. vi. figs. 6–8.

*Neritina*: 5 species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clvii.

*Navicella squamata* (Dohrn), *iid. tom. cit.* pl. clvii. figs. 1 & 4.

### Trochidæ.

P. Fischer has published (1875) descriptions to the figures of *Trochidæ* long ago published by L. C. Kiener. New names: *Trochus crogatus* = *indistinctus* (Kien & Philippi, *nec* Wood), *leseuri* = *elegans* (Kien., *nec* Gmel.).

*Phasianella pulchella* (preoccupied), J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 13, Tasmania.

J. E. T. Woods, *l. c.*, describes the following spp. nn. from Tasmania :—*Turbo* (*Lunella*) *simsoni*, and (*Ninella*) *stamínea* var. p. 13. *Carinidea tasmanica*, p. 14. *Clanculus dominicana*, *raphaeli*, and *angeli*, p. 16. *Diloma australis* [*-le*], p. 17. *Gibbula multicarinata*, *dolorosa*, and *weldi*, pp. 14 & 15. *Monilea turbinata*, p. 17. *Margarita* (*Minolia*) *tasmanica*, p. 15. *Ethalia tasmanica*, p. 18. *Adcorbis picta* [*-tus*], p. 18. *Cyclostrema josephi*, *micra* [*-rum*], *weldi*, *susonis*, *spinosa* [*-sum*], and *immaculata* [*-tum*], pp. 19 & 20. *Liotia incerta*, p. 20. *Scissurella atkinsoni*, p. 21.

### Fissurellidæ.

*Scutus abnormis* (Nevill, 1876) is the additional shell-plate of *Pholas siamensis* (Spengl.) ; Mörch, J. de Conch. xxiv. p. 367.

*Togalia tasmanica*, sp. n., J. E. T. Woods, *l. c.* p. 28, Tasmania.

*Macroschisma tasmanicum* (Sow.) var. an spec. propria ? *id. l. c.* p. 28, Tasmania.

## *CYCLOBRANCHIA.*

### Acmæidæ.

*Acmæa costata* (Sow., as *Patella*), probably = *alticostata* (Angas, 1865) *A. septiformis* (Q. G.) = *acutilirata* (Angas), probably also = *cantharus* (Rv.), *A. flammea* (Q. G.), *crucis*, sp. n., and *marmorata* (Woods, 1875), described from living Tasmanian specimens ; J. E. T. Woods, P. R. Soc. Tasm. 1876, pp. 10–13. *A. petterdi* and *alba*, id. *l. c.* p. 27, Tasmania.

*Scurria scurra* (Less.) : radula as in *S. mesoleuca* (Mke.) ; Dall, P. Ac. Philad. 1876, pp. 239–243.

### Patellidæ.

*Patella limbata* (Phil.) and *ustulata* (Rv.) described from living Tasmanian species ; J. E. T. Woods, *l. c.* pp. 8 & 9.

W. Dall, by examination of the gigantic *Ancistromesus mexicanus*, comes to the conclusion that the seminal products make their way by dehiscence into the perivisceral cavity, and thence by narrow oblique openings into the renal sac, from which they are extruded by the renal papilla ; P. Ac. Philad. 1876, pp. 239–243. He also thinks that North-West America forms a great centre of distribution for the *Docoglossa*, and gives a genealogical tree of this tribe, beginning with *Lepeta* and ending with *Ancistromesus* ; l. c. pp. 244–247.

*Helcion* (Montp.) : dentition of the typical *Patellidæ*, outer cusp of the third lateral tooth obsolete ; *id. l. c.* p. 244.

### Chitonidæ.

Carpenter divides this family into two groups—articulated or perfect,

spp. nn., Abraham, Ann. N. H. (4) xviii. pp. 136 & 137, pl. vi. figs. 2 & 3.

*Doris glabra*, sp. n., Friele, Förh. Selsk. Chr. 1875, Norway.

*Calycidoris*, g. n. Branchiæ retractile in a pallial cavity, as in *Doris*. Oral veil, buccal gizzard, and radula as in *Lamellidoris*. *C. guentheri*, sp. n., Abraham, Ann. N. H. (4) xviii. pp. 132 & 133, pl. vi. fig. 1, locality unknown.

*Goniodoris danielsseni*, sp. n., Friele, *l. c.* Norway.

*Plocamophorus navatus*, sp. n., Abraham, *l. c.* p. 139, pl. vi. fig. 4, New South Wales.

*Ceratosoma caledonicum*, P. Fischer, J. de Conch. xxiv. p. 92, New Caledonia; *C. tenue*, locality unknown, *brevicaudatum*, Australia, and *oblongum*, West Australia, Abraham, *l. c.* pp. 141–144, pl. vii. figs. 5–7; spp. nn.

*Trevelyana concinna*, sp. n., Abraham, *l. c.* p. 145, pl. vii. fig. 8, Suez.

## Tritoniidæ.

*Tethys*. An anatomical description, chiefly of the nervous system, intestine, sexual organs, and kidney, and pointing out the simple primitive character of those organs in comparison with other *Nudibranchia*. H. v. Ihering, Morph. JB. ii. pp. 27–62, pl. ii.

An error made by Lacaze-Duthiers concerning its worm-like appendages corrected; *id.* JB. mal. Ges. iii. p. 160.

## Æolidiæ.

*Acanthopsole*, Trinchese, Mem. Ac. Bologn. 1874 (3) v. with pl., = *Facelina* (Ald. & Hanc.); *F. gigas* (Costa), from Naples; and *drummondi* (Thomps.), anatomically described by R. Bergh, Verh. z.-b. Wien, xxvi. 752–757, pl. xi.

*Spurilla neapolitana* (Delle Chiaje, as *Æolis*), from Naples, anatomically described; *id. l. c.* pp. 758–761, pl. xii.

*Circolania viridis* (Costa), and *Coryphella argenteo-lineata* (Costa), species; anatomical figures by Bergh, *l. c.* pls. x. figs. 12–14, xi. figs. 12, 13, & xii. figs. 1, 13, 14.

## Phyllobranchidæ.

Bergh arranges the known genera and species as follows:—

*Phyllobranchus* (Ald. & Hanc.). "Anus lateralis; podarium conradula hamo infra applanato, marginibus denticulatis, infra spiralem formans; ingluvies elongata; penis longior, inermis." ing *Lobifera* (Pease, 1866) and *Polybranchia* (Pease, 1860), 5 Red Sea, Philippines, Pacific, and (part) West Indies.

(Bergh). "Anus dorsalis; podarium transversaliter bipartitum; hamo infra applanato, marginibus denticulatis, infra acervum m formans; ingluvies brevior; penis sat brevis, hamo vel uctus." 2 species, *Lobifera nigricans* (Pease, 1866) = *Cyerce* nper, 1873), from the South Sea.

*Caliphylla* (Costa). "Tentacula nulla; anus latero-dorsalis; papillæ dorsales ut in Phyllobrancho, sed margine integro; podarium continuum; radula hamo pugioniformi, infra fasciam spiralem formans; ingluvies brevior; penis brevior, inermis." 2 species from the Mediterranean. *Cal. mediterranea* (Costa) and *Cy. nigra* (Semper) are anatomically described. Verh. z. b. Wien, xxvi. pp. 737–752, pls. ix. & x.

### Elysiidæ.

*Allportia*, g. n. "Corpus expansum, tenue, antice et postice omnino complanatum, oculis submarginalbuis." *A. expansa*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 2, Tasmania.

*Elysia viridis* (Mont.): green colour caused by chlorophyll; Negri, Atti Acc. Rom. (2) iii. p. 437.

## *PULMONATA.*

L. Pfeiffer has completed the seventh volume of his "Monographia Heliceorum viventium," bringing up the number of described species of *Helix* (sens. lat.) to 3476, *Streptaxis* to 74, *Ennea* to 59, *Streptostele* to 5. All that has been published upon these genera between 1868 and 1875 is quoted, and the descriptions of the new species copied. Some explanatory notes and an abstract of innovations and additions are given by the author in Mal. Bl. xxvi. pp. 58–77 & 196–230.

For Leydig's researches on the anatomy, see *suprà*, p. 5.

### Agnatha.

*Glandina fusiformis* var. n. *miltochila*, Martens, JB. mal. Ges. iii. p. 259, Guatemala.

*G.* (*Oleacina*) *cleriei*, sp. n., Weinland, Mal. Bl. xxiii. pp. 170 & 231, pl. ii. fig. 5, Hayti.

*Streptostyla sargi* (Crosse & Fischer, 1875), J. de Conch. xxiv. p. 384, pl. xi. fig. 1, Guatemala.

*Ennea insignis* (Pfr.). Living animal with a very long neck and peculiarly appendiculated under-feelers, from a drawing by the late Prof. Buchholz; MB. Ak. Berl. 1876, p. 263, pl. iv. fig. 1.

*Ennea stylodon*, *conica* [? = *monodon*, Morelet], *mucronata*, *buchholzi*, *trigonostoma*, *complicata*, *columellaris*, and *cavidens*, spp. nn., and *monodon* (Morelet [? sp. n.]), Martens, MB. Ak. Berl. 1876, pp. 263–267, pl. iv. figs. 2–23.

*Ennea dupuyana*, Crosse, J. de Conch. xxiv. p. 167 (April, 1876), and p. 387, pl. xi. fig. 2, Comoro Islands; *E. quadridentata* [= the former, which has the priority of some months) and *comorensis*, Martens, JB. mal. Ges. iii. pp. 251 & 252, pl. ix. figs. 4 & 5, Joanna Island: spp. nn.

*Ennea*: one species, figured in Hanley & Theobald's Conch. Icon. pt. viii. pl. clx.

*Celostele scalaris* (Bens.), figured, *iid. tom. cit.* pl. clvi. fig. 5.

*Streptaxis epistylium* (O. Fr. Müller): the original specimen has been made out; it is allied to *dunkeri* (Pfr.), and probably comes from Guinea. O. A. Mörch, J. de Conch. xxiv. p. 374.

*Streptaxis monroviana*[-us] (Raug) = *nobilis* (Gray); Dohrn, in Pfeiffer's Novitates, v. p. 26, pl. cxlii. figs. 1–6, very variable, Liberia.

*Streptaxis*: three species figured in Hanley & Theobald's Conch. Ind. pt. viii. pl. clvi.

*Scolodonta argentina* (Strobel, as *Hyalina*), Döring, Bol. Ac. Cordova, ii. p. 310, Mendoza, Argentine States.

*Sagdinella microtrochus*, sp. n., and *didrichseni*, var. n. *grandis*; Mörch, J. de Conch. xxiv. p. 358, Nicobar Islands.

*Helix (Rhytida) langleyana*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. 1876, p. 18, Tasmania.

## Oxygnatha.

*Limax gracilis*, sp. n., Leydig, Arch. f. Nat. xlii. p. 276, pl. xii. fig. 22. [This is the species figured by the Recorder in Lehmann's "Lebende Schnecken und Muscheln von Pommern," pl. v. fig. 8 B.]; *L. carinatus* (Leach) = *marginatus* (Drap.), p. 273, pl. xii. figs. 19–21; *L. montanus* (Leydig), p. 282, Tirol; *L. brunneus* (Drap.), p. 287, pl. xii. fig. 18. The other German species of *Limax* are described, pp. 70–79, and the internal shell described and figured (*cf. suprà*, p. 5).

*Limax variegatus* (Drap.) varr. nn. *tigrinus* and *colubrinus*, Pini, Moll. terr. di Esino, pp. 34 & 35.

*Limax arborum* (Bouch.), varr. nn. *flava* and *tigrina*; Weinland, Weicht. schwäb. Alb, p. 27, pl. iv. fig. 6, the internal shell varies very much in thickness, p. 29. *L. brunneus* (Drap.) and *L. carinatus* (Leach); on their occurrence and habits, *id. l. c.* pp. 25 & 29.

*Limax cinereus* (Lister, Müll.), with varr. *concolor*, *cellarius*, *jonstoni*, *maculatus*, and *ferussaci*, Pini, *l. c.* pp. 18–21. On varieties of the same, see also Adami, Moll. fluv. di Brescia e Bergamo, p. 19.

*Gestroa*, new section of *Limax*; "tuberculis oblongis irregularibus instructus, dorso cinereo vel colorato unicolore, solea ardesiaca limbata, aut dorso colorato nigro-maculato, solea albo-lutea, *L. cinereo* vero interna structura omnino æqualis." *L. cornalia*, *strobeli*, and *pavesi*, spp. nn., Pini, *l. c.* pp. 21–23, Lombardy.

*Chromolimax*, subg. n. of *Limax*, for *L. cinereo-niger* (Wolf), and *dacampi* (Menegazzi), *L. isseli*, *atratus*, *trilineolatus*, *monolineatus*, *fuscus*, *villæ*, *taccanii*, and *guatteri*, sub-spp. nn., Pini, Moll. terr. di Esino, pp. 25–30, pl. A, figs. 2–9, Lombardy. On varieties of the same, see also Adami, Moll. terr. et fluv. di Brescia e Bergamo, pp. 17 & 18. *L. cinereo-niger*, young specimens described by D. Weinland, Weicht. schwäb. Alb, p. 24.

*Opilolimax*, subg. n., for *L. punctulatus* (Sordelli), *pradæ*, *parumpunctatus*, and *turatii*, sub-spp. nn.; Pini, *l. c.* pp. 30–33, pl. B, figs. 1, 2, & 7, 8.

*Stabilea*, for *Limax psarus* (Bourg.) and *pironæ*, sp. n., = *L. cinereo-niger* var. *albipes* (Stabile); Pini, *l. c.* pp. 35–37, pl. B figs. 3, 4, 5, & 6.

*Limax*: the Scandinavian species reviewed by Malm, Œfv. Ak. Förh. xxxiii. No. 1, pp. 76–80.

*Limax hyperboreus*, sp. n., Westerlund, Nachr. mal. Ges. 1876, p. 81, Island Sopotschnoi, in the Yenisei River, 70° N. lat.

*Limax hewstoni* (Coop.), genital organs, and *campestris* var. *occidentalis* (Coop.), radula; Binney, P. Ac. Philad. 1876, p. 184, pl. vi. figs. r and x n.

*Urocyclus buchholzi*, sp. n., Martens, MB. Ak. Berl. 1876, p. 269, pl. v. fig. 1, Gold Coast.

*Vitrina pyrenaica* (Fér.), found in Lombardy, and described by Pini, Moll. terr. di Esino, p. 47.

*Vitrina bocagii* (Paiva) = *Helix webbiana* (Lowe), juv.; Watson, J. de Conch. xxiv. p. 219.

*Vitrina*: 7 species [probably some of them belonging to *Helicarion*] figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clii.

*Helicarion sieversi*, sp. n., Mousson, J. de Conch. xxiv. p. 137, pl. v. fig. 1, Tabizhuri, Transcaucasia.

*Helicarion semimembranaceus* and *plicatulus*, spp. nn., Martens, MB. Ak. Berl. 1876, pp. 253 & 254, pl. i. figs. 1–4 & 5–8, Camaroons and Gold Coast.

*Nanina troglodytes* (Morelet) and *calamechroa* (Jonas), living animals figured from drawings made by the late Prof. Buchholz; MB. Ak. Berl. 1876, p. 255, pl. i. figs. 9–11, W. Africa.

*Nanina*: several species figured by Hanley & Theobald, Conch Ind. pt. viii. pls. cxlix. & cl. *N. velum*, new name for *citrina*, var., Reeve, fig. 485, Tapparone-Canefri, Ann. Mus. Genov. vi. [1874], p. 562, Aru Islands.

*Nanina? taviunensis*, *vitrinina*, and *ramsayi*, spp. nn., Liardet, P. Z. S. 1876, pp. 99 & 100, pl. v. figs. 1–3, Taviuni, Fiji Islands; the living animals described and figured.

[*Nanina*?] *Helix haughtoni* (Bens.); Pfeiffer, Nov. Conch. v. p. 28, pl. cxlii. figs. 15 & 16, Andaman Islands.

[*Nanina*] *Helix indecorata* (Gould), *id. l. c.* figs. 17–19, Liberia.

*Nanina* (*Rotularia*) *rapstorfi*, sp. n., Mörch, J. de Conch. xxiv. p. 354, Kamorta, Nicobar Islands.

*Nanina* (*Videna*) *iopharynx*, sp. n., *sulcipes* (Mörch) varr. nn. *major* and *trilineata*, and *billeana* var. n. *brunnea*, Mörch, J. de Conch. xxiv. pp. 356, 355,, Nicobar Islands.

*Microcystina*, subg. n. of *Nanina*, characterized by a small notch at the pillar lip and a polished shell; type, *M. rinki* (Mörch); *Helix molecula* (Bens.) appears also to belong to it. *Id. l. c.* p. 357.

*Trochonanina tumidula* and *percarinata*, spp. nn., and *ibuensis* (Pfr.), Martens, MB. Ak. Berl. 1876, p. 256, pl. i. figs. 12–18, Bonjongo, Camaroon Mountains, W. Africa.

*Sophina* (Bens.): the 4 known species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. cxlvii.

[*Trochomorpha*?] *Helix rhoda*, sp. n., Angas, P. Z. S. 1876, p. 267, pl. xx. figs. 10–12, San Christoval, Solomon Archipelago.

*Zonites*, (restricted): on its geographical distribution, and *Z. chloroticus*

(Pfr.), *corax* (Pfr.), *carniolicus* (A. Schmidt), and *crypta* (Parr.), described and figured; Kobelt, Iconogr. iv. p. 46–50, pls. cx. & cxi.

*Zonites? bermudensis* (Pfr.). No caudal mucus pore, no longitudinal furrows above the margin of the foot; a delicate arrow-like dart like that of *Z. ligerus*. Binney, P. Ac. Philad. 1876, pp. 183 & 184.

*Hyalina nitidula* (Drap.) and *nitens* (Mich.): on their differences, the former occurs also in Southern Germany; Weinland, Weicht. schwäb. Alb, p. 35. The latter, but not the former, found in Lombardy; Pini, Moll. terr. di Esino, p. 54.

*Hyalina subrupicola*, sp. n., Packard, Bull. U. S. Geol. Surv. iii. p. 163, Cave in Utah; allied to *indentata* (Say).

*Hyalina* (*Mesomphix*) *semisculpta*, sp. n., Mousson, J. de Conch. xxiv. p. 26, Persian shore of the Caspian Sea.

[*Mesomphix*] *Zonites inornatus* (Say) and *fuliginosus* (Griff.): radula; Binney, P. Ac. Philad. 1876, p. 183, pl. vi. figs. C & D.

*Macrocyclis sportella* (Gould): radula; *id. l. c.* fig. AA.

## Odontognatha.

*Arion empiricorum* (Fér.): the darkly-coloured varieties prevail in damp localities, the clear red in rather dry regions. *A. subfuscus* (Drap.), a rather brown and a rather grey variety distinguished. *A. hortensis* (Fér.) is a good species, but *A. tenellus* appears to be a young of *A. empiricorum*. Leydig, Arch. f. Nat. xlii. pp. 265–273.

*Arion melanocephalus* (Fauve Biguet) = *empiricorum* (Fér.), juv., as already stated by Seibert; *A. fuscus* (Müll.) and *hortensis* (Fér.), diagnosed: Weinland, Weicht. schwäb. Alb, pp. 43–45.

The Scandinavian species of *Arion* reviewed by Malm, Œfv. Ak. Förh. xxxiii. No. 1, pp. 74–76.

*Binneya notabilis* (Dall): genital organs; Binney, P. Ac. Philad. 1876, p. 185, pl. vi. fig. 5.

*Patula strobeliana* and *stelzneriana*, spp. nn., Döring, Bol. Ac. Cordova, ii. pp. 312 & 313, western slope of the Sierra de Alchala, Argentine States.

*Helix.* Palæarctic species:—

[*Vallonia*] *Helix tenuilabris* (Braun): apparently recent specimens found in the sediment of the Danube in Bavaria; S. Clessin, Nachr. mal. Ges. 1876, p. 67.

[*Fruticola*] *Helix edentula* (Drap.) described; Weinland, Weicht. schwäb. *l. c.* Alb, p. 50.

*Helix rufescens* (Penn.) var. n. *clessini*, with hairs; *id. l. c.* p. 53.

*Helix dirphica*, sp. n., Martens, JB. mal. Ges. iii. p. 339, pl. xii. fig. 2, Euboea.

*Helix* (*Fruticola*) *septemgyrata*, sp. n., Mousson, J. de Conch. xxiv. p. 29, pl. ii. fig. 2, Kers [Kars?].

*Helix* (*Eulota*) *nordenskioldi* and (*Trichia*) *stuxbergi*, spp. nn., Westerlund, Nachr. mal. Ges. 1876, pp. 97 & 98, Siberia, on the shores of the

Yenisei River, between 61° & 68° N. lat., and on those of the Amur River. The former is probably the species described by Schrenck as *H. rufescens* (Penn.).

[*Caracollina*] *Helix asturica* (Pfr., 1854) = *bucinieri* (Michaud, 1841); Fischer, J. de Conch. xxiv. p. 95.

[*Campylæa*] *Helix cingulata* (Stud.) and *frigida* (Jan.), their varieties and next allied species discussed by Kobelt, JB. mal. Ges. iii. pp. 344–352, and in his continuation of Rossmässler's Iconography, pp. 33–39, pls. cvi.–cviii. figs. 1070–1082. Observations on these, and their occurrence in the province of Como, the latter = *insubrica* (Jan.) and confined to Monte Codeno and Monte Campione; Pini, Moll. terr. di Esino, pp. 72–77. On the same in the province of Bergamo; Adami, Moll. terr. Bresc. e Berg. pp. 43–46, pl. i. figs. 4–9.

*Helix foetens* (C. Pfr., *nec* Studer) [*ichthyomma*, Held], *planospira* (Lam.) and allied species, treated by Kobelt, Iconogr. iv. pp. 26–46, pls. cii.–cv. *H. cisalpina* (Stabile), including *rhætica* (Mouss.), and var. n. *bettæ*, is geographically and conchologically distinct from the above species; Adami, *l. c.* pp. 36–42, pl. i. figs. 1–3.

*Helix cyclolabris* (Desh.) and its varieties; Kobelt, Iconogr. iv. pp. 39–41, pl. cviii. figs. 1083–1088, Greece.

*Helix distans* (Blanc, MS.), sp. n., Martens, JB. mal. Ges. iii. p. 338, pl. xii. fig. 1, Corfu.

*Campylæa brusinæ*, sp. n., Stossich, Boll. Soc. Adr., No. 7, 1876, and Kobelt, Iconogr. iv. p. 56, pl. cxiv. fig. 1132, Mount Biocovo, in Dalmatia.

*Campylæa imberbis*, sp. n., = *setosa* var. *denudata* (Brusina, *olim*), *lutescens* (Kutschig, 1866) = *kleciachi* (Parr., 1870), and *brusinæ* (Stossich), all from Dalmatia, described by Brusina, Bull. mal. Ital. (2) ii. pp. 53–61.

*Helix schaufussi*, sp. n., *cantabrica* (Hidalgo), and *velascoi* (Hidalgo), all from Northern Spain; Kobelt, *l. c.* pp. 44 & 45, pl. cix. figs. 1096–1099. *H. nubigena* (Charp.) = *carascalensis* (Fér.), var.; Gloyne, Q. J. Conch. 1876, p. 133.

*Helix* (*Campylæa*) *transcaucasica* (Bayer) specifically distinguished from *ravergii* (Fér.); Mousson, J. de Conch. xxiv. p. 31, Elbrus.

*Helix* (*Campylæa ?*) *appeliana*, sp. n., *id. l. c.* p. 32, pl. ii. fig. 3, Kislovodsk, Caucasus (perhaps rather a *Fruticola*).

*Campylæa styriaca* (Frauenfeld) found with *Arionta arbustorum* var. *alpestris*, but nevertheless perhaps a variety of it; Tschapeck, Nachr. mal. Ges. 1876, pp. 145–149.

*Helix arbustorum* (L.): on its varieties in Lombardy, including var. n. *scalvina*; Adami, Moll. terr. di Brescia e Bergamo, p. 47.

*Helix lapicida* (L.), variety without keel; Wienland, Weicht. schwäb. Alb, p. 56, pl. iv. fig. 2.

[*Xerophila*] *Helix unifasciata* (Poiret) var. n. *mellæ*, Pini, Moll. terr. di Esino, p. 71, Lombardy. Var. *alpina* (Mhlfld.), Adami, *l. c.* p. 50, Schilpario, in the Lombardy Alps.

*Helix chalcidica* (Blanc, MS.), sp. n., Martens, JB. mal. Ges. iii. p. 339, pl. xii. fig. 3, Euboea.

*Helix crenimargo* (Kryn.) var. *obtusior*; Mousson, J. de Conch. xxiv. 139, Desert of Sardarad, Transcaucasia.

*Helix finitima*, *conopsis*, and *maroccana*, spp. nn., Morelet, J. de Conch. iv. pp. 374 & 375, Morocco. [These appear near *H. turcica* (Chemn.) d its varieties described by Mousson as distinct species in JB. mal. s. i. pp. 5–9.]

*Helix terrestris*, Chemn. [*elegans*, Gmel.], found in Charleston, South rolina, by W. G. Mazgek, its radula described and figured; Bland, Ac. Philad. 1876, p. 127.

*Turricula tuberculosa* (Conrad), jaw and radula; Binney, P. Ac. ilad. 1876, p. 187, pl. vi. fig. *r*.

[*Euparypha*) *Helix seetzeni* (Koch), *planata* (Chemn.), and *dehnii* och), treated by Kobelt, Iconogr. iv. pp. 57–60, pl. cxv.

*Helix desertorum* with its varieties, *H. turcica* (Chemn.) and *mograbina* orelet); *id. l. c.* pp. 13–16, pls. xcvi. & xcvii.

[*Tachea*] *Helix nemoralis* (L.): 18 different varieties, with observa- ns on the general colour and disposition of the bands; Adami, *l. c.* 49. *H. nemoralis*, 7 varr., and *H. hortensis*, 16 varr.; Weinland, eicht. schwäb. Alb, pp. 59 & 61. The red colour of some varieties eclared to be protective on trunks and among decayed leaves of beech ves; *id. l. c.* p. 62. Young specimens of both these species exhibit e same 5 bands as the parents, and the third band is the first which kes its appearance; Seibert, Nachr. mal. Ges. 1876, pp. 65–67. [*Cf.* ol. Rec. vii. p. 158.]

[*Macularia*] *Helix platychela* (Mke.), *nebrodensis* (Pirajno), *melisis* (Fér.), *intus-plicata* (Pfr.), *atlasica* [!] (Mouss.), and some allied ecies from Northern Africa, treated by Kobelt, Iconogr. iv. pp. 50–56, .. cxii. & cxiii.

*Helix crassa* (Pfr.), probably an umbilicated variety of *codringtoni* ray); Martens, JB. mal. Ges. iii. p. 338.

*Helix* (*Macularia*) *ghilanica*, sp. n., Mousson, J. de Conch. xxiv. p. 33, ii. fig. 4, Ghilan, Northern Persia.

[*Pomatia*] *Helix lucorum* (Müll.), Italy and Turkey, several varieties; *ata* (Müll.) = *gussoncana* (Shuttl.), Italy, several varieties; *anctostoma* Martens), and some other species of this group, treated by Kobelt; onogr. pp. 18–25, pls. xcviii.–ci.

*Helix pomatia* (L.), observations on the young animals; Weinland, .. p. 67.

## *Helix*. Species from Japan.

*Helix papilliformis* and *nipponensis*, spp. nn., Kobelt, JB. mal. Ges. pp. 30 & 31, pl. i. figs. 1 & 2; the latter very near *H. peliomphala* Fér.), some varieties of which are described, *id. l. c.* p. 32, pl. i. figs. 3, 4. *senckenbergiana* (Kob.) var., *id. l. c.* p. 275, pl. viii. fig. 1. *H. amaliæ* Kob.) var., *id. l. c.* p. 149, pl. v. fig. 2. Notes on the variability of *peliomphala*, including *nipponensis* and *senckenbergiana*, and on *callizona* (Crosse) = *amaliæ* (Kob.); E. v. Martens. *tom. cit.* .. 357 & 358.

*Helix goodwini*, sp. n., E. Smith, Q. J. Conch. 1876, p. 119, Japan; near *H. conospira* (Pfr).

*Helix*. African species:—

[*Aerope*] *Helix caffra* var. *wesselliana* (v. Maltzan, MS.), Kobelt, Jb. mal. Ges. iii. p. 149, pl. v. fig. 1.

[*Ampelita*] *Helix eganziniana*, Crosse & Fischer, J. de Conch. xxiv. p. 167, Madagascar; *H. robillardi*, H. Adams & Angas, P. Z. S. 1876, p. 489, pl. xlvii. figs. 6 & 7, S.W. Madagascar: spp. nn.

*Helix teneriffensis*, sp. n., H. Adams & Angas, *l. c.* p. 489, pl. xlvii. figs. 8 & 9, Teneriffe Islands, N.W. Madagascar.

*Helix*. Indian species:—

[illegible] species figured in Hanley & Theobald, Conch. Ind. pt. viii. pls. cxlix., cl., & clix.

*Helix massoni* (Behn); Pfeiffer, Novitat. Conch. v. pl. cxlii. figs. 23–25, Nicobar.

*Helix* (*Plectopylis*) *shanensis* (Stoliczka) and *beddomii*, sp. n., Hanley & Theobald, *l. c.* pl. cxlix. figs. 8 & 9, & pl. cl. figs. 1 & 2.

*Helix* (*Janira*) *codonodes* (Pfr.) appears allied to *Obba* (Beck), and several varieties of it are enumerated; Mörch, J. de Conch, xxiv. p. 357, Nicobar.

*Helix*. Australian species:—

*Helix eyrei* [*eyrensis*], sp. n., H. Adams & Angas, P. Z. S. 1876, p. 490, pl. xlvii. figs. 10–13, shores of Lake Eyre, Central Australia.

*Helix weldi*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 33, Tasmania; sinistral.

*Helix* (*Charopa*) *nupera*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 18, King George's Sound, S.W. Australia.

*Helix* (*Thalassia*) *gayndahensis*, sp. n., *id. l. c.* p. 2, Queensland.

*Helix* (*Dorcasia*) *blackalli*, sp. n., *id. l. c.* p. 1, Queensland.

[*Hadra*] *Helix moresbii*, sp. n., G. F. Angas, P. Z. S. 1876, p. 267, pl. xx. figs. 8 & 9, Port Denison, Queensland. *H. angasiana* (Pfr.), fresh specimens, and *bitæniata*, Cox (1868). = *flindersi* (A. Adams & Angas, 1863), figured; *id. l. c.* p. 268, pl. xx. figs. 13, 14, & 15, 16.

*Helix* (*Hadra*) *bayensis*, Queensland, *rufo-fasciata*, South Australia, and *cookensis*, N.E. Australia, spp. nn., Brazier, *l. c.* pp. 2 & 17.

*Helix*. Polynesian and Melanesian species:—

*Helix princii*, *pinnocki*, *barkasi*, and *clayi*, spp. nn., Liardet, P. Z. S. 1876, pp. 100 & 101, pl. v figs. 4–7, Taviuni, Fiji Islands.

[*Papuina*] *Helix beatrix* and *ramsdeni*, spp. nn., Solomon Archipelago, Angas, P. Z. S. 1876, pp. 266 & 267, pl. xx. figs. 1–7. *H. malantensis*, Malanta Islands, Solomon Archipelago, and *comrici*, S.E. New Guinea, H. Adams & Angas, *tom. cit.* pp. 488 & 489, pl. xlvii. figs. 1–5.

*Helix* (*Geotrochus*) *brenchleyi*, sp. n., Brazier, *l. c.* p. 3, Guadalcanar, Solomon Archipelago.

*Helix* (*Corasia*) *wiseman*, sp. n., *id. l. c.* p. 3, Solomon Archipelago.

*Helix goodwini*, sp. n., E. Smith, Q. J. Conch. 1876, p. 119, Japan; near *H. conospira* (Pfr).

*Helix.* African species:—

[*Aerope*] *Helix caffra* var. *wesselliana* (v. Maltzan, MS.), Kobelt, JHL mal. Ges. iii. p. 149, pl. v. fig. 1.

[*Ampelita*] *Helix sganziniana*, Crosse & Fischer, J. de Conch. xxiv. p. 167, Madagascar; *H. robillardi*, H. Adams & Angas, P. Z. S. 1876, p. 489, pl. xlvii. figs. 6 & 7, S.W. Madagascar: spp. nn.

*Helix teneriffensis*, sp. n., H. Adams & Angas, *l. c.* p. 489, pl. xlvii. figs. 8 & 9, Teneriffe Islands, N.W. Madagascar.

*Helix.* Indian species:—

120 species figured in Hanley & Theobald, Conch. Ind. pt. viii. pls. cxlix., cl. & clx.

*Helix massoni* (Behn); Pfeiffer, Novitat. Conch. v. pl. cxlii. figs. 23–25, Nicobar.

*Helix* (*Plectopylis*) *zhanensis* (Stoliczka) and *beddomii*, sp. n., Hanley & Theobald, *l. c.* pl. cxlix. figs. 8 & 9, & pl. cl. figs. 1 & 2.

*Helix* (*Janira*) *codonodes* (Pfr.) appears allied to *Obba* (Beck), and several varieties of it are enumerated; Mörch, J. de Conch, xxiv. p. 357, Nicobar.

*Helix.* Australian species:—

*Helix eyrei* [*eyrensis*], sp. n., H. Adams & Angas, P. Z. S. 1876, p. 490, pl. xlvii. figs. 10–13, shores of Lake Eyre, Central Australia.

*Helix weldi*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 33, Tasmania; sinistral.

*Helix* (*Charopa*) *nupera*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 18, King George's Sound, S.W. Australia.

*Helix* (*Thalassia*) *gayndahensis*, sp. n., *id. l. c.* p. 2, Queensland.

*Helix* (*Dorcasia*) *blackalli*, sp. n., *id. l. c.* p. 1, Queensland.

[*Hadra*] *Helix moresbii*, sp. n., G. F. Angas, P. Z. S. 1876, p. 267, pl. xx. figs. 8 & 9, Port Denison, Queensland. *H. angasiana* (Pfr.), fresh specimens, and *bituniata*, Cox (1868), = *flindersi* (A. Adams & Angas, 1863), figured; *id. l. c.* p. 268, pl. xx. figs. 13, 14, & 15, 16.

*Helix* (*Hadra*) *bayensis*, Queensland, *rufo-fasciata*, South Australia, and *cookensis*, N.E. Australia, spp. nn., Brazier, *l. c.* pp. 2 & 17.

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*Helix princii*, *pinnocki*, *barkasi*, and *clayi*, spp. nn., Liardet, P. Z. S. 1876, pp. 100 & 101, pl. v figs. 4–7, Taviuni, Fiji Islands.

[*Papuina*] *Helix beatrix* and *ramsdeni*, spp. nn., Solomon Archipelago, Angas, P. Z. S. 1876, pp. 266 & 267, pl. xx. figs. 1–7. *H. malantensis*, Malanta Islands, Solomon Archipelago, and *comrici*, S.E. New Guinea, H. Adams & Angas, *tom. cit.* pp. 488 & 489, pl. xlvii. figs. 1–5.

*Helix* (*Geotrochus*) *brenchleyi*, sp. n., Brazier, *l. c.* p. 3, Guadalcanar, Solomon Archipelago.

*Helix* (*Corasia*) *wisemani*, sp. n., *id. l. c.* p. 3, Solomon Archipelago.

*Helix.* South American species :—

*Microphysa incrustata* (Pocy) : jaw ribbed, radula as in *M. ingerselli*; Binney, P. Ac. Philad. 1876, p. 187, pl. vi. fig. T.

*Helix ghiesbreghti* (Nyst) and *eximia* (Pfr.); on their coloration, Martens, JB. mal. Ges. iii. p. 260.

*Helix trigonostoma* (Pfr.); on its systematic position, *id. ibid.*

*Helix costaricensis* (Roth); on its variability, *id. l. c.* p. 255.

*Eurycampta hydalgonis*, sp. n., = *trenquelleonis* var. *b* of Hidalgo; Döring, Bol. Ac. Cordova, ii. p. 310, Sierra Chica, Argentine States; the genital organs are also described.

*Helix.* North American species :—

*Helix pulchella* (Müll.) found also in Nevada, North America, at an elevation of 8000 feet, and lower, probably not introduced; Hemphill, Q. J. Conch. 1876, p. 128.

*Glyptostoma newberrianum* (Binn.); genital organs with dart sac or prostate gland, Binney, P. Ac. Philad. 1876, p. 190, pl vi. fig. H.

*Polygyra postelliana* (Bland), *dorfeuilleana* (Lea), and *avara* (Say); radula, *id. l. c.* p. 188, pl. vi. figs. Z, U, & Y.

[*Polygyra*] *Helix febigeri* (Bland); Pfeiffer, Novitat. Conch. v. pl. cxlii. figs. 20–22.

*Helix monodon* (Rackett); genitalia with large penis sac, Binney, *l. c.* p. 138, pl. vi. fig. Q.

*Mesodon major* (Binney); on its localities and genital organs, the latter agreeing with those of *albilabris* (Say), *id. l. c.* p. 189, pl. vi. fig. F.

*Aglaia fidelis* (Gray); genital organs, *id. l. c.* p. 189, pl. vi. fig. P.

*Arionta mormonum* (Pfr.) and *sequoiicola* (Coop.), genitals, *californiensis* (Lea), and *dupetithouarsi* (Desh.), radula; *id. l. c.* pp. 189 & 190, pl. vi. figs. S, R, W, & U.

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[*Amphidromus*] *Bulimus andamanicus* (Thorpe, MS.), Hanley & Theobald. Conch. Ind. pt. viii. pl. cxlviii. fig. 10.

*Bulimus*, group *Borus*. The known species are compared and arranged according to the sculpture of the first whorls :—

I.—First whorls granulated with distant riblets: *B. popelairianus* (Nyot), with var. n. *thammianus*, pl. cxl. fig. 1, var. *dohrnianus*, pl. cxxxix. fig. 2, and var. *connectens*, pl. cxxxix. fig. 1. *B. maximus* (Sow.), *huascari* (Tschudi, = *lacunosus* of Reeve, *nec* Orb.) pl. cxli. figs. 3 & 4, *sanctae-crucis* (Orb.), *lacunosus* (Orb.), *matthewsi* (Orb.) = ? *leucostoma* (Sow.), *duerfeldti* (Dohrn), pl. cxl. figs. 4 & 5, *castelnaui* (Hupé), and *granulosus* (Rang).

II.—First whorls plaited: *B. valenciennesi* (Pfr.), *proximus* (Sow.), *cantagalianus* (Rang) = *accelerans* (Martens), pl. cxxxviii. figs. 1 & 2, *intercedens*, sp. n., pl. cxli. figs. 1 & 2, Bahia, *ovatus* (Müll.) and *bronni* (Pfr.).

III.—First whorls densely ribbed: *B. oblongus* (Müll.) with *B. capillaceus* (Pfr.) as var., *B. lichtensteini* (Albers) and *auritus* (Sow.).

IV.—First whorls crenated: *B. roseaceus* (King), *crenulatus* (Pfr.), *pachychilus* (Pfr.).

V.—First whorls finely striated: *B. lutescens* (King) with var. *australis* [= *dorbignii*, Döring, see *infrâ*] and *globosus*, sp. n., pl. xl. figs. 2 & 3, locality unknown.

Martens, in Pfeiffer's Novitat. Conch. v. pp. 1–26, pls. cxxxviii–cxli.

*Bulimus lutescens* var. n. *cordilleræ*, Sierra de Cordoba, *B. dorbignii*, sp. n., = *nucleus* of Orbigny and Strobel, *nec* Sow., Northern Patagonia, and *B. lorentzianus*, sp. n., Sierras de Tucuman, Salta and Jujuy, Argentine States; Döring, Bol. Ac. Cordova, ii. pp. 335–337.

*Bulimus* (*Orphnus*) *tapacii* (Orb.), some varieties from the eastern slope of the Cordilleras described, jaw with 16–18 ribs; *id. l. c.* pp. 338 & 339.

*Bulimus* (*Macrodontes*) *cordovanus* (Pfr.) & var. n. *stelzneri*, jaw with 15 strong ribs, locality western slope of the Sierra de Aconjigasta, Argentine States; *id. l. c.* pp. 332 & 333.

*Odontostomus achalanus*, *popanus*, *aconjigastanus*, *multispiratus*, *bergi*, *salinicola*, *chancaninus*, *champagnianus*, and *reticulatus*, spp. nn., *id. l. c.* pp. 324–331; jaw of some species described, with 11–13 strong ribs.

*Plagiodontes*, new group of *Bulimus*, separated from *Odontostomus*: shell ovate, aperture with many teeth and a transverse plait behind; jaw strongly ribbed. Confined to the countries of the La Plata River from 27° N. lat. to the borders of Patagonia. Type, *P. dentatus* (Wood), also *dædaleus* (Desh.), & *P. brackebuschi* and *weyemberghi*, spp. nn., Sierra de Luis and Sierra de Aconjigasta. *Id. l. c.* pp. 318–322.

*Bulimus rhodotrema* (Martens, 1868) = *tripictus* (Albers, 1857), Costa Rica, belongs perhaps to *Plectostylus*; Martens, JB. mal. Ges. iii. p. 256.

*Limicolaria rubicunda* (Shuttl.): living animal figured from a drawing by Prof. Buchholz, MB. Ak. Berl. 1876, p. 258, pl. iii. fig. 4.

*Achatina marginata* (Swains.) var. and *balteata* (Rv.): living animal figured from a drawing by the late Prof. Buchholz, *l. c.* p. 257, pl. ii. figs. 1 & 2.

*Achatina pulchella*, sp. n., Martens, *tom. cit.* p. 258, pl. iii. figs. 1 & 2, Bonjongo, Camaroon Mountains.

*Pseudachatina downesi* (Gray); living animal figured from a drawing made by Prof. Buchholz, *l. c.* p. 259, pl. ii. fig. 3.

*Perideris solimana* (Morelet): neck of the living animal very long, deep green, hinder extremity of the foot truncated, from a drawing made by Prof. Buchholz; Martens, *l. c.* p. 259, pl. iii. fig. 5.

*Perideris torrida* (Gould), *interstincta* (Gould), *mucida* (Gould), and *auripigmentum* (Reeve), including *vignoni* (Morelet), Western Africa, Dohrn in Pfeiffer's Novitat. Conch. iv. pp. 161–164, pl. cxxxvii. figs. 1–7.

[*Rhachis*] *Buliminus pallens* (Jonas) = *finschi* (Dohrn); Pfeiffer, Novitat. Conch. iv. p. 165, pl. cxxxvii. figs. 11–14, Guinea.

*Buliminus oxianus*, sp. n., Martens, JB. mal. Ges. iii. p. 335, pl. xii. fig. 8, Eastern shore of the Caspian Sea.

[*Buliminus*] *Bulimus semanni*, Morelet (1873), ? = *bourguignati* (Le-

tourneux, 1870), Kabylia; Morelet, J. de Conch xxiv. p. 160, pl. iv. fig. 7.

*Buliminus*. Several species of "*Bulimus*" and two of "*Hapalus*" figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. cxlviii.

*Buliminus* (*Petræus*) *brevior*, sp. n., Mousson, J. de Conch. xxiv. pp. 34 & 139, pl. ii. fig. 5, alluvial deposits of the Upper Araxes.

*Buliminus* (*Chondrus*) *diffusus*, sp. n., *id. l. c.* p. 36, pl. ii. fig. 6, alluvial deposits of the Araxes. *Chondrus tricollis*, sp. n., Mousson, *tom. cit.* p. 141, pl. v. fig. 2, Azhuz, Transcaucasia. *C. sagax* (Frivaldszki) var. *destituta*, id. *l. c.* p. 142, Mastaza, Transcaucasia.

[*Glessula.*] Seven species of "*Achatina*" figured by Hanley & Theobald, Conch. Ind. pt. viii. on pls. clv, clvi. & clix.

*Cionella lubrica* (Müll.) var. *pfeifferi*, 10 mm. long, aperture only 3; Weinland, Weicht. schwäb. Alb, p. 74, pl. iv. fig. 4 [probably a scalarid monstrosity].

*Cæcilianella liesvillii* and *anglica* (Bourg.) = *acicula* (Müll.); Gloyne, Q. J. Conch. 1876, p. 133.

*Azeca nouletiana* (Dupuy) a variety, and *mabilliana* (Pagot), not even a variety, of *tridens* (Pulteney); *id. ibid.*

[*Tornatellina*] *Lamellaria perforata*, sp. n., Liardet, P. Z. S. 1877, p. 101, pl. v. fig. 8, Taviuni, Fiji Islands; the living animal figured.

*Achatinella* (*Leptachatina*) *turgidula*, *costulosa*, *balteata*, *tenebrosa*, *lævis*, *antiqua*, and (*Amastra*) *sphærica* and *rugulosa* (all of Pease, 1870), from Kanai, figured by H. Crosse, J. de Conch. xxiv. pp. 95–99, pls. i. figs. 4 & 5, iii. figs. 4–6, iv. figs. 4–6.

*Carelia bicolor* (Jay): jaw costate, radula as in *Laminella* and *Leptachatina*, genitals with a long narrow accessory organ, perhaps a dart sac or prostate gland. Binney, P. Ac. Philad. 1876, pp. 185–187, pl. vi. figs. G, CC & O.

*Stenogyra calabarica* (Pfr., as *Achatina*), *S. retifera*, *oleata*, *pileata*, and *buchholzi*, spp. nn., and *S. angustior* (Dohrn); Martens, MB. Ak. Berl. 1876, pp. 260–262, pl. iii. figs. 5–17, Bonjongo, Camaroon Mountains.

*Stenogyra* (*Opeas*) *octonula*, sp. n., Weinland, Mal. Bl. xxiii. pp. 171 & 232, pl. ii. figs. 7 & 8, Hayti.

[*Stenogyra*] *Bulimus* (*Prosopeas*) *roepstorfi*, sp. n., and *achates*, new name for *Stenogyra achatinacea* (Pfr.), with several varieties; Mörch, J. de Conch. xxiv. pp. 358 & 359, Nicobar Islands.

*Rhodea* (H. & A. Adams) is acknowledged as a distinct genus, which should be placed near *Stenogyra* and the known species enumerated as follows:—*R. pfeifferi*, new name for *Achatina californica* (Pfr.), inhabiting New Granada and not California, *gigantea* (Mouss.), and *wallisiana* (Dohrn), both also from New Granada, anatomy not yet known; Crosse, J. de Conch. xxiv. pp. 5–24, pl. i. figs. 1–3.

*Balea carinata* (A. Adams); Kobelt, JB. mal. Ges. iii. p. 34, pl. i. fig. 5, Japan.

*Clausilia*. The numerous Dalmatian species are examined and most of them redescribed by Küster, Ber. Ges. Bamb. x., also published separately. The author gives a general historical introduction with distinctive specific observation, following chiefly the arrangement of

A. Schmidt; the following are new:—*C. grossa* (Ziegler), p. 9, *incisa*, p. 20, *dotzaueri*, p. 21, *sorex*, p. 25, *kobeltiana*, p. 43, *maritima* (Kleciach, MS.), *hiatula*, p. 54, *adcena*, p. 55, *parthenia*, p. 93, *longicollis*, p. 95, *sebenicensis* (Vidovich, MS.), p. 104, *angistoma* = *lævissima* var., in Rossmässler, Iconogr. fig. 716, p. 113, *helenæ* (Kleciach), p. 118, *divergens* (Kleciach), p. 124, *opaca* (Ziegler), p. 125, *angusticollis* (Kleciach), p. 128, *rutila*, p. 131, all from Dalmatia, and *minuscula* (Parr.), p. 92, from Transcaucasia.

*Clausilia dubia* (Drap.) and *cruciata* (Stud.) distinguished by the surface being reticulated in the former and costulated in the latter; Weinland, Weicht. schwäb. Alb, p. 91.

*Clausilia dubia* var. n. *sordellii*; Adami, Moll. terr. di Brescia e Bergamo, p. 66, pl. i. figs. 10–13, Val Camonica. *C. spreaffei*, Pini, Bull. mal. Ital. (2) i. p. 164, Valtellina.

*Clausilia aurigerana*, sp. n., Fagot, Mollusques de la haute vallée d'Ambus, 1875 (not seen by the Recorder), Pyrenees.

*Clausilia itala* (Martens); on its varieties in Lombardy, Pini, Moll. terr. di Esino, pp. 88–91.

*Clausilia blanci* and *thebana* (Blanc, MS.), Bœotia, *osculans*, Attica, *messenica*, Messina, spp. nn., E. v. Martens, JB. mal. Ges. iii. pp. 340–343, pl. xii. figs. 4–7.

*Clausilia* (*Alinda*) *fusorium*, p. 41, pl. ii. fig. 8, Valley of the Rheon, Mingrelia; *C.* (*Marpessa*) *raddei* (Sievers, MS.), p. 43, pl. iv. fig. 3, Mount Schambodel, at a height of 6000 feet, south of Achalzich; *C.* (*Mentissa*) *acuminata* and (*Alinda*) *griseo-fusca*, pp. 144 & 145, pl. v. figs. 4 & 5, Tabizhuri, Transcaucasia: Mousson, J. de Conch. xxiv. spp. nn. *C. acrolepta*, sp. n., Martens, JB. mal. Ges. iii. p. 370, Russian Armenia [= *acuminata*, Mousson, *suprà*, in April of the same year].

*Clausilia ducalis* and var. *reiniana*, p. 152, pl. v. figs. 7 & 8, *nipponensis*, p. 275, pl. viii. figs. 3 & 4, Kobelt, JB. mal. Ges. iii.; *C. bilabrata* and *kobensis*, E. Smith, Q. J. Conch, 1876, pp. 120 & 122; *C. platydera*, *interlamellaris*, and *validiuscula*, Martens, JB. mal. Ges. iii. pp. 362 & 363: spp. nn., all from Japan. Remarks on the various groups of Japanese *Clausiliæ*; Martens, *l. c.* pp. 360 & 361.

*Clausilia*: one species figured by Hanley and Theobald, Conch. Ind. pt. viii. pl. clix.

*Pupa*. 165 species figured by Sowerby in the continuation of Reeve's Conch. Icon. pts. 326–329, pls. iii.–xix. 10 species by Hanley & Theobald, Conch. Ind. pt. viii. pls. clvi. & clx.

*Pupa*: plaits on the roof of the aperture, analogous to the lamella spiralis in *Clausilia*, observed in some species; Küster, Ber. Ges. Bamb. x. (1875) p. 54.

*Pupa baillensis*, sp. n., Dupuy, Revue agricole et horticole du Gers, 1873 (also as a separate pamphlet, "Note sur une espèce de Maillot," 4 figs., pl.).

*Pupa* (*Pupilla*) *superstructa*, p. 37, pl. ii. fig. 7, Lailasch, Transcaucasia, and *micula*, p. 40, Mahmoutli, Transcaucasia, spp. nn., and *P.* (*P.*) *signata* (Mouss.) var. n. *cylindrica*, p. 39, Krasnovodsk; Mousson, J. de Conch. xxiv.

*Pupa edentula* (Drap.); Weinland, Weicht. schwäb. Alb, p. 83, pl. iv. fig. 5.

*Edentulina*, subg. n. of *Pupa*, type *P. edentula* (Drap.); Clessin, Deutsche Excursionsmolluskenfauna, p. 208 [pre-occupied by Pfeiffer for a subgenus of *Eunea*, and = *Isthmia*, Gray, 1840].

*Pagodulina*, subg. n. of *Pupa*, type *P. pagodula* (Desm.); *id. l. c.* p. 198 [= *Pagodina*, Stabile, 1864].

*Vertigo* (*Isthmia*) *clavella*, sp. n., Reinhardt, JB. mal. Ges. iii. p. 368, Transcaucasia.

*Pupa* (*Vertigo*) *pygmæa* var. *nitidula*, Mousson, J. de Conch. xxiv. p. 143, Tabizhuri, Transcaucasia.

*Pupa* (*Vertigo*) *arctica* (Wallenberg) var. n. *extima*, Westerlund, Nachr. mal. Ges. 1876, p. 99, shores of Yenisei River, 64° N. lat.

*Pupa muscorum* var. n. *lundstræmi*, id. *l. c.* p. 98, Siberia, shores of the Yenisei River, between 61° and 69° N. lat.

*Pupa* (*Pupilla*) *interrupta*, sp. n., Reinhardt, JB. mal. Ges. iii. p. 367, Borsshom, Transcaucasia.

*Pupa* (*Vertigo*) *rossiteri*, sp. n. (= *strangei* var., Cox, Austral. Landsh. pl. xiv. fig. 18 A), Brazier, P. Linn. Soc. N. S. W. i. p. 18, N. S. Wales.

## GONIOGNATHA.

[*Placostylus*] *Bulimus koroensis* (Garratt) = *kantavuensis* (Crosse), lives on the island Koro, not on Kantavu; Schmeltz, J. Mus. Godeffr. xii. p. 161, and Verh. Ver. Hamb. ii. pp. 215 & 216.

*Bulimus* (*Eumecostylus*) *macfarlandi*, sp. n., Brazier, *l. c.* p. 4, Solomon Archipelago.

*Bulimulus dormani* (Binney), jaw, radula, and genitalia, *B. edwardsi* (Mor.), jaw and radula; Binney, P. Ac. Philad. 1876, pp. 190 & 191, pl. vi. figs. M, N, HH, & DD.

*Bulimulus jonasi* (Pfr.), specimens from Costa Rica, and on *B. costaricensis* (Pfr.); Martens, JB. mal. Ges. iii. p. 257.

*Bulimulus stelzneri* (Dohrn, 1875); Pfeiffer, Novitat. Conch. p. 164, pl. cxxxvii. figs. 8–10, Argentine States.

*Macroceramus johannis* (Pfr., 1874); Pfeiffer, Novitat. Conch. v. p. 27, pl. cxlii. figs. 7 & 8, a variety, figs. 9 & 10, Porto Rico.

*Cylindrella innata* and *kraussiana*, spp. nn., Weinland, Mal. Bl. xxiii. pp. 170 & 171, 230 & 231, pl. ii. figs. 1–4, Hayti.

*Cylindrella* (*Gongylostoma*) *polygyrella*, sp. n., Martens, JB. mal. Ges. iii. p. 261, pl. ix. fig. 8.

*Amphibulima patula* (Brug.), living specimens found on the island Marie Galante by H. Mazé, J. de Conch. xxiv. pp. 394–396.

## ELASMOGNATHA.

*Succinea putris* (L.) and *pfeifferi* (Rossm.); several anatomical differences pointed out by M. Schepwan, Ned. T. D. ii. pt. ii.

*Succinea oblonga* (Drap.) lives in dry meadows; Weinland, Weicht. schwäb. Alb, p. 95.

*Succinea turgida*, sp. n., Westerlund, Nachr. mal. Ges. 1876, p. 99, shores of Yenisei River, 65°–70° N. lat.

*Succinea subgranosa* and *ceylanica* (Pfr.), Hanley & Theobald, Conch. Ind. pt. viii. pl. clviii. figs. 9 & 10.

*Succinea ovalis* (Gould); jaw and radula, Binney, P. Ac. Philad. 1876, p. 191, pl. vi. fig. A.

*Succinea magellanica* (Gould), *meridionalis* (Orb.) = *burmeisteri* (Döring, 1873) with var. *cornea* (Döring) = *oblonga* (Orb., *nec* Drap.), and *S. rosarinensis* (Döring) = *meridionalis* (Strobel, *nec* Orb.), Argentine States, shells and jaws described by Döring, Bol. Ac. Cordova, i. pp. 305–309.

[*II*] *Omalonyx unguis* (Fér.), and *convexa* (Martens) = *unguis* of Döring 1873 & 1874; jaws described, Döring, Bol. Ac. Cordova, ii. pp. 302–304.

*Amphibulima felina*, sp. n., Lechmere Guppy, P. Sc. Ass. Trinidad, 1872, Trinidad; is a species of *Homalonyx* according to H. Crosse, J. de Conch. xxiv. p. 307.

## Veronicellidæ.

*Veronicella pleuroprocta*, sp. n., vent placed obliquely and laterally at the hinder end of the animal; Martens, MB. Ak. Berl. 1876, p. 268, pl. v. figs. 2–5, Gold Coast.

*Vaginula rodericensis*, sp. n., E. Smith, Ann. N. H. (4) xvii. p. 405, Rodriguez Island.

*Vaginulus australis*, sp. n., Heynemann, J. Mus. Godeffr. xii. p. 159, pl., Gayndah, Burnett River, Queensland.

## Onchidiidæ.

*Onchidella borealis* (Dall); jaw and radula described by Binney, P. Ac. Philad. 1876, p. 184, pl. vi. figs. BB & EE.

## Auriculidæ.

L. Pfeiffer has given, at the end of his Monogr. Pneum. suppl. iii. pp. 298–375, a supplement to his former Monograph of *Auriculidæ*, published in 1859, containing descriptions of all species which have since been published, and completing quotations and synonymy. He enumerates:—*Otina*, 3 species; *Camptonyx*, 1; *Melampus*, 119; *Marinula*, 10; *Pedipes*, 11; *Pythia* (*Scarabus*), 48; *Plecotrema*, 27; *Cassidula*, 27; *Auricula*, 44; *Alexia*, 21; *Blauneria*, 3; *Leuconia*, 7; *Cœlostele*, 1; and *Carychium*, 15.

*Pedipes jouani* (Montrouzier, 1862) = *subglobosus* (Garrett, 1873); P. Fischer, J. de Conch. xxiv. p. 149.

*Plecotrema souverbiei* (Montrouzier, 1862) = *turrita* (Garrett, 1873); *id. ibid.*

*Auricula reiniana*, sp. n., Kobelt, JB. mal. Ges. iii. p. 151, pl. v. figs. 3–6, Interior [?] of Japan. [Probably only a variety of *A. judæ*, L.]

*Autonoe riparia* (Guppy, 1868) = *Auricula pellucens* (Menke, 1868), according to Lechmere Guppy himself, P. Sc. Ass. Trinidad, 1872.

*Alexia myosotis* var. n. *hiriarti*, Folin & Bérillon, Bull. Soc. Bayonne, 1875, Biarritz, at the light-house.

## Limnæidæ.

Troschel states, in opposition to Siebold (Zool. Rec. xii. p. 193), that there is a limited respiration in the *Limnæidæ* during the winter, and that water is not used instead of air for that purpose. SB. Ver. Rheinl. 1876, p. 82.

*Limnæa stagnalis* (L.) and *palustris* (Müll.); remarkable varieties observed at Hamburg by H. Strebel, Verh. Ver. Hamb. ii. pp. 267–285, pls. i. & ii. *L. palustris*, a white variety found at Southport; E. Collier, Q. J. Conch. 1876, p. 139. Banded varieties of *L. palustris* and *auricularia* (L.), mentioned by Issel, Bull. mal. Ital. (2) ii. pp. 50 & 51 [probably due to a slight damage of the periostracum].

*Limnæa peregra* (Müll.), different varieties from Lombardy, including var. n. *apricensis*; Adami, Moll. terr. e. fluv. di Brescia e Bergamo, p. 69, pl. i. figs. 20 & 21. Var. from the Jura chain of Southern Germany; Weinland, Weicht. schwäb. Alb, p. 97, pl. iv. fig. 7.

*Limnæa truncatula* (Müll.) var. n. *wittlingensis*, 11 mm. long, found in a pond which had existed only a few years; Weinland, *l. c.* pp. 17 & 98, pl. iv. fig. 6.

*Limnæa microcephala* (Küster)? = *ovata* (Drap.), var., from Transcaucasia, described by Mousson, J. de Conch. xxiv. pp. 146 & 147.

*Limnæa goodwini*, sp. n., E. Smith, Q. J. Conch. 1876, p. 125, Japan [Probably = *pervia* (Martens)].

*Limnæa brevicauda* (Sow.), Hanley & Theobald, Conch. Ind. pt. viii. pl. clviii. fig. 2, Kashmir.

*Physa* (*Isidora*?) *sibirica*, sp. n., Westerlund, Nachr. mal. Ges. 1876, p. 100, Yenisei River, 71° N. lat.

*Physa* (*Aplexa*) *hypnorum* (L.) var. n. *polaris*, id. ibid., same locality.

*Camptoceras* (Bens.), the three known species, figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clviii. figs. 1–6.

*Planorbis vorticulus* (Troschel), *P. charteus* (Held) = *bavaricus* (Westerlund), and *P. acies* (Mhlfld.), critical notes; and variability of *P. vortex* (L.) and *dispar* (Westerlund) = *contortus* (L.) var.; Clessin, J B. mal. Ges. iii. pp. 262–275.

*Planorbis centro-gyratus* (Westerlund) = *rotundatus* (Poiret), var.; Gredler, Nachr. mal. Ges. 1876, p. 19. This statement retracted; *id. l. c.* p. 76. *P. vorticulus* (Troschel, Clessin) provided with a membranaceous fringe at the keel; Schepman, *tom. cit.* p. 107.

*Planorbis crista* (L.) var. n. *lævigata*, Adami, Moll. terr. e fluv. di Brescia e Bergamo, p. 74, Lago di Capolago, Lombardy. *P. villæ*, sp. n., *id. l. c.* p. 76, pl. i. figs. 14–16, Edolo, Val Camonica, Lombardy, allied to *rotundatus* (Poir.).

*Planorbis micromphalus* (Fuchs), hitherto only known from tertiary

beds, found in apparently recent state in the Caspian Sea; O. Grimm, Kaspinskoe more i ego fauna, i. p. 157, pl. vi. fig. 9.

*Planorbis infra-liratus*, sp. n., Westerlund, Nachr. mal. Ges. 1876, p. 101, Yenisei River, 63° N. lat.

*Planorbis mauritianus*, sp. n., Morelet, J. de Conch. xxiv. p. 91, pl. iii. fig. 7, Mauritius.

*Planorbis*, 3 species; Theobald & Hanley, Conch. Ind. pt. viii. pl. cli.

*Planorbis meridionalis*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 20, Tasmania.

*Planorbis weinlandi*, sp. n., Pfeiffer, Mal. Bl. xxiii. pp. 172 & 232, pl. ii. figs. 9–11, Hayti.

*Planorbis bavayi* (Crosse, 1875), J. de Conch. xxiv. p. 388, pl. xi. fig. 3, Guadeloupe.

*Choanomphalus*; radula like that of *Planorbis*. *C. valvatoides* and *schrencki*, spp. nn., Lake Baikal; *C. maacki* (Gerstf.) in the same lake in depths of 100–300 mètres. Dybowski, Mém. Ac. Pétersb. (7) xxii. No. 8, pp. 52–60, pls. ii. figs. 11–33, vii. figs. 1–6.

*Ancylus troscheli*, sp. n., and *sibiricus* (Gerstf.), shell elevated as in *A. fluviatilis*, intestinal, respiratory, and genital orifices on the right side; Lake Baikal. *Id. l. c.* pp. 61–65, pls. iv. figs. 35–38, vii. figs. 11–15.

*Gundlachia crepidulina*, sp. n., Lechmere Guppy, P. Sc. Ass. Trinid. 1872, Trinidad.

### Siphonariidæ.

*Siphonaria denticulata* (Q. G.) var. n. *tasmanica* and *S. diemenensis* (Q. G.) described from living Tasmanian specimens by J. E. T. Woods, P. R. Soc. Tasm. 1876, pp. 14–18.

### Amphibolidæ.

*Ampullarina minuta*, sp. n., J. E. T. Woods, *l. c.* p. 27, Tasmania.

## *PULMONATA OPERCULATA.*

Pfeiffer has completed the third Supplement to his Monograph, bringing up the number of described species of *Helicina* to 343, *Georissa* to 12, *Chondrella* to 3; fresh additions are given, pp. 375–421; a review of the adopted genera is also published by him in Mal. Bl. xxvi. pp. 77–86, 143–170.

### Cyclophoridæ.

*Cyclotus quitensis* (Pfr.) var. n. *costaricensis*, Martens, JB. mal. Ges. iii. p. 254.

*Cyclotus campanulatus* (Martens), operculum; *id. l. c.* p. 359, Japan.

*Pterocyclus*; 3 species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. cxlii.

*Cyathopoma ceylonicum* and *vitreum* (Beddome), *iid. l. c.* pl. cxlv. figs. 8 & 9.

*Cyclophorus*; 12 species figured, *iid. l. c.* pls. cxliii.–cxlv.

*Cyclophorus* (*Craspedotropis*) *reepstorfi* and *polynema*, spp. nn., Mörch, J. de Conch. xxiv. p. 361, Nicobar Islands.

*Leptopoma*; 3 species figured, Hanley & Theobald, *l. c.* pl. cxlii.

*Logochilus hispidus*, sp. n., Liardet, P. Z. S. 1876, p. 101, pl. v. fig. 10, Gamia, Fiji Islands: living animal figured [but without operculum].

*Alycæus expatriatus* (Blanf.) and *kurzianus* (Theob.) figured, Hanley & Theobald, *l. c.* pl. cxlv. figs. 1–3.

## Pupinidæ.

*Pupina* 32, *Hargravesia* 1, *Callia* 5, *Rhegistoma* 9, *Cataulus* 18, *Arinia* 1, *Pollicaria* 3, *Megalopastoma* 23, and *Rhaphaulus* 4 species, figured by Sowerby in the continuation of Reeve's Conch. Icon. pts. 324–327, 10 plates.

*Megalomastoma hialmarsoni* (Pfr., 1875), Pfeiffer, Novitat. Conch. v. pl. cxlii. figs. 11–14.

*Tomocyclus gealii* (Crosse & Fischer), Kobelt, JB. mal. Ges. iii. p. 278, Central America.

*Heterocyclus*: see *Valvatidæ*, suprà, p. 32.

*Cataulus*: 6 species figured by Hanley & Theobald, *l. c.* pls. cxlv. & cxlvi

*Pupina japonica* (Martens), Kobelt, JB. mal. Ges. iii. p. 35, pl. i. fig. 6, Japan. [Not *japonica*, Martens, but *rufa*, A. Ad.]

*Pupina macleayi*, Queensland, and *angasi*, New Guinea, spp. nn., Brazier, P. Linn. Soc. N. S. W. i. p. 5.

## Diplommatinidæ.

*Diplommatina*. An historical sketch of the knowledge of this genus, by L. Pfeiffer, Mal. Bl. xxiii. p. 15.

*Diplommatina taviensis*, sp. n., Liardet, P. Z. S. 1876, p. 101, pl. v. fig. 9, Taviuni, Fiji Islands; the living animal described and figured.

*Diplommatina*: 16 species figured by Hanley & Theobald, *l. c.* pls. cxl. & cxli.

*Hypselostoma dayanum* (Stoliczka); *iid. l. c.* pl. cxlvii.

## Cyclostomatidæ.

*Cyclostoma dupontianum*, p. 86, Madagascar, *defloratum*, p. 88, pl. iii. figg. 3, Bourbon, spp. nn, with notes on the operculum of some other species, pp. 87–90; Morelet, J. de Conch. xxiv.

*Cyclostoma hildebrandti*, sp. n., Martens, JB. mal. Ges. iii. p. 250, pl. ix. fig. 6, Joanna, Comoro Islands.

*Cyclostomus caspicus*, sp. n., Mousson, J. de Conch. xxiv. p. 46, pl. iv. fig. 2, Lenkoran.

*Cyclostoma* (*Tudora*?) *kaziba*, sp. n., Weinland, Mal. Bl. xxiii. pp. 173

& 234, pl. ii. figs. 17 & 18, Hayti; ? sub-fossil; ? = *basicarinatum* (Pfr.).

*Chondropoma*? *scripturatum*, sp. n., Weinland, *l. c.* pp. 173 & 233, pl. ii. figs. 15 & 16, Hayti.

*Omphalotropis viticnsis*, sp n., Liardet, P. Z. S. 1876, p. 101, pl. v. fig. 11, Taviuni, Fiji Islands; living animal figured [without operculum].

*Omphalotropis distermina* (Bens.), figured by Hanley & Theobald, *l. c.* pl. cxlv. fig. 10.

*Pomatias canestrinii*, sp. n., Adami, Moll. Brescia e Bergamo, p. 79, pl. i. figs. 17 & 18, Monte Presolano, at a height of 1800–2350 mètres.

### Truncatellidæ.

*Truncatella hait[i]ensis*, sp. n., Weinland, Mal. Bl. xxiii. pp. 172 & 233, pl. ii. figs. 12–14, Hayti.

### Helicinidæ.

*Helicina anozona*, sp. n., Martens, JB. mal. Ges. iii. p. 261, pl. ix. fig. 7, Guatemala.

*Helicina bicincta* (Gloyne, 1872) redescribed and figured by the author, J. de Conch. xxiv. p. 159, pl. v. fig. 5, Brazil.

*Helicina* (*Pachystoma*) *dunkeri* (Zelebor) and *zelebori* (Pfr.) redescribed by Mörch, J. de Conch. xxiv. pp. 363, 364, & 366, Nicobar Islands.

*Helicina* (*Trochatella*) *sophiæ*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. p. 4, Solomon Archipelago.

*Bourciera*: internal septa of the whorls absorbed as in other *Helicinidæ*: Bland, Q. J. Conch, 1876, p. 128.

### Proserpinidæ.

The known species of *Proserpinacea*, viz., 2 of *Ceres*, 7 of *Proserpina*, 1 *Proserpinella*, and 1 *Cyane*, enumerated, and their literature since 1866 quoted by L. Pfeiffer, Monogr. Pneum., suppl. iii. pp. 295–298.

### Solenoconchæ.

*Dentalium tasmaniensis*[*-se*] and *weldiana*[*-num*], spp. nn., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 12, Tasmania.

## LAMELLIBRANCHIA.

### Pholadidæ.

*Xylophaga*, 2, and *Navea*, 1 species, figured by Sowerby, in the continuation of Reeve's Conch. Icon. pts. 326 & 327.

*Teredo*, 19 species figured, *id. l. c.* *T. megathorax* (Gould, MS.), fig. 8, North America, and *campanulata* (Desh., MS.), locality unknown, are apparently new.

### Gastrochænidæ.

*Fistulana*: 3 species figured by Sowerby, *l. c.*

*Gastrochæna*: 29 species figured, *id. l. c.*; *G. difficilis*, St. Thomas, and *gigantea* (Desh., MS.), fig. 5, locality unknown, are apparently new.

*Gasterochaena* [sic] *tasmanica*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 31, Tasmania.

### Corbulidæ.

*Poromya rotunda*, sp. n., Jeffreys, Ann. N. H. (4) xviii. p. 494, N. Atlantic, 1450 fathoms.

*Pecchiolia gibbosa* and *tornata*, spp. nn., *id. ibid.*, N. Atlantic, 1450–1785 fathoms.

*Neæra striata*, *exigua*, *notabilis*, *circinata*, *papyria*, and *angularis*, spp. nn., *id. ibid.*, N. Atlantic, 1450–1785 fathoms.

### Tellinidæ.

*Psammobia circe*, sp. n., Mörch, J. de Conch. xxiv. p. 373, Tortola.

*Fischeria truncata*, Mungo Creek, mouth of Camaroon River, and *tumida*, Loango coast, spp. nn., Martens, MB. Ak. Berl. 1876, p. 271, pl. v. figs. 6–8, 9–11.

### Paphiidæ.

*Semele warburtoni*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 30, Tasmania.

### Mactridæ.

*Mactra targionii* (Aradas & Benoit), probably = *lisor* (Desh.), Aradas & Benoit, Conch. viv. Sic., and Kobelt, JB. mal. Ges. iii. p. 281.

### Veneridæ.

*Venus casina* (L.): on its varieties, see Monterosato, Poche note, &c., p. 10.

*Chione stutchburii* (Gray), from Bass's Straits, J. E. T. Woods, *l. c.* p. 31.

### Cyrenidæ.

*Cyrena*. 41 species figured by Sowerby in the continuation of Reeve's Conch. Icon. pts. 330 & 331. *C. minor* (Prime, MS.), fig. 8, locality unknown, and *caledonica* (Gassies, MS.), fig. 40, New Caledonia, are apparently new; *C. veneriformis*, new name for *Batissa fuscata* (Prime), fig. 11.

S. Clessin commences a monograph of this genus in Küster's new edition of Chemnitz, pt. 258 (vol. ix.), describing and figuring 13 known

species; *C. solida* (Phil.) = *nicaragua* (Prime), *C. rugulosa* (Mouss., MS.), sp. n., p. 106, pl. xv. figs. 1 & 2, Cape York, N. Australia.

*Cyrena* (*Corbicula*) *fluminalis* var. n. *oxiana*, 37 mm. high, dry bed of the Amu Daria; Martens, JB. mal. Ges. iii. pp. 337.

*Corbicula*: 3 species figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clv.

*Spherium*: 47 species figured by Sowerby, *l. c.* pts. 330 & 331. *S. lenticulare*, fig. 6, and *rugosum* (Whitmore), fig. 16, locality unknown, *madagascariense* (Tristan, MS.), fig. 22, Madagascar, *eburneum* (Anthony, MS.), fig. 25, United States, *borneense*, fig. 42, Borneo, *elongatum*, fig. 43, locality unknown, *mormonicum*, fig. 44, Great Salt Lake, *capense* (*nec* Krauss), fig. 45, South Africa, and *translucidum*, fig. 46, Australia, are apparently new.

S. Clessin commences a monograph of this genus also in Küster's new edition of Conchylien-Cabinet by Chemnitz, pts. 257 & 258 (vol. ix.); besides some well-known species of Europe and North America he describes and figures the following:—*S. oblongum*, sp. n., = *Cyclas rivalis*, Dupuy & Brand, = *S. corneum* var., Bourguignat, France, p. 83, pl. ix. figs. 25–27; *westerlundi* (Clessin) = *corneum* var. *nucleus* (Westerlund), Northern Sweden, p. 84, pl. x. figs. 6–8; *firmum* (Clessin), Denmark and Northern Germany, p. 84, pl. x. figs. 9–11; *mamillanum* (Westerlund), Sweden, p. 85, pl. x. figs. 12–14; *duplicatum* [sic] (Clessin), lakes of Southern Bavaria, p. 86, pl. xi. figs. 4–6; *draparnaldi* (Clessin) = *Cyclas lacustris* (Drap.) = *ovalis* and *consobrina* (Férussac), throughout Europe, p. 87, pl. xi. figs. 7–9; *galitzinianum* (Clessin), Oka River, Russia, p. 88, pl. xi. figs. 15–17; *sandbergeri*, sp. n., Würzburg, Germany, p. 89, pl. xii. figs. 13–15; *obense*, sp. n., mouth of the Ob River, p. 90, pl. xi. figs. 12–14; *capense* (Krauss, as *Cyclas*), S. Africa, p. 93, pl. x. figs. 3–5; *pisidioides* (Gray), England, p. 94, pl. x. figs. 3–5; *fragile*, sp. n., Bremen, p. 95, pl. xi. figs. 18–20; *dickini*, sp. n., Frankfort, p. 96, pl. xii. figs. 18–20; *nitidum*, sp. n., Siberia, p. 98, pl. xii. figs. 9–11.

*Spherium lecinodis* [*-de*] and *nitidum*, spp. nn., Westerlund & Clessin, Nachr. mal. Ges. 1876, p. 102, Yenisei River, 68° & 69° N. lat.

*Cyclas indica* (Desh.), figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clv. fig. 9.

*Cyclas incurva*, sp. n., Lechmere Guppy, P. Sc. Ass. Trinid. 1872, Trinidad.

*Calyculina lacustris* var. n. *septentrionalis*, Clessin, *l. c.* p. 103, Yenisei River, 60°–69° N. lat.

*Pisidium*. S. Clessin has completed his monograph in Küster's new edition of Chemnitz, pts. 252–257 (vol. ix.); besides some American species already known from the works of Prime and Haldeman, the following are described and figured:—*Pisidium mirabile* (Whittemore, MS.) and *wheatleyanum*, spp. nn., both Massachusetts, pp. 49 & 57, pl. vi. figs. 1–3 & 19–21; *herminii* (Welwitsch, MS.), sp. n., p. 61, pl. vii. figs. 12–14, Sierra d' Estrella, Spain; *dorbignii*, new name for *Cyclas pulchella* (d'Orb.), Maldonado, p. 62, pl. vii. figs. 3 & 4; *argentinum*, Orb. (*Cyclas*), Monte Video, p. 63, pl. x. figs. 1 & 2; *novo zealandicum*

(Prime), p. 65, pl. vii. fig. 11, New Zealand; *sibiricum* and *nordenskioldi* (Westerlund), N.W. Siberia, pp. 66 & 67, pl. vii. figs. 15–17 & 18–20; *foreli* (Clessin), Lake of Constance and Geneva, below 20 mètres, p. 68, pl. viii. figs. 1–3; *occupatum* (Clessin), Lake of Neuchatel, 65 mètres, p. 69, pl. viii. figs. 10–12; *urinator* (Clessin), Lake of Zurich, 28–50 mètres, p. 70, pl. viii. figs. 16–18; *profundum* (Clessin), Lake of Geneva, below 60 mètres, p. 70, pl. viii. figs. 13–15; *demissum* (Clessin), p. 71, pl. viii. figs. 19–21, Lake of Constance, below 20 mètres; *ovatum*, sp. n., p. 72, pl. viii. figs. 22–24, Schwarzwald and Bairischer Wald, S. Germany; *punctiferum* (Guppy), p. 74, pl. viii. figs. 7 & 8, Trinidad. Of the above species, *P. demissum*, *foreli*, *urinator*, *occupatum*, and *profundum*, are described as new by Clessin, in Bull. Soc. Vaud. xiv. pp. 234–243, pl. iii.

*Pisidium pusillum* (Gm.) observed creeping in damp moss, 6–20 paces from water; D. Weinland, Weicht. schwäb. Alb, pp. 15 & 111, pl. iv. figs. 14–16.

*Pisidium sordellianum*, sp. n., Pini, Moll. terr. di Esino, p. 133, Esino, Lombardy.

*Pisidium sibiricum*, *boreale*, and *mucronatum*, spp. nn., Clessin, Nachr. mal. Ges. 1876, p. 103, Yenisei River, 60°–69° N. lat.

*Pisidium clarkeanum* (Nevill), figured by Hanley & Theobald, Conch. Ind. pt. viii. pl. clv. fig. 10.

## Cardiidæ.

*Cardium ornatum*, sp. n., Sowerby, P. Z. S. 1876, p. 755, pl. lxxv. fig. 2, Hongkong.

*Cardium edule* (L.) var. *rusticum* (Lam.), in the Caspian Sea, rather small and sharply angulated; Grimm, Kaspinskoe more i ego fauna, i. pp. 122–134, with many measurements, pl. vi. fig. 1.

*Donaciocardium*, g. n. for *Cardium donaciforme* (Schröter) [Chemnitz] and *australiense* [Reeve]: Vest, JB. mal. Ges. ii. (1875), p. 322, and iii. pp. 290 & 291, pl. x. fig. 1 [= *Hemidonax*, Mörch, Mal. Bl. 1870, p. 121].

*Didacna*, *Monodacna*, *Adacna*: their affinity to *Cardium* discussed and the known species enumerated; Vest, JB. mal. Ges. iii. pp. 292–317. *M. caspia* (Eichw.), *colorata* (Eichw., as *Adacna*), *vitrea* (Eichw.), and *læviuscula* (Eichw.) figured, pl. x. figs. 2–4.

*Cardium* [*Didacna*] *crassum* (Eichw.) and *trigonoides* (Pall.), in the Caspian Sea, connected by intermediate forms; Grimm, *l. c.* pp. 126–131 pl. vi. fig. 2.

*Cardium* [*Monodacna*] *caspium* (Eichw.): several measurements of it; *id. l. c.* pp. 134–136.

*Adacna vitrea* (Eichw.): *id. l. c.* p. 142.

## Lucinidæ.

*Lucina schrammi*, sp. n., Crosse, J. de Conch. xxiv. p. 166, Guadeloupe; near *L. philippiana* (Reeve).

*Diplodonta torelli*, Jeffreys, Ann. N. H. (4) xviii. p. 493, Spitsbergen; *D. lateralis*, E. Smith, *op. cit.* xvii. p. 405, Rodriguez Island; *D. tasmanica*, J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 31, Tasmania: spp. nn.

*Axinus cycladius* (S. Wood, as *Kellia*) = *Poromya subtrigona* (Jeffr. 1858), *A. cumyarius* (Sars) and *A. incrassatus*, sp. n., North Atlantic, 1100–1250 fathoms; Jeffreys, Ann. N. H. (4) xviii. pp. 491 & 492.

## Kelliidæ.

*Kellia pumila* (S. Wood) in the recent state at Sciacca, Southern Sicily; Monterosato, Poche note, &c., p. 9.

*Kellia symmetros*, sp. n., Jeffreys, Ann. N. H. (4) xviii. p. 491, N. Atlantic, 1750 fathoms.

*Kellia atkinsoni*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 30, Tasmania.

*Montacuta dawsoni* (Jffr.) found alive in various parts of the N. Atlantic, 5–300 fathoms; Jeffreys, *l. c.* p. 490.

*Lepton parasiticum*, sp. n., Dall, Bull. U. S. Mus, No. 3, p. 45, Kerguelen Island, living on *Tripylus*.

## Galeommatidæ.

*Scintilla eburnea*, sp. n., Mörch, J. de Conch. xxiv. p. 373, St. Thomas, West Indies.

## Astartidæ.

*Astarte sulcata* (Dacosta) found at Sciacca; Monterosato, Poche note, &c., p. 10.

*Kelliella* (O. Sars) = *Isocardia cor* (L.), fry; Jeffreys, *l. c.* p. 494.

*Gouldia tasmanica*, sp. n., Woods, *l. c.*, p. 30, Tasmania.

## Unionidæ.

*Unio fiscallianus* (Kleciach), Dalmatia, *aradæ* (Phil.), Sicily, *blauneri* (Shuttl.), Lake of Lugano, *aleroni* (Companyo), Pyrenees, *subreniformis* (Bourg.), Spain, *terminalis* (Bourg.), Jordan, *ksibianus* (Mouss.), Morocco, *vescoi* (Bourg.), Asia Minor, and *penchinatianus* (Bourg.), Catalonia; Kobelt, Iconogr. iv. pp. 60–67, pls. 114–119.

*Unio requieni* (Mich.) var. *corrosus* (Villa) and var. n. *sebinensis*, in the lake of Iseo, Lombardy; Adami, Moll. Brescia e Bergamo, pp. 87 & 88.

*Unio baudoni*, Lake Ondres, dept. Landes, and *moreletiana* [pre-occupied], Lake de la Négresse, dept. Basses Pyrénées, spp. nn., Folin & Berillon, Bull. Soc. Bayonne, 1875, pl.

The Chinese species of *Unio* described by Heude in J. de Conch. xxii. 1874 [Zool. Rec. xi. p. 187], are now figured by him in "Conchyliologie fluviatile de la province de Nanking," fasc. i. pl. 1. *Unio corderii*, new name for *heudei* (Bazin), pl. i. fig. 3; *U. affinis, scriptus, montanus, leleci, rochechouarti*, spp. nn., pls. iii., iv., & v., China. *U. bazini, triclavus,*

*fibrosus*, *spurius*, *microstictus*, *polystictus*, *modestus*, and *biesianus*, figured, *id. l. c.* fasc. ii. pls. ix.–xiv. *U. polyeticto-scriptus* and *scripto-polystictus*, believed to be hybrids; *id. l. c.* fasc. ii. pl. xiii. figs. 26 & 27. [These and some of the preceding may be varieties of *U. plumbeus*, Chemnitz (as *Chama*), = *nodulosus*, Wood, Reeve, known long ago.]

*Unio contortus* (Triquetra), Lea; *id. l. c.* pl. xv. figs. 31–33.

*Unio semialatus*, *crossii*, *comptus*, *anceps*, *fabagina*, and *broti*, spp. nn., Deshayes & Jullien, N. Arch. Mus. x. pp. 123–130, pls. vi. figs. 1–12, vii. figs. 1–6, Cambodia.

*Unio* (*Arconaia*) *delaportii*, sp. n., Crosse & Fischer, J. de Conch. xxiv. p. 327, pls. x. fig. 1, xi. fig. 5, Cambodia, province Compong-Soai.

*Unio*: 8 species figured by Hanley & Theobald, Conch. Ind. pt. viii. pls. cliv. & clv.

*Unio lunulatus* [script. *unulatus*], sp. n., Pratt, P. Davenp. Ac. i. pp. 167 & 168, pl. xxxi., Mississippi River, near Davenport, Iowa.

*Monocondylæa*. The 6 species established by Orbigny, with *M. lentiformis* (Lea), *pazi* (Lea), and *franciscana* (Morelet), all from South America, are described and figured by Clessin in the continuation of Küster's new edition of Chemnitz, *Anodonta*, &c., pp. 244–252, pls. lxxiv., lxxviii., & lxxix.

*Monocondylæa nankingensis*, sp. n., Heude, Conch. fluv. de Nanking, pl. iv. fig. 9, China.

*Pseudodon harmandi*, sp. n., Crosse & Fischer, J. de Conch. xxiv. p. 331, pl. x. fig. 2, Cambodia. *Monocondylæa tumida* (Morelet), Deshayes & Jullien, N. Arch. Mus. x. (1874) p. 117, pl. v. figs. 1–3, Mekong River, Cambodia; two specimens preserved in spirits are described, they exhibit specific but not organic or generic differences from *Unio* or *Anodonta*.

*Microcondylæa compressa* (Lea, *Monocond.*), Siam, *wheatleyi* (Lea), Malacca, *cumingi* (Lea), Malacca, *saulcii* (Bourg., *Unio*), Syria, *mouhotiana* (Lea), Siam, described and figured by Clessin in Küster's new edition of Chemnitz, pp. 258–261, pls. lxxx., lxxxii., lxxxiii. & lxxvi.; *Alasmodonta bonellii* (Fér.), *rhomboidea* (Lea), *planulata* (Lea), *vandembuschiana* (Lea), and *fragilis* (Mouss.), are also placed in this genus; *id. l. c.* p. 257.

*Margaritana spillmanni* (Lea), *alabamensis* (Lea), *elliotti* (Lea), *connasaugensis* (Lea), *etowahensis* (Lea), *elliptica* (Lea), *arcula* (Lea), *quadrata* (Lea), and *dehiscens* (Say) = *oriens* (Lea), all from North America, *tripolitana* (Bourguignat), Syria, *mardinensis* (Lea), Mesopotamia, described and figured by Clessin, *l. c.* pp. 264–274, pls. lxxx.–lxxxiii. & lxxxvi.

*Anodonta idrina* (Spinelli) and *debettana* (Martinati), Upper Italy; Kobelt, Iconogr. iv. pp. 67–69, pl. cxx. Pearl-bearing specimens of *Anodonta cygnea* (L.) and *variabilis* (Drap.), in the lake of Alice, Lombardy, Issel, Bull. mal. Ital. (2) ii. p. 51.

*Anodonta edulis* (Heude, 1874) Heude, Conchyl. fluv. de Nanking, pl. viii. fig. 18.

*Anodonta gibba* (Bens.), Martens, in Pfeiffer's Novitat. Conch. iv. p. 159, pl. cxxxvi. figs. 6 & 7, China.

*Anodonta sempervivens*, sp. n., Deshayes & Jullien, N. Arch. Mus. x. (1874) p. 120, pl. v. figs. 4 & 5, Cambodia; a specimen remained alive removed from the water for eight months [*cf.* Zool. Rec. xii. p. 136; this species scarcely differs from *A. exilis* (Lea)].

*Mycetopus* [?] *iridineus* (Heude, 1874); Heude, *l. c.* pl. viii. fig. 19, China.

*Columba* (Lea). Under this generic name, long pre-occupied by Linné in *Arca*, the 3 known species of *Leila*, viz., *blainvilleana* (Lea), *castelnaudi*, and *pulvinata* (Hupé), are described and figured by S. Clessin, *l. c.* pt. 248 (vol. ix.), pp. 252–255, pls. lxxxiv.–lxxxvi.

## Mytilidæ.

*Mytilus latus* (Lam.), var. n., and *M. crassus*, sp. n., J. E. T. Woods, P. R. Soc. Tasm. 1876, p. 29, Tasmania.

*Modiola albicosta* (Lam.), varr. nn. *polita* and *nebulosa*, id. *l. c.* p. 30, Tasmania.

*Kidderia*, g. n. Shell minute, byssiferous, concentrically sculptured; two minute cardinal teeth in each valve; ligament partially internal, attached to a more or less prominent process on the inner hinge-margin of each valve; pallial line simple; a single anterior muscular scar. *K. minuta*, sp. n., Kerguelen Island and Tierra del Fuego. *Modiolarca pusilla* (Gould) probably belongs also to this genus. Dall, Bull. U. S. Mus. No. 3, pp. 46 & 47.

*Crenella pellucida* (Jeffreys, 1859, as *Limopsis*) is not the young state of *C. rhombea*, but a distinct species, dredged also near Palermo at 30–90 mètres; Monterosato, Poche note, &c., p. 7.

*Idas*, g. n. Shell transversely oblong, thin, nacreous; ligament external, no cartilage, hinge toothless, hinge-plate crenulated on both sides of the beaks; shape resembling that of *Arca*. *I. argenteus*, sp. n., Atlantic, 900–1400 fathoms. Jeffreys, Ann. N. H. (4) xviii. p. 429.

*Dacrydium vitreum* (Holböll): living specimens from the Atlantic, 2435 fathoms, enclosed in an agglutinated case of ooze with *Globigerinæ*; *id. ibid.*

## Dreyssenidæ.

*Dreyssena polymorpha* (Pall.), *caspia* (Eichw.) = *Mytilus albus* (Siemaschko), and *D. rostriformis* (Desh.), all living in the Caspian Sea, the two latter figured; Grimm, Kaspinkoe more i ego fauna, i., pp. 143–147, pl. vi. figs. 4 & 5.

## Aviculidæ.

*Avicula fusco-purpurea*, sp. n., E. Smith, Ann. N. H. (4) xvii. p. 405, Rodriguez Island.

## Arcidæ.

*Arca despecta*, sp. n. (the "moussole" of Adanson, Voy. Senegal,

p. 250, pl. xviii. fig. 2), P. Fischer, J. de Conch. xxiv. p. 238, pl. viii. fig. 1, W. Africa. *A. bouvieri* (Fischer, 1874), figured; *id. l. c.* pl. viii. fig. 2, Cape Verde Islands.

*Limopsis tenella* and *cristata*, spp. nn., Jeffreys, Ann. N. H. (4) xviii. pp. 433 & 434, N. Atlantic, 1450 & 600–1000 fathoms.

*Limopsis anomala* (Eichw.) = *pygmæa* (Jeffr.), found at Sciacca, Sicily; Monterosato, Poche note, &c., p. 9.

*Limopsis cancellata*, sp. n., Woods, *l. c.* p. 28, Tasmania.

## Nuculidæ.

*Nucula reticulata*, Jeffreys, Ann. N. H. (4) xviii. p. 429, Atlantic, about 1000 fathoms; N. *perminima*, Monterosato, Poche note, &c., p. 8, southern coast of Sicily: spp. nn.

*Nucula minuta*, sp. n., Woods, *l. c.* p. 28, Tasmania.

*Leda pusio* (Phil.) var. n. *latior*, *L. pustulosa*, *expansa*, *lata*, and *sericea*, spp. nn., Jeffreys, *l. c.* pp. 430–432, Atlantic, at depths from 700–1400 fathoms.

*Malletia excisa* (Phil., as *Nucula*) and *cuneata*, sp. n., *id. l. c.* p. 435, N. Atlantic, 1400–1700 fathoms.

*Glomus*, g. n. Shell nearly spherical; cartilage internal, elongated, teeth minute and set obliquely; aspect of *Pectunculus*, but with hinge nearer that of *Leda*. *G. nitens*, sp. n., N. Atlantic, 500–1700 fathoms. *Id. l. c.* p. 433, and P. R. Soc. xxv. p. 200.

## Trigoniidæ.

*Trigonia acuticostata* (M'Coy, as a Miocene fossil) dredged in living state in Bass's Straits; F. M'Coy, Ann. N. H. (4) xviii. p. 273, and J. de Conch. xxiv. p. 396.

## Pectinidæ.

*Pecten gibbus* (Philippi, *nec* L.) renamed *commutatus*, = *philippii* (Recluz, *nec* Michelotti, 1839); Monterosato, Poche note, &c., p. 6. This species dredged at the Cape Verde Islands; Martens, JB. mal. Ges. iii. p. 245.

*Pecten fragilis*, sp. n., Jeffreys, Ann. N. H. (4) xviii. p. 424, N. Atlantic, 1000–1400 fathoms.

*Amussium* (Rumph, Klein) generically distinguished from *Pecten* by the shell being only internally fluted, not externally ribbed, and *A. lucidum* (Jeffr., 1874, as *Pleuronectes*) described; *id. l. c.* pp. 424 & 425, Atlantic, from Gulf of Mexico to 56° N. lat., 500–1400 fathoms.

*Lima ovata* (S. Wood, Crag Moll.), *subovata*, and *gibba*, spp. nn., *id. l. c.* pp. 426–428, N. Atlantic, 1450 fathoms.

*Lima zealandica*, sp. n., Sowerby, P. Z. S. 1876, p. 754, pl. lxxv. figs. 1 & 2, New Zealand.

## Ostreidæ.

*Ostrea edulis* (L.). Z. Gerbe has examined 435 oysters, one year old, and found in 35 of them young within the gills, in 127 the ovaries full with eggs, and in 189 spermatozoids; they are consequently able to propagate in the first year. R. Z. (3) iv. pp. 274–278. The annual decrease of the results of oyster-fishing on the British coasts have been the subject of a Commission appointed by Parliament; in the report of this Commission the fact is acknowledged, and attributed to the immoderate and rapacious method of fishing; several remedial measures are proposed. A German translation of this Report is to be found in the "Circulare des deutschen Fischerei-vereins," 1876, No. 6, pp. 211–221.

A. Lafont has published a popular account on oyster-breeding. "Note sur les huitrières du bassin d'Arcachon" (Bordeaux and Paris: 1874, 8vo, 52 pp.), and De Bon another, "Notice sur la situation de l'Ostréiculture en 1875" (Paris: 1875, 8vo, 27 pp.), this latter is published also in the "Revue maritime et coloniale" of the same year. Historical notes on oyster-fishing on the coast of Eastern Friesland in the newspaper "Hansa," No. 23, and in "Circulare des deutschen Fischerei-vereins," 1876, No. 1, pp. 14–23.

# MOLLUSCOIDA.

BY

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## LIST OF MORE IMPORTANT PUBLICATIONS.

BROOKS, W. K. The development of *Salpa*. Bull. Mus. C. Z. iii. Nos. 11–14, pp. 291–348, woodcuts. (A German translation in Arch. f. Nat. xlii. pp. 247–254.)

——. The affinity of the *Mollusca* and *Molluscoida*. P. Bost. Soc. xviii. pp. 225–236.

EHLERS, E. *Hypophorella expansa*, ein Beitrag zur Kenntniss der minirenden Bryozoen. Abh. Ges. Götting. xxi. pp. 1–156, pls. i.–v.

REPIACHOFF, W. Zur Naturgeschichte der chilostomen See-Bryozoen Z. wiss. Zool. xxvi. pp. 139–160, pls. vi.–ix.

SALENSKY, W. Ueber die embryonale Entwicklungsgeschichte der Salpen. Z. wiss. Zool. xxvii. pp. 179–237, pls. xiv.–xvi.

## CONTRIBUTIONS TO FAUNAS.

8 species of *Bryozoa*, observed in the zoological station at the Helder (Holland) are enumerated by C. K. HOFFMANN, Ned. T. D. iii. pp. 36 & 37.

22 species of compound *Ascidiæ* (Synascidies), including 2 *Clavelinidæ*, 7 *Botryllidæ*, 6 *Polyclinidæ*, and 7 *Didemniidæ*, including one new, observed on the south-western coast of France by P. FISCHER, Act. Soc. L. Bord. xxx. 11 pp.

Scattered notes on some *Tunicata* and *Polyzoa* from Kerguelen Island, collected by J. H. KIDDER, Bull. U. S. Mus. No. 3, p. 48.

## BRACHIOPODA.

### TEREBRATULIDÆ.

*Terebratula tenera*, sp. n., Jefferys, Ann. N. H. (4) xviii. p. 259, N. Atlantic, 1450 fathoms, 56° N. lat.

*Waldheimia*: a very large species with exceedingly small animal, from 300 fathoms, between Gibraltar and Madeira; Willemoës-Suhm, P. R. Soc. xxiv. p. 578.

*Megerlia truncata* (L.): the var. *monstruosa* (Scacchi) is caused by the shortening of the stalk; Monterosato, Poche note, &c. [*supra*, p. 3], p. 4.

*Argiope seminulum* (Phil.) distinct from *neapolitana* (Scacchi) and *A. appressa* (Forbes), found at Sciacca, and distinct from both; *id. l. c.* p. 5.

### Rhynchonellidæ.

*Atretia*, g. n., near *Rhynchonella*, but beak straight and arms not coiled. *A gnomon*, sp. n., N. Atlantic, 1100–1400 fathoms, 56°–63° N. lat. Jeffreys, Ann. N. H. (4) xviii. p. 251, and P. R. Soc. xxv. p. 199.

### Discinidæ.

*Discina atlantica* (King, 1868), found alive in the N. Atlantic, 56° N. lat. 690–2400 fathoms, probably = *fallens* (S. Wood) from the coralline crag; Jeffreys, Ann. N. H. (4) xviii. p. 252.

## TUNICATA.

Histological description of the endostyle of several *Tunicata*, by H. Fol, Morph. JB. 1875, pt. ii.

### Ascidiidæ.

*Boltenia*: a fine species in the Atlantic near the coast of N. America, in 1700 fathoms; Willemoës-Suhm, P. R. Soc. xxiv. p. 578.

### Polyclinidæ.

*Amaroucium lafonti*, sp. n., P. Fischer, Act. Soc. L. Bord. xxx. p. 9, Arcachon, on *Zostera*.

### Diplosomatidæ.

A. Giard insists on the distinctness of the families *Didemnidæ* and *Diplosomatidæ*, the former being provided with numerous calcareous spicules in the tunica; and he describes the embryogeny of a species of the latter family, *Astellium spongiiforme* (Giard), pointing out that the common cloaca in it has the morphological value of an individual, like the cyathozoid of *Pyrosoma* [Zool. Rec. xii. p. 210]; he therefore thinks that the family *Diplosomatidæ* must be removed to the order *Luciæ*. CR. lxxxi. (1875). pp. 1214–1216; abstract in Ann. N. H. (4) xvii. pp. 479 & 480.

## Salpæ.

W. K. Brooks describes the development of *Salpa*, and comes to the following conclusions: the solitary *Salpa* is female; it produces a chain of males by budding, and discharges an egg into the body of each of them before birth; these eggs are impregnated while the zooids of the chain are very small and sexually immature (there is no close interbreeding), and develop into females, which afterwards produce other males in the same way. After the fœtus has been discharged from the body of the male, the latter grows up, becomes sexually mature, and discharges its spermatic fluid into the water, to fertilize the eggs carried by other immature chains. Since both forms are the offspring of the female, the one by budding, and the other by true sexual reproduction, we have not here an instance of alternation of generations, but a very remarkable difference in the form and mode of origin of the sexes. *Salpa* takes the "tadpole larva" stage because the adult animal is locomotive. The gill is not a rudimentary, but a specialized form of the branchial sac, no branchial slits being ever formed upon the sides of the sac, and the lateral atria becoming converted into the respiratory muscle girdles. The structure of the ganglion and sense organs is also much more specialized in *Salpa* than in the fixed Ascidians, and resembles that of their locomotive larvæ. The presence of the placenta is a mere analogy with the *Mammalia*, since the resemblance is simply functional, and not morphological. Regarding the existence of a communication between the body cavity of the nurse and the inner chamber of the placenta, the author states that in all stages, from the first appearance of the cavity of the gastrula until the embryo is fully formed, the blood of the nurse can be seen passing into and out of the cavity of the placenta. Finally, the *Salpæ* are to be regarded as *Tunicata* specialized for permanent locomotive life. The fertilization of the eggs within the body of zooids, produced by budding from the same female, is not peculiar to *Salpa*, but is also observed in *Pyrosoma* and in several compound *Ascidiæ*, and probably will be found in most *Tunicata*. Todaro's memoir on the same subject [see Zool. Rec. xii. p. 210] reached the author after he had finished his own account; the discrepancies may partly, perhaps, be due to the circumstance that Todaro worked almost entirely upon sections of specimens hardened and treated with reagents, while the author made no sections, but confined his attention to the living animal. Bull. Mus. C. Z. iii. Nos. 11–14, pp. 291–348, with several woodcuts. [It is true that the accounts of Todaro and of Brooks are at variance regarding several important points, but they coincide in the main conclusion that the solitary and the chain-forming individuals are not the offspring of one another, but elder and younger progeny of the same parent.]

W. Salensky has published an extensive paper on the embryonal development of *Salpa democratica* (Forsk.), describing the origin and transformation of each single organ; he comes finally to the conclusion that *Salpa* is not morphologically allied to the *Mollusca*. Z. wiss. Zool. xxvii. pp. 179–237, pls. xiv.–xvi.

## POLYZOA.

Ehlers, in the monograph of a new genus (*infrà*) discusses the systematic position of this class, judging that its nearest alliance is with the Gephyreans (*Sipunculidæ*) among the *Vermes*, and not with the *Tunicata* or *Rotifera*; he rejects the order "*Ctenostomata*" as a natural division, the *Vesicularidæ* being too different from the *Halcyonellidæ* and the toothed collar an artificial character, which, moreover, is also exhibited by *Aetea* among the *Chilostomata*, and is nearly obsolete in some *Ctenostomata*; the opening, moreover, is not terminal in some *Vesiculariidæ*. He proposes to form a chief division of "*Bryozoa stolonifera*," comprising all those which have two distinct sorts of cells: (1) nutritive, or fully developed animals; and (2) others without intestine, producing by budding and supporting the former. This group will contain the family of the *Vesiculariidæ* and the *Pedicellineæ* (*Endoprocta* of Nitsche), and the author gives a table showing the position of the nutritive cells on the others or the stalk in the different genera. Abh. Ges. Götting. xxi. pp. 122–156.

W. K. Brooks endeavours to point out the homology between the larval stage of the *Mollusca* and the *Polyzoa*; comparing the velum to the lophophore, the foot and pedal ganglion to the epistome with its ganglion, the shell with the cell, the operculum with the lid of the chilostomatous *Polyzoa*, etc. P. Bost. Soc. xviii. pp. 233–236.

W. Repiachoff has observed the embryology and development of a species of *Membranipora*, of *Lepralia* (probably *pallasiana*) and of *Tendra zostericola*. He comes to the conclusion that the polypid is formed only after the fixation of the larva, that it is no separate individual, that its outer layer corresponds to the muscular stratum of other animals in the embryonal stage, and that the so-called "brown bodies" [see Zool. Rec. viii. pp. 177 & 178] are remains of the yelk which make their way into the interior of the polypid. The periodical destruction and new formation of the polypid within the same zoœcium is not without analogies in other classes of animals, viz., the *Crustacea*. Z. wiss. Zool. xxvi. pp. 139–160, pls. vi.–ix.

"Of *Bryozoa* there is a great variety in nearly all depths where animals have been found. A very striking new form, *Nareeia cyathus*, has been found off the coasts of Portugal and Brazils, in 350, 1525, and 1950 fathoms. In the dredgings near the latter coast the fauna of *Bryozoa* was especially rich." Willemoës-Suhm, preliminary report on observations made on board the "Challenger," P. R. Soc. xxiv. p. 572.

### Chilostomata.

*Stichoporina* sp? on shells of *Dreyssena polymorpha* and *Neritina liturata* in the Caspian Sea; Grimm, Kaspinskoe more i ego fauna, i. p. 120.

## Ctenostomata.

*Laguncula repens* (Farre) and *Bowerbankia densa* (Farre) from the Caspian Sea, Grimm, *l. c.* pp. 117–120, pls. iv. figs. 4 & 5, vi. fig. 17.

*Hypophorella*, g. n. (*Vesiculariidæ*). "Bryozoarium stolonibus rectangularibus conjunctis repens, in extremitate articulorum antica dilatata, præter articulum lateralem terminalemque, singula animalia alternatim in stolonibus collocata, urceolata, juxta aperturam transversam ventralem utroque corniculo armata gignens." *H. expansa*, sp. n., ramified threads of elongated cells without intestines and without genital organs, which bear laterally other animal cells provided with intestine, feelers, and genitals; the animal cells and the secondary branches are placed alternately on the same stem. It lives within the tube of *Terebella conchilega* (L.), in the North Sea, the threads undermining its walls, and the animal cells opening on the inside of the tube. The anatomy, the development, and the "histolysis," *i. e.*, transformation of the intestine (polypid) to brown bodies and regeneration of it, are fully described. The larva produced by the animal cells and contained within them has first a biconical and then a conoid shape, and is encircled with a simple row of cilia, having an oral opening near this ring; the youngest stage observed in the free state at the inside of the tube has nearly the shape of a peach, and is clothed with fragments of sand or foreign shells; it produces by budding first the stalk cells and afterwards the nutritive cells. Ehlers, Abh. Ges. Götting. xxi. pp. 1–132, pls. i.–v.

*Alcyonidium gelatinosum*, Pall.; some figures of it, from specimens observed at Zandvoorl, Holland, by M. H. Weyenburgh, Period. Zool. Argent. i. 1874, p. 80, pl. ii. figs. 19–25. In Zool. Rec. xii. p. 212, Buenos Ayres is by mistake named as the locality of these specimens.

# CRUSTACEA.

BY

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## LIST OF MORE IMPORTANT PUBLICATIONS.

BATE, C. SPENCE. On the Development of the Crustacean Embryo, and the Variations of form exhibited in the Larvæ of 38 Genera of *Podophthalmia*. P. R. Soc. xxiv. pp. 375–379.

——. Report on the present State of our Knowledge of the *Crustacea*. Pt. i. On the Homologies of the Dermal Skeleton. Rep. Br. Ass. 45th meeting, pp. 41–53, with 2 pls.

BOVALLIUS, C. Ett nytt slägte af familjen Portunidæ från Skandinaviens kuster. Œfv. Ak. Förh. xxxiii. No. 9, pp. 59–69, pls. xiv. & xv.

BRADY, G. S. Report on Dredging off the coast of Durham and North Yorkshire. Rep. Br. Ass., 45th meeting, pp. 185–187.

CATTA, J. D. Note sur quelques Crustacés erratiques. Ann. Sci. Nat. (6) iii. No. 1, 33 pp. 2 pls.

CLAUS, C. Untersuchungen zur Erforschung der genealogischen Grundlage des Crustaceen-Systems. Wien: 1876, fol., 114 pp., and 19 pls.

——. Zur Kenntniss der Organisation und des feineren Baues der Daphniden und verwandter Cladoceren. Z. wiss. Zool. xxvii. pp. 362–402, pls. xxv.–xxviii.

FAXON, W. Crustacea, in "Exploration of Lake Titicaca," No. iv. Bull. Mus. C. Z. iii. No. 16, pp. 361–375, with woodcuts.

GERSTÄCKER, A. Klassen und Ordnungen des Thierreichs (commenced by the late H. G. BRONN). Vol. v. Arthropoda, pt. 21, pp. 993–1024, pls. xxxii. & xxxiii.

HESSE, —. Description des Crustacés rares ou nouveaux des côtes de France (27me article). Ann. Sci. Nat. (6) iii. No. 5, 42 pp., pls. 5 & 6.

HUDENDORFF, A. Beitrag zur Kenntniss der Süsswasser-Cladoceren Russlands. Bull. Mosc. l. pp. 26–61, pl. ii.

MIERS, E. J. Descriptions of some new species of *Crustacea*, chiefly from New Zealand. Ann. N. H. (4) xvii. pp. 218–229.

MILNE-EDWARDS, A. Recherches sur la faune carcinologique de la Nouvelle-Calédonie. N. Arch. Mus. x. (1874) pp. 39–58, pls. ii. & iii.

ROUGEMONT, P. DE. Naturgeschichte des *Gammarus puteanus* (Koch). München: 1875, 8vo (Inaugural dissertation).

——. Die Fauna der dunkeln Orte. München: 1876, 4to, 5 pls.

SARS, G. O. Nye bidrag til kundskaben om Middelhavets Invertebrat-Fauna (New contribution to the knowledge of the Mediterranean Invertebrate Fauna) I. Middelhavets Mysider. Arch. Math. og Naturvidensk. i. pp. 1–111, with 36 pls.

STEBBING, T. R. R. Description of a new species of Sessile-eyed *Crustacea* and other Notices. Ann. N. H. (4) xvii. pp. 73–80, pls. iv. & v.

——. Amphipodous *Crustacea*. Tom. cit. pp. 337–346, pls. xviii. & xix.; and xviii. pp. 443–449, pls. xix. & xx.

WEISMANN, A. Zür Naturgeschichte der Daphniden. I. Über die Bildung von Wintereiern bei *Leptodora hyalina*. Z. wiss. Zool. xxvii. pp. 51–112, pls. v.–vii.

WILLEMOËS-SUHM, R. v. On the Development of *Lepas fascicularis* and the "*Archizoëa*" of *Cirripedia*. Phil. Tr. clxvi. pp. 131–154, pls. x.–xv.; abstract in P. R. Soc. xxiv. pp. 129–132.

## ANATOMY AND EMBRYOLOGY.

C. CLAUS has published a rather extensive work upon the embryology of the *Crustacea*, and the amount of resemblance between their structure and that of other families and orders. He admits theoretically the common origin of the *Crustacea* from one form, but insists on the many difficulties which present themselves to any one who tries to make out the phylogenetic relations of the orders and families; he expressly denies that the "*Zoea*" represents a distinct adult form of old times, from which various other forms would have originated, thinking that it has always been, as it is now, a transitory stage. He distinguishes two more typical stages of the metamorphosis of the *Crustacea*, following that of *Nauplius* and preceding that of *Zoea*, and distinguishes them by the names *Metanauplius* and *Protozoea*. It appears to be a general rule that the anterior segments and their appendages are first developed, and that by subsequent moults the posterior segments follow, one by one; but there are many exceptions to this rule, the middle part of the body being of later development in the *Decapoda*, and this is to be seen in the *Zoea*-stage.

The author thinks that of all now living *Crustacea*, the Phyllopods

may be those which most resemble the primordial ancestors of all *Crustacea*; the *Limulidæ*, *Trilobitidæ*, and *Eurypteridæ* may be some of the earliest offshoots of that stem; he comprises these 3 families under the name *Crustacea polygnatha*, because in them several pairs of extremities unite in themselves the manducatory and walking functions. The *Ostracoda* may be derived from the *Phyllopoda* by a closer adaptation of the body to the surrounding shield, and the *Cladocera* are linked with them by *Estheria*. The *Copepoda* form another distinct branch, and from them the *Cirripedia* are to be derived; the hermaphroditism of the latter may be secondary, caused by the fixed life. On the same line with the Phyllopods, the author ranges the presumed primordial *Malacostraca*, to which he ascribes a lengthened chambered heart, a second pair of antennæ, the nerves of which were furnished by the infra-pharyngeal ganglion, a dorsal shield starting from the maxillary region, eight thoracic segments with eight pairs of feet, and, clearly distinct from them, seven abdominal segments with natatory feet and tail fin; seven pairs of feet (including gnathopods, &c.) in them are morphologically identical with those of the *Entomostraca* or the above-mentioned orders of *Crustacea*, the others are new; *Nebalia* and *Branchipus* among the living forms may give an approximate idea of those primordial forms, from which the Decapods, Stomapods, Amphipods, and Isopods are to be derived. The metamorphosis of *Euphausia*, and in some degree also that of *Peneus*, illustrates the gradual progress from the primordial forms to the *Decapoda Macrura*. The Isopods deviate more than any other order from the common type of the *Crustacea*, and their development is the most shortened, the intermediate transitory stages being suppressed.

In the *Schizopoda* and *Penеidæ*, the larva is hatched as a *Nauplius*, and undergoes its further development in free life; the rest of the *Caridea* go through the stage of *Nauplius* and *Protozoea* within the egg, and the first stage of free life is that of *Zoea* mingled with features of the *Mysis*-like stage. The *Thalassinidæ* and *Paguridæ* are hatched in the *Zoea*-stage. The cephalothorax of the *Decapoda* appears to take its origin from the shield of the *Nauplius* (p. 53).

[The Recorder has entered, contrary to his system, into such theoretical and hypothetical views, as they are brought forward by an acute and exact observer who has a thorough knowledge of the subject, and opposes himself to the wild speculations of some proclaimers of the transmutation theory.]

C. Spence Bate has observed the larva of the following genera of stalk-eyed *Crustacea*: *Stenorrhynchus*, *Libinia*, *Menœtius*, *Mithrax*; *Carpilodes*, *Liomera*, *Actæa*, *Xantho*, *Pilumnus*, *Eriphia*, *Melia*, *Trapezia*, *Pirimela*, *Thalamita*, *Achelous*; *Gelasimus*, *Cyclograpsus*; *Thia*, *Trichia*; *Pagurus*, *Clibanarius*; *Porcellana*, *Galatea*; *Palinurus*, *Homarus*, *Astacus*, *Thalassina*; *Crangon*, *Alpheus*, *Hymenocera*, *Palæmon*; *Squilla*. Some of the species are British, the majority foreign; the latter have been hatched from the eggs by W. H. Power, and the parents of all have been identified. He adds interesting observations on the change in form of the embryo within the egg, homologous with the

form of free-swimming larva (*Nauplius*) in others; and on the origin and formation of the nerves, eyes, and some internal viscera. He states that the three pairs of mobile appendages in the *Nauplius*-stage of the Cirripeds, are homologous with the eyes and two pairs of antennæ, not antennæ and mandibles, as had been thought by other authors, and that the small pair of filamentary appendages seen on each side of the eye in the same *Nauplius* is homologous with arm-like appendages in the pupa-stage of the same Cirripeds, and with the stalk of the adult, and also with the peduncular appendage in the larva of *Caligus*. P. R. Soc. xxiv. pp. 375–379, and Ann. N. H. (4) xviii. pp. 174–177.

The same author gives a condensed account of the morphology of the dermal skeleton of the *Crustacea*, discussing the division into cephalon, pereion, and pleon, the constituent parts of the carapace in the larva and the adult, its regions, &c. Rep. Br. Ass., 45th meeting, pp. 41–53, with 2 pls.

Some observations on the brain (supra-pharyngeal ganglion) of *Astacus fluviatilis*, its resemblance to that of the *Insecta*, and the method of preparing it, by M. J. Dietl, Z. wiss. Zool. xxvii. pp. 509–512, pls. xxxvii. fig. 24, xxxviii. figs. 25 & 26.

The general structure of the *Gammaridæ*, with special reference to the organs of sense, is discussed by P. de Rougemont [*suprà*] pp. 6–26.

## Contributions to Faunas.

### 1. *Land and Fresh-water Crustacea.*

*Holland.* A list of all known species by R. T. Maitland, Ned. T. D. i. (1875), pp. 228–270.

*Carinthia.* R. Latzel enumerates the Decapod (*Astacus fluviatilis*), 1 Amphipod, and 5 Isopods, JB. Mus. Kärnt. xii. pp. 110–112.

*Russia.* 50 species of the order *Cladocera* enumerated, some new, with critical and descriptive notes by A. Hudendorff, Bull. Mosc. l. pp. 20–21, pl. ii.

*Lake Titicaca.* 7 new species of *Allorchestes* are the only Crustaceans found; they occur at 10–66 fathoms; near the lake a known species of *Allorchestes* and one of *Cypris* occur. Faxon, Bull. Mus. C. Z. iii. pp. 361–375.

*Tristan d'Acunha.* A species of *Oniscus* and one of *Gammarus*, everywhere under stones; Willemoës-Suhm, P. R. Soc. xxiv. p. 585.

*New Zealand.* New Isopods by Miers, Ann. N. H. (4) xvii. pp. 225–227.

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General observations on the *Crustacea* inhabiting caves and deep wells by P. de Rougemont, in Fauna der dunkeln Orte [*suprà*, p. 2], pp. 5, 9, & 10. *Gammarus puteanus*, Koch, and a distinct species of *Asellus* [see *infrà*] live in the depths of the Lake of Geneva and Neuchatel; *id.* Naturges. Gamm., &c. [*suprà*], p. 3.

## 2. *Marine Crustacea.*

The *Crustacea* collected during the late Austrian Arctic Expedition, viz., 7 species of Decapods, 13 Amphipods, 3 Isopods, 1 Cirriped and 3 Pycnogonids, some of them new, are treated by C. Heller, Denk. Ak. Wien, xxxvi. (1875) pp. 25–43, pls. i.–v.

A preliminary general account of the *Crustacea* observed in the N. Atlantic and Davis Straits during the "Valorous" cruise, is given by J. G. Jeffreys, P. R. Soc. xxv. pp. 202–215.

Notes on some new or little known *British* Amphipods and Isopods, by T. Stebbing, Ann. N. H. (4) xvii. pp. 73–80, 337–346, pls. iv., v., xviii., & xix.; and xviii. pp. 443–449, pls. xix. & xx.

A list of 67 species of *Ostracoda* and 62 *Copepoda*, dredged off the coast of Durham and North Yorkshire, from 17 to 45 fathoms, by G. Stewardson Brady, Rep. Br. Ass., 45th meeting, pp. 186 & 187, 196 & 197. Some other *Crustacea* are also mentioned, p. 185.

A list of 195 species of *Crustacea* found in the kingdom of *Holland*, including 36 Decapods, 3 *Cumacea*, 5 *Schizopoda*, 26 Amphipods incl. *Caprellina*, 26 *Isopoda*, 3 *Phyllopoda*, 15 *Cladocera*, 10 *Ostracoda*, 57 *Copepoda* and *Parasita*, 2 *Pycnogonida* and 12 *Cirripeda* is given by R. T. Maitland, Ned. T. D. i. (1875) pp. 228–270. 31 species of *Crustacea* (including *Pycnogonida*) observed at the zoological station at the Helder, Holland, are enumerated by P. P. C. Hoek, *op. cit.* ii. pp. 39–44.

*Mediterranean.* G. O. Sars has observed 20 species of *Mysidæ* and 15 of *Cumacea* in the Mediterranean, 15 and 6 of which are peculiar to that sea, the others occur also in the northern seas of Europe. Arch. Math. Naturvid. i. pp. 1–5. The *Mysidæ* are fully described by him [see *infrà*, p. 9].

Marion has collected several exotic or new species of *Crustacea*, outside a vessel arriving at Marseilles from Pondicherry; they were *Pachygrapsus adscna*, sp. n., *Nautilograpsus minutus* (L.), *Plagusia squamosa* (Hbst.), and *tomentosa* (M.E.), *Idotea tricuspidata* (Desm.), *Amphithoe penicillata* (Costa), *Probolium polyprion* (Costa), and 2 Cirripeds; this will account for the wide distribution of some species of *Crustacea*. Catta, Ann. Sci. Nat. (6) iii. No. 1.

Many interesting notes on deep sea and surface *Crustacea* in the Atlantic and Southern Indian Sea, observed on board H. M. S. "Challenger," by Willemoës-Suhm, P. R. Soc. xxiv. pp. 570–592. The same from the China Sea and the Pacific in Z. wiss. Zool. xxvi. p. lv.; some of them will be indicated in the special part.

A table giving the general distribution of the chief orders of the *Crustacea* in twelve dredgings from various depths between Falkland Islands and Tristan d'Acunha, by Wyville Thomson, *tom. cit* p. 635.

Many small Crustaceans, usually of a bright orange colour—Copepods, Amphipods, and Cypridians principally—were found in the deep nets during the cruise of the "Challenger," which had not hitherto nor have since been observed near the surface." J. Murray. P. R. Soc. xxiv. p. 535.

*New Caledonia.* 12 species of *Leucosiidæ*, 1 Corystid (*Gomeza*), and 5 *Calappidæ* enumerated; the new species described by A. MILNE-EDWARDS, N. Arch. Mus. x. (1874) pp. 39–58, pls. ii. & iii.

*New Zealand.* New Decapods and Isopods described by MIERS, Ann. N. H (4) xviii. pp. 218–229.

*Kerguelen Island.* Notes on the *Crustacea*, many Amphipods and Isopods, as for example *Tanais*, *Anceus*, *Serolis*, but only one Decapod, a species of *Mysidæ*; in all of them, the young are bred in pouches of the parent. WILLEMOËS-SUHM, P. R. Soc. xxiv. p. 591. One Decapod, *Halicarcinus planatus* (Fabr.), 3 Amphipods and 3 Isopods, all marine, collected by J. H. Kidder; S. F. SMITH, Bull. U. S. Mus. No. 3, pp. 57–64.

## DECAPODA.

### BRACHYURA.

Several different forms of determined and undetermined larvæ in the stage of *Zoea* and *Megalopa* described, and the latter distinguished by the names of *Fissocaris*, *Pterocaris*, and *Pluteocaris*. The mandibular palpus is finger shaped, but not articulated in the earlier stages. The pereion (thorax) consists of eight segments, not of seven, as Spence Bate supposed. Claus, Untersuch. Crust. syst. pp. 61–68, pls. x.–xiv.

### OXYRRHYNCHA.

*Inachus scorpio* (F.), Zoea; Claus, *l. c.*, p. 64, pl. x. fig. 8.

*Maia verrucosa* (M. E.), Zoea; *id. ibid.* figs. 9 & 10.

*Halimus hectori*, sp. n., Miers, Ann. N. H. (4) xvii. p. 219, New Zealand.

*Paramithrax barbicornis* (Latr.), male specimen from New Zealand described; *id. ibid.*

*Leptomithrax*, subg.-n. *Paramithrax*: anterior legs of male elongated, fingers not gaping, without longitudinal crests. *L. longimanus*, New Zealand, and *australiensis*, Tasmania, spp. nn. *Id. l. c.* p. 220.

### CYCLOMETOPA.

*Pilumnus tridentatus*, sp. n., Maitland, Ned. T. D. i. (1875) p. 232. Already figured in Baster's Opuscule subseciva, ii. pl. ii. figs. 4 & 5.

*Portunus*: Megalopa-stage, Claus, *l. c.* p. 66, pl. xiii. figs. 1–8.

*Thranites*, g. n., near *Portunus* and *Goniosoma*; cephalothorax distinctly hexagonal, with 4 obtuse frontal teeth, and on each side 5 anterolateral teeth, the last twice as long as the preceding, and directed outwards. Only one specimen found N.W. off Bergen, Norway, by fishers. Bovallius, Œfv. Ak. Förh. xxxiii. No. 9, pp. 59–69, pls. xiv.–xv.

*Neptunus trituberculatus*, sp. n., Miers, Ann. N. H. (4) xvii. p. 221, coasts of China and Japan; near *pelagicus* (L.), = *pelagicus* of De Haan, Fn. Jap.

### CATOMETOPA.

*Paratelphusa.* The 7 known species enumerated, with a synoptical table of their differences, by J. Wood-Mason, Ann. N. H. (4) xvii. pp. 120–122.

*Elamene whitii*, sp. n., = *E. depressa* (White, 1846, *nec* Jacq. & Lucas), Miers, Ann. N. H. (4) xvii. p. 221, New Zealand.

*Grapsus*, a large species, very common all over the island of St. Paul, in the Atlantic; Willemoës-Suhm, P. R. Soc. xxiv. p. 582.

*Pachygrapsus advena*, sp. n., Catta, Ann. Sci. Nat. (6) iii. No. 1, p. 7, pl. i.; arrived at Marseilles outside a vessel coming from Pondicherry.

*Plagusia squamosa* (Hbst.) and *tomentosa* (M. E.) found with the preceding; *id. l. c.* p. 4.

### OXYSTOMA.

*Leucosia neocaledonica*, *elata*, and *margaritata*, spp. nn., A. Milne-Edwards, N. Arch. Mus. x. (1874) pp. 40–42, pl. ii. figs. 1–3, New Caledonia.

*Philyra longimana*, sp. n., *id. l. c.* p. 43, pl. ii. fig. 4, New Caledonia.

*Nucia tuberculosa*, sp. n., *id. l. c.* p. 44, pl. ii. fig. 5, New Caledonia.

*Myra eudactyla* (Bell), specimen from New Caledonia; *id. l. c.* p. 46, pl. iii. fig. 3.

*Phlyxia crosa*, sp. n., *id. l. c.*, p. 47, pl. iii. fig. 2, New Caledonia; female only known.

*Arcania lævimana* (Bell), New Caledonian specimen; *id. l. c.* p. 48, pl. iii. fig. 4.

*Tlos petræus*, sp. n., *id. l. c.* p. 51, pl. iii. fig. 1, New Caledonia.

*Thia polita* (Leach), Zoea; Claus, Untersuch. Crust. syst. p. 56, pl. x. figs. 1–7.

*Gomeza vigintispinosa* (Dehaan, as *Oidia*), A. Milne-Edwards, N. Arch. Mus. x. (1874) p. 52, pl. iii. fig. 5, New Caledonia.

### ANOMURA.

CLAUS rejects this suborder, referring the *Paguridæ* to the *Macrura*, and the *Porcellanidæ*, *Hippidæ*, and all the *Apterura* of Milne-Edwards to the *Brachyura*, on account of what is known about their development. Two undetermined larvæ, one probably an *Albunea*, described. Untersuch. Crust. syst. pp. 59–61, pl. ix.

### DROMIIDÆ.

*Dromia*? Zoea- and Megalopa-stages; *id. l. c.* p. 68, pl. xiv. figs. 6–17.

### PAGURIDÆ.

A. AGASSIZ has observed how the young hermit crab occupies the shells in which it dwells, and adds some theoretical considerations as to their possession of instinct; Am. J. Sci. (3) x. (1875), pp. 290.

*Pagurus* [*Clibanarius*] *misanthropus* (Risso), adult and larva described, and its habits observed; Hesse, Ann. Sci. Nat. (6) iii. No. 5, pp. 1–29, pl. v.

*Pagurus*-larva in the *Mysis*-like stage; Claus, Untersuch. Crust. syst. p. 55, pl. vii. fig. 14.

*Pagurus*: description of an unknown larva by Hesse, *l. c.* pp. 29–32, pl. vi.

*Pagurus ulidianus* (Thomps.) is the young state of *bernhardus* (L.), and on the habits of *P. prideauxi* (Leach) and its commensalism with *Adamsia*; id. *l. c.* pp. 32–40.

*Eupagurus spinulimanus*, sp. n., Miers, Ann. N. H. (4) xvii. p. 223, New Zealand.

### Porcellanidæ.

*Porcellana*: on the larva (*Lonchophorus*, Eschscholtz, 1825), Claus, *l. c.* pp. 57 & 58, pl. vii. figs. 1–13.

*Petrocheles*, subg.-n. of *Petrolisthes* (*Porcellanidæ*), sides of the rostrum, lateral margins of the carapace, and anterior margin of the arms with spines. *P. spinosus*, New Zealand, and *P. australiensis*, Australia. Miers, Ann. N. H. (4) xvii. p. 222.

## MACRURA.

### Loricata.

*Scyllarus* and *Palinurus*: on their metamorphosis, very young *Phyllosoma* larvæ figured, Claus, *l. c.* pp. 50–53, woodcut, & p. 114.

### Astacidæ.

*Homarus*: on its larva, Claus, *l. c.* p. 49.

*Astacus fluviatilis*. The female crayfish becomes able to propagate (in Northern Germany) when it has reached a length of 9–10 centimètres; Behrbohm, "Circulare des deutschen Fischerei-Vereins," 1876, No. 1, p. 2. Breeding of the common crayfish tried with success by Brüssow, in Mecklenburg; *op. cit.* No. 4, pp. 163 & 164.

*Astacus colchicus*, sp. n., Kessler, Bull. Mosc. I. pp. 1–6, Rion River; allied to *fluviatilis* (Fabr.) and *pachypus* (Rathke).

*Astacoides zealandicus* = *Paranephrops setosus* (Hutt.): the young are attached by strong hooked claws of the two hindermost pairs of feet to the post-abdominal appendages of the mother. Wood-Mason, Ann. N. H. (4) xviii. p. 307, with woodcut. *Astacoides* and *Paranephrops* maintained as distinct genera, *P. zealandicus* (White) and *setosus* (Hutt.) as distinct species, by E. Miers, *tom. cit.* pp. 412 & 413.

*Willemoesia* (Grote) = *Deidamia* (Will.-Suhm) = ? *Polycheles* (Heller) which is the oldest name [see Zool. Rec. xii. p. 223], two species in the Atlantic, one in great depths, and a third in the Pacific, blind, their

resemblance to the fossil *Erycinidæ* pointed out: Willemoës-Suhm, P. R. Soc. xxiv. p. 577).

*Homaralphæus*, g. n., name without description or type, C. S. Bate, P. R. Soc. xxiv. p. 378.

### Thalassinidæ.

*Callianassa subterranea* (Mont.), Zoea-stage; Claus, Untersuch. Crust. syst. p. 54, pl. viii. figs. 1–7.

*Gebia danai* [sic], sp. n., = *hirtifrons* (Dana, *nec* White), Miers, Ann. N. H. (4) xvii. p. 223, New Zealand and [?] Davis Straits.

### Caridea.

On the maxillæ of several genera and their formation, see Claus, Untersuch. Crust. syst. p. 46, footnote.

*Hippolyte* larva; Claus, *l. c.* pp. 44 & 45, with woodcuts.

*Virbius bifidirostris*, sp. n., Miers, Ann. N. H. (4) xvii. p. 224, New Zealand.

*Alpheus novæ-zealandiæ*, sp. n., *id. ibid.*, New Zealand.

*Palæmon fluvialis*, sp. n., without description, C. Spence Bate, P. R. Soc. xxiv. p. 379, Port Louis.

*Peneus*: on its development, *Nauplius*-, *Metanauplius*-, *Protozoea*-, and *Mysis*-like stages; Claus, *l. c.* pp. 10–12, with woodcuts, pp. 41–43, pls. ii. & iii.

### Sergestidæ.

*Sergestes*: On its development, *Elaphocaris* (Dohrn, 1870) being its Protozoea- and Zoea- stage, *Acanthosoma* (Claus, 1863), the Mysis-like stage, and a further *Mastigopus*-like stage following it; Claus, *l. c.* pp. 35–40, pls. v. & vi. & woodcuts. Willemoës-Suhm, from his own observations, comes also to the conclusion that *Elaphocaris* is the larva of *Sergestes*; P. R. Soc. xxiv. p. 133, Ann. N. H. (4) xvii. p. 163, and Z. wiss. Zool. xxvii. p. cvi.

*Leucifer* (Thomps.) and *Acetes* (M. E.) belong also to the *Sergestidæ*, and are sexually fully developed, but morphologically analogous to certain stages of development of *Sergestes*; Claus, *l. c.* p. 40. A larva, probably belonging to *Leucifer* described; *id. l. c.* p. 113, pl. iv. fig. 1. Some observations on the development of *Leucifer*; Willemoës-Suhm, P. R. Soc. xxiv. p. 134, and Ann. N. H. (4) xvii. p. 163.

## SCHIZOPODA.

Willemoës-Suhm gives several observations on deep-sea Schizopods; P. R. Soc. xxiv. p. 575.

### Mysidæ.

*Mysis helleri*, *assimilis*, *arenosa*, and *bahirensis*, spp. nn., G. O. Sars, Arch. Math. og Naturvidensk. i. pp. 7–22, pls. i.–viii., Goletta, Tunis

and other points of the Mediterranean. *M. longicornis* (M. Edw.) from Naples, described; *id. l. c.* p. 22, figs. 9 & 10.

*Macropsis*, g. n. (= *Podopsis*, Van Beneden, *nec* Thompson); eyes very long, upper antennæ of the male with four appendages. For *P. slabberi* (Beneden), found at several points of the Mediterranean, and described. G. O. Sars, *l. c.* pp. 27–36, pls. xi.–xiii., both sexes.

*Leptomysis mediterranea* & *apiops*, both from different points of the Mediterranean, and *sardica*, Cagliari, spp. nn., *id. l. c.* pp. 36–48, pls. xiv.–xviii. & xxxvi.

*Chiromysis*, g. n. First pair of feet much stronger than the following subcheliform. Organs of the mouth nearly as in *Mysis*. Male not yet known. *C. microps*, sp. n., *id. l. c.* pp. 48–54, pls. xix. & xx. (? Mediterranean).

*Gastrosaccus* (Norman). The pectoral bag or marsupium is not fixed to the first segment of the abdomen, as has been described, but exclusively to the thorax, as in the rest of the *Mysidæ*; the epimeral processes, however, of the first abdominal segment are very large, and cover a part of the marsupium. *G. sanctus* (Beneden), both sexes, and *normani*, sp. n., both observed in the Mediterranean, described; *id. l. c.* pp. 54–69, pls. xxi.–xxv.

*Anchialus agilis*, sp. n., *id. l. c.* pp. 69–79, pls. xxvi.–xxviii., both sexes, from Messina and Naples. In the female, only one pair of abdominal feet is developed.

*Siriella clausi* and *crassipes*, spp. nn., *id. l. c.* pp. 81 & 89, pls. xxix. & xxxi., both sexes, & xxxii., Goletta and other points of the Mediterranean; *Mysis frontalis* (M. Edw.) and *Cynthia armata* (M. Edw.) belong also to this genus, and are described; *id. l. c.* pp. 91–101, pls. xxxiii.–xxxv.

*Petalophthalmus* [see Zool. Rec. xii. p. 225], Willemoës-Suhm, P. R. Soc. xxiv. pp. 575, 588, & 592.

New forms of *Mysidæ* from the Antarctic Sea indicated; *id. l. c.* p. 589.

### Euphausidæ.

*Euphausia*: on development, as typical for the *Malacostraca*, see Claus, Untersuch. Crust. syst. pp. 7–9, 33 & 34, pl. i.

### Lophogastridæ.

*Gnathophausia gigas*, W.-S., ? = *Lophogaster ingens*, Dohrn, and *G. zoea* [see Zool. Rec. xi. p. 210, & xii. p. 225], and *agilis*, spp. nn., Atlantic, 1500 fathoms, Willemoës-Suhm, P. R. Soc. xxiv. pp. 576 & 592.

*Chalaraspis*, g.n. Shield loose; very long walking legs with large claws; no accessory eyes. *C. unguifer*, sp. n., Middle and Southern Atlantic and Southern Indian Sea, 350–1900 fathoms. *Id. l. c.* pp. 576, 588, & 592.

### Nebaliidæ.

*Nebalia longipes*, sp. n., Willemoës-Suhm, Tr. L. S. (2) i. (1875), p. 26, pl. vi., Bermuda Islands. On the structure of this species as well as *N. geoffroyi* (M.E.), its sexual differences and circulatory systems, see Claus, Untersuch. Crust. syst. pp. 24–30, pl. xv.

## CUMACEA.

*Diastylis polaris*, *stygia*, *Leucon pallidus*, *Eudorella gracilis* (Sars), and *Campylaspis rubicunda* (Lillj.) [see Zool. Rec. ix. p. 195], all from the Polar Sea, fully described and figured by G. O. Sars, Sv. Ak. Handl. xi. (1873) No. 6, 12 pp. 1 pl. *D. spinulosa*, sp. n., Heller, Denk. Ak. Wien, xxxvi. (1875) p. 28, pl. i. fig. 5, Arctic Sea.

### Family ?.

*Amphion*. Two pelagic forms nearly allied to this genus, and provided with fully-developed genital organs, observed by Willemoës-Suhm, P. R. Soc. xxiv. pp. 132 & 133; Ann. N. H. (4) xvii. p. 162; and Z. wiss. Zool. xxvii. p. cvi. Claus was inclined to regard *Amphion* (M.E.) as a larva belonging to the *Sergestidæ*, and the animal as described first by Milne-Edwards is certainly one; it has only 6 pairs of developed natatory feet, the first two of which are the second and third maxillipeds, and the four following true feet, the fifth not being developed. Milne-Edwards described the under lip as first maxilla, the first maxilla as second, and so on. But the observations of Willemoës-Suhm show that with only slight changes *Amphion* becomes a sexually developed perfect animal. Claus, Untersuch. Crust. syst. pp. 47–49, 112 & 113, pl. viii. figs. 8–10.

## AMPHIPODA.

J. C. Schiödte distinguishes and describes three types of oral structure in this order:—

1. *Eleutherognatha*: Mandibulæ trigonæ, condylo articulario antice carentes. Labrum planiusculum, transversum, simplex. Greater part of the *Gammaridæ* and *Caprellidæ*.
2. *Trochalognatha*: Mandibulæ productæ, condylo articulario instructæ antico, acetabulo epipharyngis accommodato. Labrum crassum, conicum, simplex. *Lysianassa*, including *Anonyx*, and *Opis*.
3. *Piezognatha*: Mandibulæ productæ, condylo articulario antico carentes, mala exteriore fossæ transversæ labri accommodata. Labrum planiusculum, transversum, duplex. *Hyperiidæ*.

The first type corresponds with that of the *Onisci*, the second with that of *Cirolana* among the Isopods, and also with that of *Scolopendra* among the Myriopods. The genera *Stegocephalus*, *Cyamus*, and *Laphystius*

exhibit very remarkable modifications of the eleutherognathous type, which are fully described by the author. Nat. Tids. (3) x. (1875) pp. 211–252, pls. iv.–viii. An English translation, without figures, in Ann. N. H. (4) xviii. pp. 260–266 & 295–305.

### Orchestiidæ.

*Talitrus gulliveri*, sp. n., E. Smith, Ann. N. H. (4) xvii. p. 406, Rodriguez Island, under stones in damp places.

*Allorchestes* (Dana, pt., Bate) = *Hyalella* (S. F. Smith), generic character discussed; *A. armatus, echinus, longipes, lucifugax, latimanus, longipalmus, cupreus*, spp. nn., and *dentatus* (Smith) var. n. *inermis*, all from Lake Titicaca, the former from 10–60 fathoms, the last from marshy spots near the lake. Faxon, Bull. Mus. C. Z. iii. pp. 362–374, all figured in woodcuts.

*Hyale nilssoni* (Rathke) and *lubbockiana* (Sp. Bate, as *Nicea*) specifically distinct; Stebbing, Ann. N. H. (4) xvii. pp. 337–340, pl. xviii. figs. 1 & 2.

*Hyale villosa*, sp. n., S. F. Smith, Bull, U. S. Mus. No 3, p. 58, Kerguelen Island.

### Gammaridæ.

*Lysianassa kidderi*, sp. n., S. F. Smith, *l. c.* No. 3, p. 59, Kerguelen Island.

*Stegocephalus ampulla* (Phipps), oral structure; Schiödte, Nat. Tids. (3) x. p. 233, pl. iv. figs. 6–9.

*Anonyx obesus* (Spence Bate) = *Acidostoma obesum* (Lillj.), found in the South British Seas; Stebbing, Ann. N. H. (4) xvii. p. 75.

*Anonyx lagena* (Kr.), Heller, Denk. Ak. Wien, xxxvi. (1875) p. 29, pl. i. figs. 6–15. Its oral structure examined by Schiödte, Nat. Tids. (3) x. pp. 226 & 227, pl. vii. figs. 1–5.

*Aristias tumidus* (Kr.), Heller, *l. c.* p. 30, pl. ii. figs. 1–7.

*Onisimus litoralis* (Kr.), *id. l. c.* p. 31, pl. ii. figs. 8–15.

*Amphilochus concinna* [*-us*], sp. n., Stebbing, Ann. N. H. (4) xviii. p. 443, pl. xix. fig. 1, Torbay.

*Danaïa dubia* (Bate) described from Torbay specimens, *id. l. c.* p. 444, pl. xix. fig. 2.

*Urothoe marina* (Bate) lives in company with a Spatangid, *Echinocardium cordatum* (Penn.), in the holes which the latter makes in the sand; Giard, CR. lxxxii. p. 76, with some notes on the pretended species of *Urothoe*; abstract in Ann. N. H. (4) xvii. pp. 261–263.

*Probolium polyprion* (Costa, 1853) = *megacheles* (Heller), found at Marseilles on the outside of a ship coming from Pondicherry, fully described; Catta, Ann. Sci. Nat. (6) iii. No. 1, pp. 15–27, pl. ii. fig. 1.

*Lilliehorgia normani* (Stebbing); complete specimen described by the author, *l. c.* p. 76, pl. v. fig. 4.

*Atylus ? australis* (Miers ?), specimens from Kerguelen Island; S. F. Smith, Bull. U. S. Mus. No. 3, p. 61.

*Laphystius sturionis* (Kr.), oral structure, Schiödte, Nat. Tidsk. (3) x. pp. 237–242, pl. v. figs. 9–18.

*Cleippides quadricuspis*, sp. n., Heller, Denk. Ak. Wien, xxxvi. (1875) p. 32, pl. iii. fig. 16, Arctic Sea.

*Gammarus puteanus* (Koch). P. de Rougemont, Naturges. Gamm. [*supra*, p. 2] pp. 26–40, from observations made at Munich and Neuchatel, comes to the conclusion that this animal is able at a very early stage to produce eggs, even when it has attained no more than one-tenth of its maximum size, but that it undergoes considerable transformations by subsequent moults. He distinguishes the following 5 forms, or stages of development, all of them being found in the same well at Munich :— I. *G. minutus* (Gervais) = *Crangonyx subterraneus* (Bate); II. *Niphargus kochianus* (Bate); III. *G. puteanus* (Caspari, Hosius) = *N. fontanus* (Bate); IV. *G. puteanus* (Koch); V. *N. stygius* (Schiödte) = *G. puteanus* (Lavalette, Plateau); VI. a very large specimen, 85 mm. in length, including the antennæ and caudal appendages, the body alone 33 mm. The differences are situated chiefly in the appendages of the post-abdominal segments and in the development of the prehensile hand. He thinks therefore that the genera *Niphargus* and *Crangonyx* are to be cancelled.

*Melita gladiosa* (Bate); both sexes described from British specimens by Stebbing, Ann. N. H. (4) xvii. pp. 77.

*Amathillopsis*, g. n., body, with at first two pairs of feet, as in *Amathilla*, feelers as in *Gammaracanthus*. *A. spinigera*, sp. n., Heller, Denk. Ak. Wien, xxxvi. p. 35, pls. iii. & iv., Arctic Sea, depth of 240 mètres.

*Microdeuteropus bidentatus*, sp. n., *id. l. c.* p. 73, pls. iv. fig. 1, v. fig. 1, Salcombe.

*Kroyeria arenaria* (Bate): generic difference from *Monoculodes* not reliable; *id. l. c.* p. 76, pl. iv. fig. 3.

*Amphithoe penicillata* (Costa, 1853) = *desmaresti* (Bate), found on a ship coming from Pondicherry to Marseilles and described; Catta, Ann. Sci. Nat. (6) iii. No. 1, pp. 27–31, pl. ii. fig. 2.

*Callimerus*, g. n. No generic character given; coxæ of all pairs of thoracic feet denticulate, those of the last three membranaceous. *C. acudigitata*[*-tus*], sp. n., Stebbing, Ann. N. H. (4) xviii. p. 445, pl. xx. fig. 3, Torbay.

*Exunguia stilipes* (Norman), ? = *Cratippus tenuipes* (Bate), described from Torbay specimens living within *Halichondria panicea*; id. *l. c.* pp. 447–449, pl. xx. fig. 4.

## Hyperiidæ.

*Themisto libellula* (Mandt.): its oral structure examined, and real analogies with that of the *Libellulidæ* pointed out; J. C. Schiödte, Nat. Tids. (3) x. (1875) pp. 229–232, pl. viii. and translated in Ann. N. H. (4) xviii. p. 295.

*Cystisoma neptuni* (Guérin) observed between Gibraltar and Madeira, as well as in the China Sea, by Willemoës-Suhm, P. R. Soc. xxiv. p. 570; Z. wiss. Zool. xxvi. p. lv. [*cf.* Phil. Tr. 1873, and Tr. L. S. 1875, p. 24].

A blind Amphipod of this family, about 70 mm. long, from deep water in the China sea; Willemoës-Suhm, Z. wiss. Zool. xxvi. p. lv.

Note on a gigantic Amphipod, 60 mm. long, dredged in the southern Indian Sea, between 1375 and 1600 fathoms; *id.* P. R. Soc. xxiv. p. 587.

### Caprellidæ.

*Caprella septentrionalis* (Kr.), oral structure; Schiödte, Nat. Tids. (3) x. p. 224, pl. v. figs. 1–8.

*Proto goodsiri* (Bate) found at Salcombe, it is perhaps only a more advanced stage of *P. pedata* (Müll.); Stebbing, Ann. N. H. (4) xvii. p. 78.

### Cyamidæ.

*Cyamus ovalis* (Rouss.), oral structure; Schiödte, Nat. Tids. (3) x. pp. 234–237, pl. vi.

## ISOPODA.

### Tanaidæ.

*Crossurus vittatus* (Rathke) with eggs, found at Salcombe; Stebbing, *l. c.* p. 78.

*Apseudes latreillii* (Bate & Westw.) found at Salcombe, with note on its antennæ; *id. l. c.* p. 79.

*Tanais.* A blind species at the depth of 1400 fathoms in the Atlantic; Willemoës-Suhm, P. R. Soc. xxiv. p. 574.

### Anthuridæ.

*Anthura carinata* (Kr.), oral structure minutely described by Schiödte, *l. c.* pp. 211–222, pl. iv., with pls.; an English translation in Ann. N. H. (4) xviii. pp. 253–260. The author thinks that it should be placed near the *Cymothoidæ*.

*Paranthura arctica*, sp. n., H. Heller, Denk. Ak. Wien, xxxvi. (1875), p. 38, pl. iv. figs. 9–12, Arctic Sea, depth of 220 mètres.

### Idoteidæ.

*Idotea elongata*, sp. n. (name without description, 1847), Miers, Ann. N. H. (4) xvii. p. 225, Auckland Islands.

*Arcturus*: species found in the depths of the Atlantic and Southern Indian Sea; Willemoës-Suhm, P. R. Soc. xxiv. pp. 574 & 586.

### Munnopsidæ.

Several species found in the depths of the Atlantic and Southern Indian Sea; *id. ibid.*

## Asellidæ.

*Asellus sieboldi* in the depths of the lakes of Switzerland, and in deep wells at Munich, scarcely differs from *A. aquaticus*, except in its rudimentary eyes and more developed antennæ; Rougemont, "Fauna der dunkeln Orte," p. 9. [Doubtless = *A. cavaticus* (Schiödte), see Zool. Rec. viii. p. 192, x. p. 190; but in spite of the double name the animal has not yet been properly described, as far as the Recorder knows.]

*Jæra albifrons* (Leach) and *nordmanni* (Bate) are specifically distinct, the latter occupying a higher zone and remaining smaller in size; Stebbing, Ann. N. H. (4) xvii. p. 79, pl. v. figs. 5–7.

*Limnoria lignorum* (Rathke) = *terebrans* (Leach), injurious to telegraph cables; Deutsche allgemeine polytechnische Zeitung, 1876, No. 3. [See Zool. Rec. xii. p. 226.]

## Oniscidæ.

*Armadillo inconspicuus*, sp. n., Miers, Ann. N. H. (4) xvii. p. 225, New Zealand.

*Cubaris rugulosus*, sp. n., *id. l. c.* p. 225, New Zealand.

*Porcellio graniger* and *zealandicus*, sp. n. (names without description, 1847), *id. l. c.* p. 226, New Zealand.

*Scyphax intermedius*, sp. n., *id. l. c.* p. 227, New Zealand.

## Serolidæ.

*Serolis bromleyana*, sp. n., Willemoës-Suhm, P. R. Soc. xxiv. p. 591, found near the ice-barrier in the Antarctic Sea from 1975 fathoms. Species at Kerguelen Island; *id. l. c.* p. 590. *S. tuberculata* (Grube) from Bass's Straits; remarks by Schmeltz, J. Mus. Godeffr. xii. p. 161.

## Sphæromidæ.

*Isocladus*, g. n., for *Sphæroma armata* (M.-Ed.) and *spinigera* (Dana), from New Zealand, having subequal appendages of the pleon, seventh segment of pereion armed with a long median dorsal spine, and terminal segment of the pleon narrowing and pointed at the extremity. Miers, Ann. N. H. (4) xvii. p. 228.

*Cymodocea granulata* and *granulata*, spp. nn., *id. l. c.* p. 229, New Zealand, the former also from Tasmania and Flinders' Island.

## Cymothoidæ.

*Ceratothoa lineata*, sp. n., Miers, *l. c.* p. 227, New Zealand.

*Livoneca novæ-zealandiæ*, sp. n., *id. l. c.* p. 228, New Zealand.

*Cirolana rossi*, sp. n. (name without description, 1847), *id. ibid.*, New Zealand and Auckland Islands.

## BRANCHIOPODA.

A. Gerstäcker has published a new part (21) of his general treatise on the *Crustacea* [title *suprà*, p. 1], discussing the development of *Cypris*, *Argulus*, *Daphnia*, and other *Cladocera*, *Limnetis*, *Estheria*, *Limnadia*, *Artemia*, *Branchipus*, and *Apus*; and giving an historical review of the classification proposed by different authors for these animals, which he comprehends in one order, *Branchiopoda*.

## PHYLLOPODA.

### Branchipodidæ.

*Branchipus australiensis*, sp. n., F. Ritchers, J. Mus. Godeffr. xii. pp. 43 & 44, pl. iii. Peak Downs, E. Australia, 300 miles inland.

*Artemia salina* (L.) and *muehlhauseni* (M.E): W. J. Schwankowitsch's observations [Zool. Rec. xii. p. 228] extracted in Ann. N. H. (4) xvii. pp. 256–258.

### Limnadiidæ.

*Estheria ticinensis* (Crivelli), larva; Claus, Untersuch. Crust. syst. p. 101, pl. xix. figs. 1 & 2.

*Lymnetis* [*Limn-*] *brevifrons*, sp. n., Packard, Bull. U. S. Geol. Surv. ii. p. 172 (with woodcuts representing distinctive characters of several species), Kansas.

## CLADOCERA.

Claus makes many interesting observations on the structure of the *Cladocera*, especially of *Daphnia*, but comparing that of other genera; he describes the nerves of the eye, cervical organ, and feelers, the ventral chain of ganglia, the muscles of the œsophagus, the intestine, the peculiar "organ of fixation" (haft-organ) in the neck, which he thinks to have an excretory function, at least in the genus *Sida*, the heart, which he finds always provided with two lateral venose slits, the ovarium, the formation of the eggs, &c. Z. wiss. Zool. xxvii. pp. 362–402, pls. xxv.–xxviii.

### Sididæ.

*Sida crystallina* (Müll.). The number of natatory bristles in the second pair of antennæ is variable; Hudendorff, Bull. Mosc. l. p. 29.

### Daphniidæ.

*Ceriodaphnia quadrangula* (Müll.). Ephippium and male specimens described; *id. l. c.* p. 38.

Ilyocryptina *flagellata*, sp. n., *id. l. c.* p. 39, Belo-Omut, Govt. Rjäsan, Central Russia.

[The *Eurycercia longispina*, Klunz., *nec* Müll., renamed *similis*, ? = *atkinsoni* Kosw.] Jerusalem and Egypt; Claus, Z. wiss. Zool. xxvii. pp. 363

*Streblocerus serricaudatus* (Fischer, as *Daphnia*) = *D. laticornis*, Fischer, 1849, *nec* Jurine, redescribed by Hudendorff, *l. c.* p. 41, pl. ii. fig. 2.

### Lyncodaphnidæ.

*Ophryoxus paradoxurus*, sp. n., *id. l. c.* p. 43, pl. ii. fig. 1, River Wyg, near Archangel.

### Lyncidæ.

*Eurycercus lamellatus* (Müll.): parts of the feet and branchial appendages of the fourth and fifth pair described by Hudendorff, *l. c.* pp. 48 & 49, pl. ii. fig. 3. According to him the description given by Gerstäcker is wrong in some points.

*Acroperus alonoides*, sp. n., Hudendorff, *l. c.* p. 51, pl. ii. fig. 4, Rjäsan, Central Russia. *A. leucocephalus* (Koch?): antennæ described and a variety indicated; *id. l. c.* p. 51.

*Alona inornata*, *tuberculata*, and *angusticaudata*, spp. nn., *id. l. c.* pp. 53–55, pl. ii. figs. 5–7, Rjäsan.

*Pleuroxus gracilis*, sp. n., *id. l. c.* p. 57, pl. ii. fig. 8, Rjäsan.

### Polyphemidæ.

A. Weismann, in a paper on the formation of winter eggs in *Leptodora Hyalina*, completes his former observations [see Zool. Rec. xi. p. 216]; out of several germs, the origin and first growth of which are quite equal, only one comes to perfection as a winter egg, the others stopping in their development as soon as the available stock of nourishment is exhausted, and themselves becoming the food of the one remaining. Where only one germ is present, it is never fully developed into a winter egg, the surrounding nourishment not being sufficient. Z. wiss. Zool. xxvii. pp. 51–112, pls. v.–vii.

## OSTRACODA.

*Cypris*: larval stages discussed and figured; Claus, Untersuch. Crust. syst. pp. 28 & 99, with woodcuts.

*Asterope* (Phil.). Its structure discussed, and the many differences from the rest of the *Cypridinidæ* pointed out; to this genus belongs also *Cypridina oblonga* (Grube), ? = *Cylindroleberis teres* (Norman): *id. l. c.* pp. 92–94, pl. xvii.

*Cypridina stellifera* (Claus) and *mediterranea* (Costa); *id. l. c.* p. 97, pl. viii. figs. 1–6.

General remarks on the shells of the *Cypridinidæ*; id. *l. c.* p. 94, foot-

Note on gigantic Ostracod, 25 mm. long, dredged in the South Indian Ocean; Willemoës-Suhm, P. R. Soc. xxiv. p. 587.

## COPEPODA.

### Calanidæ.

*Diaptomus.* Nauplius- and Metanauplius-stage; Claus, Untersuch. Crust. syst. p. 75, pl. xix. figs. 3–5.

*Temora velox* (Lilj.) found in the stomach of *Alausa vulgaris* (Val.); its eggs and spermatophores described. Weber, Arch. f. Nat. xlii. pp. 168–178, pl. vii.

### Lichomolgidæ.

*Sabelliphilus sarsi* (Claparède). The male, as well as the buccal organs and the large single eye of the female, described; C. Claus, Z. wiss. Zool. xxvi. pp. 161–165, pl. x.

### Caligidæ.

*Caligus lacustris* (Stp.). The male found on the gills of *Perca fluviatilis*, at Hamburgh, and described; F. Richters, Verh. Ver. Hamb. ii. pp. 244 & 245.

*Lernæonema abdominale* (M. E.) lives on *Boreogadus productus* (Gthr.), and another undetermined Lernæid on *Syngnathus acicularis*, on the coast of Peru; Schmeltz, J. Mus. Godeffr. xii. p. 160.

## CIRRIPEDIA.

Development of the *Cirripedia* discussed and compared with that of the Copepods; and the chrysalis-like stage of *Balanus* and *Lepas* described and figured; Claus, Untersuch. Crust. syst. pp. 79–90, pl. xvi.

*Lepas fascicularis* (Ellis); its embryology and metamorphosis described, Nauplius-stage (*Archizoea*, Dohrn) attaining a size of 12–14 mm., freely swimming somewhat below the surface of the sea, and second Cypris-like stage attached to dead specimens of *Velella* on the surface. This is the first time that the whole metamorphosis of a Cirriped from the egg to the adult form has been observed and described. Willemoës-Suhm, Phil. Tr. clxvi. pp. 131–154, pls. x.–xv. Abstract in P. R. Soc. xxiv. pp. 129–132, and Z. wiss. Zool. xxvii. pp. cvii. & cviii.

*Scalpellum* (Leach) is widely distributed in the greater depths, and is the only Cirriped which was often met in depths from 950–2850 fathoms; *id.* P. R. Soc. xxiv. pp. 574 & 592. *S. strœmi* (Sars), Heller, Denk. Ak. Wien, xxxvi. (1875), p. 39, pl. iv. figs. 13 & 14, Arctic Sea.

## ARANEIFORMIA.

[See Pycnogonidea, in the Arachnida, *infrâ*.]

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# ARACHNIDA.

BY

THE REV. O. P. CAMBRIDGE, M.A., C.M.Z.S.

## LIST OF PUBLICATIONS.

BIRCHALL, EDWIN. A plague of Spiders. Ent. M. M. xiii. pp. 42–44.

Observations are made upon a large number of spiders on the shores of Onchan Bay, near Douglas, in the Isle of Man, the number on a shingly bank 250 yards long by 12 wide, at a low estimate of 10 to the square foot, calculated to be 270,000. The species conjectured to be *Lycosa saccata*, Walck. [This spider is not usually found in such a situation; there are several other allied species, to either of which it may more probably have belonged, most likely to *L. pallida*, Bl., = *L. fluviatilis*, Bl., and *L. arenaria*, Westw.]

BUTLER, A. G. On a small collection of *Arachnida* from Queensland, with descriptions of three apparently new species. Cist. Ent. i. pp. 349–354, pl. x.

Contains 19 species of various families; one species of *Gasteracanthides* and two of *Epeirides* being described as new.

——. Preliminary notice of new species of *Arachnida* and *Myriopoda* from Rodriguez, collected by Messrs. George Gulliver and H. H. Slater. Ann. N. H. (4) xvii. pp. 439–446. [*Arachnida*, pp. 439–444.]

Describes 10 new species of various families and genera of *Araneidea*, and one species of *Acaridea*.

RADLEY, H. H. B. The Araneides of the "Chevert" Expedition. Pt. i. M P. Linn. Soc. N. S. W. i. pp. 137–150.

3 species of *Gasteracanthides* and *Epeirides* are recorded, 8 being cribed as new.

[Bradley, H. H. B.] On some new forms of *Arachnidæ*. Tow
pp. 220–224, pl. ii. Soutl

Characterizes two new genera, and describes three new specie
families of *Araneidea*, from Queensland and New Guinea. al treatise

——. On a new genus of *Arachnidæ*. Tom. cit. pp. 240 & 241. of Cypris,

Cambridge, O. P. On a new Order and some new genera of *Arachnida* from Kerguelen's Land. P. Z. S. 1876, pp. 258–265, pl. xix.

Characterizes [doubtfully] a new order of *Arachnida*; also two new genera and four new species of four families of *Acaridea*, together with a new genus and species of *Araneidea*.

——. Catalogue of a collection of Spiders made in Egypt, with descriptions of new species, and characters of a new genus. *Tom. cit.* pp. 541–630, pls. lviii.–lx.

The catalogue contains 164 species of numerous genera and families; 64 new species are described, and one genus of the family *Lycosides* is characterized as new. A list is added of Egyptian spiders recorded by other authors, but not contained in the catalogue; these make up the known species indigenous to Egypt to 226. The Spiders of Palestine are also compared (in respect to their families and genera) with those of Egypt, and also with those of Great Britain. The number of species common to Palestine and Egypt is 48. The number of genera in Egypt is 60, distributed amongst 18 families, those most numerously represented being the *Drassides*, *Agelenides*, *Theridiides*, *Epeirides*, *Thomisides*, *Lycosides*, and *Salticides*.

Canestrini, G. Osservazioni Arachnologiche. Atti Soc. Pad. iii. pp. 206–232, pls. viii.–x.

Records 20 species of *Araneidea*, of which several are described and figured; three (of the genus *Prosthesima*, L. Koch) being considered new. A list is given of 46 species of *Opilionidi* [*Phalangidea*], with descriptions of several *Trogulides* and figures of three other Phalangids. One of the *Trogulides* is new. A list is also given of 25 species of *Chernetidi* [*Pseudo-Scorpiones*]; 11 are described, and of these 3 are new.

——. & Fanzago, F. Nuovi Acari Italiani. *Op. cit.* v. fasc. i. pp. (sep. copy) 1–15.

Describes 20 species of various genera and families of *Acaridea*; one family and all the species new.

Cavanna, G. Studi e Ricerche d'Aracnologia. Bull. Ent. Ital. viii. pp. 87–97, 208–221, 271–291, pl. ii.

Chiefly the results of the author's studies of Calabrian spiders, consisting of:—1, Observations on the want of the median eyes in a specimen of *Segestria florentina*, Rossi (figs. 1 & 2); 2, descriptions of a new genus and species of *Epeiridæ*; 3, dimorphism in *Linyphia montana*, Walck., *Chiracanthium nutrix*, W., and *C. italicum*, Can. & Pav., *Meta mariana* and *M. segmentata*; 4, observations on various Calabrian *Epeiridæ*; on nidification of European spiders (figs. 12–14); 6, observations on European *Episini*, with one new species. mens

HERBERT, LUDWIG. Ueber die Bildung des Blastoderms bei den Spinnen. Z. wiss. Zool. vi. pp. 470–485, pls. xxix. & xxx.

[The Recorder has not seen this paper.]

KOCH, LUDWIG. Arachniden in "Die zweite Deutsche Nordpolarfahrt in den Jahren 1869 und 1870 unter Führung des Kapitän Karl Koldewey, herausgegeben von dem Verein für die Deutsche Nordpolarfahrt in Bremen." ii. Wissenschaftliche Ergebnisse; Zoologie, 9, Arachniden, pp. 400–403, pl. i. [Omitted from Zool. Rec. xi.]

Describes and figures a new species of *Lycosa*.

——. Verzeichniss der in Tirol bis jetzt beobachteten Arachniden nebst Beschreibungen einiger neuen oder weniger bekannten Arten. Z. Ferd. (3) xix. pp. 221–354.

This paper collects the results of Tyrolean Arachnology. 436 species of 94 genera of *Araneidea* (distributed amongst 14 families) are recorded, 15 species being described as new. 91 are from North, and 138 species from South Tyrol; 207 are found in both North and South. Also 44 species of *Phalangidea*: 7 in North and 14 in South Tyrol; 24 being common to both. 14 species of *Pseudo-scorpiones*: 2 from North, 9 from South Tyrol, and 3 common to both. *Scorpiones*, 3 species: South Tyrol 2, the other common to North and South. *Ixodides*: 3 species, all in South Tyrol. 149 species of *Arachnida* (130 being *Araneidea*) are found in the high Alpine regions of Tyrol, at an elevation of 5500 feet and upwards; among these the single genus *Erigone* monopolizes 31 species. The works from which the above results are chiefly obtained are six papers by Koch himself—1861–1872—and others by Anton Ausserer, Giovanni Canestrini, O. P. Cambridge, Pietro Pavesi, and T. Thorell.

——. Die Arachniden Australiens, nach der Natur beschrieben und abgebildet. Nürnberg: 1876, pts. 17–19, pp. 741–888, pls. lxv.–lxxvi.

The continuation of the work (*cf.* Zool. Rec. xii. p. 239).

105 species, of which 47 are new to science, are described. One new genera of *Stephanopides*, and two of *Thomisides* are characterized.

KRAMER, P. Beiträge zur Naturgeschichte der Milben. Arch. f. Nat. 1876, pp. 28–45, pl. iii.

[The Recorder has not seen this paper.]

——. Zur Naturgeschichte einiger Gattungen aus der Familie der Gamasiden. *Tom. cit.* pp. 46–105.

[The Recorder has not seen this paper.]

MENGE, A. Preussische Spinnen. viii. Fortsetzung. Schr. Ges. Danz. (n. f.) iii. pp. 423–454, pls. lxxi.–lxxv.

Continues the work (of which previous parts have been recorded in

former volumes of Zool. Rec.) and comprises a portion of the family *Thomisides*. 2 new genera are characterized, and out of 20 species described, 3 are new.

PAVESI, PIETRO. Le prime crociere del "Violante," comandato dal Capitano-Armatore Enrico D'Albertis. Risultati Aracnologici, pp. 407–429. Catalogo generale sistematico degli Aracnidi raccolti col "Violante," e descrizione di specie nuove o poco note, pp. 430–451. Ann. Mus. Genov. viii.

3 species of *Scorpiones*, 53 of *Araneidea*, 3 of *Phalangidea*, and 1 of *Acaridea* are contained in this portion of the work. All (except 2, a Phalangid and an Acarid) are of known species. The *Araneidea* are comprised in 35 genera, belonging to 14 families. The localities in which the above were chiefly found are the various islands in the Mediterranean.

——. Gli Aracnidi Turchi. Atti Soc. Ital. xix. fasc. i. pp. (sep. copy) 1–27.

European Turkey only (including the Ionian Islands and Greece) appears to be intended. 5 species of *Scorpionides*, 76 of *Araneidea*, 8 of *Phalangidea*, 3 of *Solpugidea*, 6 of *Pseudo-Scorpiones*, and 1 of *Acaridea* are recorded. The *Araneidea* are comprised in 11 families and 41 genera.

SIMON, EUGÈNE. Étude sur les Arachnides du Congo. Bull. Soc. Zool. Fr. i. pp. 12–15, 215–224.

Refers to *Thelyphonidea*, *Araneidea*, *Dinopides*, and *Scorpionidea*. One new genus and ten new species are characterized.

——. Les Arachnides de France, iii. Contenant les Familles des *Attidæ*, *Oxyopidæ*, et *Lycosidæ*. Pp. 1–360, pls. viii.–xi. [pl. viii. belongs to vol. vii.]

The general treatment is similar to that of the preceding volume (*cf.* Zool. Rec. xii. p. 242). 35 genera (of which 10 are new) are characterized: *Attidæ*, 27, *Oxyopidæ*, 1, *Lycosidæ*, 7. The first of these 3 families contains 136 species, 6 being new; the second, 3 species, of which 1 is new; and the third, 81 species, of which 25 are new. The new genera are *Attidæ*, 9, *Lycosidæ*, 1. The total number of species is 223, of which 32 are described as new.

——. Études Arachnologiques. 4e Mémoire. Ann. Soc. Ent. Fr. (5) vi. pp. 57–91, pl. iii.

Contains, vi., a revision of the European species of the group of *Lycosa tarentula*, Rossi (nine new species are described); vii., description of a new species of *Cælotes* from France.

STECKER, ANTON. Die Entwickelung der Chthonius-Eier im Mutterleibe, und die Bildung des Blastoderms. SB. böhm. Ges. 1876, Heft 3, pp. (sep. copy) 1–13, with woodcuts.

The different phases of the development of the ova of *Chthonius* are

fully and minutely detailed, and the following important position is laid down, that there is "an agreement between the *Amphigastrula* of *Chthonius*, or rather of the *Chernetidæ*, and the corresponding embryonal structures, not only of the *Vermes* and *Arthropoda*, but also of the *Mollusca* and *Vertebrata*. For an English translation of this paper, by W. S. Dallas, see Ann. N. H. (4) xviii. pp. 197–207.

——. Anatomisches und Histologisches über *Gibocellum*, eine neue Arachnide. *Tom. cit.* pp. 298–346, pls. xvii.–xx.

An exhaustive treatise on the anatomy and histology of the curious Arachnid, *Gibocellum sudeticum*, Stecker (Zool. Rec. xii. p. 259). A short general introduction is followed by the first division of the work, in three chapters, pp. 296–309, pl. xvii., on the external structure. The second division comprises seven chapters, pp. 309–341, pls. xviii.–xx., on the internal anatomy. The third division treats upon the classification of *Gibocellum*, its place being considered to be in the family *Cyphophthalmidæ*, a subordinate group of the order *Opiliones*.

[illegible]IAS, FRIEDRICH A. W. Beschreibung neuer oder minder gekannter Acaro-cecidien (Phytoptus Gallen) 1877. N. Act. L.-C. [illegible] xxxviii. pp. 255–288, pls. ix.–xi.

[The Recorder has not had an opportunity of studying this paper.]

THORELL, T. Sopra alcuni Opilioni (*Phalangidea*) d'Europa e dell' Asia occidentale, con un quadro dei generi europei di quest' Ordine. Ann. Mus. Genov. viii. pp. 452–508.

The author reviews the literature of the subject, and states the principles of the classification he intends to follow. Details are given of various structural characters of the order, those being particularly noted upon which it is conceived that generic and specific characters should be based. This introductory portion, pp. 452–461, is in Italian, the remainder in Latin. A synopsis of the European families and genera of the order is given, pp. 462–470, the ordinal, family, and generic characters being fully detailed. Four new genera are characterized and fourteen new species described.

——. Descrizione di alcune specie de Opilioni dell' Arcipelago Malese appartenenti al Museo civico di Genova. Ann. Mus. Genov. ix. (1876) * pp. 111–138.

Five new genera of the order *Phalangidea* (*Opiliones*, Sund.) are characterized, and eight new species described from the Malay Archipelago.

——. On the Classification of Scorpions. Ann. N. H. (4) xvii. pp. 1–15.

The author proposes a modification of the scheme adopted by Peters in his work, "Ueber eine neue Eintheilung der Skorpione," 1861. The latter author established four groups, based on the form of the sternum and the various toothing of the falces; passing over the eyes,

* Vol. ix. is not yet published.—ED., 1878.

according to the number of which Scorpions had previously been arranged by all authors, excepting Gervais. Thorell attaches less importance to the denticulation of the falces, but finds a better character for distinguishing "families" in the form of the pectoral combs, the structure of which he minutely describes. For subfamilies and genera, the characters relied upon by Peters and others are used, as well as some taken from the denticulation of the "palp-fingers" [digital joints of the palpi]. The families established are four in number, and eleven new genera are characterized.

WAJGLA, LEOPOLDA. Pajeczaki Galicyjske (Arachnoidea Haliciæ). Kolomea: 1874, pp. 1–36.

A list of 257 known species of Galician Arachnids. 232 are of the order *Araneidea* and 25 of the order *Phalangidea*. The Recorder is unable to give any further account of this paper, excepting that the families and genera are all briefly characterized. The *Araneidea* are comprised in 48 genera, belonging to 9 families; the *Phalangidea* form one family, divided into 8 genera.

WOODWARD, H. On the Discovery of a Fossil Scorpion in the British Coal Measures. J. G. Soc. xxxii. pp. 57–59, pl. viii.

Besides the scorpion referred to in the title of this paper, two others are figured and referred to. A list is also given, *l. c.* p. 63, of all the Arachnids yet known to have been discovered in the Coal Measures. These are SCORPIONIDEA: *Scorpiones*, 5 species, belonging to 4 genera; *Pseudo-scorpiones*, 3 species, belonging to 2 genera. ARANEIDEA, 3 species, belonging to 3 genera.

WRIGHT, E. PERCEVAL. Notes of a Tour in the Spring and Summer of 1868 to Sicily and Portugal. P. Soc. Dubl. v. pp. 85–108.

A list of 67 species of various families of *Araneidea* (all Sicilian) is contained in this paper, pp. 85–89, pls. vi. & vii. [The new species have been described by Blackwall, in J. L. S. x. pp. 405–434, pls. xv. & xvi.]

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H. LUCAS, Bull. Soc. Ent. Fr. (5) vi. p. clxi., adds 12 to his list of species found near Paris [Zool. Rec. xii. p. 240].

A large spider observed to drop 10 or 15 feet from a tree on to a minnow swimming on the surface of a spring in Alabama. The spider bit this fish on the back of the neck, and adhered to it till it died (communicated by the Smithsonian Institution). T. M. Peters, Am. Nat. x. p. 688.

## ARANEIDEA.

### THERAPHOSIDES.

R. GILLIES, Tr. N. Z. Inst. viii. pp. 222–262, pls. vi.–viii., gives a long and interesting account of the nests of trap-door spiders found

in the Otago-Oamaru district. The spiders are not specifically determined.

*Idiops aussereri*, sp. n., Eugène Simon, Bull. Soc. Zool. Fr. i. p. 223, Landana, River Congo.

### Filistatides.

*Filistata puta*, ♀, sp. n., O. P. Cambridge, P. Z. S. 1876, p. 544, Egypt.

### Œcobiides.

*Œcobius putus*, p. 544, pl. lviii. fig. 1, and *Œ. templi*, p. 545, pl. lviii. fig. 2, spp. nn., O. P. Cambridge, *l. c.* Egypt.

### Dysderides.

*Harpactes canestrinii*, sp. n., L. Koch, Z. Ferd. (3) xix. pp. 259 & 319, Tyrol.

*Oonops scutatus*, p. 547, pl. lviii. fig. 2 a, and *O. pauper*, p. 549, spp. nn., O. P. Cambridge, *l. c.* Egypt.

### Drassides.

*Gnaphosa thressa*, sp. n., Pietro Pavesi, Atti Soc. Ital. xix. fasc. i. p. 18 (sep. copy), Constantinople.

*Prosthesima napæa*, pp. 254 & 304, Bad Ratzes, Tyrol, and *P. apricorum*, pp. 254 & 307, Völs, Tyrol, spp. nn., L. Koch, l. c. *P. dentina*, p. 207, fig. 7, *P. anauniensis*, p. 208, figs. 6 & 9, and *P. prognatha*, p. 209, fig. 8, spp. nn., G. Canestrini, Atti Soc. Pad. iii. fasc. ii. pl. x., Trentino.

*Clubiona abdita*, sp. n., L. Koch, *l. c.* pp. 57 & 314, Tyrol.

*Chiracanthium letochæ*, sp. n., *id. l. c.* pp. 255 & 309, Chir, Tyrol.

*Chiracanthium nutrix*, Walck. Auguste Forel, Bull. Soc. Vaud. xiv. pp. 30–32, states that he has, from personal experience, proved the venomous nature of the bite of this spider. The effects are general indisposition, cold sweat, and an inability to walk, for some minutes, without help; these symptoms soon subside, but the wound continues painful for some days.

*Agræca chrysea*, sp. n., L. Koch, *l. c.* pp. 257 & 315, Nürnberg.

*Agræca brunnea*, Blackw. A. W. M. van Hasselt, in Tijdschr. Ent. xix. pp. 28–42, speaking of the pear-shaped nest formed by this spider, comes to the conclusion that there are two or more species of *Agræca* constructing somewhat similar nests, but differing in size; and that the outer covering of clay may be a specific character. [*Cf.* Arch. Néerl. xi. pp. 117–130, pl. xi., which contains a French translation of the above.]

### Dictynides.

*Dictyna conducens*, fig. 3, and *D. condocta*, fig. 4, p. 556, pl. lviii., spp. nn. O. P. Cambridge, P. Z. S. 1876, Egypt.

### Agelenides.

*Celotes leveillii*, sp. n., Eugène Simon, Ann. Soc. Ent. Fr. (5) vi. p. 92, Quintin, Côtes-du-Nord, France.

*Enyo expers*, sp. n., O. P. Cambridge, *l. c.* p. 560, Egypt.

*Agelena lepida*, sp. n., *id. l. c.* p. 558, Egypt.

*Myro*, g. n. Allied to both *Tegenaria* and *Agelena*, for *M. kerguelenensis*, sp. n.; *id. l. c.*, p. 263, pl. xix. 5.

*Cryphœca lichenum*, sp. n., L. Koch, *l. c.* pp. 248 & 297, Duxer Thale, Lannersbach, Hinterdux Brunecker Alpe, and St. Jacob in Defereggen.

### Hersiliides.

*Hersilidia lucasi*, sp. n., O. P. Cambridge, *l. c.* p. 562, pl. lviii. fig. 5, Egypt.

### Scytodides.

*Scytodes kochi*, sp. n., *id. l. c.* p. 564, Egypt.

### Pholcides.

*Pholcus vexillifer*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 441, Rodriguez. *P. semicaudatus*, sp. n., O. P. Cambridge, *l. c.* p. 565, Egypt.

### Theridiides.

*Episinus maculipes*, sp. n., G. Cavanna, Bull. Ent. Ital. viii. p. 288, Calabria.

*Theridion spinitarsis* and *T. melanostictum*, spp. nn., O. P. Cambridge, *l. c.* p. 570, Egypt..

*Steatoda signata*, sp. n., *id. l. c.* p. 568, Egypt.

*Euryopis quadrimaculata*, sp. n., *id. l. c.* p. 569, Egypt.

*Linyphia extricata*, sp. n., *id. l. c.* p. 572, pl. lix. fig. 7, Egypt.

*Pachygnatha argyrostilba*, sp. n., *id. l. c.* p. 573, pl. lix. fig. [illegible] Egypt.

### Epeirides.

*Meta monogrammata*, A. G. Butler, Cist. Ent. i. (1875) p. 352, pl. x. fig. 3, Queensland; *M. vacillans*, id. Ann. N. H. (4) xvii. p. 441, Rod.

riguez ; *M. striatipes*, H. H. B. Bradley, P. Linn. Soc. N. S. W. i. p. 148, fig. 8, New Guinea : spp. nn.

*Tetragnatha nero*, sp. n., Butler, *l. c.* p. 442, Rodriguez.

*Nephila instigans*, p. 442, and *N. ardentipes*, p. 443, spp. nn., *id. l. c.* Rodriguez.

*Nephilengys gemmalis*, Gerst., described from River Congo ; Eugène Simon, Bull. Soc. Zool. Fr. i. p. 14.

*Cyclosa caudata*, sp. n., L. Koch, Z. Ferd. (3) xix. pp. 230 & 287, Meran and Saragossa.

*Argiope stictica lis*, sp. n., O. P. Cambridge, P. Z. S. 1876, p. 576, Egypt. *A. variabilis*, p. 141, figs. 3 & 3 *a*, New Guinea, and *A. lunata*, p. 143, fig. 4, Sue and Cocoa Nut Islands, Torres Straits, spp. nn., H. H. B. Bradley, *l. c.*

*Singa affinis*, sp. n., O. P. Cambridge, *l. c* p. 575, Egypt.

*Epeira umbratica*, Clk. The mode in which this spider constructs its web described ; A. P. Ninni, Atti Soc. Pad. iii. p. 204, pls. vi. & vii.

*Epeira macleayi*, p. 145, fig. 5, *E. mastersi*, p. 146, fig. 6, and *E. caudata*, p. 147, spp. nn., H. H. B. Bradley, *l. c.*, New Guinea. *E. byzanthina*, sp. n., allied closely to *E. ceropegia* and *E. adianta*, Pietro Pavesi, Atti Soc. Ital. xix. fasc. i. p. 12 (sep. copy), Constantinople. *E. felina*, sp. n., A. G. Butler, Cist. Ent. i. (1875) p. 351, pl. x. fig. 2, Queensland. *E. suspicax* and *E. atomaria*, p. 577, fig. 9, spp. nn., O. P. Cambridge, *l. c.* Egypt.

## Gasteracanthides.

*Sclerogaster*, g. n., G. Cavanna, Bull. Ent. Ital. viii. p. 89. Allied to *Peltosoma*, Sim. (*Peniza*, Auss.), and *Cyrtarachne* (Thor.), and the author suggests that these may eventually be all united to form a genus near the exotic *Gasteracantha*. For *S. pusillus*, sp. n., *id. l. c.* p. 90, pl. i., figs. 3–11, Arena, Calabria.

*Tholia macleayi*, sp. n., H. H. B. Bradley, *l. c.* p. 140, fig. 2, Palm Island. *T. nasalis*, sp. n., A. G. Butler, *l. c.* p. 349, pl. x. figs. 4 & 5, Queensland.

*Gasteracantha crucifera*, sp. n., H. H. B. Bradley, *l. c.* p. 138, fig. 1, New Guinea.

## Poltides.

*Gerrosoma*, g. n., p. 222, for *G. pap[u]ense*, sp. n., p. 223, pl. ii. fig. 2, and *Rhyncharachne*, g. n., p. 240, for *R. dromodaria* [sic], sp. n., p. 241, fig. 3, H. H. B. Bradley, *l. c.* pl. ii., New Guinea. [There is no doubt but that both these new genera are identical with *Poltys*, Koch.]

## Uloborides.

*Uloborus signatus*, sp. n., O. P. Cambridge, *l. c.* p. 579, Egypt.

### Miagrammopides.

*Miagrammopes gulliveri*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 443, Rodriguez.

### Stephanopides.

*Stephanopis cambridgii*, Thor., described and figured, p. 744, pl. lxv. figs. 3 & 3 A, Gayndah. *S. ornata*, p. 746, pl. lxv. fig. 4 Sydney, and *S. corticalis*, p. 748, pl. lxv. figs. 5 & 5 A, Gayndah, spp. nn. *S. bicornis*, L. Koch, p. 571, pl. lxvi. fig. 1, and *S. hirsuta*, L. K., p. 573, pl. lxvi. figs. 2. 2 A & 2 B, Peak Downs, described and figured. *S. minuta*, sp. n., p. 756, pl. lxvi. figs. 4 & 4 A, Peak Downs; *S. bicuspidata*, L. Koch, p. 757, pl. lxvi. figs. 5, 5 A, & 5 B, Sydney; *S. trapezia*, L. Koch, p. 760, pl. lxvi. figs. 6 & 6 A, Peak Downs; *S. rubro-signata*, L. Koch, p. 762, pl. lxvii. figs. 1, 1 A, & 1 B, ♂, 2 & 2 A, ♀, Sydney; described and figured. *S. augusta*, sp. n., p. 794, pl. lxix. figs. 2 & 2 A, Sydney. L. Koch, Arachniden Australiens.

*Isala*, g. n. (closely allied to *Stephanopis*) for *I. punctata*, sp. n., *id. l. c.* p. 796, pl. lxix. fig. 3 [Australia].

### Chalinurides.

*Chalinura novæ-hollandiæ*, p. 828, pl. lxxi. figs. 1, 1 A, 1 B, 1 C & 1 D, Sydney and Peak Downs, and *C. fickerti*, p. 830, pl. lxxi. figs. 2, 2 A, 2 B & 2 C, New Holland, spp. nn.; *id. l. c.* [These two spiders are the first known living representatives of a genus formed for a fossil spider, *Chalinura longipes*, by Dalman in 1825. L. Koch places them in close proximity to the *Thomisides* as laterigrade spiders; but their true position, judging from the descriptions and figures, *l. c.*, seems rather to be next to the *Hersiliides*.]

### Thomisides.

*Porropis*, g. n. A very peculiar Thomisid genus, allied more nearly perhaps to *Misumena* than to any other. Type, *P. flavifrons*, sp. n., L. Koch, *l. c.* p. 807, pl. lxix. fig. 9, Peak Downs.

*Diæa cæcutiens*, p. 813, pl. lxx. figs. 3 & 3 A, Peak Downs; *D. elegans*, p. 815, pl. lxx. figs. 4, 4 A, 4 B & 4 C, Sydney; *D. circumlita*, p. 817, pl. lxx. figs. 5 & 5 A, Sydney and Rockhampton; *D. prasina*, p. 819, pl. lxx. figs. 6 & 6 A, Sydney; *D. celata*, p. 820, pl. lxx. figs. 7 & 7 A, Rockhampton and Gayndah: spp. nn. *D. pilula*, L. Koch, = *Xysticus pilula*, id. p. 813, and *D. dæmeli*, id., = *Xysticus dæmeli*, ibid., p. 812; *D. rosea*, L. Koch, p. 821, pl. lxx. figs. 8 & 8 A, described and figured, L. Koch, *l. c.*; *D. candicans*, sp. n., O. P. Cambridge, P. Z. S. 1876, p. 580, Egypt.

*Bomis larvata*, L. Koch, p. 798, pl. lxix. figs. 4 & 4 A, Peak Downs, *id. l. c.*

*lactea*, p. 799, pl. lxix. figs. 5 & 5 A, Sydney, and *M.* 01, pl. lxix. figs. 6 & 6 A, Peak Downs, spp. nn., *stulosa*, L. Koch, egg sac described, from Gayndah, p. 801,

*striatipes*, p. 783, pl. lxviii. fig. 5, Peak Downs; *C. similis*, 785, pl. lxviii. figs. 6 & 6 A, Sydney, Rockhampton, and Peak Downs; and *C. cerea*, p. 789, pl. lxix. figs. 1, 1 A, 1 B, 1 C & 1 D, Peak Downs, spp. nn. *C. ocellata*, L. Koch, p. 788, pl. lxviii. figs. 7, 7 A & 7 B, Sydney, described and figured: *id. l. c.*

*Hedana pallida*, sp. n., p. 803, pl. lxix. fig. 7, Tonga Island, *id. l. c.*

*Tharpyna venusta* = *Diæa venusta*, L. Koch, p. 823, and *T. albosignata*, sp. n., p. 791, pl. lxviii. figs. 8 & 9, Sydney and Peak Downs; *id. l. c.*

*Corynethrix*, g. n.; nearly allied to *Oxyptila*, Sim.; type, *C. obscura*, sp. n., pp. 804 & 805, pl. lxix. fig. 8, 8 A, 8 B, 8 C, 8 D, Peak Downs; *id. l. c.*

*Oxyptila guttulata*, sp. n., Pavesi, Ann. Mus. Genov. viii. p. 440, Sardinia.

*Spiracme*, g. n., closely allied to *Xysticus*, Koch; for *S. striata*, sp. n.; A. Menge, Schr. Ges. Danz. (n.s.) iii. p. 447, pl. ccliii., Prussia.

*Psammitis*, g. n., also closely allied to *Xysticus*, Koch, p. 448; type, *P. sabulosa* (= *Xysticus sabulosus*, Hahn), p. 449. *P. abscondita*, sp. n., p. 450, pl. cclv. *id. l. c.*, Prussia.

*Xysticus secedens*, pp. 263 & 329, *X. glacialis*, pp. 263 & 332, Tyrol, and *X. apricus*, pp. 264 & 337, Tione, spp. nn.; L. Koch, Z. Ferd. (3) xix. *X. promiscuus*, p. 581, *X. ferus*, p. 583, *X. peccans*, p. 584, and *X. subclavatus*, p. 584, Egypt, spp. nn.; O. P. Cambridge, P. Z. S. 1876. *X. ferrugineus*, sp. n., A. Menge, *l. c.* p. 444, pl. ccli., Prussia. *X. bimaculatus*, L. Koch, described, p. 809, pl. lxx. figs. 1, 1 A & 1 B, and *X. inornatus*, sp. n., p. 811, pl. lxx. figs. 2 & 2 A, Sydney; L. Koch, Arachn. Austr.

*Monæses* (*Monastes*, Luc.) *truncatus*, p. 765, pl. lxvii. figs. 3, 3 A, 4 & 4 B, Peak Downs; *M. cineraceus*, p. 768, pl. lxvii. figs. 5, 5 A, 6 & 6 A, Peak Downs, Rockhampton, and Gayndah; *M. marmoreus*, p. 771, pl. lxvii. figs. 7 & 7 A, Rockhampton and Gayndah; *M. macilentus*, p. 773, pl. lxviii. fig. 8, Peak Downs; *M. variabilis*, p. 775, pl. lxviii. figs. 1, 1 A, 2 & 2 A, Gayndah, Peak Downs, and Port Mackay; *M. albidus*, p. 778, pl. lxviii. figs. 3 & 3 A, Gayndah; *M. projectus*, p. 780, pl. lxviii. figs. 4 & 4 A, Peak Downs: L. Koch, *l. c.* spp. nn.

*Selenops annulatus*, sp. n., Eugène Simon, Bull. Soc. Zool. Fr. i. p. 15, Chinchonxo, River Congo. *S. ægyptiacus*, Savigny, described (♂ new to science); O. P. Cambridge, P. Z. S. 1876, p. 585, pl. lix. fig. 10, Egypt.

*Hemiclæa præginis*, p. 387, pl. lxxii. figs. 1, 2, 2 A & 2 B, Peak Downs; *H. fumosa*, p. 840, pl. lxxii. fig. 3, 3 A & 3 B, Gayndah; *H. cineracea*, p. 843, pl. lxxii. figs. 5 & 5 A, Rockhampton; *H. tenera*, p. 847, pl. lxxiii. figs. 1 & 1 A, Peak Downs, spp. nn.; with *H. major*, L. Koch, p. 841, pl. lxii. figs. 4 & 4 A, Sydney; *H. plana*, L. Koch, p. 845, pl. xlii. figs. 6,

6 A & 6 B, Rockhamptom and Gayndah; and *H. lugubris*, l
pl. lxxi. figs. 4 & 4 A, Rockhampton, Peak Downs, and Gayr
and figured, Koch, *l. c.*

*Sarotes jugulans*, sp. n., L. Koch, *l. c.* p. 852, pl. lxxiii. fH. (4) xvii. Peak Downs.

*Zachria oblonga*, L. Koch, described and figured from Sydney; *id. l. c.* p. 850, pl. lxxiii. figs. 3 & 3 A.

*Sparassus cognatus* and *S. suavis*, spp. nn., O. P. Cambridge, P. Z. S. 1876, p. 588, Egypt.

*Artanes bigibba*, p. 590, and *A. lugens*, p. 591, spp. nn.; *id. l. c.* Egypt.

*Thanatus lineatipes*, p. 591, *T. flavus*, and *T. flavescens*, p. 592, spp. nn., *id. l. c.* Egypt; *T. tenellus*, sp. n., L. Koch, Arachn. Austr. p. 849, pl. lxxiii. figs. 2, 2 A, 2 B, 2 C, 2 D & 2 D, Peak Downs.

*Opitis austera*, sp. n., *id. l. c.* p. 824, pl. lxx. fig. 9, Peak Downs.

*Philodromus adjacens*, p. 592, pl. lix. fig. 11, *P. cinereus* and *P. venustus*, p. 594, fig. 12, spp. nn.; O. P. Cambridge, P. Z. S. 1876. *P. alpestris*, sp. n., L. Koch, Z. Ferd. (3) xix. pp. 261 & 321, Tyrol.

## Podophthalmides.

In a note upon *Podophthalma bayoniana*, Brito Capello, E. Simon refers *Podophthalma* to the *Oxyopidæ*, Bull. Soc. Zool. Fr. i. p. 14.

## Sphasides.

*Oxyopes modestus*, sp. n., E. Simon, *l. c.* p. 216, Chinchonxo, River Congo. *O. bilineatus*, sp. n., O. P. Cambridge, *l. c.* p. 609, Egypt. *O. (Sphasus) extensipes*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 439, Rodriguez. *O. globifer*, sp. n., E. Simon, Arachn. de France, iii. p. 222, Algeria.

## Lycosides.

*Phoneutria erythrochelis*, sp. n., E. Simon, Bull. Soc. Zool. Fr. i. p. 222, Landana, River Congo.

*Nilus*, g. n., allied to *Dolomedes*, for *N. curtus*, sp. n., O. P. Cambridge, *l. c.* p. 596, pl lix. fig. 13, Alexandria, Egypt.

*Dolomedes icadius*, p. 859, pl. lxxiii. figs. 5 & 5 A, Rockhampton, Port Mackay, Bowen, and Peak Downs; *D. elegans*, p. 861, pl. lxxiii. figs. 6, 6 A & 6 B, Port Mackay; *D. instabilis*, p. 863, pl. lxxiv. figs. 1 & 1 A, Caigan, near Mudjee; *D. minor*, p. 864, pl. lxxiv. figs. 2, 2 A, 2 B, 3 & 3 A, and *D. imperiosus*, p. 867, pl. lxxiv. figs. 4 & 4 A, New Zealand; *D. facetus*, p. 869, pl. lxxiv. figs. 5, 5 A, 6, 6 A & 6 B, Rockhampton, Sydney, Gayndah, Peak Downs, Bowen, Upolu, and New Zealand; *D. cervinus*, p. 872, pl. lxxv. fig. 1, River Nepean: spp. nn. *D. australianus*, L. Koch, p. 873, pl. lxxv. figs. 2 & 2 A; *D. albicomus*, L. Koch, p. 875, pl. lxxv. figs. 3 & 3 A; *D. flaminius*, Koch, p. 877, pl. lxxv. figs. 4, 4 A & 4 B,

escribed and figured. L. Koch, Arachn. Austr. Doubts are to whether *D. signatus*, Walck., is a *Dolomedes*; id. *l. c.*

*roxima*, sp. n., O. P. Cambridge, P. Z. S. 1876, p. 598, pl. ; *T. tenuitarsis*, sp. n., E. Simon, Arachn. de France, iii. p. 302, Corsica.

L. Koch, *l. c.* p. 880, following Simon, includes under *Lycosa*, the genera *Trochosa*, *Arctosa*, and *Tarentula*.

*Lycosa exculta*, p. 881, pl. lxxvi. figs. 1, 1 A, 1 B & 1 C, Sydney; *L. ovaria* p. 883, pl. lxxvi. figs. 2, 2 A, 3, & 3 A, King George's Sound; *L. albosparsa*, p. 886, pl. lxxvi. fig. 4, Rockhampton, and *L. candicans*, p. 888, pl. lxxvi. figs. 5, 5 A, 6, 6 A & 6 B: spp. nn., *id.* l. c. *L. anacthea*, sp. n., *id.* Z. Ferd. (3) xix. pp. 269 & 343. Tyrol and Bavarian Alps. *L. munieri*, p. 70, Algeria, Oran, &c.; *L. piochardi*, p. 72, figs. 8 & 9, Asia Minor, Latakieh; *L. baulnyi*, p. 74, figs. 20 & 21, Constantine, Algeria; *L. raffrayi*, p. 76, fig. 23, Zanzibar; *L. dufourii*, p. 80, fig. 3, South Spain; *L. bedeli*, p. 81, fig. 15, Oran, &c., Algeria; *L. olivieri*, p. 83, fig. 10, Jordan Valley; *L. cambridgii*, p. 84, figs. 11 & 12, Latakieh, Asia Minor; *L. leprieuri*, p. 87, fig. 22, Algeria: spp. nn., Eugène Simon, Ann. Soc. Ent. Fr. (5) vi. pl. vi. The same author, *l. c.*, makes some interesting remarks on the very local distribution of the group of *Lycosa* (*Arenea*) *tarentula*, Rossi, to which all the above species belong; and gives, as leading characters for differentiating the species:—1. The minute differences of colour, in adults, which are generally constant, especially the tint of the "épigastre," and the shape of the black portion of the ventral surface. 2. The markings on the tibial joints of the legs, but not those on the femora. 3. The relative size and position of the first and second rows of eyes. And 4. (in adult females) the form and structure of the genital aperture ("la plaque de l'épigyne").

*Tarentula truculenta*, p. 601, *T. tremens*, p. 602, spp. nn., O. P. Cambridge, *l. c.*, Egypt.

*Lycosa* (*Tarentula*) *oculata*, p. 239, Corsica; *L.* (*T.*) *pastoralis*, p. 251, South of France; *L.* (*T.*) *alpicola*, p. 263, South of France; *L.* (*T.*) *soriculata*, p. 264, Alpes Maritimes; *L.* (*T.*) *laciniosa*, p. 265, South of France and Spain; *L.* (*T.*) *renidens*, p. 275, Alpes Maritimes; *L.* (*Trochosa*) *filicata*, p. 277, Cantal, Lioran; *L.* (*Tro.*) *lacustris*, p. 280, South of France, Corsica, Algeria, and Syria: *L.* (*Tro.*) *robusta*, p. 286, France; *L.* (*Tro.*) *tomentosa*, p. 289, South of France and Spain; *L.* (*Tro.*) *excellens*, p. 291, North Spain; *L.* (*Tro.*) *subfasciata*, p. 292, North Spain; *L.* (*Tro.*) *lutetiana*, p. 293, Paris, La Varenne: spp. nn., E. Simon, Arachn. de France, iii.

*Trochosa partita*, p. 599, *T. depuncta*, p. 600, *T. virulenta*, p. 600, *T. urbana*, p. 601, pl. lx. fig. 14, spp. nn., O. P. Cambridge, *l. c.*, Egypt.

*Lycosa aquilonaris*, sp. n., L. Koch, Zweite Deutsche Nordpolarfahrt, ii. p. 400, pl. i., N. E. Greenland. *L. petiti*, sp. n., E. Simon, Bull. Soc. Zool. Fr. i. p. 217, Chinchonxo, River Congo. *L. ungulata*, p. 603, *L. injucunda*, p. 605, pl. lx. fig. 15, *L. iniqua*, p. 605, *L. inquieta*, p. 606, *L. inopina*, p. 607, pl. cx. fig. 16, *L. observans*, p. 608, spp. nn., O. P.

21. *Palamnæus*, g. n.
22. *Miephonus*, g. n.
23. *Opisthophthalmus*, C. Koch.
24. *Opisthacanthus*, Peters.
25. *Hormurus*, g. n.
26. *Ischnurus*, C. Koch.
27. *Urodacus*, Peters.
28. *Broteas*, C. Koch.
29. *Scorpiops*, Peters.
30. *Ioctonus*, g. n.
31. *Euscorpius*, g. n.

Synoptical table for determining North American *Scorpiones*; B. Pickman Mann, Psyche, i. pp. 209–214.

*Uroplectus occidentalis*, sp. n., E. Simon, Bull. Soc. Zool. Fr. i. p. 219, Chinchonxo, River Congo.

*Lepreus pilosus*, sp. n., T. Thorell, *l. c.* p. 7, note, Caffraria.

*Phassus columbianus*, sp. n., *id. l. c.* p. 8, note, Columbia.

*Rhopalurus laticauda*, sp. n., *id. l. c.* p. 9, note, Columbia.

*Vejovis intrepidus*, sp. n., *id. l. c.* p. 10, note, Mexico.

*Uroctonus mordax*, sp. n., *id. l. c.* p. 11, note, California.

*Palamnæus petersi*, id. *l. c.* p. 13, note, new name for *Heterometrus megacephalus*, Sim.

*Miephonus wahlbergi*, sp. n., *id. ibid.*, Caffraria.

*Ophisthacanthus maculatus*, sp. n., E. Simon, *l. c.* p. 221, Landana, River Congo.

*Broteas herbsti*, sp. n., Thorell, *l. c.* p. 14, note, = *Scorpio maurus*, Deg., *nec* Linn.

*Ioctonus manicatus*, sp. n., *id. ibid.*, Australia.

*Euscorpius carbonarius*, sp. n., fossil from the British coal measures, Sandwell Park, Birmingham; considered to be closely allied to an existing Indian species, *Buthus afer*. H. Woodward, J. G. Soc. xxxii. p. 57, pl. vii. fig. 1.

### Pseudo-Scorpiones.

*Chelifer brevipalpis*, p. 226, Padua, and *C. ninii*, p. 227, Venice, spp. nn., G. Canestrini, Atti Soc. Pad. iii.

*Obisium dolichodactylum*, sp. n., *id. l. c.* p. 229, Trentino.

## THELYPHONIDEA.

### Phryneides.

*Phrynus tibialis*, sp. n., E. Simon, Bull. Soc. Zool. Fr. i. p. 12, River Congo.

### Thelyphonides.

*Telyphonus proscorpio*, Latr. Observations on habits, by C. de Gavere, Tijdschr. Nederl. Ind. (7) iii. p. 512. [Erroneously recorded in the sub-order *Scorpiones* in Zool. Rec. xii. p. 258.]

## PHALANGIIDEA.

J. Thorell (Ann. Mus. Genov. viii. pp. 463–470) thus classifies the European genera and families of this order, which he names *Opiliones*:—

Section 1, PALPATORES.—Fam. Phalangioidæ, containing gg. *Egænus*, C. Koch; type, *E. convexus*, id. *Odius*, g. n.; type, *Opilio hystrix*, Latr. *Acantholophus*, C. Koch; type, *A. hispidus*, Herbst. *Lacinius*, g. n. [the author, *l. c.*, note, says, "Hoc genus mihi incognitum est"!]; type, *L. horridus*, Panz. *Megabunus*, Meade; type, *M. diadema*, Fabr., = *M. insignis*, Meade. *Platylophus*, C. Koch; type, *P. rufipes*, id. *Diabunus*, g. n.; type, *D. œdipus*, Thor. *Phalangium*, Linn.; type, *P. parietinum*, De Geer. *Mitopus*, g. n.; type, *M. morio*, Fabr., = *P. urnigerum*, Meade. *Prosalpia*, L. Koch; type, *P. bibrachiata*, id. *Liobunum*, C. Koch; type, *L. fasciatum*, Herbst. *Astrobunus*, g. n. (= *Hoplites*, L. Koch, 1869, *nec* Philippi, 1857); type, *A. argentatus*, L. Koch. *Sclerosoma*, Luc., = *Homalenotus*, Koch; type, *S. quadridentatum*, Cuv.

Fam. Nemastomoidæ. Sub.-Fam. i. Nemastomini, containing gg. *Ischyropsalis*, L. Koch; type, *I. kollari*, C. Koch. *Nemastoma*, C. Koch; type, *N. bimaculatum*, Fabr. *Dicranolasma*, Soer. (includes *Amopaum*); type, *D. scabrum*, Herbst. Sub-Fam. ii. Trogulini, gg. *Anelasma*, Soer.; type, *A. lycosinum*, id. *Trogulus*, Latr.; type, *T. nepiformis*, Scop.

Fam. Cyphophthalmoidæ, gg. *Stylocellus*, Westwood, = *Cyphophthalmus*, Joseph, type, *C. corsicus*, Sim.; and *Pettalus*, p. 469, note, g. n., type, *C. cimiciformis*, Cambridge.

Section 2, LANIATORES.—Fam. i. Gonyleptoidæ, g. *Scotolemon*, Luc.; type, *S. lespesii*, id.

This section contains another family—Cosmetoidæ—which, however, has as yet no European representative.

### Phalangiides.

*Acantholophus longisetus*, sp. n., T. Thorell, *l. c.* p. 470, Florence.

*Diabunus œdipus*, sp. n., *id. l. c.* p. 473, Persia.

*Phalangium cjuncidum*, p. 475, and *P. hyrcanum*, p. 477, Persia; *P. gestroi*, p. 479, Sardinia; *P. nicœnse*, p. 481, Liguria; *P. ferrugineum*, p. 483, Island of Ebusus (Ivica); *P. canestrinii*, p. 485, Italy: spp. nn. *iid. l. c.*

*Liobunum gracile*, p. 496, and *L. lœve*, p. 497, spp. nn. *id. l. c.*, Sweden.

*Astrobunus kochi*, sp. n., p. 499, Thorell, *l. c.*, Italy.

*Sclerosoma sardum*, p. 501, Sardinia, and *S. meadii*, p. 503, Austria? spp. nn., *id. l. c.*

*Dicranolasma sørensenii*, p. 505, Liguria, and *D. cristatum*, p. 506, Italy, spp. nn., *id. l. c.*

*Homalonotus sicanus*, sp. n., P. Pavesi, *tom. cit.* p. 446, Palermo.

*Syleus*, g. n., T. Thorell, *op. cit.* ix. p. 114; type, *S. niger*, C. L. Koch, Bombay.

*Zaleptus*, g. n. (nearly allied to *Gagrella*), for *Z. trichopus*, sp. n., *id. l. c.* p. 116, Borneo.

*Gagrella albertisi*, p. 119, and *G. doleschalli*, p. 121, spp. nn., *id. l. c.* New Guinea.

*Hexomma*, g. n., type *H. vulcanicum*, Dol., *id. l. c.* p. 114.

### Trogulides.

*Trogulus tuberculatus*, sp. n., p. 221, *T. sinuosus*, Soer., p. 219, *T. asperatus*; C. Koch, p. 220, *T. squalidus*, L. Koch, p. 221, *T. nepiformis*, Latr., and *T. coriziformis*, C. Koch, p. 222, described; G. Canestrini, Atti Soc. Pad. iii. fasc. ii., Italy.

### Gonyleptides.

*Mermerus*, g. n., p. 123, allied to *Phalangodus*, Gerv., and *Scotolemon*, Luc., for *M. beccarii*, sp. n., p. 124, T. Thorell, *l. c.*, Java.

*Epedanus*, g. n., p. 127, differs from *Mermerus* and the other two genera mentioned in the spine, or the ocular tubercle; for *E. pictus*, p. 128, Borneo, *E. javanus*, p. 131, Java, and *E. lutescens*, p. 133, Borneo: spp. nn. *id. l. c.*

### Cosmetides.

*Oncopus*, g. n., p. 134, for *O. doriæ*, sp. n., T. Thorell, *l. c.* p. 135, Borneo.

## PYCNOGONIDEA.

Cavanna, G. Riassunto di una Memoria sui Pignogonidi. Bull. Ent. Ital. viii. pp. 292–297.

Chiefly anatomical. The original memoir, "Studi e ricerche sui Pignogonidi, Pte.1a, Anatomia e Biologia," is in the Pubblicazioni del R. Istituto di studi superiori practici e di perfezionamente in Firenze, i. (1876) pp. 249–264.

*Nymphon*, common in the deeper parts of the Atlantic from 1250 fathoms, and *Zetes*, from 350 and 1077 fathoms; Willemoës-Suhm, P. R. Soc. xxiv. p. 578. *Nymphon gracilipes* and *hians*, Heller [Zool. Rec. xii.

[p. 259], fully described by the author; Denk. Ak. Wien, xxxvi. (1875) [pp. 40 & 41, pls. iv. fig. 15, v. figs. 1, 2, and 3–5, Arctic Sea.

A Pycnogonid measuring nearly two feet across the legs, dredged in the Southern Indian Sea; Willemoës-Suhm, *l. c.* p. 588.

## PŒCILOPHYSIDEA (Ordo Nova?).

### Pœcilophysides.

*Pœcilophysis*, g. n., appears to be a kind of compound of Spider, *Solpuga*, *Chelifer*, and *Acarus*; probably it will eventually be decided to constitute merely a special family of *Acaridea*. *P. kerguelenensis*, sp. n., O. P. Cambridge, P. Z. S. 1876, pp. 261 & 262, pl. xix. fig. 4, Kerguelen Island.

## ACARIDEA.

Mégnin, P. Métamorphoses des Acariens en général, et en particulier des Trombidions.

A paper, reported by M. Girard, from the 14me. réunion des Sociétés savantes départementales à la Sorbonne, Avril, 1876 (Pet. Nouv. ii. pp. 41, 47).

——. Mémoire sur l'organisation et la distribution Zoologique des Acariens de la famille des Gamasides. Paris: 1876, 8vo (Pet. Nouv. ii. p. 52).

——. Note sur la faculté qu'ont certains Acariens avec ou sans bouche, de vivre sans nourriture pendant des phases entières de leur existence, et même pendant toute leur vie. CR. lxxxiii. pp. 993–995.

*Ixodes* is the only genus identified.

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*Ixodes* extracted from an umbilical tumour in the human subject; Nat. Canad. vii. p. 244.

*Zarcon mucronatus*, p. 3, and *Z. furcatus*, p. 4, spp. nn., G. Canestrini and F. Fanzago, Atti Soc. Pad. v. fasc i., Trevigniano, Italy.

*Gamasus plumifer*, sp. n., *iid. l. c.* p. 4, Maser, Italy.

*Iphis ovum*, sp. n., *iid. l. c.*, p. 5, Maser.

*Tetranychus vestitus*, p. 5, and *T. pilosis*, p. 6, *iid. l. c.* Maser.

*Caligonus calyx*, p. 7, Maser, *C. pulcher*, p. 7, Trevigniano, *C. clavatus*, p. 8, Maser and Padua, *C. cuneatus* and *C. coronatus*, p. 9, Maser, *C. marginatus*, p. 10, Maser; spp. nn. *iid. l. c.*

*Heteronychus*, g. n. (allied to *Tetranychus*), *H. hirtus*, p. 10, Maser spp. nn., *iid. l. c.*

*Eupalus maseriensis*, sp. n., Maser, *iid. l. c.* p. 11.

*Stigmæus bicolor*, sp. n., Maser, *iid. l. c.* p. 12.

*Tydeus tetranemus*, sp. n., Maser, *iid. l. c.* p. 12.

*Acarus mammillaris*, p. 13, and *A. armatus*, p. 14, spp. nn. *iid. l. c.*, Maser.

*Tarsonemus*, g. n., for *Chironemus*, Canestr., *nec* Cuvier (Pisces). *T. floricolus*, sp. n., *iid. l. c.* p. 14, Maser.

*Torynophora*, g. n. (fam. *Acarides*), for *T. serrata*, sp. n., O. P. Cambridge, P. Z. S. 1876, p. 259, pl. xix. fig. 1, Kerguelen Island.

*Scirus? pallidus*, sp. n. (fam. *Bdellides*), id. *l. c.* p. 260, pl. xix. fig. 2, Kerguelen Island.

*Hyalomma puta*, sp. n. (fam. *Ixodides*), id. *ibid.* fig. 3, Kerguelen Island, on a Penguin, *Pygoscelis taniatus*.

*Holothyrus? testudineus*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 444, Rodriguez.

# MYRIOPODA.

BY

THE REV. O. P. CAMBRIDGE, M.A., C.M.Z.S.

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FANZAGO, FILIPPO. Sui Chilognati Italiana. Atti Soc. Pad. iii. pp. 233–292, pls. xi. & xii.

Enumerates 65 known species of the following genera:—*Polyxenus*, 1; *Glomeris*, 13; *Platyrrhacus*, 1; *Craspedosoma*, 6; *Pachydesmus*, 1; *Polydesmus*, 4; *Lysiopetalum*, 2; *Iulus*, 35. The families, genera, and many of the species are diagnosed.

——. Nuovi contribuzioni alla fauna Miriopodologica Italiana. Ann. Soc. Mod. (2) x., pp. 60–80.

Records 25 species, of which 2 are new; one new genus also is characterized.

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*Polydesmus bituberculatus*, sp. n., F. Fanzago, *l. c.* p. 65, Lago di Agnano, Naples.

*Atractosoma*, g. n. (between *Craspedosoma* and *Polydesmus*) for *A. meridionalis* [*-le*], sp. n., *id. l. c.* 71, Naples.

*Strongylosoma erucaria* [*-ium*], sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 444, Rodriguez.

*Cambala nodulosa*, sp. n., *id. ibid.*, Rodriguez.

*Spirostreptus avernus*, *sorornus*, *gulliveri*, and *simulans*, p. 445, spp. nn., *id. l. c.* Rodriguez.

*Spirobolus hecate*, sp. n., *id. l. c.* p. 445, Rodriguez.

*Eurylithobius*, g. n. (allied to *Lithobius*) for *E. slateri*, sp. n., *id. l. c.* p. 446, Rodriguez.

*Rhombocephalus smaragdinus*, sp. n., *id. ibid.*, Rodriguez.

*Mecistocephalus gulliveri*, sp. n., *id. ibid.*, Rodriguez.

*Lithobius verrucosus*, figs. 1–7, Moldavia, and *algerianus*, figs. 8–14, Algeria, spp. nn., A. Selivanoff, Hor. Ent. Ross. xii. p. 70, pl. i.

# INSECTA.

## THE GENERAL SUBJECT.

By E. C. Rye, F.Z.S., M.E.S.

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Bertkau, P. Bericht über die wissenschaftlichen Leistungen im Gebiete der Entomologie während der Jahre 1871 und 1872. Deutsche E. Z. 1876, Heft v. pp. 1–192.

——. Bericht über die wissenschaftlichen Leistungen auf dem Gebiete der Entomologie während der Jahre 1873 und 1874. Zweite Hälfte. Arch. f. Nat. xli. (2) pp. 173–312.

This part, dated 1875 (received in 1877), refers to *Hymenoptera*, *Trichoptera*, *Orthoptera*, *Lepidoptera*, *Diptera*, and *Hemiptera*. The 1st half was published, *op. cit.* xl. pp. 253–400.

Blanchère, H. de la. Les Ravageurs des Vergers et des Vignes. Histoire naturelle, Mœurs, Dégats, Moyens de les combattre; suivis d'une étude sur le Phylloxera. Paris: 1876, 12mo, p. 286, woodcuts.

——, & Robert, E. Les Ravageurs des Forêts et des Arbres d'Alignement. Paris: 1876, 12mo, pp. 398, woodcuts.

These two little works form part of Rothschild's popular series, and scarcely call for serious notice, however pretentious as instructive manuals, being full of the most evident error. Dr. Robert's part, however (the 2nd book of the last work, with separate title, "Les Ravageurs des plantations d'Alignement, Histoire naturelle, Mœurs, Dégats, Moyens pratiques pour les détruire et pour restaurer les Plantations"), is the 4th augmented edition of a practical treatise of considerable value.

Bolivar, Ignacio. Apuntes acerca de la caza y conservacion de los Insectos. Madrid: 1876, 8vo, pp. 1–96, cuts 1–17.

After a general introduction, the author briefly discusses each order, giving hints as to capture, preservation, &c., and concludes with a bibliographical reference to works in which Spanish insects are described. (See also Resumen de los Trabajos del Ateneo propagador de las Ciencias Naturales, 1874–75, p. 37, by the same author.)

CARPENTER, W. L. Report on the Alpine Insect Fauna of Colorado and New Mexico, Season of 1875. Appendix H. 11, pp. 301–305, of Wheeler's Ann. Rep. Geogr. Surv. W. of 100th Mer., itself being Appendix J J of Ann. Rep. Chief of Engineers for 1876. Washington: 1876, 8vo.

The American alpine insect fauna is regarded as a fragment of that which survived the geological changes occurring at the close of the Tertiary and beginning of the Quartenary epoch. Observations are made upon the hypsometrical distribution, &c., of the insects observed.

DOHRN, ANTON. Notizen zur Kenntniss der Insectenentwicklung. Z. wiss. Zool. xxvi. pp. 112–138.

Unconnected observations upon the earlier development of *Bombyx mori*, *Gryllotalpa vulgaris*, and various special organs in insects.

GIRARD, M. Rapport sur les insectes qui attaquent et détruisent les bois ouvrés, et spécialement les frises de parquet. Paris: 1876, 4to.

A contribution to legal entomology. For summary of the author's opinion, with regard to the limitation of liability, &c., of timber-merchants, contractors, and architects from actions for recovery of damages by *Anobium* and *Ptinus* and other insects that destroy wood used in houses, &c., see Pet. Nouv. ii. p. 23.

JOSEPH, G. Ueber das Zusammentreffen von theilweisen und gänzlichen Lichtmangel mit Lageveränderung, Verkleinerung, Verkümmerung, Vermehrung der Zahl, Verlust, und Ersatz der Sehorgane. Ent. MB. i. pp. 145–149.

This paper was originally read at the meeting on Nov. 10, 1875, of the Natural Science Section of the Silesian Society, and contains general observations on the modifications of the visual apparatus in insects.

KRAATZ, G. Entomologische Monatsblätter. i. Berlin: 1876, 8vo, pp. 1–160.

Forms Heft iii. of Deutsche E. Z. 1876, and (*op. cit.* Heft ii. p. 399), was apparently discontinued on completing its first volume.

MAYER, P. Ueber Ontogenie und Phylogenie der Insekten. Jen. Z. Nat. x. pp. 125–221, pls. i.–iv.

The author endeavours to prove that insects did not first appear as larval forms, but fully developed, in the shape of a hypothetical *Protentomon*, derived from the worms, not from the *Crustacea*. In discussing the ancestry of the orders of insects, he commences with the *Hymenoptera* and ends with the *Neuroptera*, placing the *Coleoptera* near the *Hemiptera* and *Orthoptera*. For an able review, see A. S. Packard, Am. Nat. x. pp. 688–691. No new facts, according to the latter (who is assuredly a competent judge on such a point), are adduced by the author.

MÉGNIN, P. Précis des maladies de la peau de cheval. Paris: 1876, 8vo, pp. 96, figs.

The Insects and *Acari* parasitic upon the skin of horses are here clearly described and figured. Among the former, *Hæmatopinus tenuirostris* and *Trichodectes equi*, and among the latter a *Sarcoptes*, *Psoroptes*, *Chorioptes*, *Dermanyssus*, and *Ixodes*, each cause a different affection.

Müller, Hermann. Fertilisation of Flowers by Insects. Nature, xiii. pp. 210–212, 289–222, xiv. pp. 173–175, figs. 71–92.

Chapters xii.–xiv. of the author's detailed treatment of this interesting subject, being "Further Observations on Alpine Flowers" (affected by *Anthophora*, *Osmia*, *Halictus*, and *Bombus*, *Colias*, *Pieris*, *Argynnis*, *Lycæna*, *Larentia*, *Botys* and *Psodos*, and some *Muscidæ*), "Additional Alpine Flowers adapted to Cross-fertilisation by Lepidoptera" (*Polyommatus*, *Lycæna*, *Argynnis*, *Hesperia*, *Sphinx*, *Macroglossa*, and *Zygæna*), "Flowers Fertilised by the wings of Butterflies" (*Callidryas*, *Agraulis*, and *Papilio*; *Bombus* also referred to).

See also Nature, xv. pp. 178–180, for an abstract of an article by this author in the "Bienen Zeitung," on the relation between Flowers and Insects.

Packard, Jr., A. S. [Half-hour Recreations in Natural History. Division first.] Half-hours with Insects. Twelve parts. Boston: no date, sm. 8vo, pp. 1–384, coloured frontispiece, and 260 wood-cuts.

This is distinguished by the care and completeness attending all the author's productions, and, without being in any way superficial, is at once a practical and scientific introduction to a knowledge of American insects, upon a sound basis. It is divided as follows:—Parts 1 & 2, Insects of the Garden, their habits, &c.; 3, Relations of Insects to Man; 4 Insects of the Plant House; 5, Insects of the Pond and Stream; 6, Population of an Apple Tree; 7, Insects of the Field; 8, Insects of the Forest; 9, Insects as Mimics; 10, Insects as Architects; 11, The Social Life of Insects; and 12, Mental Powers of Insects. Of these, parts 1–8 appear from Psyche, i. p. 118, to have been issued in 1874 & 1875.

Original observations are made on the mode of respiration in *Notonecta* and *Corixa* (pp. 139–142). In part 9, a number of new facts which have fallen under the author's notice referring to mimicry are published, and (p. 281) he objects to the prevalent views on this subject, from palæontological reasons, inclining to the belief that the resemblance in pattern and colour between insects belonging to different groups is probably due to causes more fundamental than natural and sexual selection. The chapter on the mental powers of insects, though perhaps beyond the scope of this Record, deserves serious attention. The author's ideas may be briefly summarized as follows:—Admitting that, as regards ordinary instinctive acts, insects are automata, it is probable that future facts and investigations will tend to prove that these instincts may be regarded in most cases as the sum of inherited experiences—implying the possession of a conscious intelligence by the original stock

Perris, E. Nouvelles Promenades entomologiques. Ann. Soc. Ent. Fr. (5) vi. pp. 171–244; Rectifications et additions, *tom. cit.* Bull. pp. ccxvi. & ccxvii.

Contains a mass of biological observations on insects of all orders, noticed in the Mont-de-Marsan district for the most part, and extending over the whole year. Hints are also given for collecting in the different seasons, and particulars of the parasites observed in many instances.

Descriptions of larvæ, and other salient points, will be recorded *infrà*; but a complete analysis of this interesting (if rambling) paper is impossible in these pages. One new genus (*Diptera*), and various new species are described or indicated.

RILEY, C. V. Eighth Annual Report on the noxious, beneficial, and other Insects of the State of Missouri, &c. Jefferson City, Mo.: 1876. 8vo, pp. i.–iv., 1–185, woodcuts.

Of the usual practical nature. Discusses *Doryphora* 10-*lineata*, *Anisopteryx pometaria* and an allied new species, *Leucania unipunctata*, *Caloptenus spretus*, *Phylloxera vastatrix*, and *Megathymus yuccæ*.

——. Potato Pests. Being an illustrated account of the Colorado Potato Beetle and the other Insect foes of the Potato in North America. New York: 1876, 12mo, pp. 1–108, map, 49 cuts.

Sufficiently explains itself by the title. This useful little manual is practically a condensation of the author's State Reports already recorded.

RITSEMA, C. Bijdrage tot de Kennis der Insecten-fauna van het Noordelijkste Gedeelte van Sumatra. Tijdschr. Ent. xix. pp 43–50.

Enumerates 9 species of *Coleoptera* (4 new), and 1 of *Hemiptera*.

RONDANI, C. Repertorio degli Insetti parassiti e delle loro Vittime. Bull. Ent. Ital. viii. pp. 54–70, 120–138, 237–258.

Supplemental to the first part, enumerating Hymenopterous parasites, alphabetically arranged, with brief observations upon the other insects attacked by them. The author, *l. c.*, gives redescriptions of 4 new species of parasitic *Hymenoptera* and *Diptera*, described by him in the Bulletino del Comizio agrario Parmense, 1875.

SCHOYEN, W. M. De i Husene skadeligste Insekter og Midder, der angribe og bedærve vore Madvarer, Klæder, Bohave og övrige Eiendele under Tag. Kristiania: 1876, 12mo, pp. i.–viii., 1–102, pls. i.–iv. woodcuts.

A popular descriptive account of Insects and *Acari*, &c., injurious to food, clothes, furniture, &c., in houses.

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Fossil insects. A list of the species known to occur in the Palæozoic epoch; H. Woodward, J. G. Soc. xxxii. pp. 63 & 64.

Insect gallery in silicified wood of *Araucarites* from old red sandstone; A. Puton, Pet. Nouv. ii. p. 2.

Development of insects; J. Young, P. N. H. Soc. Glasg. ii. p. 260.

Hearing in insects; note by G. J. Romanes, Nature, xv. p. 177.

Ocelli in insects suggested to be "functional remnants of larval organizations;" Nature, xiii. p. 406.

On the periodical abundance and disappearance of various insects; Nat. Canad. viii. pp. 30–32.

Fertilization of plants by insect agency. See Müller, in titles *supra*, and in *Hymenoptera*, infrà. Ants observed to effect cross-fertilization by removing pollen from one plant of a small shrub (*Coffea*) to another at Durban; M. S. Evans, Nature, xiii. p. 427. T. Meehan's observations

(from Forney's "Weekly Press," Philadelphia, Aug. 21, 1875), opposed to the universal acceptation of this theory, reproduced in Arch. Sci. Nat. (2) lvi. pp. 294–296.

Connection between insects and plants; K. v. Dalla Torre, Ent. Nachr. ii. pp. 170–172.

On the peculiar relations of plants and insects as exhibited in islands; A. R. Wallace, Ent. ix. pp. 221–229 (extr. from his address as President of Section D, Brit. Ass. Meeting, 1876).

Flower insect-trap. *Darlingtonia californica* described, with a list of insects found in its pitchers; H. Edwards, in San Francisco Evening Bulletin, Dec. 22, 1875 (Psyche, i. p. 183).

Insects attracted by the exudation of juices from willows, &c., caused by the operations of larvæ of *Cryptorrhynchus lapathi*; E. Olivier, Pet. Nouv. ii. p. 70.

Supplementary notes to the late F. Walker's "List of insects inhabiting oak-apples;" E. A. Fitch, Ent. ix. pp. 30–42.

Insects (including a new species of *Cebrio*) brought by parent birds to a nest of swallows in a room at Algiers, with inferences as to the time of flight of the former; *id.* Bull. Soc. Ent. Fr. (5) vi. p. clxvii. See also p. clxxxvi.

Insects destroyed in quantities by the sulphurous exhalations from the ferruginous springs at Tarasp, Lower Engadine; H. Miot, Bull. Soc. Ent. Fr. (5) vi. p. clxiv.

Great numbers of insects of all orders found floating in the gutters of a gasometer basin, of which the water is ammoniated; Cornelius, S. E. Z. xxxvii. pp. 43–49.

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Geographical Distribution.—Island of Skye. Notes on its entomology; W. A. Forbes, Scot. Nat. ii. pp. 262–264.

West of Scotland. Lists, with localities, of species of *Hymenoptera* (*Tenthredinidæ* and *Cynipidæ*), by P. Cameron, pp. 12–18; *Trichoptera*, by F. G. Binnie, pp. 19–21; & *Lepidoptera*, by J. J. King, pp. 22–37; with introductory chapter on the Entomology of Clydesdale, by P. Cameron, pp. xvii.–xix. In "Notes on the Fauna and Flora of the West of Scotland," Glasgow, 1876, 12mo; a handbook prepared by local scientific men on the Meeting of the British Association at Glasgow in Sep., 1876, and given to the members.

Hammersmith (near London). W. Koltze, S. E. Z. xxxvii. p. 67. [English collectors will be surprised to hear of *Dasypolia templi*, *Atomaria zetterstedti*, and *Cryptophagus hirtulus* in this suburban locality —the two latter, moreover, new to the fauna!]

Netherlands. Various observations on habits, localities, and species new to the fauna, by Van Hasselt, Gerth van Wijk, Six (Utrecht, especially), Snellen van Vollenhoven, Lersberg, Ritsema, and Van der Wulp; Tijdschr. Ent. xix. Verslag, pp. xiv.–li., cxii. & cxiii.

Moselle. Notes on *Coleoptera* and *Hemiptera* new or rare for the department; and on insects injurious to the lime at Metz; Bellevoye, Bull. Soc. Metz (2), 1876, pp. 171 & 181. fig.

Tirol. A second instalment of insect bibliography referring to this district; Gredler, Z. Ferd. (3) xix. pp. 299–304.

Rothenstein. O. Schmiedeknecht, S. E. Z. xxxvii. pp. 184–188.

Florence. Address by A. Targioni-Tozzetti on the foundation of a station for agrarian entomology; Bull. Ent. Ital. viii. pp. 3–18.

Calabria. Results of entomological excursions; S. Bertolini, *tom. cit.* pp. 48–53.

Italy. Comparison of different periods of appearance, &c., of insects in 1875 & 1876; A. Villa, *tom. cit.* pp. 225–228.

North Persia, Krasnovodsk, & Daghestan. Some general notes in the introduction to H. Christoph's account of the *Lepidoptera* observed; Hor. Ent. Ross. xii. p. 187 *et seq.*

Libyan desert: Max Korb, S. E. Z. xxxvii. pp. 27–32. Very few specially African forms observed.

Annual Report of the Entomological Society of the province of Ontario for 1875. Toronto: 1876, 8vo, pp. 54.

Entomology at the Centennial Exhibition. Philadelphia: G. Dimmock, Psyche, i. pp. 201–205.

North Western Wyoming. General observations on the insects met with during Capt. Jones's Expedition in 1873, with lists of the *Hymenoptera*, *Lepidoptera*, *Coleoptera*, and *Neuroptera* observed. J. D. Putnam, P. Davenport Ac. i. pp. 187–191. Some Indian names for insects obtained during this Expedition are given, p. 192.

Utah. A "Report on the Insects collected in the vicinity of Spring Lake Villa, Utah Co., Utah, during the summer of 1875," 75 miles south of Salt Lake City, with lists of *Hymenoptera*, *Lepidoptera*, *Coleoptera*, and *Neuroptera* (observations by H. A. Hagen). J. D. Putnam, *l. c.* pp. 193–206.

Fiji. Observations on economy, &c., of *Phyllium geryon*, Gray, *Phybalosoma pythonius*, Westw., *Eupholus lagopygus*, M. C. V., *Macrotoma heros*, Heer, and *Acraea andromacha*, F.; Kleinschmidt, J. Mus. Godeffr. xii. p. 174.

Insects observed in the Seychelles, Fiji, and New Zealand, by Filhol & de l'Isle; Pet. Nouv. ii. p. 50.

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Collecting and preserving. Instructions in a Greek periodical (not seen by the Recorder) are noticed in P. E. Soc. 1876, p. lix. See also Ent. Nachr. ii. pp. 22, 38–45 (figs.); 61, 93, 95, 107–110, 125, 126, 143, 157.

On the relative advantages of boxes and cabinets for arranging collections; G. Kraatz, Ent. MB. i. pp. 58–60.

On the great Insect collections of the German capitals and Europe generally. Vienna, *id. l. c.* pp. 121–123; Hamburg, W. Koltze, *tom. cit.* pp. 152 & 153.

Description of frame and figure of a net named "Porte-nappe," for beating purposes; J. Gallois, Feuil. Nat. iv. p. 72. See also Ent. Nachr. ii. p. 39.

The gum exuded from cherry trees recommended for mounting specimens, as it does not scale in drying; E. Honnorat, Feuil. Nat. vi. p. 92.

### Bibliography.

The "Bulletin d'Insectologie Agricole" [Zool. Rec. xii. p. 270] i. 1875–76, contains the continuation of De la Blanchère's Elementary Lessons on Insectology and Joubert's Insects of the Vine, and various miscellaneous entomological notes.

Der Zoologische Garten (Frankfurt-am-Main). A list, with pages, &c., of the entomological contents of this publication from vol. i., 1860, to xvi., 1875. L. v. Heyden, Deutsche E. Z. 1876, Entomologisches Repertorium, pp. 1–6.

Verhandlungen des naturforschenden Vereines in Brünn. The like treatment, vol. i., 1862, to xiii., 1874; F. Blücher, *l. c.* pp. 6–8.

Bulletin de la Société Impériale des Naturalistes de Moscou. The like treatment, xxxv., 1862, to xlviii., 1875; *id. l. c.* pp. 9–13.

Archiv für Naturgeschichte. The like treatment, xxviii., 1862, to xli., 1875; *id. l. c.* pp. 14–16.

Additions to Hagen's Bibliotheca; H. N. Schmidt-Göbel, Deutsche E. Z., 1876, pp. 145–160. An Entomological work of Von Salis Marschlins added to Hagen's list; E. C. Rye, Ent. M. M. xii. p. 237.

On the literature useful to Insect Collectors of all Orders, especially in Switzerland; MT. schw. ent. Ges. iv. pp. 533–535, 585–596.

On separate copies of papers in scientific Societies' publications, and the necessity of their retaining the original pagination, with correct date of issue, &c.: G. Kraatz, Deutsche E. Z. 1876, pp. 75–79. Observations on separata from C. H.; *id. l. c.* p. 80.

On the expediency, in citations of synonymy, of giving the name of the person on whose authority it is given, and the place of publication of the statement on which it is grounded; *id. l. c.* p. 143.

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# COLEOPTERA.

BY

E. C. Rye, F.Z.S., M.E.S.

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### The General Subject.

Bertolini, S. de. Catalogo sinonimico e topographico dei Coleotteri d'Italia. Firenze: 1876, pp. 205–236.

Published with Bull. Ent. Ital. viii. *Cerambycida* to end.

Blackburn, T. Outline descriptions of British Coleoptera. Scot. Nat. ii. pp. 10–17, 65–72, 106–112, 161–168, 219–226, 254–261, 300–307, 338–348.

The author, after an explanatory figure of the chief points of external anatomy of a beetle, and a glossary, &c., gives in a tabular form very

abbreviated diagnostic characters for the recognized British species as far as the *Philhydrida*, inclusively. The work is discontinued at that point.

BROUN [*script.* BROWN], T. Notes on the *Coleoptera* of Auckland, New Zealand. Tr. N. Z. Inst. viii. pp. 262–271.

Observations upon the known species of the different groups, with notices of the more conspicuous forms, indications of habit, &c.

——. On insects injurious to the Kauri Pine (*Dammara australis*). *Op. cit.* ix. [for 1876, issued May, 1877] pp. 366–371.

Refers exclusively to *Coleoptera*, describing the harm done by *Xenocnema spinipes*, Woll., and "*Dryophthorus*" (a Cossonid) *bi-tuberculatus*, White, with observations on other, apparently undescribed, species, and preventive measures. *Otiorrhynchus sulcatus*, imported, has been found feeding on this tree at Auckland.

CHAPUIS, F. [See LACORDAIRE, T.]

CHAUDOIR, E. DE. Catalogue des Cicindélètes et des Carabiques recueillis par M. Achille Raffray en Abyssinie, avec la description des espèces nouvelles. R. Z. (3) iv. pp. 329–388.

Contains also observations and descriptions by Putzeys. In several instances, identity or affinity with South African species appears to occur. New species from other countries are incidentally described.

CUNI Y MARTORELL, M., & MARTORELL Y PENA, M. Catalogo metodico y razonado de los Coleopteros observados en Cataluna. Barcelona: 1876, 8vo, pp. 360, woodcuts.

Enumerates 1278 species occurring in Catalonia, with brief descriptive remarks, indication of localities, &c.

FAIRMAIRE, L. Faune élémentaire des Coléoptères de France. 4e. édn. Paris: 1876, 12mo, pp. 322, pls. i.–x.

Reviewed, Pet. Nouv. ii. p. 39.

——. Révision des Coléoptères du Chili. Ann. Soc. Ent. Fr. (5) vi. pp. 143–170, 341–388.

Refers chiefly to the *Nycteliides* in the *Tenebrionidæ*, with other *Heteromera* belonging to groups already revised by the author. Bolivian and Patagonian species are also included, in spite of the limitation conveyed by the title. One new genus and several new species are described.

GEMMINGER, MAX, & HAROLD, E. VON. Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus. xii. pp. 3479–3822 [*Chrysomelidæ*, pt. 2, — *Platypsyllidæ*]. Index, pp. i.–lxxiii. Munich: 1876, 8vo.

Contains 575 genera, and completes this gigantic undertaking, one of the most important works ever published. 11,618 generic names (of which 7,364 are adopted) are enumerated in the whole work, and 77,908 species (of which 10,214 are *Chrysomelidæ*). Notes by E. v. Harold on the conclusion of the work, in C. H. xv. pp. 172–174.

For corrections, &c., as regards N. American *Curculionidæ*, see J. L. Leconte, P. Am. Phil. Soc. xv. p. 437; various *Tenebrionidæ*, F. Baudi, Deutsche E. Z. 1876, pp. 249, 256, &c.; *Brachynidæ*, Chaudoir, Ann. Ent.

g. xix. p. 12; *Chlæniides*, id. Ann. Mus. Genov. viii. p. 8; *cf.* also v. et faits, 1876, No. 25, pp. cii. & ciii., and L. W. Schaufuss, Nunq. iii. pp. 314–316, 384; and for general summary, C. O. Waterhouse, E. Soc. 1875, p. xxxvi.

BLER, V. Vierte Nachlese zu den Käfern von Tirol. C. H. xv. pp. 99–117.

any species (including two described as new) are added to the Fauna Tirol, with observations on localities, &c. See also Z. Ferd. (3) xix. 299–304.

DEN, LUCAS VON. Die Käfer von Nassau und Frankfurt. JB. nass. Ver. xxix. & xxx. (for 1876 & 1877, in one vol.) pp. 55–412.

lf purely local interest. Not even the number of species is given, so any generalization is impossible.

AN, G. H. Notes on the Coleopterous fauna of Guadalupe Island. Tr. Am. Ent. Soc. v. pp. 198–201.

his island lies 100 miles west of the peninsula of Lower California, the Pacific Ocean. 23 species are recorded (4 new, and 1 new genus), nd by Dr. E. Palmer. The fauna is essentially Upper Californian.

—. Notes on some Coleopterous remains from the bone cave at Port Kennedy, Penna. *Tom. cit.* pp. 241–245.

hese were contained in masses of clay in caves of which the mammaremains belong to the Post-pliocene period, strongly connected with present geological epoch, and suggestions are made as to the beetles g ancestors of now existing species. *Cychrus wheatleyi*, p. 242, (*minor*), *Pterostichus*, 2 spp. & *Cymindis aurora*, p. 243, *Chlænius tulatus*, *Dicælus alutaceus* and another sp., & *Chæridium*? *ebeninum*, 44, *Phanæus antiquus* & *Aphodius precursor*, p. 245, are described as „ from various fragments and impressions.

—. Synoptic tables of some genera of *Coleoptera*, with notes and synonymy. *Tom. cit.* pp. 246–252.

ome of these are by the late G. R. Crotch, and are so indicated. The era discussed are *Elaphrus*, *Notiophilus*, *Blethisa*, *Carabus*, *Perigona*, *rrobus*, *Pogonus*, *Hydrocharis*, *Berosus*, and *Tropidosternus*, with observations on isolated species of a few others. It is impossible, without producing it, to give any useful idea of this paper.

ISCH, T. Beiträge zur Kenntniss der Peruanischen Käferfauna auf Dr. Abendroth's Sammlungen basirt. (Sechstes Stück). Deutsche E. Z. 1876, pp. 81–133.

*Cryptocephalides* to *Corylophidæ*; and apparently concludes the work, itting the *Galerucides* and *Hispides*.

TEL, GEORG. Systematisches Verzeichniss der Sandkäfer und Laufkäfer, welche in Bayern und der nächsten Umgebung vorkommen. Passau: 1876, 8vo. 16 pp.

list, with localities, reaching to *Brachynus* only.

AATZ, G. Nachträge zum Verzeichnisse der Käfer Deutschlands von Dr. G. Kraatz. Berlin: 1876.

LACORDAIRE, T., & CHAPUIS, F. Histoire Naturelle des Insectes. Genera des Coléoptères, ou Exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d' Insectes. xii. Famille des Érotyliens, des Endomychides, et des Coccinellides par F. Chapuis. Paris: 1876, 8vo, pp. 1–424.

Completes the grand work commenced by Lacordaire in 1854. This volume, besides the usual index, contains a classified table of the families, tribes, groups, and genera discussed in the entire work, and also an alphabetical table of the families, groups, and genera (including synonyms), with references in each case to volume and page. Dr. Chapuis, who has so ably fulfilled the task left uncompleted at Lacordaire's death, explains that the MS. was out of his hands before receiving the publications of Crotch & Baly upon groups discussed in this and the preceding volume. Reviewed by E. v. Harold, C. H. xv. pp. 131–133; *cf.* also Pet. Nouv. ii. pp. 39, 42, 46.

LECONTE, J. L. New species of *Coleoptera*, collected by the expeditions for geographical Surveys west of the one hundredth meridian, in charge of Lieut. Geo. M. Wheeler, United States Engineers. Appendix H. 10, pp. 296–300, of Wheeler's Ann. Rep. geogr. Surv. W. of 100th mer., itself being Appendix JJ. of Ann. Rep. Chief of Engineers for 1876. Washington: 1876, 8vo.

A list of species collected in California, Southern Colorado, and New Mexico by Lieut. W. L. Carpenter. 11 new species are described.

MARSEUL, S. A. DE. Répertoire des Coléoptères d'Europe décrits isolément depuis 1863. L'Ab. xii. pp. 384–456.

*Anthribidæ* to *Coccinellidæ*; completes the undertaking.

——. Coléoptères du Japon recueillis par M. Georges Lewis. 2e. mémoire. Énumération des Hétéromères, avec la description des espèces nouvelles. Pts. 1–3. Ann. Soc. Ent. Fr. (5) vi. pp. 93–142, 315–340, 447–486.

*Pedinides* to *Œdemerides* inclusively. 129 species are recorded, whereof 106 are new. In spite of the title, the author also describes various new species from all parts of the world.

MARTORELL [see CUNI].

ROTHSCHILD, J. Musée Entomologique illustré. Histoire naturelle Iconographique des Insectes, publiée par une réunion d'entomologistes français et étrangers, sous la direction de J. Rothschild. i. Les Coléoptères. Paris: 1876, 4to, pp. 1–384, pls. (col.) i.–xlviii., woodcuts.

Consists of a general introduction to the *Insecta*, followed by notes averaging two lines in length, on the type species of each genus of beetles discussed. The work is quite worthless, except as an outline, and the plates are beneath criticism.

SCUDDER, S. H. Fossil Coleoptera from the Rocky Mountain Tertiaries. Bull. U. S. Geol. Surv. ii. pp. 77–87.

Contains descriptions of a new genus (*Halticides*) and 31 new species.

tt recorded from the Tertiaries of the United States, and, with the on of some doubtful remains in the Connecticut Valley red sand- the first American species from any formation.

W, S. In A. Fedchenko's Puteshestvie v Turkestan [Travels in arkestan]; Part 11, section ii. Zoogeographicheskia Izledovania. vision 5. Jestkokrilia (*Coleoptera*), fasc. 2, pp. 223–398, with ble, pp. i.–xxiv. (all the families, and the genera to *Stenus*), pls. i. iv. St. Petersburg & Moscow: 1876, 4to [Zool. Rec. xi. p. 250].

prises from the *Histeridæ* to the *Scarabæidæ*, inclusively. One new and many new species are described. The chief feature appears the number of new *Dermestidæ*. This forms pt. 1 of vol. xxi. of . Ges. Mosc.

ONI-TOZZETTI, A. Catalogo della Collezione di Insetti Italiani l R. Museo di Firenze. Firenze: 1876, 8vo.

ers to *Carabidæ*.

ON, SERAFIN DE. Coleópteros de Badajoz. Primera Parte. An. oc. Esp. v. pp. 45–78, pl. i.

ches to the end of the *Scydmænidæ*. A new genus of *Hydrophilidæ* racterized by Pandellé, and a few new species are described.

, H. Report upon the collections of *Coleoptera* made in portions Nevada, Utah, California, Colorado, New Mexico, and Arizona, uring the years 1871, 1872, 1873, and 1874. Chapter ix. of Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. Zoology (Washington: 1875, 4to), pp. 809–827, pl. lxi.

species are enumerated, with locality, &c., of capture. Five new es are described. The *Tenebrionidæ* and *Meloidæ* are very characc families in these desert regions.

RHOUSE, C. O. New species of *Coleoptera* from the Island of odriguez, collected by the Naturalists accompanying the Transit f Venus Expedition. Ann. N. H. (4) xviii. pp. 105–121.

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tland. D. Sharp continues his list [Zool. Rec. xi. p. 250]; Scot. iii. pp. 33–40, 85–88, 133–136, 183 & 184, 231 & 232, 277–280, 28, 368–376 (*Lathrobium* to *Cerylon*). W. A. Forbes, *tom. cit* .. G. C. Champion, Ent. M. M. xiii. p. 111.

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sia. Additions to the beetle-fauna [Zool. Rec. xii. p. 275], raising 159; K. Letzner, Z. E. Ver. schles. (n. f.) v. p. 20.

itz. J. Gerhardt, Deutsche E. Z. 1876, pp. 170–173, 383.

ngia. Kellner, *tom. cit.* p. 173.

Münster: Rade, Ent. Nachr. ii. pp. 114–116. Schönberg: Konow, *l. c.* p. 124.

Kriván, Hungary. K. Branesik, Deutsche E. Z. 1876, pp. 314–316.

Western Hungary. Max v. Hopffgarten, *tom. cit.* pp. 337–343.

France. A. Fauvel's "Annuaire Entomologique pour 1876" (Caen: 1876, 12mo, pp. 1–150), contains various extracts, &c., referring to captures and synonymy, &c., of French species.

Landes. E. Gobert, in the 3rd fasc. of his "Catalogue des Coléoptères du département des Landes" [Zool. Rec. xii. p. 275], pp. 59–145, comprises the *Staphylinidæ* (from the *Paederides*), *Pselaphidæ*, *Scydmænidæ*, and *Clavicornia*. The descriptions of larvæ are continued, including those of many species by E. Perris [*infrà*]. This work was originally issued in Bull. Soc. Toulouse, x. (1875–76) p. 29 *et seq.* *Cf.* also Feuil. Nat. vi. p. 36.

Senlis. Feuil. Nat. vi. pp. 28–31.

Rare species near Paris. Poujade, Bull. Soc. Ent. Fr. (5) vi. p. xcii.; C. & H. Brisout, *l. c.* p. cv.; Régimbart, *l. c.* pp. cvi. & cviii.; L. Bedel, *l. c.* p. cxxiii.

Isle de Ré. Bonnaire, *tom. cit.* p. cxxv.

Sos (Lot-et-Garonne). P. Bauduer, *tom. cit.* p. cxxx.

Gien, by beating dead faggots. V. Pyot, Pet. Nouv. ii. p. 82.

Reims. C. Lebœuf, Feuil. Nat. vi. p. 105.

Digne. E. Bellier de la Chavignerie, Bull. Soc. Ent. Fr. (5) vi. p. clix.

Fontainebleau. G. A. Poujade, *tom. cit.* p. clix.

Cancale. C. E. Leprieur, *tom. cit.* p. clxvi.

Languedoc. Marquet, Bull. Soc. Toulouse, x. p. 145.

Piedmontese Alps. J. Guichard, Bull. Soc. Ent. Fr. (5) vi. p. clxxv.

Dijon. A. Rouget. *tom. cit.* p. ccxvii.

Italy. Notes on *Cicindela dilacerata*, *Cossyphus insularis*, *Brachynus bayardi* and *obscuricornis*, and *Carabus variolatus*; A. Costa, Bull. Ent. Ital. viii. pp. 222–224 (see also p. 300).

Swiss and Italian Alps. MT. schw. ent. Ges. iv. pp. 465–468.

Monte-Codeno. F. Baudi, Pet. Nouv. ii. p. 9 (*cf.* pp. 13 & 17).

Nordenskiöld's and Pippingsköld's collection (some species new for Finland); Medd. Soc. Fenn. i. pp. 130 & 131.

Finland. Species recorded as new to the Fauna, 1873–1875; *tom. cit.* pp. 139–144.

St. Petersburg. J. Obert, Troudy Ent. Ross. viii. (1876); see Hor. Ent. Ross. xi., Rev. Bibliogr. p. viii.

Caucasus. A few species observed; F. Morawitz, Hor. Ent. Ross. xii. pp. 9–11.

Russia in Asia. S. Solsky, Hor. Ent. Ross. xi. pp. 273–299 (published in 1876), continues his enumeration and description of species.

Japan. E. v. Harold, Abh. Ver. Brem. v. pp. 115–135, describes second consignment of species from Hiogo (one new genus and four species). For corrections of his first paper [Zool. Rec. xii. p. 27] *erti-*
C. H. xv. p. 167.

*pecies.*

lberia. Observations on various species, some new; C. A. Dohrn, – Z. xxxvii. pp. 77–86, 115–118, 339–342.

.. Helena. Observations on the limited fauna, a quarter of which are rently *Cossonides*; T. V. Wollaston, Ent. M. M., xii. p. 252.

. America. Synonymy of the *Coleoptera* of Kirby's "Fauna Boreali-ericana," by G. H. Horn, Canad. Ent. viii. pp. 126–130, 150 & 151, 170, 190–193. Of 238 species described as new by Kirby, 111 stand are recognized; and 108 of the rest are certainly synonyms of known ies.

avenport, Monticello, and Frederic, Iowa. Lists of captures; J. D. mam, P. Davenport Ac. i. pp. 169–173.

olorado, Rocky Mountains. List of 250 species; *id. l. c.* pp. –182.

Iichigan. E. A. Schwarz, Psyche, i. pp. 145–148.

lorida. *Id. l. c.* pp 154 & 155.

ordova. Observations on various species by W. Davis, translated by .. Dohrn, S. E. Z. xxxvii. pp. 405–412.

apuasia. New species described, especially from New Guinea; Gestro, Ann. Mus. Genov. viii. pp. 512 *et seq.*

ew Guinea. Six species of *Cicindelidæ* and *Carabidæ*, from Katow Hall Sound, were the only Geodephagous beetles found during the nevert" Expedition; W. Macleay, P. Linn. Soc. N. S. W. i. p. 164.

ew Zealand. F. P. Pascoe, Ann. N. H. (4) xvii. pp. 48–60 (pt. ii.), ii. pp. 57–67. See also *Colydiidæ* and *Anthribidæ*, Sharp, *infrâ*.

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nve-beetles. On various points connected with F. J. Schmidt's inal records; G. Kraatz, Deutsche E. Z. 1876, pp. 175 & 176. On the ies of Ariége and the Pyrenees; Lucante, in Fauvel's Annuaire omologique, 1876, pp. 72–85. On the species of Kentucky; A. S. kard, Am. Nat. x. pp. 282–287, pl. ii. figs. 6–9.

reat quantities of living beetles accompanying rain during a violent m, wind W.S.W., in Northern Norway. They covered the snow, resembled *Galeruca viburni*. Ent. Nachr. ii. p. 53.

n nocturnal flight of beetles, with list of species observed; C. Hoftin- *tom. cit.* ii. pp. 77–79. Flight of *Coprophaga*; G. de Rossi, *l. c.* 42.

eetles found in various fungi (*Sphindus* in a *Lycogale*); Schmidt bel, S. E. Z xxxvii. p. 390.

arious small notes on habits, &c.; *id. l. c.* pp. 388–401.

ungus on beetles. *Sphæria entomorrhiza* on a species of *Hilipus* from ; G. Kraatz, Deutsche E. Z. 1876, p. 379, pl. i. fig. 15. *Stenopterus* with fungoid appendages below the head; *id. ibid.* fig. 16.

eetles found in connection with willows in Alsace; A. Claudon, Feuil. vi. pp. 123–126.

etles in swallows' nests; *tom. cit.* p. 60.

etritus of inundations; E. Trouessart, *tom. cit.* p. 61, R. Guilbert, *collis*, L. Mesmin, p. 89.

*us*, p. g in winter; *tom. cit.* p. 88.

876.

Beetle larvæ attacking telegraph posts; P. de Borre, CR. Ent. Belg. xix. p. ix.

A method of collecting and rearing larvæ of wood-feeding beetles described; A. Engel, Feuil. Nat. vi. p. 142.

Deformities in beetles (*Lucanus capreolus* with a double left mandible, and another with an abbreviate, stout, and blunted left mandible; *Thylacites pilosus* with double apical and sub-apical joints to the left antenna; *Silpha obscura*, merely an arrested development of elytra; *Aphodius contaminatus* with 3 normal tarsi to the left middle leg; and *Leptura testacea* with double claw- and sub-apical joints to the left hind tarsus); G. Kraatz, Deutsche E. Z. 1876, pp. 377 & 378, pl. i. figs. 9–14.

Mocquerys' "Coléoptères anormaux," No. x., 20 pls., has not been seen by the Recorder (Nouv. et faits, ii. p. 28).

Natural selection. A structure directly adapted to the preservation of the beetle from parasites is discussed in the description of a new genus of *Staphylinidæ* from S. America, and considered to present an extensive field in which natural selection may be supposed to operate directly. Such protected forms are probably often primitive. [Would they not seem, by retaining their original structure, to have escaped any alteration by selection or otherwise ?]. D. Sharp, Ent. M. M. xii. p. 200.

Roger's Hypothesis [Zool. Rec. xii. p. 273] on the natural system and descent of *Coleoptera*, discussed by G. Schoch, MT. schw. ent. Ges. iv. pp. 471 & 472.

Observations on Bock's species yet unaccounted for; G. Kraatz, Deutsche E. Z. 1876, p. 169.

Grimmer's Coleopteren Steiermark's. Identification of various species contained in this work; J. Weise, Deutsche E. Z. 1876, pp. 177 & 178.

## Cicindelidæ.

Horn, G. H. The sexual characters of North American *Cicindelidæ*, with notes on some groups of *Cicindela*. Tr. Am. Ent. Soc. v. pp. 232–240, pl. i. figs. 18–25 (sexual characters in outline).

The first of a proposed series of papers, in which the sexual characters of N. American genera are to be fully exposed.

Synoptical descriptive table of French species; J. Bourgeois, Feuil. Nat. vi. pp. 98–101.

*Cicindela schauppi*, Horn, *l. c.* p. 240, fig., E. Texas; *C. singularis*, E. de Chaudoir, R. Z. (3) iv. p. 330, Island of Dalak, Red Sea; *C. maino*, W. Macleay, P. Linn. Soc. N. S. W. i. p. 165, Katow, New Guinea; *C. tetrachoides*, R. Gestro, Ann. Mus. Genov. viii. p. 514, Hatam; *C. huttoni*, T. Broun, Tr. N. Z. Inst. ix. p. 375, Hikuwai, near Tairua, and Martin Bay, Otago, New Zealand: spp. nn.

## Carabidæ.

Continuation of the enumeration by P. Pellet of the *Carabi* in the Eastern Pyrenees, Faune Entomologique du dépar Terti- species.

Pyrénées-Orientales, Perpignan: 1876, 8vo, reprinted from Bull. Soc Pyrén. [Zool. Rec. xii. p. 278]. See also Pet. Nouv. ii. p. 92.

Notes and additions to E. C. Reed's memoir on the *Carabidæ* of Chili [Zool. Rec. xi. p. 254], pt. 1; Chaudoir, Ann. Ent. Belg. xix. pp. 105–124.

"Additions to the list of Geodephagous *Coleoptera* of Japan, with synonymic and other remarks"; H. W. Bates, Tr. E. Soc. 1876, pp. 1–5, pl. i.

A list embodying the late Piochard de la Brûlerie's synonyms; E. v. Harold, C. H. xv. pp. 137–139.

*Carabides.*

Gehin, J. B. Lettres pour servir à l'histoire des Insectes de la tribu des Carabides. 1 & 2. Bull. Soc. Metz (2), 1876, pp. 101–124, 125–148; also separately.

For reviews, *cf.* C. H. xv. p. 171, Pet. Nouv. ii. p. 64, and Nouv. et faits, No. 24, 1876, p. xcvii. The author recognizes 22 genera, divided into four groups, Pamborites, Nebriites, Cychrites, and Carabites, the latter occupying 18 of the genera (one new). The 14 known fossil *Carabi* are enumerated. The second letter contains special references to varieties and geographical distribution.

——. Catalogue-étiquettes des Coléoptères carabiques de la tribu des Carabides. Nancy: 1876, 8vo, pp. 72.

The author enumerates 22 genera or subgenera, and 685 species, of which 282 are referred to *Carabus*; 375 varieties or races are also admitted (256 in *Carabus*). For reviews, see Pet. Nouv. ii. p. 67, and C. H. xv. p. 172, note.

*Procerus.* Revision of the known species by G. Kraatz, Bull. Mosc. 1876, pt. 2, pp. 125–147, pl. i. The following are recognized:—*P. duponcheli*, Dej., fig. 1; *gigas*, Creutz.; *syriacus*, Kollar, fig. 9; *scabrosus*, Ol., figs. 2–5, 10–12 (including var. *cribratus*, Mots., figs. 4 & 5, and varr. nn. *breviusculus*, p. 125, figs. 2 & 3, Brussa, and *modestus*, p. 137, figs. 10, 11, 12, Amasia); *tauricus*, Adams (with varr. *audoini*, Brullé, and *olivieri* and *æneus*, Mots., and varr. nn. *viridissimus* and *purpureus*, p. 143, Crimea, and *nigritulus*, p. 144, Arabad), *colchicus*, Mots., = *caucasicus*, Adams, and a new species.

*Carabus.* C. G. Thomson's discussion of this genus [Zool. Rec. xii. p. 279] reproduced with comments and corrections as to erroneous localities, improper collocations of species, &c. Some species, also, considered distinct by Thomson, are not different in the structure of the ♂ copulatory organs pointed out by him. G. Kraatz, Deutsche E. Z. 1876, pp. 321–332.

*Carabus montivagus*, Pall., stirps nova *blandus*, from the Balkans; G. Kraatz, *l. c.* p. 332. *C. gougeleti*, Reiche, badly described, and referred by the author himself to *latus*, is queried as identical with *leptopus*, Dej., p. 68, Thoms.; *id. l. c.* pp. 333 & 334. *C. fausti*, Dohrn, general depre-*vitticollis*, observations; *id. l. c.* pp. 334–336. *C. intricatus*, L., var. n. *montesinnicus*, from Montenegro; *id. l. c.* p. 336. *C. trabuccarius*, Fairm., =

1876. [

*helluo*, Dej.; *id.* (quoting Chaudoir), Ent. MB. i. p. 153. *C. monilis*, var. n. *simulator*, from the Servian Mountains, analogous to *ulrichi*, Germ., var. *arrogans*, Schaum, from the same locality, with observations upon the importance of this as bearing on the Darwinian hypothesis; *id.* Deutsche E. Z. 1876, pp. 139–141. *C. ulrichi*, var. n. *rhilensis*, from Rhilo Dag, Balkans; *id. l. c.* p. 141. *C. torosus*, Friv., and *C. callegi*, Fisch., considered distinct species; *id. l. c.* pp. 142 & 143. Observations opposing Schaufuss's objections to the collocation by Perez Arcas of *C. brabeus*, Schauf., and *macrocephalus*, Dej.; *id. l. c.* p. 144. *C. biseriatus*, Chaud., recharacterized from the Caucasus, and considered specifically different from *concexus*, of which also *C. microderus*, Chaud., is thought not to be a variety, as Brûlerie states; *id. l. c.* p. 224.

*Carabus japonicus*, Thoms., *nec* Mots., = *dehaani*, Chaud.; *C. maiyasanus*, Thoms., is not Bates's species; *C. kæmpferi*, Thoms., = *insulicola*, Chaud.; observations on dilatation of inner under edge of fore tibiæ in ♂ in Japanese species: H. W. Bates, Tr. E. Soc. 1876, pp. 1 & 2.

*Carabus auratus* eating a strawberry; Feuil. Nat. vi. p. 39.

On hibernation of Carabi; E. Cotty, Bull. Soc. L. N. Fr. iii. p. 41.

*Calosoma sycophanta* in gardens, on cabbages, and also feeding on spiders; *C. sericeum* near Antwerp: C. Putzeys, CR. Ent. Belg. xix. p. lxi.

*Cychrocephalus*, g. n., J. B. Gehin, Bull. Soc. Metz (2), 1876, p. 119. Differs from *Carabus* in its long, narrow head, and the large lateral lobes of the labrum. For *Calosoma asperatum*, Dej., and *Carabus stenocephalus*, Luc. Observations on the long narrow head in the latter and in allied species that prey on snails, analogous to the structure of *Cychrus cylindricollis*, by the late T. Blackmore, P. E. Soc. 1876, p. iii. The proposed new genus = *Cathoplius*, Thoms.; E. v. Harold, C. H. xv. p. 172.

*Procerus laticollis*, sp. n., G. Kraatz, Bull. Mosc. 1876, pt. 2, p. 130, pl. i. figs. 6–8, Külek and Karl-Boghd.

*Carabus gehini*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 37, Japan.

*Calosoma palmeri*, sp. n., G. H. Horn, Tr. Am. Ent. Soc. v. p. 199, Guadalupe Island, Lower California.

### *Cychrides.*

*Cychrus cylindricollis*, Pini, again found on Monte-Codeno: it devours *Helix frigida*, inserting its antennæ, head, and thorax into the spires of the shell of that mollusc. F. Baudi, Pet. Nouv. ii. p. 9, fig.

### *Pamborides.*

*Tefflus raffrayi*, Chaud., from Adowa, fully described; it is the smallest known of its genus, and lives in marshy places with *Chlænius*, &c., diffusing a strong odour, like *Panagæus*; Chaudoir, R. Z. (3) iv. p. 354.

### *Galeritides.*

*Zuphium umbrigerum*, sp. n., Chaudoir, *l. c.* p. 379, ? Abyssinia.

*Drypta punctulata*, p. 380, *tarsata* and *nigripes*, p. 381, spp. nn. -erti- Abyssinia.

species.

*Helluonides.*

Table of Australian species, &c., compiled from Gestro's account; E. v. Harold, C. H. xv. p. 147.

*Acanthogenius dorsiger*, sp. n., Chaudoir, *l. c.* p. 369, Abyssinia.

*Brachynides.*

Chaudoir, Ann. Ent. Belg. xix. pp. 11–104, under the title "Monographie des Brachynides," describes new species from his own collection (though without the usual indications of novelty), with rectifications of synonymy, and suggestions as to the proper position of various isolated species. He omits the species of *Brachynus* of Europe, Northern, Central, and Western Asia, the Mediterranean Basin, and the United States. *B. annulicornis*, Chaud., and *graecus*, Dej., = *ejaculans*, Fisch.; *B. biguttatus* and *guttula*, Chaud., = *bayardi*, Dej.; *B. elegans*, Chaud., = *psophia*, Dej.; *B. scutellaris*, Chaud., = *sclopeta*, F.; *B. tibialis*, Mots., = *strepens*, Fisch.; *B. testaceus*, Ramb., = *pygmæus*, Dej.; with denials of other synonymy in Gemminger & Harold's Catalogue. *Aptinus cordicollis*, Chaud., is not *pyrenæus*, and is from Anatolia; *Pherosophus bifulcatus*, Chaud., is an error for *bifasciatus*, = *parallelus*, Dej., var.; *P. fuscicollis*, Dej., var. n. *4-pustulatus*, p. 37, Java; *P. humeralis*, Chaud., *nec* Ahrens, renamed *omostigma*, p. 39; *Aptinus occipitalis*, Macl., = *P. javanus*, Dej., of which var. n. *fimbriatus* from Malabar, &c., described, p. 42; *Brachynus cruciger*, Chaud., = *sericeus*, Dej.; *B. galamensis*, Gory, = *dorsalis*, Dej.; *B. stenoderus*, Bates, = *longicornis*, Mots., renamed *macrocerus*, p. 67; *B. atripes*, Putzeys, = *pachygaster*, Perty. Much more synonymy is indicated.

*Styphromerus* [script. *Styphlo-*], g. n., Chaudoir, *l. c.* p. 87. Paraglossæ entirely glabrous, mentum with a prominent middle triangular tooth, joints of antennæ and tarsi closely articulated together. For *Brachynus aulicus*, *4-maculatus*, and *equestris*, Dej., *parallelus*, Chaud., *exilis*, Laf., *ludicrus*, Er., *bicolor*, Boh. (renamed *dichrous*), and *fusciceps*, Schm. G., and *Crepidogaster bicolor*, Bates (renamed *S. batesi*); also *S. cribricollis*, p. 90, Senegal, and *ruficeps*, p. 91, Coromandel, spp. nn.

*Aptinus acutangulus*, sp. n., Chaudoir, *l. c.* p. 15, Greece, &c.

*Pheropsophus biplagiatus*, p. 18, Oaxaca, *aptinoides*, p. 19, E. India, *emarginatus*, p. 20, Philippine Isles, *dux*, Abyssinia, and *guineensis*, Guinea, p. 21, *basiguttatus*, Angola, and *planti*, Lagoa Bay, p. 22, *capensis*, p. 25, and *dregii*, p. 39, Cape of Good Hope, *palmarum*, p. 26, Cape Palmas, *nebulosus*, p. 27, Cochin China, *siamensis*, p. 29, *picicollis*, p. 44, Siam, *laticostis*, p. 30, Senegal, *hypoxanthus*, E. Australia, and *assamensis*, Assam, p. 33, *assimilis*, p. 38, N. China, and *subcordatus*, locality unknown, p. 38, *agnatus*, p. 43, China, *flexuosus*, p. 46, Columbia, Chaudoir, *l. c.*; *P. papuensis*, W. Macleay, P. Linn. Soc. N. S. W. i. p. 166, Katow, New Guinea: spp. nn.

*Brachynus bigutticeps*, p. 52, locality unknown, *piceus*, p. 53, *luzonicus*, p. 68, Philippine Isles, *tetragrammus*, p. 54, *hexagrammus*, p. 55, Bengal, *vitticollis*, p. 56, Rangoon, *diffusus*, Caffraria, *costiger*, p. 58, and *abyssinnicus*, p. 60, *suturatus*, p. 73, Abyssinia, *illotus*, p. 58, *limbicollis*,

p. 67, *scutellatus*, p. 69, *cinctellus* and *limbellus*, p. 70, and *tetracolon*, p. 61, Deccan, *axillaris*, p. 64, Natal, *orientalis*, p. 67, N. China, *flaiventris*, p. 68, Coromandel, *vigilans*, p. 68, *suturellus*, p. 69, and *atripennis*, p. 71, N. Hindostan, *longulus*, p. 72, Cape of Good Hope, *cognatus*, p. 74, *elongatulus* and var. ? *brevior*, and *azureipennis*, p. 75, *rhyti[do]derus*, and *consanguineus*, p. 76, *melanarthrus*, p. 84, and *sallei*, p. 85, Mexico, *xanthopleurus*, Montevideo, and *limbiger*, Cantagallo, p. 81, *xanthophrygus*, Para, *ager*, New Granada, and *fulvipennis*, Peru, p. 83, *niger*, p. 86, Montevideo, Chaudoir, *l. c.*; *B. costiger* and *tetraspilotus*, p. 366, *suturatus*, p. 367, *id.* R. Z. (3) iv. Abyssinia: spp. nn.

*Crepidogaster picipennis*, p. 94, *non-striatus*, p. 95, *ovicollis*, p. 96, Cape of Good Hope, *humeratus*, p. 96, Malabar, spp. nn., *id.* Ann. Ent. Belg. xix.

*Mastax striaticeps*, id. *l. c.* p. 99, Deccan; *M. raffrayi*, id. R. Z. (3) iv. p. 367, White Nile and Lake Tsana: spp. nn.

*Lebiides.*

CHAUDOIR, E. DE. Étude monographique des Masoréides, des Tetragonodérides, et du genre *Nematotarsus*. Bull. Mosc. 1876, pt. 2, pp. 1–84.

The author, after referring to the general distinction of the *Truncatipennes* by their ligula being entirely adherent to its paraglossæ, remarks upon the small number in which the tibiæ, especially of the 4 posterior legs, are terminated internally by two long spines, such as the *Graphipterides*, *Corsyra*, the Masoréides, Tetragonodérides, Sarothrocrépides, and *Nematotarsus*.

The *Masoreidæ*, proposed by Thomson to be re-united to the "Cinchoménides" [!], are placed between the *Coptoderides* and *Cymindides*, and include *Somoplatus*, *Lophidius*, *Caphora*, *Masoreus* (in which *Æphnidius*, *Macracanthus*, and *Anaulacus* are merged), and 3 new genera:—

*Colobonychus* [also promiscuously written *Colobonichus*], p. 4; having the hooks of the tarsi very short and thick, obtuse-trigonate, with no visible toothing. For *Lophidius brevicollis*, Dej.

*Microus*, pp. 4–8; with no pencil of hairs on the prosternum, tarsal claws arched, thin, and denticulate, antennæ very moniliform and short, labrum emarginate in the middle. For "*Spl. mocquerysi*," p. 9, Port de Rouen, and Island of Pemba.

*Ophryognathus*, pp. 3 & 5. No tooth in the mentum; differing from *Masoreus* in the very sharply defined projecting margin of the mandibles, &c. For *O. tuberculatus*, sp. n., p. 26, N. & E. littoral of South America.

Various corrections and observations are made with regard to described species; *Masoreus laticollis*, Chaud., = *orientalis*, Dej., var.; *M. sericans*, Schm. Gb., is near *Mochtherus*. The following new species are described:—

*Somoplatus marseuli*, p. 7, Cette (imported).

*Masoreus* (*Æphnidius*) *guinecnsis*, p. 17, Guinea, *batesi*, p. 20, Ega, *bonariensis*, Argentine Republic, and *ampliusculus*, Pará, p. 21, *piceolus*

p. 22, Amazon River, Cayenne, and Yucatan; *M.* (*Macracanthus*) *unicolor*, p. 23, Ega; *M.* (*Anaulacus*) *siamensis*, p. 25, Bangkok.

The *Tetragonoderidæ* are characterized as a special group having the terminal hook of the maxillæ very slender, sharp, and curved, and surmounted by a rather large lobe, which is clothed with hairs. They include *Cyclosomus*, *Tetragonoderus*, *Mnuphorus*, and two new genera:—

*Tilius*, pp. 29 & 71, with intermediate tarsi simple in both sexes, and no tooth to the mentum. For *Lionychus holosericeus*, Chaud., *Dromius obscurellus*, Dej., and *T. subsericeus*, sp. n., p. 73, S. Africa.

*Peronoscelis*, pp. 29 & 56. Paraglossæ slightly pubescent, only laterally attached to the ligula, and evidently overtopping it. For *Tetragonoderus velutinus*, Mots., &c., and *P. variipennis*, p. 59, Amazons and Bolivia, *femoralis*, p. 60, Ega, *mexicanus*, p. 62, Mexico, *oxyomus*, p. 66, Brazil, [*h*]*omophron*[*o*]*ides*, p. 68, Pará, spp. nn.

Various corrections and observations are made with regard to described species; *Crossonychus viridis*, Dej., Chaud., is a *Tetragonoderus*; *Mnuphorus*, Chaud., is characterized, p. 69; and the following new species are described:—

*Tetragonoderus obscurus*, p. 36, Madagascar, *subsulcatus*, p. 37, Island of Pemba, *gabonicus*, p. 40, Gaboon, *insignicollis*, p. 42, Natal and Zanzibar, *tessel*[*l*]*atus*, p. 43, Caracas, *sinuosus*, p. 44, Cordova, *lacordairii*, p. 45, Cayenne, *tetragrammus*, Ega, and *lævigatus*, Uruguay, p. 46, *unicolor*, p. 47, Rio Janeiro, *mixtus*, p. 51, Venezuela, *chalceus*, p. 53, Argentine Pampas.

*Mnuphorus discophorus*, p. 69, Simla.

*Nemotarsus*, Lec., corrected to *Nematotarsus*, is fully recharacterized, pp. 74–76, and stated to be only capable of being placed near the *Tetragonoderides*, from which it is distinguished by the constriction of the base of the head, the absence of the lobe over the terminal hook of the maxillæ, &c. The following new species are described:—

*Nematotarsus disciger*, p. 76, Rio Janeiro, *interruptus*, p. 77, Minas Geraes, *scutellaris*, p. 79, Ega.

*Sarothrocrepis*, Chaud. *Lebia luctuosa*, Newm., is referred to this genus; *L. benefica*, *tridens*, and *civica*, Newm., with *Cymindis inquinata*, Er., come very near it, but constitute a new genus "que j'ai nommé *Lebiomorphe*"; *Rhinochita levrati*, Montr., is also allied. Another special group is foreshadowed. *L. c.* p. 80.

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*Mimodromius* (g. n.), referred to Chaudoir by E. C. Reed [Zool. Rec. xi. p. 255], must be attributed to the latter, and additional characters are given, distinguishing it from *Cyanotarus*, Reed; *Callida guttula* and ? *Dromius nigro-testaceus*, Sol., are included in it, also *M. parallelus*, and *obscuripennis*, p. 107, ? Chili, *opacicollis*, p. 108, Chili, *phœoxanthus*, ibid. note, Pampas, and *gracilis*, p. 109, note, locality unknown, spp. nn.: Chaudoir, Ann. Ent. Belg. xix. p. 107.

*Cyanotarus andinus*, Germ., redescribed, with observations upon various other Chilian allied species; *id. l. c.* p. 110.

*Dromius fenestratus* found in February only ; G. de Rossi, Ent. Nachr. ii. p. 126.

*Endynomena lewisi*, H. W. B., fig. 4, *Paraphœa signifera*, H. W. B., fig. 5, *Taicona aurata*, H. W. B., fig. 6, and *Lebidia bioculata*, fig. 7, figured ; H. W. Bates, Tr. E. Soc. 1876, pl. i.

*Cymindidius* [*Cymindidoideus*], g. n., Chaudoir, *l. c.* p. 109, note. Near *Mimodromius*, Reed, but with long, fine, and quite simple hooks to the tarsi, and with long and slender antennæ and tarsi. For *C. cruciger* and *trivittis*, spp. nn., *id. ibid.*, Argentine Pampas.

*Cyanotarus foveolatus*, sp. n., *id. l. c.* p. 111, ? Chili.

*Variopalpus ovipennis* and *brunneus*, spp. nn., *id. l. c.* p. 112, ? Chili.

*Callida terminata*, sp. n., C. O. Waterhouse, Tr. E. Soc. 1876, p. 11, Borneo.

*Perigona discalis*, sp. n., Chaudoir, R. Z. (3) iv p. 353 (in error 553), Abyssinia.

*Glycia rectangula*, sp. n., *id. l. c.* p. 370, Abyssinia.

*Demetrias natalensis*, id. *l. c.* p. 372, Natal (with suggestions as to the African forms requiring a new genus); *D. sagitta*, Coye, L'Ab. 1876, livrn. 4 [sheet mark, " vi. 2e partie 1870, Mai "] p. 386 on left side, p. 16 on right, Syria [in noticing further species, no attempt can be made by the Recorder to unravel these mysteries] : spp. nn.

*Phlaodromius plagiatus*, sp. n., W. Macleay, P. Linn. Soc. N. S. W. i. p. 167, Yule Island, New Guinea.

*Dromius flavescens*, p. 372, *gentilis* and *figuratus*, p. 373, spp. nn., Chaudoir, *l. c.*, Abyssinia.

*Blechrus rhyti* [*do*] *derus*, sp. n., *id. l. c.* p. 374, Upper Egypt.

*Metabletus* (?) *fraterculus*, sp. n., *id. ibid.*, Abyssinia.

*Apristus subovatus*, sp. n., *id. l. c.* p. 375, Abyssinia.

*Lionychus sulcatus*, sp. n., *id. l. c.* p. 376, Abyssinia.

*Lebia æthiopica*, id. *l. c.* p. 377, Abyssinia; *L. papuensis*, W. Macleay, *l. c.* p. 167, Hall Sound, New Guinea : spp. nn.

### *Pericalides.*

*Amphimenes piceolus*, Bates; H. W. Bates, Tr. E. Soc. 1876, pl. i. fig. 8.

*Miscelus morio* [*ni*] *formis*, sp. n., W. Macleay, *l. c.* p. 168, Hall Sound, New Guinea.

### *Ozœnides.*

*Eustra plagiata*, Schm. G. ; H. W. Bates, *l. c.* pl. i. fig. 1.

### *Siagonides.*

CHAUDOIR, E. DE. Monographie des Siagonides. Bull. Mosc. 1876, pt. 1, pp. 62–112.

After an historical account, the author discusses the external anatomical features, removing the group from the vicinity of the *Ditomides* to that of the *Scaritides*, and describing as new species :—

*Siagona obscuripes*, Rangoon, and *sublævis*, Malay Peninsula, &c., p. 86, *baconi*, p. 89, Hindostan, *plagiata*, p. 93, *induta*, p. 98, *punctulata*, p. 99,

Deccan, *cinctella*, p. 95, Rangoon, *germana*, p. 96, *punctatissima*, p. 106, Coromandel, *cyclobasis*, p. 100, and *pubigera*, p. 108, Abyssinia.

*S. dorsalis*, Dej., = *flesus*, F., var.

*Coscinia*. Chaudoir, *l. c.* pp. 113–125, in like manner discusses this genus, with which *Cymbionotum*, Baudi, is identical, and heretofore placed either in this group or in the *Ditomides*. It should form a special separate group, at the head of the second great division of *Carabidæ*, in which the suture which joins the epimera of the mesosternum to their episterna does not reach the intermediate coxæ; but differing from all others in the group by wanting this suture, and by having no epimera to the posterior episterna,—in fact, forming a transition between the two great divisions. Dejean and Lacordaire are wrong in stating that the mentum is soldered to the neck, with no suture, that it has no tooth in the emargination, that the mandibles are not toothed internally, and that the last joint of the palpi is cylindrical. Chaudoir recharacterizes the genus fully, and describes as new:—

*Coscinia transcaucasia*, p. 120, Daghestan (= *pictula*, Bates, and occurs at Bagdad; L. v. Heyden, Ent. MB. i. p. 140), and *C. microphthalma*, p. 122, Senegal, queried as myrmecophilous.

### *Ditomides.*

*Aristus elegans*, sp. n., Coye, L'Ab. 1876, livrn. 4, p. 369, Syria.

*Apotomus velox*, sp. n., Chaudoir, R. Z. (3) iv. p. 335, Adowa, Abyssinia.

### *Anthiides.*

*Polyhirma polioloma*, Chaud., redescribed; *P. leucomelæna*, Roth, = *ferreti*, Rche.; *Anthia dimidiata*, Roth, = *galinieri*, Rche., = *P. tetrastigma*, Chaud., all from Abyssinia: Chaudoir, *l. c.* p. 368.

### *Morionides.*

*Morio senegalensis*, Laf., = *guineensis*, Imhoff, and *Platynodes westermanni*, Westw., is specifically, though dubiously generically, distinct from it; Chaudoir, *l. c.* p. 352.

### *Scaritides.*

*Scarites nitidus*, Chaud., = *asphaltinus*, Klug, and *S. rocheti*, Chaud., = *guineensis*, Dej. (omitted from Gemm. and Har. Cat.), varr.; *S. subcylindricus*, Chaud., is quite distinct from *arenarius*, Bon.; *Clivina natalensis*, Putz., agreeing with type from the Red Sea. Chaudoir, *l. c.* pp. 332 & 333.

*Scarites obtusangulus*, sp. n., *id. l. c.* p. 332, Lake Tsana, Abyssinia, and Nubia.

*Coryza raffrayi*, Adowa, *simplex*, Red Sea, spp. nn., *id. l. c.* p. 334.

*Ochyropus alcides*, sp. n.?, from Monrovia; C. A. Dohrn, S. E. Z. xxxvii. p. 85, not described.

*Sparostes africanus*, sp. n., J. Putzeys, S. E. Z. xxxvii. p. 447, Zambesi.

*Panagæides.*

*Dischissus mirandus*, H. W. B.; H. W. Bates, Tr. E. Soc. 1876, pl. i. fig. 2.

*Eudema latifrons*, p. 354, *planicolle*, p. 355, spp. nn., Chaudoir, R. Z. (3) iv. Abyssinia (a relative difference noted in the antennal joints of large and small species).

*Chlæniides.*

CHAUDOIR, E. DE. Monographie des Chléniens. Ann. Mus. Genov. viii. pp. 5–315.

Having acquired the collection of Dejean, and examined the types of a great number of species in the chief European collections, the author again publishes a treatise upon the insects belonging to this group, from which he eliminates *Eccoptomenus*, *Asporinus*, and *Harpostomus*. *Amblygenius*, Laf., is sunk in *Chlænius*, *A. chlænioides*, Laf., being only *C. quadricolor*, F. As additional, but merely negative, characters, it is noted that the two hinder pairs of tarsi never have any lateral furrows, and that there are never any impressed points on the 3rd interstice of the elytra. One new genus and 404 species of *Chlænius* are described (including very many new), and 8 of *Anomoglossus*, *Hololius*, *Penthimus*, and *Rhopalistes*. Much synonymy is established, especially as to Dejeanian species. *Chlænius elongatus*, Murray, = *vertagoides*, Laf.; *C. swinhoei*, Bates, *planicornis* and *concinnus*, Laf., = *mellii*, Chaud.; *C. myops*, Gory, Chaud., renamed *insignis*; *C. striato-punctatus*, Laf., = *deyrollii*, Laf.; *Vertagus spathulifer*, Bates, is an *Ocybatus*; *C. chevrolati*, Murray, *venator*, Laf., = *gorii*, Buq.; *C. discicollis*, Chaud., *nec* Laf., renamed *nepos*; *C. bimaculatus*, W. MacL., renamed *rudicollis*; *C. formosus*, Chaud., = *neelgheriensis*, Guér.; *C. pubiger*, Chaud., renamed *pubifer*; *C. bruneti*, Gory, = *ammon*, F.; *C. pictus*, Bates, ? = *virgulifer*, Chaud.; *C. guerini*, Laf., renamed *menevillii*; *C. chrysopleurus*, Chaud., var. n. *cærulea* from Puebla, p. 78; *C. darlingensis*, Cast., = *marginatus*, var., Cast., *nec* Dej., renamed *læteviridis*; *C. cupricollis*, Nietn., = *circumdatus*, Brullé; *C. marginatus*, Dej., *nec* Rossi, renamed *marginifer*; *Epomis* is refused generic status, p. 120; *C. armeniacus*, Mots., = *dejeani*, Sol.; *C. brevicollis*, Chaud., *senegalensis* and *capensis*, Gory, ? = *circumscriptus*, Duft., varr.; *C. gorii*, Gray, *nec* Buquet, renamed *protensus*; *C. culminatus*, Bates, and *rugicollis*, Laf., = *nigricans*, Wied.; *C. pubipennis*, Chaud., = *chalcothorax*, Wied.; *C. caspicus*, Mots., = *festivus*, F., var.; *C. violaceus*, Waterh., *nec* Chevr., renamed *purpuratus*; *Oodes puncticollis*, Boh., is a *Chlænius*, renamed *oodioides*; *C. carbonarius*, Dej., *nec* Rossi, renamed *carbonatus*; *C. sparsus*, Lec., = *cursor*, Chevr.; *C. brachyderus*, Chaud., *brevicollis*, Lec., *rufipes*, Dej., = *laticollis*, Say; *C. cyaneus*, var., Harold & G., named *infantulus*; *Rhopalopalpus pœciloides*, Laf., Chaud., = (*Rhopalistes*) *janthinus*, Redt.; *Hololius punctulatus*, Chaud., = *nitidulus*, Dej., var.

*Melanodes* is a transitional form between *Chlænius* and *Oodes*; *O. aterrimus*, Chaud., 1857, = *C. aterrimus*, Laf., 1853, is referred to it, and preferred to *Feronia atrata*, Reiche, 1850, with which both are identical.

because of *Abacetus atratus*, Klug [which belongs to the *Trigonotomides*]; Chaudoir, R. Z. (3) iv. p. 360.

G. H. Horn, Tr. Am. Ent. Soc. v. pp. 253–276, revises the species of *Chlænius* found in the United States, utilizing Chaudoir's monograph, though making an entirely different arrangement. Some observations are made with regard to Chaudoir's determinations of various N. American species, and some synonymy is indicated.

*Brachylobus*, g. n., Chaudoir, Ann. Mus. Genov. viii. p. 287. Lobes of mentum confused with the middle portion, and not projecting. For *Chlænius smaragdiger*, Mots., = *lithophilus*, Say.

*Eccoptomenus cordicollis*, sp. n., *id.* R. Z. (3) iv. p. 356, Abyssinia.

*Chlænius panagæoides*, p. 28, Malabar, *buquet*, p. 31, Senegal, *schœnherri*, p. 32, Guinea, &c., *medio-guttatus*, p. 35, Deccan, *orbicollis*, p. 40, Neilgherry Hills, *limbicollis*, p. 41, ? Formosa, ? Deccan, *fenestratus*, p. 44, Natal, *antennatus*, p. 45, White Nile, *cribellatus*, p. 47, N'gami, *distigma*, p. 49, Singapore, *gestroi*, p. 51, Malacca, *granulipennis*, p. 63, ? Abyssinia, *raffrayi*, p. 64, Zanzibar, *soginoides*, p. 74, Mexico, *cæruleicollis*, p. 78, Mexico, *gallæcianus*, p. 80, Galicia, *dinodoides*, p. 81, Abyssinia, *semperi*, p. 92, Philippine Islands, *birmanicus*, p. 93, Rangoon, *scapularis*, p. 98, Bengal, *cosciniophorus*, p. 101, Senegal, *nubicus*, p. 107, Nubia, *cupripennis*, p. 110, Abyssinia, *acroxanthus*, Siam, Singapore, and *extremus* (? = *postscriptus*, Bates), Hongkong, p. 112, *accedens*, Abyssinia, and *proximus*, Deccan, p. 113, *transfuga*, p. 114, Angola, *pachys*, p. 116, Abyssinia, *pachysomus*, p. 117, Siam, *subovatus*, Madagascar, and *leucoristus*, Cape of Good Hope, p. 119, *violaceipennis*, p. 128, Cape Palmas, *æthiopicus*, p. 129, White Nile, *bicolor*, p. 130, Deccan, *mendax*, Mozambique, and *lacustris*, N'gami, *wallacii*, Celebes, *crenistriatus*, Nubia, p. 134, *rude-sculptus*, p. 136, Siam, *doriæ*, p. 137, Bangkok, *cribellicollis*, p. 138, Abyssinia, *chalcoderus*, Bangkok, and *braminus*, E. India, p. 139, *macropus*, p. 140, Deccan, *togifer*, p. 143, S. Africa, *putzeysi*, Montevideo, and *amazonicus*, Upper Amazon, p. 147, *gundlachi*, p. 148, Cuba, *sallæi*, p. 149, Mexico, *sparse-punctatus*, p. 150, Bolivia and Uruguay, *rodriguezi*, p. 152, Guatemala, *ducalis*, p. 155, Deccan, *cuprecolineatus*, p. 158, Bangkok, *atripes*, p. 160, and *phanoderus*, p. 161, Deccan, *natalensis*, p. 164, *piceus*, p. 165, *erythrocnemis*, p. 166, *cham* [!], p. 168, S. Africa, *lissoderus*, p. 172, and *pradieri*, p. 173, Gaboon, *persimilis*, p. 175, ? Abyssinia, *vividus* and *opacipennis*, p. 176, India, *lugens*, p. 185, Nile, *chlorochrous*, p. 190, Mexico, *lævipennis*, p. 196, Deccan, *germanus*, p. 199, Laos, *luteicauda* and *celer*, p. 201, and *contractus*, p. 202, Deccan, *pratensis*, p. 210, Shanghai, *azurescens* and *planipennis*, p. 220, Mexico, *porrectus*, p. 224, Deccan, *melanopterus*, p. 226, Siam, *laticollis*, p. 228, Nubia, &c., *sericimicans*, China, and *submarginatus*, Burma, p. 235, *impressicollis*, p. 236, N. Hindostan, *cubanus*, p. 238, Cuba, *purpureus*, p. 246, Mexico, *atratus*, p. 247, Ega, *sivorii*, p. 248, Montevideo, *breviusculus*, p. 250, Peru, *amplipennis*, p. 252, Java, *læviplaga*, Abyssinia, and *frater*, Malabar, p. 261, *syriacus*, Bagdad, and *stenoristus*, Malabar, p. 265, *velocipes*, Deccan and Siam, and *fugax*, N. Hindostan, p. 266, *varians*, p. 270, Abyssinia, *speciosus*, p. 275 (? = *ernesti*, Gory), Kordofan, *kirki*, p. 276, Zambesi, *amabilis*, p. 279, Siam, *lativittis*, p. 282,

Angola, *fulvicollis*, p. 286, S. Africa, Chaudoir, Ann. Mus. Genov. viii.; *C. chrysoderus*, id., R. Z. (3) iv. p. 358, Lake Tsana, Abyssinia; *C. olivaceus*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 106, Rodriguez Island; *C. interruptus*, p. 259, Oregon, *maxillosus*, p. 260, and *floridanus*, p. 263, Florida, *texanus*, p. 261, and *flaccidus*, p. 265, Texas, *chaudoiri*, p. 270, Texas and Mexico, Horn, Tr. Am. Ent. Soc. v.: spp. nn.

*Melanodes iridescens*, sp. n., Chaudoir, R. Z. (3) iv. p. 361, Abyssinia.

*Cnemacanthides.*

*Broscus cephalotes* feeding on *Gammarus* at Calvados; its copulation described. H. Lucas, Bull. Soc. Ent. Fr. (5) vi. p. clxxviii.

*Cnemalobus darwini*, Wat., = *desmaresti*, Guér.; *Cardiophthalmus stephensi*, Wat., = *Baripus elivinoides*, Curt.; Chaudoir, Ann. Ent. Belg. xix. p. 124.

*Baripus aequicostis*, sp. n., *id. ibid.*, Uruguay.

*Anisodactylides.*

*Lecanomerus marginatus*, Reed, = *Nematoglossa brevis*, Sol.; Chaudoir, Ann. Ent. Belg. xix. p. 124.

*Selenophorus* (*Pangus*) *ochropus*, Dej., is an *Anisodactylus*; id. R. Z. (3) iv. p. 337.

*Anisodactylus laticolor* and *subcupreus*, spp. nn., *id. l. c.* p. 336, Abyssinia.

*Axinotoma punctulata*, sp. n., *id. l. c.* p. 337, Abyssinia.

*Harpalides.*

*Harpalus laevicollis*, Bates, *nec* Dufts., from Japan, is a *Tachycellus*, and is renamed *falsus*; *H. argutoroides*, Bates, belongs to *Oxycentrus*, Chaud., hitherto only known from N. India, and is figured, pl. i. fig. 3; H. W. Bates, Tr. E. Soc. 1876, p. 3.

*Harpalus asphaltinus*, Roth, = *agnatus*, Rche., *H. subcylindricus*, Rche., = *phalangioides*, Rche.; Chaudoir, R. Z. (3) iv. pp. 342 & 343.

*Harpalus punctato-striatus* and *dispar*, Dej., have 10 or 12 setigerous pores on the thorax; J. Bourgeois, Bull. Soc. Ent. Fr. (5) vi. p. cxix.

*Oxycentrus angustus*, p. 3, note, Rangoon, *borneensis*, p. 4, note, Borneo, spp. nn., H. W. Bates, *l. c.*

*Hypolithus spoliatus*, p. 339, *collaris* and *resplendens*, p. 340, spp. nn., Putzeys, R. Z. (3) iv. Abyssinia.

*Ophonus angustipennis*, sp. n., *id. l. c.* p. 341, Abyssinia.

*Harpalus papuensis*, W. Macleay, P. Linn. Soc. N. S. W. i. p. 168, Hall Sound, New Guinea; *H.* (*Pangus*) *tingitanus*, L. Fairmaire, Pet. Nouv. ii. p. 37, Morocco; *H. cognatus*, p. 342, *germanus*, *frater*, and *cratognathoides*, p. 343, *inconcinnus*, p. 344, Chaudoir, *l. c.* Abyssinia: spp. nn.

*Hispalis aeneolus* and *umbrifer*, spp. nn., Chaudoir, *l. c.* p. 345, Abyssinia.

*Stenolophus interruptus*, sp. n., *id. l. c.* p. 346, Natal.

*Trigonotomides.*

*Holconotus*, g. n., Chaudoir, R. Z. (3) iv. p. 352. A genus named, with

figures of some of its characters, by Schmidt-Goebel, but not yet characterized. Differs from *Abacetus* in its ligula, and in the insertion of the second antennal joint. For *A. ferrugineus* and *H. rufus*, sp. n., *ibid.*, Abyssinia.

*Abacetus quadrisignatus*, p. 347, *germanus*, *protensus*, and *contractus*, p. 349, *foveolatus*, p. 350, *piliger* and *cosciniderus*, p. 351, Abyssinia, *transcaucasicus*, p. 349, Russian Georgia, *mouffleti*, p. 350, Senegal, spp. nn., *id. l. c.*

*Feroniides.*

*Haptoderus placidus*, *cognatus*, and *schmidti*: observations on localities and relations, &c.; Chaudoir, Deutsche E. Z. 1876, p. 345.

*Molops*. Various desultory observations (with comments by Kraatz in notes); Chaudoir, *l. c.* pp. 346–348. *Pterostichus incultus*, Ktz., = *Omaseus armenus*, Fald.: this is denied by Kraatz, *l. c.* p. 348.

*Nortes*, Mots., = *Feroniomorpha*, Sol., = *Pachymorphus*, Chaud., subg., and its characters discussed; *Omaseus marginalis*, Curtis, = *F. ærea*, Dej., of which *subænea*, Mots., is probably a var.; *F. fischeri*, Sol., = *lucida*, Curt.; *F. sulcata*, Sol., = *nebrioides*, Curt.; with observations on other non-Chilian species. Chaudoir, Ann. Ent. Belg. xix. pp. 112–114.

*Trirammatus angustatus*, Chaud., *nec* Dej. (*Feronia*), = *Blennidus ferrugineicornis*, Mots., which must be used; *id. l. c.* p. 114.

*Feronia arata*, Sol., from Chili, redescribed, p. 115; *F. bonellii*, Wat., *rufipalpis*, Curt., *erraticus*, Guér., = *chalybicolor*, Chaud.; *F. sinuatipennis*, Fairm., redescribed, p. 118; *F. erratica*, var. *a*, Sol., ? = *profunde-striata*, Mots.; *Percus alienus*, Reed, is no *Percus*, but = *F. convexipennis*, Fairm., and presents the facies of the *Broscides*. Id. *l. c.*

*Pterostichus oblongo-punctatus* in Shetland; T. Blackburn, Scot. Nat. ii. p. 8.

*Pterostichus findeli*, Dej., from Tirol; G. Kraatz, Ent. MB. i. p. 62.

*Feronia marowighii*, Fairm., = *Lagarus inquinatus*, Sturm.; *id.* Deutsche E. Z. 1876, p. 174.

*Pœcilus*. Monograph by Chaudoir, L'Ab. 1876 (xiv.) pp. 1–54. After eliminating 48 species, and referring them to other genera of *Feroniides*, the author describes 48 others (whereof 2 new) to *Pœcilus*, as restricted to those having carinated basal joints to the antennæ. *P. lævigatus*, Mén., *nec* Duf., is renamed *liosomus*, p. 7; *P. lossinianus*, Fairm., and *æneicollis*, Grimmer, = *koyi*, Germ., varr.; *P. stenoderus*, Chaud., and *murex*, Coq., = *gressorius*, Dej.; *P. cyaneus*, Gebl., = *erythropus*, Fald., and *P. anatolicus*, Chaud., = *cupreus*, L., varr., and the red-thighed var. *affinis*, Stm., is stated [erroneously] not to occur in England; *P. bicolor*, Lec., = *luculblandus*, Say; *P. reichii*, Waltl, *cyanellus*, Rche., *gotschi* and *festivus*, Chaud., = *cursorius*, Dej.; *P. vicinus*, Levrat, ? = *quadricollis*, Dej., of which *numidicus*, Luc., is also a var.; *P. karelini*, Chaud., = *subæruleus*, Quens., and *P. subæruleus*, Schaum, = *striato-punctatus*, Duft.; *P. texanus*, Lec., and *micans*, Chaud., = *chalcites*, Say; *P. subcordatus*, Lec., renamed *diplophryus*, p. 42; *P. cyaneus*, Lec., *nec* Gory, renamed *cyanicolor*, p. 43, and var. n. *connexus*, Rocky Mountains, described,

p. 44; *P. scitulus*, Lec., ? = *cyanicolor*, var.; *Ancholeus*, Ziegler, is characterized as a section or sub-genus, p. 45. with *P. punctipollis*, Dej., as type; *P. lævicollis*, Chaud., renamed *lissodorus*, p. 46; *P. crenato-striatus*, Chaud., *nec* Steph., renamed *crenuliger*, p. 49; *P. curticollis*, Peyr., = *glabratus*, Peyr.

*Zabrus gibbus* distinctly proved to be a vegetable feeder, from actual personal observation; Schmidt Goebel, S. E. Z. xxxvii. p. 400. Some species of *Amara* also suggested to be phytophagous; *id. ibid.* and p. 401.

*Amara chalcites*, Bates, *nec* Zimm., = *zimmermanni*, Putz. [preoccupied by Heer, 1837]; H. W. Bates, Tr. E. Soc. 1876, p. 4.

*Amara continua* [script. *concinna*], Thoms., in Germany; G. Kraatz, Deutsche E. Z. 1876, pp. 183, 397.

*Argutor* [*o*]*idius*, subg. n. of *Feronia*, differing from *Argutor* in its margined and piliferous prosternum, and without the chief characters of *Lagarus*; for *Feronia* (*Argutor*) *chilensis*, *ardens*, *bonariensis*, and *oblita*, Dej., *F. patagonica*, Waterhouse, and *F. abacetoides*, Bolivia and Brazil, and *uruguaica*, Montevideo, spp. nn., Chaudoir, Ann. Ent. Belg. xix. p. 114.

*Trichosternus* (= *Homalosoma*) *hispidus*, sp. n., T. Broun, Tr. N. Z. Inst. ix. p. 371, Tairua.

*Feronia medio-lævis*, p. 115, *ignobilis*, p. 116, *gayi*, p. 118, *melæna* (? = *orobia*, Fairm.) and *stenoma*, p. 121, *putzeysi*, p. 122, Chili, *latere-striata* [*lateralistr-*], p. 115. note, Argentine Pampas, spp. nn., Chaudoir, Ann. Ent. Belg. xix.

*Pœcilus viridus*, p. 40, Algeria (? = *œrarius*, Coq., var.), and *mexicanus*, p. 44, Mexico, spp. nn., Chaudoir, L'Ab. 1876 (xiv.).

*Platyderus emblema*, sp. n. [? De Marseul], L'Ab. 1876, p. 388, Cordova.

*Amara ballata*, sp. n. [? *id.*] *l. c.* p. 389, Sarepta.

### *Anchomenides.*

*Calathus micropterus*, recorded by the late T. Blackmore from Mogadore, is probably in error for *C. encaustus*, Fairm.; M. Sédillot, Nouv. et faits, ii. p. 27, note.

*Anchomenus punctatus*, T. Broun, Tr. N. Z. Inst. iv. p. 371, Auckland; *A. strenuus*, p. 361, *opaculus*, p. 363, Chaudoir, R. Z. (3) iv. Abyssinia: spp. nn.

*Megalonychus amplicollis*, sp. n., Chaudoir, *l. c.* p. 364, Abyssinia.

### *Trechides.*

*Anophthalmus* should not be retained as a genus, depending as it does on absence of colouring in the eyes, a negative character which is not constant; *A. chaudoiri*, Bris., *nec* Levr., is renamed *brisouti*; *T. raymondi*, Pand., *nec* Del., renamed *galloprovincialis*: E. A. de Perrin, Bull. Soc. Ent. Fr. (5) vi. pp. vi.–viii. *Trechus kiesenwetteri*, Pand., *nec* Schaum, renamed *mutatus*; *T. brucki*, Pice., *nec* Fairm., renamed *picciolii*; *T. croaticus*, Hampe, *nec* Dej., renamed *oszailensis* (p. cxxiv.); *T. pubescens*, Joseph, *nec* Horn, renamed *pubens* (p. cxxv.): L. Bedel, *l. c.*, with reproductions of original diagnoses.

*Anophthalmus*. General observations on species found in Kentucky caves, with fig. of typical sp., p. 284, and figs. of pupa (fig. 2) and larva and details (figs. 3, 3*a-d*), of *A. tellkampfi*; A. S. Packard, Am. Nat. x. pp. 284–287, pl. ii.

*Perileptus testaceus*, p. 381, and *P.* (?) *lebioderus*, p. 382, spp. nn., Chaudoir, R. Z. (3) iv. Abyssinia.

*Bembidiides.*

*Tachys iridipennis*, p. 383, *xanthochrous* and *leptocerus*, p. 384, *germanus*, *variabilis*, and *abyssinicus*, p. 385, *majusculus*, p. 386, spp. nn., Chaudoir, R. Z. (3) iv., Abyssinia.

*Elaphropus æthiopicus*, sp. n., *id. l. c.* p. 386, ? Abyssinia.

*Bembidium* (*Peryphus*) *africanum*, p. 386, *melanocerum* and *adowanum*, p. 387, *B.* (*Notaphus*) *tropicum*, p. 387, Abyssinia, *B.* (*N.*) *madagascariense*, ibid., Madagascar, *id. l. c.*; *B. nevadense*, H. Ulke, in Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. p. 811, pl. xli. fig. 3, Nevada; *B. exoletum* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 77, Rocky Mountain tertiaries, White River; *B. tenue-striatum*, L. Fairmaire, Pet. Nouv. ii. p. 37, Algeria; *B. biasolii*, V. Gredler, C. H. xv. p. 104, Tirol (ex. typ., fide Heyden, = *inustum*, Duv.; E. v. Harold, *l. c.* p. 174): spp. nn.

## Dytiscidæ.

Experiments by D. Sharp upon the length of time spent submerged and on the surface for breathing exposure by various species of *Dytiscidæ*, reported in Nature, xv. p. 91 (published *in extenso* in P. L. S. 1877). *Pelobius hermanni* remains under water in a ratio of 375 to 1 of air exposure, and the more highly developed *Dytiscus marginalis* has a corresponding ratio of 12 to 1. *Pelobius*, *Hydrovatus*, and *Amphizoa* are considered to represent the most rudimentary and primitive forms of existing *Dytiscidæ*.

Negative observations on the peculiar milky secretion of *Dytiscides*, from experiments on *Dytiscus marginalis* and *dimidiatus*, and *Acilius sulcatus* and *canaliculatus*; it is not injurious to other insects nor is it sexual; it is a special fluid, not blood, secreted by cutaneous monocellular glands, and does not serve to form a greasy coating on the surface. F. Plateau, Ann. Ent. Belg. xix. pp. 1–10.

Water beetles under ice; Feuil. Nat. vi. p. 60.

*Hyphydrus acuminatus*, Steinh., = *Hydroporus connexus*, Aubé, and is an *Oxynoptilus* (*Hydrovatus*); *Hyphydrus humeralis*, Clk., = *gigas*, Boh.; *Hydroporus monticola*, Shp., = *melanarius*, Stm., var.; *H. bifasciatus*, Macleay, = *Hyph. blanchardi*, Clk.; *Hydr. foveiceps*, Mcl., = *howitti*, Clk.; *H. brunnipennis*, Mcl., = *gardneri*, Clk.; *H. luridus*, Mcl., = *bistrigatus*, Clk.; *H. fossulipennis*, Mcl., = *Hyph. australis*, Clk.; *Necterosoma flavicolle*, Mcl., = *wollastoni*, Clk., and *N. vittipenne*, Mcl., = *penicillatus*, Clk.; E. Wehncke, Ent. MB. i. p. 92.

*Hydroporus opatrinus*, Germ. Synonymy and tabular description of allied species; *H. vestitus*, Fairm., *nec* Gebl., renamed *fairmarii*; C. E. Leprieur, Pet. Nouv. ii. pp. 53 & 54. Figures of the thorax and base of

elytra in the species discussed, *l. c.* p. 39. *Cf.* also Bull. Soc. Ent. Fr. (5) vi. pp. lxi. & lxii., ciii.–cxv., cxix.–cxxii.; and MT. schw. ent. Ges. iv. pp. 566–570.

*Hydroporus assimilis*, Payk., var. wanting the basal thoracic spots, from Cumberland; E. C. Rye, Ent. M. M. xii. p. 175.

*Laccophilus* sp. (foss.). Remains described from Rocky Mountains tertiaries; S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 78.

*Agabus femoralis* and *uliginosus* differentiated; Leprieur, Bull. Soc. Ent. Fr. (5) vi. p. xxxi.

*Dytiscus circumflexus* and *circumcinctus*. On their colour differences, &c.; G. Kraatz, Ent. MB. i. p. 151.

*Dytiscus marginalis* emitting sound; M. Isenschmid, Ent. Nachr. ii. p. 121.

*New species :—*

*Cnemidotus festivus*, E. Wehncke, S. E. Z. xxxvii. p. 356, Texas.

*Vatellus lentus*, p. 356, Portorico, *haagi*, p. 357, Corrientes, *id. l. c.*

*Hydrovatus clypealis*, D. Sharp, Pet. Nouv. ii. p. 61, S. England, France, Algeria [= *Oxynoptilus cuspidatus*, Crotch, Moncreaff, *nec* Kunze].

*Hydroporus inconspectus*, Leprieur, Pet. Nouv. ii. p. 53 (no locality given), fig. of thorax, p. 89, No. 6; *H. bombycinus*, id., Bull. Soc. Ent. Fr. (5) vi. p. cxxii. (no loc.); *H. acuminatellus*, Boghari, and *subtruncatus*, Biskra, L. Fairmaire, Pet. Nouv. ii. p. 49; *H. wakefieldi*, p. 20, *duplex*, p. 21, D. Sharp, Ent. M. M. xiii., New Zealand; *H. habelmanni*, E. Wehncke, Ent. MB. i. p. 76, Dalmatia.

*Hydrocanthus rugoso-punctatus*, Madagascar, and *lineatus*, Mexico, p. 221, *weisii*, and *morsbachi*, p. 222, and *indicus*, p. 223, Cochin China, *orientalis*, Madras, Tranquebar, and *haagi*, Siam, p. 222, *badeni*, Angola, *semperi*, Luzon, and *australasiæ*, North Australia, p. 224, E. Wehncke, Deutsche E. Z. 1876.

*Colymbetes* (*Rantus*) *socialis*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 106, Rodiguez Island.

*Trogus* [*Cybister*] *godeffroyi*, p. 357, Australia, *haagi*, Nubia, and *natalensis*, Natal, p. 358, *nigripes*, Borneo, and *steinheili*, Columbia, p. 359, Wehncke, S. E. Z. xxxvii.

*Dytiscus persicus*, id. *l. c.* p. 52, Persia.

*Hydaticus insignis*, p. 194, *bipunctatus*, p. 196, *philippensis*, p. 197, Philippine Isles, *dameli*, Cape York, and *richli*, Cuba, p. 195, *maculatus*, p. 196, Cuba, *id. l. c.*

## Gyrinidæ.

*Dineutes picipes*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 107, Rodriguez Island.

*Enhydrus tibialis*, Brazil, and *atratus*, Panama, spp. nn., M. Régimbart, Bull. Soc. Ent. Fr. (5) vi. p. ccxv.

## Hydrophilidæ.

*Hydrophilus piceus*, L., and *aterrimus*, Esch., diagnosed; Doebner, Ent. Nachr. ii. p. 139. Varieties of *H. piceus*; G. Eichler, *l. c.* p. 168.

*Hydrobius glabricollis*, Schauf., = *bipustulatus*, Msh.; Martinez y Saez, An. Soc. Ep. v. (Act.) p. 23.

*Limnebius picinus*, Marsh. (*atomus*, Duft.), and *sericans*, Muls., differentially and very fully described; J. Gerhardt, Deutsche E. Z. 1876, pp. 163–166. *L. sericans*, Muls., is, however, the same as *picinus*, Marsh., and *atomus*, Duft., must stand for the other species; G. Kraatz, *l. c.* p. 166.

*Helophorus rugosus*: larva described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3, p. 78; also in Ann. Soc. Ent. Fr. (5) vi. p. 183; it was found in turnip roots, in the gallery of a larva of *Psylliodes*, on which it fed.

*Helophorus æqualis*, *planicollis*, *brevicollis*, and *strigifrons*, Thoms., recorded from Britain; T. Blackburn, Ent. M. M. xiii. pp. 39 & 40. *H. laticollis*, Thoms., also (dubiously) recorded from England; E. C. Rye, *l. c.* p. 40.

*Hemisphæra*, g. n., Pandellé, An. Soc. Esp. v. p. 57. Antennæ with only 7 apparent joints, the second joint sub-globular: facies of *Cyllidium* or *Anacæna*. For *H. infima*, sp. n., *id. l. c.* p. 58, pl. i. fig. 5, Madrid.

*Philhydrus primævus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 78, tertiaries of Wyoming.

*Berosus mixtus*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 114, Rodriguez Island.

*Limnebius fussi*, sp. n., J. Gerhardt, *l. c.* p. 167, and Z. E. Ver. schles. (n. f.) v. p. 34, Clêves and Liegnitz.

*Ochthebius torrentium*, sp. n., Coye, L'Ab. 1876, livrn. 4, p. 370, Syria.

*Cyclonotum marginale*, sp. n., D. Sharp, Ent. M. M. xiii. p. 21, New Zealand.

## PAUSSIDÆ.

DOHRN, C. A. Ueber australische Paussiden. J. Mus. Godeffr. xii. pp. 48–55.

A myrmecophilous habit is not yet ascertained for Australian species; in almost all, the detonating power has been observed. They occur in dead wood, and come to light. General observations of a somewhat bewildering nature, with no definite result, are made on various species of Macleay and Westwood.

*Paussus* lives very rarely in formicaria, and there appear to be no relations between it and the ants. Its detonating power described; the gas does not stain the skin or feel warm. Received in a glass tube, it deposits a yellow crystal, similar to that formed by the phosphorus of a lighted match, and this crystal cauterizes the tongue. A few observations are made on habits. A. Raffray, "Abyssinie" (Paris: 1876, 12mo), pp. 114–117. Raffray's observations reproduced, with comments; C. A. Dohrn, S. E. Z. xxxvii. p. 333.

*Paussus* certainly crepitates, like *Brachynus*; L. Bedel, quoted in Nouv. et faits, 1876, No. 23', p. xciv. See also Bull. Soc. Ent. Fr. (5) vi. p. xlix. as to crepitation by *P. favieri*.

*Pleuropterus dohrni*, sp. n., C. Ritsema, Tijdschr. Ent. xix. p. 58, figs. *a* & *b*, Congo.

*Paussus wærdeni*, sp. n., *id.* S. E. Z. xxxvii. p. 42, Congo.

## Staphylinidæ.

Sahlberg, John. Enumeratio Coleopterorum Brachelytrorum Fenniæ. Systematisk förteckning öfver de inom Finlands naturalhistoriska område hittills funna Coleoptera Brachelytra, jemte uppgift om arternas utbredning och beskrifningar af nya och mindre kända species. i. Staphylinidæ. Helsingfors: 1876, 8vo, pp. 1–248.

This is a part of vol. i. of the "Acta Societatis pro Fauna et Flora Fennica," which, commencing in 1876, is established for the more important publications of the Society, the smaller essays, &c., being included in the "Meddelanden från Sällskapet pro Fauna et Flora Fennica." The "Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar" are replaced by these two publications.

Sahlberg's work is a very careful and well executed account of the Finland species, giving bibliographical references and localities, and diagnoses of such as are not well known. 655 species are enumerated, including 42 new, and 2 new genera. The synthetic ideas of Fauvel are not adopted, but the work is otherwise well up to date. C. G. Thomson's arrangement is followed, and all his genera are adopted.

Sharp, D. Contributions to an Insect Fauna of the Amazon Valley. *Coleoptera—Staphylinidæ*. Tr. E. Soc. 1876, pp. 27–424.

The author enumerates and describes 487 species, whereof 463 are new, and estimates the Brachelytrous fauna of Amazonia at not less than 4000 or 5000 species. The *Piestides* contain the largest proportion of widely distributed species, and the *Paederides* are by far the most numerous, the *Homaliides* only producing one species. 80 different genera are employed, whereof 12 are new. In various parts of this paper, the author refers to the importance of sexual characters and their modifications, as bearing upon natural selection and connected points; and he also reiterates his former opinion as to a genus being subservient to its species, and not properly definable until the limitations of the latter are thoroughly known.

Precise localities for some of the species described are given by the author, P. E. Soc. 1876, pp. xxvii. & xxviii.

The author describes (*inter alia*) the following new genus, which is placed here, as no suggestion as to its affinities is made:—

*Turellus*, g. n., p. 423. Antennæ clavate, 9-jointed; all the tarsi 4-jointed. Trophi indicating a relationship with the anomalous genus *Evæsthetus*. For *T. batesi*, sp. n., p. 424, Ega.

Mulsant, E., & Rey, C. Tribu des Brévipennes. Ann. Soc. Agric. Lyon (4) viii. 1875 [1876 at bottom of title], pp. 145–856, pls. i.–vi.

The student of *Brachelytra* who finds Fauvel's "Faune Gallo-Rhénane" unnecessarily voluminous, will doubtless be puzzled to understand the necessity for another prolix and almost simultaneous work on the

same subject, published in the same country, and also restricted to French species. MM. Mulsant & Rey, however, have apparently recognized a want in this respect, and now give the introductory portion of the monograph of which they have, in various places and at different times of late years, published scattered instalments [Zool. Rec. xii. p. 295]. After 60 pages of generalization, the authors divide their tribe of Brévipennes into three chief groups, Staphylinides, Micropéplides, and Sténides. Of these, the first consists of fifteen families, Staphyliniens, Xantholiniens, Pédériens (including Evæsthetus), Oxyporiens, Oxytéliens, Phléocha-riens, Trigonuriens, Proteiniens, Phléobiens, Omaliens, Pholidiens, Habrocériens, Tachyporiens, Trichophyens, and Aléochariens.

The present vol. includes the Staphyliniens; the plates consisting of outlines of various small points of external anatomy.

The Xantholiniens [*Xantholinides*, infrà] are in like manner discussed simultaneously in Mém. Ac. Lyon, xxii. These two papers are, but for the table of contents to both publications, anonymous.

Much unnecessary speculation is entered upon as regards the Stephensian species, in all probability quoted at second hand.

Various synonymical remarks [mostly already recorded or incorrect] by A. Fauvel; Ent. MB. i. pp. 61 & 62.

*Aleocharides.*

This group apparently contains some insects directly connected with, or descended from, the *Oxytelides*, and others from the *Tachyporides*, and a new genus is described [see *Tachyporides*] apparently intermediate in structure between it and the latter. D. Sharp, Ent. M. M. xii. p. 199.

*Aleochara succicola*, Thoms., is not *lygæa*, Ktz., but = *mœsta*, Grav.; *A. mœsta*, Thoms., probably = *villosa*, Mann.; G. Kraatz, Deutsche E. Z. 1876, p. 174.

*Myrmedonia collaris* seen to devour ants; L. Mesmin, Feuil. Nat. vi. p. 118.

*New genera and species :—*

*Phymatura*, J. Sahlberg, Enum. Col. Brach. Fenn. p. 85. Hitherto associated with *Bolitochara*, but with the head sub-inserted, slightly narrowed behind the rather prominent eyes; differing also in the stucture of the antennæ and the transverse thorax, which is slightly margined at the base, and hardly narrower than the elytra. For *Bolito-chara brevicollis*, Ktz. (? = *Homalota nitidicollis*, Fairm.), and *P. gyro-phænoides*, p. 86, Finland, queried as a pale var. of that species.

*Eurylophus*, id. *l. c.* p. 117. Resembles *Atheta*, but nearer *Oxypoda* in the structure of the tarsi, differing in the very elongate, slender, falcate, toothed mandibles, the structure of the labrum, and the large head. For *E. grandiceps*, p. 118, Finland.

*Myrmigaster* [*Myrmecog-*], D. Sharp, Tr. E. Soc. 1876, p. 59. Pro-bably allied to *Dinarda*, possibly through *Corotoca*. For *M. singularis*, p. 51, Ega.

*Autalia alia*, V. Gredler, C. H. xv. p. 105, Tirol [= *A. punctipennis*, Sharp, 1864].

referred to *præcox*, Er., and (3) placed between *picipes* and *peltatus*, from Spain, *l. c.* p. 718, note, provisionally named. Also *Q.* (*S.*) *cyanescens*, p. 727, in marshes, Hyères [apparently large specimens of *umbrinus*, Er.], and *bicolor*, p. 738, Grande Chartreuse, spp. nn., and *Q. etruscus*, ? sp. n., vel ? *scintillans* var., from Tuscany, p. 759, note. *Iid. l. c.*

*Tanygnathus* (? related to *Aleocharides*) *longicornis* and *nasutus*, p. 96, *flavicollis*, p. 97, spp. nn., D. Sharp, Tr. E. Soc. 1876, Amazon Valley.

*Acylophorus punctiventris*, p. 98, *angusticeps* and *acuminatus*, p. 99, *iridescens*, p. 100, spp. nn., *id. l. c.*, Amazon Valley.

*Quedius clypealis*, id. *l. c.* p. 100, Ega; *Q. nigro-cæruleus*, p. 644, larva, p. 647, living in caverns, and *assecla*, p. 655, South of France, *Q.* (*Microsaurus*) *maculicornis*, p. 624, mountains in South of France, *Q.* (*Raphirus*) *persimilis*, p. 791 [between *attenuatus* and *boops*], Lyons, Alps, Mulsant & Rey, *l. c.*: spp. nn.

*Microsaurus nigripennis*, sp. n., J. Sahlberg, Enum. Col. Brach. Fenn. p. 26, Finland.

*Heterothops sericans*, sp. n., Mulsant & Rey, *l. c.* p. 820, Provence, seacoast; a specimen connecting it with *H. prævius* named *paradoxus* [!], p. 823.

### *Staphylinides.*

*Trichoderma pubescens*, Deg., p. 240; *Ocypus cyaneus*, p. 285; *O. pedator*, p. 321; *Philonthus tenuicornis*, p. 384, *P. varius*, p. 402, *P. fimetarius* ?, p. 433, *sordidus*, p. 437, *concinnus*, p. 453, *fumigatus*, p. 459, *ventralis*, p. 484: larvæ described by Mulsant & Rey, Ann. Soc. Agric. Lyon (4) viii.

*Philonthus stenoderus*, Rche., = *fimetarius*, Grav., var.; *P. micans*, Grav., varr. nn. *helveticus*, Switzerland, *tænianus*, Lyons, p. 506; *Gabrius exiguus*, Nordm., var. n. *nigricornis*, p. 551; *Remus cinerascens*, var. (vel ? sp.) n., St. Raphael, p. 605: *iid. l. c.*

*Philonthus lucens*, Mann., *ex. typ.*, = *atratus*, Gr., and is distinct from *lucens*, Er., Ktz., which is allied to *P. politus*; J. Sahlberg, Enum. Col. Brach. Fenn. p. 16.

### *New genera and species*:—

*Staphylinites*, provisionally named, not characterized [used as a divisional term by Newman, 1834], for *S. obsoletum* [sic], (foss.), from tertiaries of Wyoming; S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 78.

*Gastrisus*, D. Sharp, Tr. E. Soc. 1876, p. 136. Of the build of *Philonthus*, but with the prothoracic lateral lines not joined, and with a stigmatic membrane; also allied to *Philothalpus*, but with no curved abdominal lines. Type, *G. lævigatus*, p. 137, also *G. obsoletus*, p. 136, and *punctatus*, p. 138, Amazon Valley.

*Eugastus*, id. *l. c.* p. 139. Very close to *Philothalpus*, but with no curved lines on the abdomen; no stigmatic membrane. *E. bicolor*, p. 139, *mundus*, p. 140, Amazon Valley.

*Isanopus*, id. *l. c.* p. 141. Near *Eugastus*, but with longer palpi, and joints 2–4 of the four posterior tarsi somewhat lobed, dilated, and unsymmetrical. *I. tenuicornis*, ibid., Ega.

*ma*, id. *l. c.* p. 426. Pubescent; antennæ subserrate internally; last of all the palpi dilated; lateral lines of thorax not confluent. *S. tta*, p. 427, Chontales.

*esmus*, Mulsant & Rey, Ann. Soc. Agric. Lyon (4) viii. p. 242. ects *Trichoderma* and *Staphylinus*. For *S. chloropterus*, Pz., and *sor*, Scop.

*masus*, subg. n. of *Platydracus*, Thoms. [itself not recognized as a s by Coleopterists], *iid. l. c.* p. 259. For *Staph. lutarius*, Grav., and *liionalis*, Rosenh.

*ewdocypus*, subg. n. of *Ocypus*, for *O. fuscatus*, &c.; *iid. l. c.* p. 291.

*thidus*, iid. *l. c.* p. 339, for *Philonthus cribratus*, Er.

*bigus*, iid. *l. c.* p. 523. Anagram of *Gabrius*; for *Philonthus tenuis nullus*.

*emdidus*, iid. *l. c.* p 574 [= *Remus*, Holme, 1837], for *Philonthus mus*, &c.

*anchydirus maculiceps*, p. 109, *antennatus*, p. 110, *styloceros*[*-rus*], 11, *cribricollis* and *simplex*, p. 112, *amazonicus*, p. 113, *batesi*, 4, *longipes* and *æneiceps*, p. 115, D. Sharp, Tr. E. Soc. 1876, Amazon ey.

*ociopterus tricolor*, p. 117, *fungi* and *nigripes*, p. 118, *affinis*, p. 119, *liiatus*, p. 120, *latus*, p. 121, *ventralis* and *traili*, p. 122, *virgineus*, 3:, *mirandus*, p. 124, *id. l. c.* Amazon Valley.

*mthopygus solskii*, p. 126, *cyanipennis*, p. 127 (? = *solskii*, var.), *lis* and *violaceus*, p. 128, *depressus*, p. 129, *nigripes*, p. 130, *cognatus*, 1., *id. l. c.* Amazon Valley; *X. viridipennis*, id. *l. c.* p. 428, Chontales.

*ilothalpus luteipes*, p. 133, *latus*, p. 134, *incongruus*, p. 135, *id. l. c.* zon Valley.

*iggonopselaphus opacipennis*, p. 143, *mutator*, p. 144, *violaceus*, p. 145, *tus*, p. 146, spp. nn., *id. l. c.* Amazon Valley.

*anus kraatzi*, p. 147, *batesi* and *amazonicus*, p. 148, *vestitus*, p. 149, c. Amazon Valley; *G. coxalis*, id. *l. c.* p. 425, Chontales.

*phylinus subcyaneus* and *parviceps*, p. 151, *gratiosus*, p. 152, *gratus*, 3:, *amazonicus*, p. 154, *priscus*, p. 155, *vetustus*, p. 156, spp. nn., *id. l. c.* zon Valley.

*Esstotrophus patriarchus* (foss.), Scudder, *l. c.* p. 78, White River ries.

*Lpus* (*Gœrius*) *decurtatus*, Mulsant & Rey, *l. c.* p. 289, Alps, &c. (? = *nilis*, var.).

*Tonuchus* (not entitled to generic rank) *batesi*, p. 157, *grandiceps*, 8:, *decipiens*, p. 159, *clypeatus*, p. 160, *holisoides* and *æqualis*, p. 161, *ssifrons*, p. 162, *armatus*, p. 163, *setiger*, p. 164, Sharp, *l. c.* Amazon ey.

*ilonthus amazonicus*, p. 165, *corallipennis*, p. 166, *deletus* and *muticus*, *gracillimus*, p. 168, *æneiceps* and *cognatus*, p. 169, *traili*, p. 170, *lis*, p. 171, *lustrator* and *æneicollis*, p. 172, *palpalis*, p. 173, *aberrans*, *conformis*, p. 175, *propinquus* and *regillus*, p. 176, *abactus*, p. 177, es, p. 178, and *P.* (?) *serraticornis*, p. 179, *id. l. c.* Amazon Valley; *secretus*, p. 428, *flohri*, p. 429, *mexicanus*, p. 430, *id. l. c.* Mexico; *rialis*, E. Eppelsheim, S. E. Z. xxxvii. p. 431, Nauplia; *P. setosus*,

J. Sahlberg, Enum. Col. Brach. Fenn. p. 14, Finland; *P. biseriatus*, G. Stierlin, MT. schw. ent. Ges. iv. p. 473, St. Bernard (= *Quedius alpestris*, id. *l. c.* p. xii,); *P. melanarius*, p. 403, Alps (= *varius*, var. *a*, Er., = *carbonarius*, Grav., *nec* Er. [but if so, Erichson's *carbonarius*, being posterior to Gravenhorst's, must fall]), *heterodoxus*, p. 419, Corsica, *subrugosus*, p. 424, *gagates*, p. 454 (? = *corvinus*, Er.), Provence, Mulsant & Rey, *l. c.*

*Gabrius tibialis*, Mulsant & Rey, *l. c.* p. 540, S. France, *piliger*, p. 553, Corsica.

*Holisus depressus*, p. 180, *picipes*, p. 181, *excavatus*, and *umbra*, p. 182, *discedens*, p. 183, Sharp, *l. c.* Amazon Valley.

### *Xantholinides.*

E. Mulsant & C. Rey, Mém. Ac. Lyon, xxii. pp. 217–344, pls. i.–iii., fully describe the species of the second family, Xantholiniens, of their "Tribu des Brévipennes" [*Staphylinidæ*, suprà]. Two branches are adopted, Othiaires (following Thomson) and Xantholinaires. *Platyprosopus* is considered as not belonging to the group. The larvæ are described of *Xantholinus tricolor* ?, p. 276, *X. linearis*, p. 289, *Leptacinus batychrus*, p. 324, and *L. linearis*, p. 327. *X. linearis*, var. n. *commixtus*, p. 289.

*Megalinus*, subg. n. of *Xantholinus*, for *X. glabratus*; iid. *l. c.* p. 261.

*Tesba*, g. n., D. Sharp, Tr. E. Soc. 1876, p. 194. Allied to *Scytalinus*, differing by the presence of the upper line of the thoracic side-piece, the thick antennæ, which are more approximate at their insertion, and separated by a compressed keel-like space, and by its much more robust build. *T. gigas* and *laticornis*, spp. nn., *id. l. c.* p. 195, Amazon Valley (with allies in Natal and Madagascar); *T. belti*, sp. n., *id. l. c.* p. 431, Chontales.

*Linidius*, g. n., *id. l. c.* p. 196. Intermediate between *Scytalinus* and *Xantholinus*, and possibly identical with *Thyreocephalus*, Guér. For *L. recticollis* and *tenuipes*, p. 197, and *extremus*, p. 198, spp. nn., *id. l. c.* Amazon Valley.

*Lithocharodes* [*-charitoides*], g. n., *id. l. c.* p. 204. Most allied to *Leptolinus*, but with undilated front tarsi and shorter maxillary palpi. *Lith. fuscipennis*, sp. n., *id. l. c.* p. 205, Tapajos.

*Platyprosopus* (provisionally referred to the *Quediides*) *major*, p. 102, *laticeps*, p. 103, *paxallelus* and *puncticeps*, p. 104, *rectus*, p. 105, *minor* and *rufescens*, p. 106, *opacifrons* and *frontalis*, p. 107, *similis*, p. 108, spp. nn., *id. l. c.*, Amazon Valley.

*Othius volans*, sp. n., J. Sahlberg, Enum. Col. Brach. Fenn. p. 32, S. Finland (? = *lapidicola*, Kies.).

*Diochus longicornis*, p. 184, *vicinus*, *tarsalis*, and *flavicans*, p. 185, spp. nn., Sharp, *l. c.*, Tapajos.

*Stereulia amazonica*, p. 186, *pauloensis*, p. 187 (? = *amazonica*, var.), *discolor* and *funebris*, p. 188, *fimetaria* and *clavicornis*, p. 190, *minor*, p. 191, spp. nn., *id. l. c.*, Amazon Valley.

*Agrodes conicicollis*, p. 192, *longiceps*, p. 193, spp. nn., *id. l. c.*, Amazon Valley.

*Metoponcus basiventris* and *holisoides*, id. *l. c.* p. 206, Amazon Valley; *M. brouni*, id. Ent. M. M. xiii. p. 22, New Zealand: spp. nn.

*Xantholinus bicolor*, p. 199, *anticus* and *pygialis*, p. 200, *temporalis*, p. 201, *æneiceps* and *batesi*, p. 202, *amazonicus*, p. 203, spp. nn., *id.* Tr. E. Soc. 1876, Amazon Valley.

*Leptacinus nitidus*, sp. n., *id. l. c.* p. 204, Ega.

*Pœderides.*

*Lathrobium rufipes*, Mäkl., is certainly identical with *punctatum*, Zett.; G. Kraatz, Deutsche E. Z. 1876, p. 174 [but it stands, as *punctatum* is preoccupied in the genus by Geoffroy].

*New genera and species*:—

*Scopæodes*, D. Sharp, Tr. E. Soc. 1876, p. 208. Between *Scopæus* and *Cryptobium*, differing from the former in its geniculate antennæ and bilobed ligula, and from the latter in its narrow neck. For *S. gracilis*, ibid., and *fusciceps*, p. 209, Tapajos.

*Sphæronum* (*Sphærinum* in table, but purposely altered), *id. l. c.* p. 224. Resembling *Ophites* in head-structure, but with different mouth-organs, sub-geniculate antennæ, and the anterior tibiæ dilated at the base and suddenly constricted in the middle. *S. opacum*, p. 225, *depressifrons*, p. 226, *carinifrons* and *elongatum*, p. 227, *carinicolle*, p. 228, *pallidum*, p. 229, Amazon Valley.

*Mònista*, id. *l. c.* p. 271. Allied to *Sunius*, but with the facies of *Lithocharis*; differing from the former in the short robust mandibles, emarginate and rounded labrum, and structure of the prosternum, and from the latter in the bilobed membranaceous fourth tarsal joint. For *M. typica*, p. 272, note, Rio Janeiro, and *M. certa*, p. 272, *longula* and *divisa*, p. 273, Amazon Valley.

*Lindus*, id. *l. c.* p. 281. Facies of the *Pinophilides*, but with the fourth joint of the maxillary palpi concealed, and the prothorax membranous behind the coxæ. For *L. religans*, p. 283, Tapajos.

*Ophites stilicoides*, id. *l. c.* p. 207, Ega.

*Cryptobium gigas*, p. 210, *plagipenne*, p. 211, *opacum*, p. 212, *opacifrons*, p. 213, *longiceps* and *ruficorne*, p. 214, *subfractum* and *longicorne*, p. 215, *scutigerum*, p. 216, *alternans*, p. 217 (in this species, the lobe on the fourth ventral segment in the ♂ varies much in different specimens), *punctipenne* and *scrobiculatum*, p. 218, *fuscipenne*, p. 219, *angustum* and *cylindricum*, p. 220, *laticolle* and *angustifrons*, p. 221, *alienum*, p. 222, *triste* and *traili*, p. 223, id. *l. c.*, Amazon Valley.

*Lathrobium macrocephalum*, p. 230, *opalescens*, p. 231, *decisum* and *puncticeps*, p. 232, *parallelum*, p. 233, *mendax*, p. 234, *certum* and *rufulum*, p. 235, *proximum*, p. 236, *amazonicum* and *tardum*, p. 237, *tenuicorne*, p. 238, *batesi* and *minor* [*-nus*], p. 239, *simplex* and *chloroticum*, p. 240, *necatum* and *deletum*, p. 241, *integrum*, p. 242, *pictum* and *hilare*, p. 243, *nanum*, p. 244, *glabrum* and *politum*, p. 245, *pumilum*, p. 246, id. *l. c.*, Amazon Valley; *L. sibiricum*, E. Eppelsheim, S. E. Z. xxxvii. p. 433, East Siberia; *L. abbreviatum*, S. Solsky, Hor. Ent. Ross. xi. p. 273, Irkutsk; *L. abscessum* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 79, tertiaries of Wyoming.

*Dolicaon distans*, Sharp, *l. c.* p. 247, Amazon Valley.

*Scopæus tarsalis* and *ornatus*, p. 249, *pauper*, p. 250, *distans* and *laxus*, p. 252, *lævis*, p. 253, *id. l. c.* Amazon

*Lithocharis latro*, p. 255, *simplex* and *condita*, p. 256, p. 257, *sobrina*, p. 258, *crassula* and *vestita*, p. 259, *pressa* and *discedens*, p. 261, *convexa*, p. 262, *oculata* and *egena* and *humilis*, p. 264, *ardua*, p. 265, *munda*, p. *germana* and *pagana*, p. 268, *picta*, p. 269, *id. l. c.*, *L. occulta*, C. O. Waterhouse, Ann. N. H. (4) xviii. Island; *L. trapezicollis*, S. de Uhagon, An. Soc. Esp. v. Badajoz.

*Stilicus amazonicus*, p. 270, *punctatus*, p. 271, Sharp, *l*

*Echiaster* (prothorax horny behind front coxæ) *bo* p. 275, *signatus* and *carinatus*, p. 276, *latifrons*, p. 277, *muticus* (? = *mamillatus*, ♀) and *tibialis*, p. 279, *bate* p. 281, *id. l. c.*, Amazon Valley.

*Paederus fennicus*, J. Sahlberg, Enum. Col. Brach. Fen *P. solidus*, p. 284, *tridens*, p. 285, *lingualis* and *mutans*, and *amazonicus*, p. 287, *punctiger*, p. 288, Sharp, *l. c.*, *P. salvini*, id. *l. c.* p. 431, Aceytum.

*Sunius amicus*, p. 290, *vittatus*, p. 291, *serpens*, p. *strictus*, p. 293, *marginatus*, p. 294, *brevis*, p. 295, *mod pictus*, p. 296, *confinis*, p. 297, *catena*, p. 298, *peltatus* and *bidens*, p. 300, *bispinus*, p. 301, *spinifer*, p. 302, *celatus* au *id. l. c.*, Amazon Valley; *S. martinezi*, Uhagon, *l. c.* p Badajoz (= *latus*, Rosenh., *ecc.* Fauvel; Zool. Rec. xii.

## *Pinophilides.*

*Tanodema plana* [*-num*, neuter termination requir p. 305, *lævis*, p. 306, *recta*, p. 307, *lenta*, p. 308, *dubia* and *tarsalis* and *bella*, p. 310, *cinerea*, p. 311, *vicina*, p. 312, *r* p. 314, *producta* and *laticornis*, p. 315, *serpens*, p. 316, *tec* p. 318, D. Sharp, Tr. E. Soc. 1876, Amazon Valley, spp.

*Pinophilus dux*, p. 319, *ater* and *rectus*, p. 320, *æquali* p. 322, *modestus* and *tenuis*, p. 323, *distans*, p. 324, *incult* p. 325, *angustus* and *oblatus*, p. 326, *extremus*, p. 327, *sul* p. 328, *laxus*, p 329, *aberrans*, p. 330, *bicolor* and *batesi* p. 332, *minor*, p. 333, *affinis* and *egens*, p. 334, *abax*, Amazon Valley, spp. nn.

*Œdodactylus errans*, p. 337, *anceps*, p. 338, spp. nn., *id*

*Œdichirus optatus*, sp. n., *id. l. c.* p. 339, Tapajos.

*Palaminus simplex* and *longicornis*, p. 341, *modestus*, p. *robustus*, p. 343, *breviceps*, p. 344, *discretus*, p. 345, *apicalis*, p. 347, *fragilis* and *niger*, p. 348, *anceps*, p. 3 *puncticeps*, p. 350, *parcus*, p. 351, *pellax* and *fuscipes*, p. 3 *sellatus* and *gracilis*, p. 354, *distans*, p. 355, spp. nn., *id. l. c.*

## *Stenides.*

*Stenæsthetus*, Shp., occurs in S. America as well as J

tional characters given. *Ctenomastax*, Ktz., should be placed here, and not in the *Paederides*. D. Sharp, *l. c.* pp. 356 & 357.

*Stenæsthetus illatus*, sp. n., *id. l. c.* p. 357, Tapajos and Lages.

*Stenus inspector*, p. 358, *obductus*, p. 359, *tinctus*, p. 360, *cognatus*, p. 361, *vacillator* and *cursitor*, p. 362, *fallax* and *simulator*, p. 364, *certatus*, p. 365, *traili*, p. 366, *pedator*, p. 367, *ventralis* and *extensus*, p. 368, *genalis*, p. 369, *parx*, p. 370, *nigricans*, p. 371, *excisus* and *laticeps*, p. 372, *tricolor*, p. 373, *heres* and *cerritus*, p. 374, *batesi*, p. 375, *collaris*, p. 376, *parviceps*, p. 377, *proximus*, p. 378, *id. l. c.*, Amazon Valley ; *S. coxalis*, p. 49, *hyperboreus*, p. 50, *scabriculus*, p. 53, *lapponicus*, p. 56 (? = *labilis*, Thoms., *nec* Er.), *confusus*, p. 58 (? = *æmulus*, Thoms., *nec* Er.), J. Sahlberg, Enum. Col. Brach. Fenn., Finland : spp. nn.

*Megalops* (antennæ 11-jointed, tarsi distinctly 5-jointed) *spinosus*, p. 379, Ega, Para, *impressus*, p. 380, Villa Nova, spp. nn., Sharp, *l. c.*

### *Oxytelides.*

*Oxytelus pristinus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 79, White River tertiaries.

*Osorius stipes* and *nitens*, p. 382, *simplex*, p. 383, *integer* and *solidus*, p. 384, *affinis*, p. 385, *oculatus*, p. 386, D. Sharp, *l. c.* Amazon Valley ; *O. mundus*, id. *l. c.* p. 432, Mexico ; spp. nn.

*Holotrochus durus*, p. 388, *syntheticus*, p. 389, *pubescens*, p. 390, *subtilis*, p. 391, and *H.* (?) *clavipes*, ibid., and *fauveli*, p. 392, spp. nn., *id. l. c.*, Amazon Valley.

*Bledius albidus*, p. 393, *rarus* and *addendus*, p. 394, *simplex* and *muticus*, p. 395, *similis* and *modestus*, p. 396, spp. nn., *id. l. c.*, Amazon Valley.

*Trogophlœus mundus*, p. 397, *breviceps*, p. 398, *latifrons* and *hilaris*, p. 399, *vicinus*, p. 400, spp. nn., *id. l. c.*, Amazon Valley.

*Thinobius longicornis*, sp. n. (but also referred to Not. Fenn. xiii. p. 488, 1874), J. Sahlberg, Enum. Col. Brach. Fenn. p. 181, Finland.

*Apocellus* (connects the family with the *Aleocharides*) *planus*, Ega, and *lævis*, Manaos, spp. nn., Sharp, *l. c.* p. 401.

### *Homaliides.*

*Boreaphilus henningianus*, Sahlb., "*β longicornis*," from Helsingfors (= *henningianus*, Ktz.), described with doubt as to its being merely a geographical form or a good species ; J. Sahlberg, Enum. Col. Brach. Fenn., p. 209.

*Olophrum laticolle*, sp. n., *id. l. c.* p. 211, Finland.

*Etheothassa crassicornis*, sp. n., *id. l. c.* p. 217, Finland (? = *Homalium longulum*, Mäkl., var.).

*Homalium nanum*, sp. n., D. Sharp, Tr. E. Soc. 1876, p. 402, Amazon Valley.

### *Piestides.*

*Prognatha decisa*, Walker, 1858, belongs to the *Cucujidæ*, and *Eurygplatus lateralis*, Mots., 1859, is identical with it ; *P. tenuis*, Walk., = *Isomalus indicus*, Ktz. : C. O. Waterhouse, Tr. E. Soc. 1876, p. 14.

*Glyptoma corticinum* in *Carpinus betulus*, with *Lasius brunneus*; Schmidt-Goebel, S. E. Z. xxxvii. p. 389.

*Piestus validus*, p. 404, *frontalis*, p. 405 (? = *capricornis*, Lap.), *rectus*, p. 406, *rugosus*, p. 407, *aper*, p. 408, spp. nn., D. Sharp, Tr. E. Soc. 1876, Amazon Valley.

*Hypotelus micans*, sp. n., *id. l. c.* p. 409, Ega.

*Isomalus agilis*, p. 410, and *dubius*, p. 411, spp. nn., *id. l. c.*, Ega.

*Lispinus catena*, p. 412, *apicalis* and *terminalis*, p. 413, *punctatus*, p. 414, *cognatus* and *modestus*, p. 415, *planus*, p. 416 (? = *linearis*, Fauv., *nec* Er.), *depressus*, *simplex*, and *lætus*, p. 417, spp. nn., *id. l. c.*, Amazon Valley.

*Thoracophorus opacus*, p. 418, Ega, *crassus*, p. 419, San Paulo and Rio de Janeiro, spp. nn., *id. l. c.*

*Leptochirus fontensis*, p. 420, *latro*, p. 421, spp. nn., *id. l. c.*, Fonte Boa and Ega.

## Pselaphidæ.

Schaufuss, L. W. Tabellen-Entwurf zur Bestimmung der Pselaphiden-Gattungen. Nunq. Ot. ii. pp. 243–248 (sheet mark dated July 24, 1872).

The notice of this tabulation in Zool. Rec. x. p. 257, which gives only the chief divisions according to the number of antennal joints, requires the addition of the following new genera:—

*Metopioides*, p. 245. *Clavigerini*: two claws, antennæ geniculate; ? ? = *Goniastes*, Westw. (which is an "imago" or myth, *teste* Schaufuss).

*Zethus*, p. 246. *Pselaphini*: one claw, last joint of maxillary palpi short conic.

*Stratus*, ibid. Differs from *Zethus* in the last joint of palpi being reversed club-shaped, emarginate in front.

*Facetus*, ibid. *Pselaphini*: two unequal claws, no eyes.

*Gamba*, p. 247. *Pselaphini*: two unequal claws, abdomen laterally margined, last joint of maxillary palpi ovate.

*Jubus*, ibid. Differs from *Gamba* in last joint of palpi being triangular.

No species are referred to in any case. Two other new genera, *Listriophorus*, p. 245 (*Clavigerini*: one claw, antennæ geniculate), and *Tamotus*, p. 248 (*Pselaphini*: two equal claws, six abdominal segments visible, fourth joint of maxillary palpi spindle-shaped), are noticed as such in Zool. Rec. xi. p. 272. Many species are described by the author, *l. c.* pp. 258–274 [Zool. Rec. x. p. 257], and pp. 281–290 (sheet mark, April 20, 1874). *Tamotus femoratus* and *Listriophorus felix*, described on p. 289, with generic characters in the latter species, are the only representatives of the new genera in the table. Further species are described, pp. 357–360 (sheet mark, Dec. 24, 1875), including some of *Gamba* (infrà).

Observations on various British species, named by De Saulcy; *Bryaxis lefeberii*, Wat. Cat., indicated as new, under the MS. name *cotus*; *Trimium brevipenne* and *brevicorne* are sexes of one species. D. Sharp, Ent. M. M. xii. p. 225.

*Batrisus spretus*, Lec., in Kentucky caves; A. S. Packard, Am. Nat. x. p. 286, pl. ii. fig. 1.

*ittrisus trifoveolatus*, Schauf., var. n. *planifrons*; L. W. Schaufuss, p.. 270, Columbia.
*gyaxis atrata*, sp. n., *id. l. c.* p. 357, Columbia.
*mba brucki*, p. 358, New Granada, *elongata*, p. 359, and *rugicollis*, 0), Pampas of Western S. America, *id. l. c.*, spp. nn.

## Scydmænidæ.

servations on four British species named by De Saulcy; D. Sharp, M. M. xii. p. 225.

## Silphidæ.

*ptodirus howenwarti*, Schmidt. On the spelling of the generic and ffic names, see G. Kraatz, Deutsche E. Z. 1876, pp. 175 & 176 [Kraatz ts *Leptoderus*, giving the derivation λεπτος and δειρος, neck. There wever, no such word as δειρος, but only δειρας, equivalent to δειρη, the ; and this could not be rendered *de-*, but *dei-*, or, according to rn custom, *di-*. It would, of course, have been equally right to est the Attic form δειρη; but this was not done].
*mascopus*. Figured, Deutsche E. Z. 1876, pl. i. fig. 17. On the ius in the ♂; G. Kraatz, *l. c.* p. 396.
*crophorus*. Observations on the structure of the clypeus in various es: in *N. germanicus* there is apparently no sexual difference in this ect, though it exists in other species; small ♂ simulates the ♀. *N.* , Gebl., apparently = *germanicus*, var., with dark epipleuræ; *N.* *chralis*, Heer, ? = *nigricornis*, Fald.; *N. sepultor*, Charp., from Tiflis. raatz, *l. c.* pp. 395–397.
*crophorus*. Notes on habits; X. Thibiat, Feuil. Nat. vi. p. 40.
*lpha*, L. On the classification and geographical distribution of this iits allies; G. Kraatz, *l. c.* pp. 352–374. The author is evidently ned to adopt as genera many of the groups now sunk, such as *bora*, *Diamesus*, and *Ptomaphila*, Hope, *Heterotemna*, Woll., *des*, Wilkin, *Thanatophilus* (*Silpha unicostata*, Lac., = *T. sinuatus*, ar.), *Oiceoptoma* [*Œc-*], and *Phosphuga*, Leach. *Xylodrepa*, Thoms., nsidered erroneously separated generically, as *Silpha 4-punctata* has afficient special characters of structure or habit. Suggestions as to mymy, and observations on habits, distribution, and other peculiari- are made with reference to the European species, which are also dis- d geographically. *Silpha carniolica*, Küster, = *obscura*, var.
*lpha opaca* phytophagous; Schmidt-Goebel, S. E. Z. xxxvii. p. 399.
*delops delarouzii*. On its metamorphoses; V. Mayet, Bull. Soc. Ent. 5) vi. p. cxcv.
*delops hirtus*. Observations on its habits in caves of Kentucky, and of perfect insect and larva; A. S. Packard, Am. Nat. x. pp. 285–287.
*olon barnevillii*, Ktz., = *zebii*, Ktz., undeveloped form, and is recorded n S. England; E. C. Rye, Ent. M. M. xii. p. 177.
*introdictus*, g. n., E. Abeille de Perrin, Pet. Nouv. ii. p. 29. Allied to *ileuon*, Hampe, differing especially in the elytral fold being invisible

*Selma*, id. *l. c.* p. 426. Pubescent; antennæ subserrate internally; last joint of all the palpi dilated; lateral lines of thorax not confluent. *S. modesta*, p. 427, Chontales.

*Abemus*, Mulsant & Rey, Ann. Soc. Agric. Lyon (4) viii. p. 242. Connects *Trichoderma* and *Staphylinus*. For *S. chloropterus*, Pz., and *S. fossor*, Scop.

*Remasus*, subg. n. of *Platydracus*, Thoms. [itself not recognized as a genus by Coleopterists], *iid. l. c.* p. 259. For *Staph. lutarius*, Grav., and *meridionalis*, Roseuh.

*Pseudocypus*, subg. n. of *Ocypus*, for *O. fuscatus*, &c.; *iid. l. c.* p. 291.

*Orthidus*, iid. *l. c.* p. 339, for *Philonthus cribratus*, Er.

*Rabigus*, iid. *l. c.* p. 523. Anagram of *Gabrius*; for *Philonthus tenuis* and *pullus*.

*Pseudidus*, iid. *l. c.* p 574 [= *Remus*, Holme, 1837], for *Philonthus sericeus*, &c.

*Brachydirus maculiceps*, p. 109, *antennatus*, p. 110, *styloceros*[*-rus*], p. 111, *cribricollis* and *simplex*, p. 112, *amazonicus*, p. 113, *batesi*, p. 114, *longipes* and *æneiceps*, p. 115, D. Sharp, Tr. E. Soc. 1876, Amazon Valley.

*Ploiopterus tricolor*, p. 117, *fungi* and *nigripes*, p. 118, *affinis*, p. 119, *dimidiatus*, p. 120, *lætus*, p. 121, *ventralis* and *traili*, p. 122, *virgineus*, p. 123, *mirandus*, p. 124, *id. l. c.* Amazon Valley.

*Xanthopygus solskii*, p. 126, *cyanipennis*, p. 127 (? = *solskii*, var.), *apicalis* and *violaceus*, p. 128, *depressus*, p. 129, *nigripes*, p. 130, *cognatus*, p. 131, *id. l. c.* Amazon Valley; *X. viridipennis*, id. *l. c.* p. 428, Chontales.

*Philothalpus luteipes*, p. 133, *latus*, p. 134, *incongruus*, p. 135, *id. l. c.* Amazon Valley.

*Trigonopselaphus opacipennis*, p. 143, *mutator*, p. 144, *violaceus*, p. 145, *venustus*, p. 146, spp. nn., *id. l. c.* Amazon Valley.

*Glenus kraatzi*, p. 147, *batesi* and *amazonicus*, p. 148, *vestitus*, p. 149, *id. l. c.* Amazon Valley; *G. cozalis*, id. *l. c.* p. 425, Chontales.

*Staphylinus subcyaneus* and *parviceps*, p. 151, *gratiosus*, p. 152, *gratus*, p. 153, *amazonicus*, p. 154, *priscus*, p. 155, *vetustus*, p. 156, spp. nn., *id. l. c.* Amazon Valley.

*Leistotrophus patriarchus* (foss.), Scudder, *l. c.* p. 78, White River tertiaries.

*Ocypus* (*Gærius*) *decurtatus*, Mulsant & Rey, *l. c.* p. 289, Alps, &c. (? = *O. similis*, var.).

*Belonuchus* (not entitled to generic rank) *batesi*, p. 157, *grandiceps*, p. 158, *decipiens*, p. 159, *clypeatus*, p. 160, *holisoides* and *æqualis*, p. 161, *impressifrons*, p. 162, *armatus*, p. 163, *setiger*, p. 164, Sharp, *l. c.* Amazon Valley.

*Philonthus amazonicus*, p. 165, *corallipennis*, p. 166, *deletus* and *muticus*, p. 167, *gracillimus*, p. 168, *æneiceps* and *cognatus*, p. 169, *traili*, p. 170, *capitalis*, p. 171, *lustrator* and *æneicollis*, p. 172, *palpalis*, p. 173, *aberrans*, p. 174, *conformis*, p. 175, *propinquus* and *regillus*, p. 176, *abactus*, p. 177, *longipes*, p. 178, and *P.* (?) *serraticornis*, p. 179, *id. l. c.* Amazon Valley; *P. discretus*, p. 428, *flohri*, p. 429, *mexicanus*, p. 430, *id. l. c.* Mexico; *P. tibialis*, E. Eppelsheim, S. E. Z. xxxvii. p. 431, Nauplia; *P. setosus*,

J. Sahlberg, Enum. Col. Brach. Fenn. p. 14, Finland; *P. biseriatus*, G. Stierlin, MT. schw. ent. Ges. iv. p. 473, St. Bernard (= *Quedius alpestris*, id. *l. c.* p. xii.); *P. melanarius*, p. 403, Alps (= *varius*, var. *a*, Er., = *carbonarius*, Grav., *nec* Er. [but if so, Erichson's *carbonarius*, being posterior to Gravenhorst's, must fall]), *heterodoxus*, p. 419, Corsica, *subrugosus*, p. 424, *gagates*, p. 454 (? = *corvinus*, Er.), Provence, Mulsant & Rey, *l. c.*

*Gabrius tibialis*, Mulsant & Rey, *l. c.* p. 540, S. France, *piliger*, p. 553, Corsica.

*Holisus depressus*, p. 180, *picipes*, p. 181, *excavatus*, and *umbra*, p. 182, *discedens*, p. 183, Sharp, *l. c.* Amazon Valley.

### *Xantholinides.*

E. Mulsant & C. Rey, Mém. Ac. Lyon, xxii. pp. 217–344, pls. i.–iii., fully describe the species of the second family, Xantholiniens, of their "Tribu des Brévipennes" [*Staphylinidæ*, suprà]. Two branches are adopted, Othiaires (following Thomson) and Xantholinaires. *Platyprosopus* is considered as not belonging to the group. The larvæ are described of *Xantholinus tricolor* ?, p. 276, *X. linearis*, p. 289, *Leptacinus batychrus*, p. 324, and *L. linearis*, p. 327. *X. linearis*, var. n. *commixtus*, p. 289.

*Megalinus*, subg. n. of *Xantholinus*, for *X. glabratus*; iid. *l. c.* p. 261.

*Tesba*, g. n., D. Sharp, Tr. E. Soc. 1876, p. 194. Allied to *Scytalinus*, differing by the presence of the upper line of the thoracic side-piece, the thick antennæ, which are more approximate at their insertion, and separated by a compressed keel-like space, and by its much more robust build. *T. gigas* and *laticornis*, spp. nn., *id. l. c.* p. 195, Amazon Valley (with allies in Natal and Madagascar); *T. belti*, sp. n., *id. l. c.* p. 431, Chontales.

*Linidius*, g. n., *id. l. c.* p. 196. Intermediate between *Scytalinus* and *Xantholinus*, and possibly identical with *Thyreocephalus*, Guér. For *L. recticollis* and *tenuipes*, p. 197, and *extremus*, p. 198, spp. nn., *id. l. c.* Amazon Valley.

*Lithocharodes* [*-charitoides*], g. n., *id. l. c.* p. 204. Most allied to *Leptolinus*, but with undilated front tarsi and shorter maxillary palpi. *Lith. fuscipennis*, sp. n., *id. l. c.* p. 205, Tapajos.

*Platyprosopus* (provisionally referred to the *Quediides*) *major*, p. 102, *laticeps*, p. 103, *paxallelus* and *puncticeps*, p. 104, *rectus*, p. 105, *minor* and *rufescens*, p. 106, *opacifrons* and *frontalis*, p. 107, *similis*, p. 108, spp. nn., *id. l. c.*, Amazon Valley.

*Othius volans*, sp. n., J. Sahlberg, Enum. Col. Brach. Fenn. p. 32, S. Finland (? = *lapidicola*, Kies.).

*Diochus longicornis*, p. 184, *vicinus*, *tarsalis*, and *flavicans*, p. 185, spp. nn., Sharp, *l. c.*, Tapajos.

*Sterculia amazonica*, p. 186, *pauloensis*, p. 187 (? = *amazonica*, var.), *discolor* and *funebris*, p. 188, *fimetaria* and *clavicornis*, p. 190, *minor*, p. 191, spp. nn., *id. l. c.*, Amazon Valley.

*Agrodes conicicollis*, p. 192, *longiceps*, p. 193, spp. nn., *id. l. c.*, Amazon Valley.

*Metoponcus basiventris* and *holisoides*, id. *l. c.* p. 206, Amazon Valley; *M. brouni*, id. Ent. M. M. xiii. p. 22, New Zealand: spp. nn.

*Xantholinus bicolor*, p. 199, *anticus* and *pygialis*, p. 200, *temporalis*, p. 201, *æneiceps* and *batesi*, p. 202, *amazonicus*, p. 203, spp. nn., *id.* Tr. E. Soc. 1876, Amazon Valley.

*Leptacinus nitidus*, sp. n., *id. l. c.* p. 204, Ega.

*Pæderides.*

*Lathrobium rufipes*, Mäkl., is certainly identical with *punctatum*, Zett.; G. Kraatz, Deutsche E. Z. 1876, p. 174 [but it stands, as *punctatum* is preoccupied in the genus by Geoffroy].

*New genera and species*:—

*Scopæodes*, D. Sharp, Tr. E. Soc. 1876, p. 208. Between *Scopæus* and *Cryptobium*, differing from the former in its geniculate antennæ and bilobed ligula, and from the latter in its narrow neck. For *S. gracilis*, ibid., and *fusciceps*, p. 209, Tapajos.

*Sphæronum* (*Sphærinum* in table, but purposely altered), *id. l. c.* p. 224. Resembling *Ophites* in head-structure, but with different mouth-organs, sub-geniculate antennæ, and the anterior tibiæ dilated at the base and suddenly constricted in the middle. *S. opacum*, p. 225, *depressifrons*, p. 226, *carinifrons* and *elongatum*, p. 227, *carinicolle*, p. 228, *pallidum*, p. 229, Amazon Valley.

*Monista*, id. *l. c.* p. 271. Allied to *Sunius*, but with the facies of *Lithocharis*; differing from the former in the short robust mandibles, emarginate and rounded labrum, and structure of the prosternum, and from the latter in the bilobed membranaceous fourth tarsal joint. For *M. typica*, p. 272, note, Rio Janeiro, and *M. certa*, p. 272, *longula* and *divisa*, p. 273, Amazon Valley.

*Lindus*, id. *l. c.* p. 281. Facies of the *Pinophilides*, but with the fourth joint of the maxillary palpi concealed, and the prothorax membranous behind the coxæ. For *L. religans*, p. 283, Tapajos.

*Ophites stilicoides*, id. *l. c.* p. 207, Ega.

*Cryptobium gigas*, p. 210, *plagipenne*, p. 211, *opacum*, p. 212, *opacifrons*, p. 213, *longiceps* and *ruficorne*, p. 214, *subfractum* and *longicorne*, p. 215, *scutigerum*, p. 216, *alternans*, p. 217 (in this species, the lobe on the fourth ventral segment in the ♂ varies much in different specimens), *punctipenne* and *scrobiculatum*, p. 218, *fuscipenne*, p. 219, *angustum* and *cylindricum*, p. 220, *laticolle* and *angustifrons*, p. 221, *alienum*, p. 222, *triste* and *trailli*, p. 223, id. *l. c.*, Amazon Valley.

*Lathrobium macrocephalum*, p. 230, *opalescens*, p. 231, *decisum* and *puncticeps*, p. 232, *parallelum*, p. 233, *mendax*, p. 234, *certum* and *rufulum*, p. 235, *proximum*, p. 236, *amazonicum* and *tardum*, p. 237, *tenuicorne*, p. 238, *batesi* and *minor* [-*nus*], p. 239, *simplex* and *chloroticum*, p. 240, *necatum* and *deletum*, p. 241, *integrum*, p. 242, *pictum* and *hilare*, p. 243, *nanum*, p. 244, *glabrum* and *politum*, p. 245, *pumilum*, p. 246, id. *l. c.*, Amazon Valley; *L. sibiricum*, E. Epplesheim, S. E. Z. xxxvii. p. 433, East Siberia; *L. abbreviatum*, S. Solsky, Hor. Ent. Ross. xi. p. 273, Irkutsk; *L. abscessum* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 79, tertiaries of Wyoming.

*Dolicaon distans*, Sharp, *l. c.* p. 247, Amazon Valley.

*Scopæus tarsalis* and *ornatus*, p. 249, *pauper*, p. 250, *chloroticus*, p. 251, *distans* and *laxus*, p. 252, *lævis*, p. 253, *id. l. c.* Amazon Valley.

*Lithocharis latro*, p. 255, *simplex* and *condita*, p. 256, *affinis* and *comes*, p. 257, *sobrina*, p. 258, *crassula* and *vestita*, p. 259, *integra*, p. 260, *compressa* and *discedens*, p. 261, *convexa*, p. 262, *oculata* and *quadrata*, p. 263, *egena* and *humilis*, p. 264, *ardua*, p. 265, *munda*, p. 266, *polita*, p. 267, *germana* and *pagana*, p. 268, *picta*, p. 269, *id. l. c.*, Amazon Valley; *L. occulta*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 108, Rodriguez Island; *L. trapezicollis*, S. de Uhagon, An. Soc. Esp. v. p. 70, pl. i. fig. 2, Badajoz.

*Stilicus amazonicus*, p. 270, *punctatus*, p. 271, Sharp, *l. c.*, Ega.

*Echiaster* (prothorax horny behind front coxæ) *boops* and *fumatus*, p. 275, *signatus* and *carinatus*, p. 276, *latifrons*, p. 277, *mamillatus*, p. 278, *muticus* (? = *mamillatus*, ♀) and *tibialis*, p. 279, *batesi*, p. 280, *scissus*, p. 281, *id. l. c.*, Amazon Valley.

*Pæderus fennicus*, J. Sahlberg, Enum. Col. Brach. Fenn. p. 38, Finland; *P. solidus*, p. 284, *tridens*, p. 285, *lingualis* and *mutans*, p. 286, *protensus* and *amazonicus*, p. 287, *punctiger*, p. 288, Sharp, *l. c.*, Amazon Valley; *P. salvini*, id. *l. c.* p. 431, Aceytum.

*Sunius amicus*, p. 290, *vittatus*, p. 291, *serpens*, p. 292, *ventralis* and *strictus*, p. 293, *marginatus*, p. 294, *brevis*, p. 295, *modestus*, *crassus*, and *pictus*, p. 296, *confinis*, p. 297, *catena*, p. 298, *peltatus* and *palpalis*, p. 299, *bidens*, p. 300, *bispinus*, p. 301, *spinifer*, p. 302, *celatus* and *insignis*, p. 303, *id. l. c.*, Amazon Valley; *S. martinezi*, Uhagon, *l. c.* p. 73, pl. i. fig. 1, Badajoz (= *latus*, Rosenh., *sec.* Fauvel; Zool. Rec. xii. p. 301).

### *Pinophilides.*

*Tanodema plana* [*-num*, neuter termination required throughout), p. 305, *lævis*, p. 306, *recta*, p. 307, *lenta*, p. 308, *dubia* and *quadrata*, p. 309, *tarsalis* and *bella*, p. 310, *cinerea*, p. 311, *vicina*, p. 312, *rudis*, p. 313, *filum*, p. 314, *producta* and *laticornis*, p. 315, *serpens*, p. 316, *tecta*, p. 317, *lurida*, p. 318, D. Sharp, Tr. E. Soc. 1876, Amazon Valley, spp. nn.

*Pinophilus dux*, p. 319, *ater* and *rectus*, p. 320, *æqualis*, p. 321, *mimus*, p. 322, *modestus* and *tenuis*, p. 323, *distans*, p. 324, *incultus* and *proximus*, p. 325, *angustus* and *oblatus*, p. 326, *extremus*, p. 327, *sulcatus* and *duplex*, p. 328, *laxus*, p 329, *aberrans*, p. 330, *bicolor* and *batesi*, p. 331, *debilis*, p. 332, *minor*, p. 333, *affinis* and *egens*, p. 334, *abax*, p. 335, *id. l. c.*, Amazon Valley, spp. nn.

*Œdodactylus errans*, p. 337, *anceps*, p. 338, spp. nn., *id. l. c.* Tapajos.

*Œdichirus optatus*, sp. n., *id. l. c.* p. 339, Tapajos.

*Palaminus simplex* and *longicornis*, p. 341, *modestus*, p. 342, *crassus* and *robustus*, p. 343, *breviceps*, p. 344, *discretus*, p. 345, *sinuatus*, p. 346, *apicalis*, p. 347, *fragilis* and *niger*, p. 348, *anceps*, p. 349, *sobrinus* and *puncticeps*, p. 350, *parcus*, p. 351, *pellax* and *fuscipes*, p. 352, *stipes*, p. 353, *sellatus* and *gracilis*, p. 354, *distans*, p. 355, spp. nn., *id. l. c.*, Amazon Valley.

### *Stenides.*

*Stenæsthetus*, Shp., occurs in S. America as well as Japan, and addi-

tional characters given. *Ctenomastax*, Ktz., should be placed here, and not in the *Paederides*. D. Sharp, *l. c.* pp. 356 & 357.

*Stenæsthetus illatus*, sp. n., *id. l. c.* p. 357, Tapajos and Lages.

*Stenus inspector*, p. 358, *obductus*, p. 359, *tinctus*, p. 360, *cognatus*, p. 361, *vacillator* and *cursitor*, p. 362, *fallax* and *simulator*, p. 364, *certatus*, p. 365, *traili*, p. 366, *pedator*, p. 367, *ventralis* and *extensus*, p. 368, *genalis*, p. 369, *parce*, p. 370, *nigricans*, p. 371, *excisus* and *laticeps*, p. 372, *tricolor*, p. 373, *heres* and *cerritus*, p. 374, *batesi*, p. 375, *collaris*, p. 376, *parviceps*, p. 377, *proximus*, p. 378, *id. l. c.*, Amazon Valley; *S. cozalis*, p. 49, *hyperboreus*, p. 50, *scabriculus*, p. 53, *lapponicus*, p. 56 (? = *labilis*, Thoms., *nec* Er.), *confusus*, p. 58 (? = *æmulus*, Thoms., *nec* Er.), J. Sahlberg, Enum. Col. Brach. Fenn., Finland: spp. nn.

*Megalops* (antennæ 11-jointed, tarsi distinctly 5-jointed) *spinosus*, p. 379, Ega, Para, *impressus*, p. 380, Villa Nova, spp. nn., Sharp, *l. c.*

### *Oxytelides.*

*Oxytelus pristinus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 79, White River tertiaries.

*Osorius stipes* and *nitens*, p. 382, *simplex*, p. 383, *integer* and *solidus*, p. 384, *affinis*, p. 385, *oculatus*, p. 386, D. Sharp, *l. c.* Amazon Valley; *O. mundus*, id. *l. c.* p. 432, Mexico; spp. nn.

*Holotrochus durus*, p. 388, *syntheticus*, p. 389, *pubescens*, p. 390, *subtilis*, p. 391, and *H.* (?) *clavipes*, ibid., and *fauveli*, p. 392, spp. nn., *id. l. c.*, Amazon Valley.

*Bledius albidus*, p. 393, *rarus* and *addendus*, p. 394, *simplex* and *muticus*, p. 395, *similis* and *modestus*, p. 396, spp. nn., *id. l. c.*, Amazon Valley.

*Trogophlœus mundus*, p. 397, *breviceps*, p. 398, *latifrons* and *hilaris*, p. 399, *vicinus*, p. 400, spp. nn., *id. l. c.*, Amazon Valley.

*Thinobius longicornis*, sp. n. (but also referred to Not. Fenn. xiii. p. 488, 1874), J. Sahlberg, Enum. Col. Brach. Fenn. p. 181, Finland.

*Apocellus* (connects the family with the *Aleocharides*) *planus*, Ega, and *lævis*, Manaos, spp. nn., Sharp, *l. c.* p. 401.

### *Homaliides.*

*Borcaphilus henningianus*, Sahlb., "*β longicornis*," from Helsingfors (= *henningianus*, Ktz.), described with doubt as to its being merely a geographical form or a good species; J. Sahlberg, Enum. Col. Brach. Fenn., p. 209.

*Olophrum laticolle*, sp. n., *id. l. c.* p. 211, Finland.

*Ethcothassa crassicornis*, sp. n., *id. l. c.* p. 217, Finland (? = *Homalium longulum*, Mäkl., var.).

*Homalium nanum*, sp. n., D. Sharp, Tr. E. Soc. 1876, p. 402, Amazon Valley.

### *Piestides.*

*Prognatha decisa*, Walker, 1858, belongs to the *Cucujidæ*, and *Eurygplatus lateralis*, Mots., 1859, is identical with it; *P. tenuis*, Walk., = *Isomalus indicus*, Ktz.: C. O. Waterhouse, Tr. E. Soc. 1876, p. 14.

*Glyptoma corticinum* in *Carpinus betulus*, with *Lasius brunneus*; Schmidt-Goebel, S. E. Z. xxxvii. p. 389.

*Piestus validus*, p. 404, *frontalis*, p. 405 (? = *capricornis*, Lap.), *rectus*, p. 406, *rugosus*, p. 407, *aper*, p. 408, spp. nn., D. Sharp, Tr. E. Soc. 1876, Amazon Valley.

*Hypotelus micans*, sp. n., *id. l. c.* p. 409, Ega.

*Isomalus agilis*, p. 410, and *dubius*, p. 411, spp. nn., *id. l. c.*, Ega.

*Lispinus catena*, p. 412, *apicalis* and *terminalis*, p. 413, *punctatus*, p. 414, *cognatus* and *modestus*, p. 415, *planus*, p. 416 (? = *linearis*, Fauv., *nec* Er.), *depressus*, *simplex*, and *lætus*, p. 417, spp. nn., *id. l. c.*, Amazon Valley.

*Thoracophorus opacus*, p. 418, Ega, *crassus*, p. 419, San Paulo and Rio de Janeiro, spp. nn., *id. l. c.*

*Leptochirus fontensis*, p. 420, *latro*, p. 421, spp. nn., *id. l. c.*, Fonte Boa and Ega.

## Pselaphidæ.

Schaufuss, L. W. Tabellen-Entwurf zur Bestimmung der Pselaphiden-Gattungen. Nunq. Ot. ii. pp. 243–248 (sheet mark dated July 24, 1872).

The notice of this tabulation in Zool. Rec. x. p. 257, which gives only the chief divisions according to the number of antennal joints, requires the addition of the following new genera:—

*Metopioides*, p. 245. *Clavigerini*: two claws, antennæ geniculate; ? ? = *Goniastes*, Westw. (which is an "imago" or myth, *teste* Schaufuss).

*Zethus*, p. 246. *Pselaphini*: one claw, last joint of maxillary palpi short conic.

*Stratus*, ibid. Differs from *Zethus* in the last joint of palpi being reversed club-shaped, emarginate in front.

*Facetus*, ibid. *Pselaphini*: two unequal claws, no eyes.

*Gamba*, p. 247. *Pselaphini*: two unequal claws, abdomen laterally margined, last joint of maxillary palpi ovate.

*Jubus*, ibid. Differs from *Gamba* in last joint of palpi being triangular.

No species are referred to in any case. Two other new genera, *Listriophorus*, p. 245 (*Clavigerini*: one claw, antennæ geniculate), and *Tamotus*, p. 248 (*Pselaphini*: two equal claws, six abdominal segments visible, fourth joint of maxillary palpi spindle-shaped), are noticed as such in Zool. Rec. xi. p. 272. Many species are described by the author, *l. c.* pp. 258–274 [Zool. Rec. x. p. 257], and pp. 281–290 (sheet mark, April 20, 1874). *Tamotus femoratus* and *Listriophorus felix*, described on p. 289, with generic characters in the latter species, are the only representatives of the new genera in the table. Further species are described, pp. 357–360 (sheet mark, Dec. 24, 1875), including some of *Gamba* (infrà).

Observations on various British species, named by De Saulcy; *Bryaxis lefebvrii*, Wat. Cat., indicated as new, under the MS. name *cotus*; *Trimium brevipenne* and *brevicorne* are sexes of one species. D. Sharp, Ent. M. M. xii. p. 225.

*Batrisus spretus*, Lec., in Kentucky caves; A. S. Packard, Am. Nat. x. p. 286, pl. ii. fig. 1.

*Batrisus trifoveolatus*, Schauf., var. n. *planifrons*; L. W. Schaufuss, *l. c.* p. 270, Columbia.

*Bryaxis atrata*, sp. n., *id. l. c.* p. 357, Columbia.

*Gamba brucki*, p. 358, New Granada, *elongata*, p. 359, and *rugicollis*, p. 360, Pampas of Western S. America, *id. l. c.*, spp. nn.

## Scydmænidæ.

Observations on four British species named by De Saulcy; D. Sharp, Ent. M. M. xii. p. 225.

## Silphidæ.

*Leptodirus howenwarti*, Schmidt. On the spelling of the generic and specific names, see G. Kraatz, Deutsche E. Z. 1876, pp. 175 & 176 [Kraatz adopts *Leptoderus*, giving the derivation λεπτος and δειρος, neck. There is, however, no such word as δειρος, but only δειρας, equivalent to δειρη, the neck; and this could not be rendered *de-*, but *dei-*, or, according to modern custom, *di-*. It would, of course, have been equally right to suggest the Attic form δειρη; but this was not done].

*Tomascopus*. Figured, Deutsche E. Z. 1876, pl. i. fig. 17. On the clypeus in the ♂; G. Kraatz, *l. c.* p. 396.

*Necrophorus*. Observations on the structure of the clypeus in various species: in *N. germanicus* there is apparently no sexual difference in this respect, though it exists in other species; small ♂ simulates the ♀. *N. morio*, Gebl., apparently = *germanicus*, var., with dark epipleuræ; *N. sepulchralis*, Heer, ? = *nigricornis*, Fald.; *N. sepultor*, Charp., from Tiflis. G. Kraatz, *l. c.* pp. 395–397.

*Necrophorus*. Notes on habits; X. Thibiat, Feuil. Nat. vi. p. 40.

*Silpha*, L. On the classification and geographical distribution of this and its allies; G. Kraatz, *l. c.* pp. 352–374. The author is evidently inclined to adopt as genera many of the groups now sunk, such as *Necrobora*, *Diamesus*, and *Ptomaphila*, Hope, *Heterotemna*, Woll., *Necrodes*, Wilkin, *Thanatophilus* (*Silpha unicostata*, Lec., = *T. sinuatus*, F., var.), *Oiceoptoma* [*Œc-*], and *Phosphuga*, Leach. *Xylodrepa*, Thoms., is considered erroneously separated generically, as *Silpha 4-punctata* has no sufficient special characters of structure or habit. Suggestions as to synonymy, and observations on habits, distribution, and other peculiarities are made with reference to the European species, which are also discussed geographically. *Silpha carniolica*, Küster, = *obscura*, var.

*Silpha opaca* phytophagous; Schmidt-Goebel, S. E. Z. xxxvii. p. 399.

*Adelops delarouzii*. On its metamorphoses; V. Mayet, Bull. Soc. Ent. Fr. (5) vi. p. cxcv.

*Adelops hirtus*. Observations on its habits in caves of Kentucky, and figs. of perfect insect and larva; A. S. Packard, Am. Nat. x. pp. 285–287.

*Colon barnevillii*, Ktz., = *zebii*, Ktz., undeveloped form, and is recorded from S. England; E. C. Rye, Ent. M. M. xii. p. 177.

*Antrodietus*, g. n., E. Abeille de Perrin, Pet. Nouv. ii. p. 29. Allied to *Pholeuon*, Hampe, differing especially in the elytral fold being invisible

from above, the proportion of second and third antennal joints, the length of the elytra, &c. Differs from *Leptodirus* in its small triangular scutellum. For *P. caudatum*, Ab., and *A. caudatissimus*, sp. n., *id. ibid.*, Cave of Vallon, Ardèche.

*Cyrtodromus*, g. n., *id. l. c.* p. 30. Also allied to *Pholeuon*, but with the elytral fold very marked, and visible for all its length on the upper side, being very wide at the shoulders. Thorax deeply channelled on each side, as in *Speleochlamys*. For *P. dapsoides*, Ab.

*Nodynus*, g. n., C. O. Waterhouse, Tr. E. Soc. 1876, p. 12. Between *Necrophilus* and *Apatetica*, having the antennæ of the former and general facies of the latter. *Nod. nitidus*, sp. n., *id. l. c.* p. 13, E. Indies.

*Hyponecrodes*, g. n., Kraatz, *l. c.* p. 357. For S. American species of elongate build; differs from *Necrodes* in its transverse, not subrotundate thorax, which has four dorsal keels, and is impressed on each side, with obtuse posterior angles, and in its elytra being distinctly narrowed behind the middle and acuminate at the apex. For *Silpha gayi*, Sol., = *lineaticollis*, Cast., *S. apicalis*, Brullé, *S. audicola* [script. *anticola*], Guér., *S. discicollis*, Brullé, = *cayennensis*, Stm., *S. erythrura*, Blanch., *S. analis*, Chevr., and ? *Necrodes brasiliensis*, Dej. Cat. These are tabulated and discussed, *l. c.* pp. 375 & 376.

*Camirus*, g. n., D. Sharp, Ent. M. M. xiii. p. 23. Probably a link between the *Catopides* and *Scydmænidæ*: eighth joint of antennæ small, maxillary palpi with large sub-securiform apical joint, head small, eyes prominent and free, tibiæ pubescent. For *C. thoracicus*, ibid., and *convexus*, p. 24, spp. nn., New Zealand.

*Dietta*, g. n., *id. l. c.* p. 78. *Anisotomides*; but without the family characteristic of the small intermediate clavate joint, and with a membranaceous clypeus and very distant intermediate coxæ [in the Recorder's opinion, from personal examination and dissection, not to be placed in the *Anisotomides*]. For *D. sperata*, sp. n., *id. ibid.*, N. W. Australia.

*Silpha hexastigma*, S Solsky, Hor. Ent. Ross. xi. p. 274, River Souyfoun, Asiatic Russia; *S. superba*, Kraatz, *l. c.* p. 374, Luzon: spp. nn.

*Thanatophilus minutus*, sp. n., Kraatz, *ibid.*, Thibet.

*Ptomaphila perlata* (? Sturm Cat.), sp. n., *id. l. c.* p. 356, Australia (? = *lacrymosa*, Schreib., var.).

*Choleva canellina*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 37, Bou-Sâada.

## Clambidæ.

*Clambus pilosellus*, sp. n., E. Reitter, Deutsche E. Z. 1876, p. 289, Transcaucasia.

*Calyptomerus caucasicus*, sp. n., *id. ibid.*, Elisabetopol.

## Corylophidæ.

*Orthoperus*. The habits and sexual characters of an undescribed species (*obscuratus*, Pandellé, MS.), recorded by E. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 187.

*Arthrolips posticus*, p. 132, *thoracicus*, p. 133, spp. nn., T. Kirsch, Deutsche E. Z. 1876, Peru.

*Sericoderus tropicus*, sp. n., *id. l. c.* p. 133, Peru.

*Corylophus peruanus*, sp. n., *id. ibid.*, Peru.

*Orthoperus punctulatus*, sp. n., E. Reitter, *tom. cit.*, p. 312, N. E. Hungary.

## Trichopterygidæ.

C. A. Dohrn, S. E. Z. xxxvii. pp. 127–133, discusses Matthews's replies to his criticisms upon "Trichopterygia illustrata."

## Scaphidiidæ.

*Scaphisoma agaricinum*: larva described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3, p. 88.

*Scaphisoma tenellum*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 48, Tairua, New Zealand.

## Histeridæ.

*Dendrophilus punctatus* living in hornet's nests: Erné, MT. schw. ent. Ges. iv. p. 566.

*Saprinus rotundatus*, p. 95, and *Abræus globosus*, p. 97; larvæ described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3.

*Sternaulax lævis*, sp. n., D. Sharp, Ent. M. M. xiii. p. 24, New Zealand.

*Platysoma cognatum*, sp. n., *id. l. c.* p. 25, New Zealand.

*Hister grandis*, T. Broun, Tr. N. Z. Inst. ix. p. 372, Tairua; *H. turanus*, p. 223, Sarafschan Valley, *falsus*, p. 229, Samarcand, Solsky, in Fedchenko's Turkestan, Col.: spp. nn.

*Hetærius lævidorsis*, p. 37, Lambessa, *plicicollis*, p. 49, Bou-Sâada, L. Fairmaire, Pet. Nouv. ii., spp. nn.

*Saprinus pedator*, D. Sharp, *l. c.* p. 25, New Zealand; *S. sparsutus*, p. 238, *ovillum*, p. 240, Sarafschan Valley, *lateristrius*, p. 240, Taschkent, Solsky, *l. c.*: spp. nn.

*Gnathoncus disjunctus*, sp. n., Solsky, *l. c.* p. 242, Samarcand.

## Phalacridæ.

*Phalacrus*. Observations on various British species; *P. humberti*, Tourn., MS., = *corruscus*, var.; *Olibrus helveticus*, Tourn., MS., recorded from England. E. C. Rye, Ent. M. M. xii. p. 177.

## Nitidulidæ.

*Cercus rufilabris*. Larva briefly described, from *Juncus obtusiflorus*; E. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 214.

*Cercus rufilabris*, p. 100, *Brachypterus vestitus*, *cinereus*, and *linariæ*, p. 101, *B. urticæ*, p. 103, *Carpophilus bipustulatus*, p. 104, *Epuræa obsoleta*, p. 105, *Nitidula 4-pustulata*, p. 106, *Pria dulcamaræ*, p. 107, *Meligethes viridescens*, p. 109, *M. marrubii*, p. 110, *Ips lævior*, p. 113, and

*Rhizophagus nitidulus*, p. 114: larvæ described by Perris, in Gobert's Cat. Col. Landes, fasc. 3.

*Meligethes æneus*. Account of its ravages at Aschaffenburg; — Doebner, Ent. MB. i. p. 58.

*Camptodes phaleratus*, Er., = *vittatus*, Er., var., and varr. nn. *humerosus*, *rufo-angulus*, *flavo-angulus*, *lugubris*, *ruficollis*, and *lituratus*, p. 207, and *variegatus*, p. 208, La Plata; E. Reitter, S. E. Z. xxxvii. pp. 206–208.

*Stelidota sexguttata*, Sahlb. (*Ipidia lata*, Aubé, *I. integra*, Wank.), from Styria; G. Stierlin, MT. schw. ent. Ges. iv. p. 479.

*New genera and species:—*

*Prioschema*, E. Reitter, *l. c.* p. 365. Facies of a very small *Pria*; between *Meligethes* and *Xenostrongylus*, differing from all true *Nitidulides* in its wide sternum and concealed mesosternum, and from the *Strongyliides* in its flat shape and in its thoracic hinder margin not reaching over the base of the elytra. *P. dohrni*, p. 367, Monrovia.

*Microporum*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 109. No differential characters given. For *M. nitens*, ibid., Rodriguez Island.

*Probænus*, id. *l. c.* p. 110. Closely allied to *Mystrops*, from which it differs in the form of its mandibles, head, basal joint of antennæ, and longer elytra. For *P. longicornis*, ibid., Rodriguez Island, and ? *M. dispar*, from Madagascar.

*Brachypterus dilutitarsis*, Solsky, in Fedchenko's Turkestan, Col., p. 247, Samarcand and Taschkent.

*Carpophilus* (*Nitops*) *dohrni*, Reitter, Deutsche E. Z. 1876, p. 308, Cordova.

*Colastus obsoletus*, id. *l. c.* p. 309, Bogota; *C. brunneus*, id. S. E. Z. xxxvii. p. 317, Columbia.

*Brachypeplus reflexus* and *B.* (*Liopeplus*) *steinheili*, id. Deutsche E. Z. 1876, p. 310, Columbia.

*Cillæus puncticollis*, id. *ibid.* Sta. Catharina.

*Epuræa ophthalmica*, C. O. Waterhouse, *l. c.* p. 111, Rodriguez Island.

*Nitidula latiplaga*, Solsky, *l. c.* p. 248, Samarcand.

*Soronia hystrix*, D. Sharp, Ent. M. M. xiii. p. 26, New Zealand.

*Phenolia incapax* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 80, Green River shales.

*Æthinopa calva*, p. 363, Monrovia, *rustica*, p. 364, ? Madagascar, E. Reitter, S. E. Z. xxxvii.

*Pria affinis*, id. *l. c.* p. 318, Madagascar.

*Meligethes xanthopus*, p. 250, pl. i. fig. 7, *vulpes*, p. 251, pl. i. fig. 8, *lutra*, p. 252, pl. i. fig. 9, Solsky, *l. c.* Kokand.

*Strongylus rotundatus*, Reitter, Deutsche E. Z. 1876, p. 307, Peru.

*Pocadius breviusculus*, id. S. E. Z. xxxvii. p. 318, N. America.

*Lasiodactylus subproductus*, id. Deutsche E. Z. 1876, p. 308, Prince's Island, Guinea Coast.

*Chalepopeplus morio*, *suturalis*, and *conoteloides*, p. 305, *kirschi*, p. 306, Peru, *obscurus*, p. 311, Bogota, *id. l. c.*; *C. vorax*, id. S. E. Z. xxxvii. p. 317, Columbia.

*Cychramus variegatus*, id. Deutsche E. Z. 1876, p. 306, Peru.

*Camptodes kirschi*, p. 306, *lateralis* and *crumnosus*, p. 307, *id. l. c.* Peru; *C. nigricentris* and *steinheili*, id. S. E. Z. xxxvii. p. 319, Columbia.

*Cryptarcha klugi*, id. S. E. Z. xxxvii. p. 320, Madagascar.

*Rhizophagus similaris*, id. Deutsche, E. Z. 1876, p. 289, Transcaucasia.

## Trogositidæ.

E. Reitter, Deutsche E. Z. 1876, Heft iv. pp. 27–95, pls. i. & ii. (also published in Verh. Ver. Brünn. xiv. pp. 3–69, but quoted here from the former as the more accessible periodical), gives a systematic arrangement of this family. He adopts as subfamilies, (1) *Helotidæ*, without doubt to be removed here from the vicinity of the *Engides*, and forming a transitional group from the *Ipides* to the true *Trogositides*; (2) *Trogosotidæ*, with groups *Nemosomini*, *Trogositini*, *Leperini*, and *Peltini* [for the first of these, the author adopts the rendering *Nemozomini*, from the incorrect and abandoned spelling "*Nemozoma*" by Latreille of the type genus. The derivation is very evident; and, if any correction is to be made, the word should be spelt *Nematosoma*, i.e., thread-body. For a just criticism on the author's scheme of giving his subfamilies the same termination as the family of which they are part, see E. v. Harold, C. H. xv. p. 168, note]. *Dupontiella*, Spin., does not belong to the *Cleridæ*, but to this family, near *Nemosoma*. *D. ichneumo*[*no*]*ides*, figured, pl. i. fig. 8.

The following new genera and species are characterized:—

*Calanthosoma*, p. 36. *Nemosomini*: allied to *Acalanthis*, Er., but differing in the 11-jointed antennæ with 3-jointed club, and the simple tibiæ. For *C. flavo-maculata*[*-tum*], p. 37, pl. i. fig. 6, Antilles.

*Nemozomia*, p. 37 [can only be considered as a word with no meaning]. Differs from *Nemosoma* in the slightly trisinuate apex of its frons, &c. For *N. vorax*, p. 38, pl. i. fig. 7, Columbia.

*Filumis*, p. 42. *Nemosomini*: differs from *Nemosoma* in the sides of the thorax not being margined, the 2-jointed club, &c. For *F. tenuissima*, p. 43, pl. i. fig. 9, Columbia. (This genus = *Nematidium*, Er.; J. L. Leconte, P. Am. Phil. Soc. xv. p. xi. note.)

*Airora*, p. 44, pl. i. figs. 14 & 17. *Trogositini*: allied to *Alindria*, Er., but with obtusely sub-serrate uni-lateral club. For *Trogosita nigella*, Melsh., = *nigra*, Melsh., = *cylindrica*, Serv., and *A. procera*, pl. i fig. 10, Paraguay, and *clivinoides*, Mexico, Bogota (? = *Trog. longicollis*, Guér.), p. 45, *apicalis*, Columbia, *striato-punctata*, Antilles, and *canescens*, S. America, p. 46; ? also *Hypophlœus* (*Alindria*) *teres*, Melsh.

*Phanodesta*, p. 57, pl. i. figs. 21, 22 A. *Leperini*: allied to *Leperina*. For *P. cordaticollis*, p. 58, *angulata* and *brevipennis*, p. 59, and *costipennis*, p. 60, pl. ii. fig. 23, Chili; also *Nitidula guerini* and *argentea*, Montr., *Gymnochila nigro-sparsa*, White, and ? *G. sobrina*, White.

*Xenoglena*, p. 66. *Leperini*: facies of *Gymnochila*, allied to *Acrops*, but subsquamulose and elongate. *X. deyrolli*, p. 67, Java.

*Peltonyxa*, p. 72. *Peltini*: antennæ 9-jointed. *P. deyrollii*, ibid. Australia.

*Latolava*, p. 75, pl. ii. figs. 30–32. *Peltini*: antennæ 10-jointed, differs from *Neaspis* in its dentate claws. For *Peltis ovalis*, Macleay, and ? *P.*

*brasilica*, Perty; also *L. cassidoides*, Malacca, and *ferrarii*, Batchian, p. 76.

*Ancyrona*, p. 77, pl. ii. figs. 34 & 35. Differs from *Latolæva* in its pubescent surface and triangularly sub-dilated prosternum. For *Ostoma lanuginosa*, Mots., and *Ancy. caffra*, Cape of Good Hope, and *lewisi*, Japan, p. 78; also probably *Ostoma subrotundata*, Mots., *Peltis nigrita*, J. Thoms., and *P. ciliata* and *crenata*, Murray.

*Leptonyxa*, p. 80, pl. ii. figs. 36 & 37. Allied to the two preceding genera, but with prominent mandibles and elongate tarsi. For *L. brevicollis*, ibid. Columbia, and *costipennis*, p. 81, Brazil.

*Holopleuridia*, p. 82. Antennæ 11-jointed, with bi-articulate club. *H. maculosa*, p. 83, Columbia.

*Eronyxa*, p. 83. Club 3-articulate, claws connate. *E. lagrioides*, p. 84, pl. ii. fig. 44, California.

*Egolia variegata*, p. 34, Tasmania.

*Acalanthis mirabilis*, p. 35, Chili.

*Nemosoma corsicum*, p. 39, Corsica, *nigripennis* [-*ne*], p. 40, Columbia.

*Alindria chevrolati*, p. 48, Senegal.

*Melambia cordicollis*, p. 51, pl. i. fig. 16 A, Philippine Islands.

*Gymnochila lepidoptera*, p. 65, Abyssinia.

*Acrops dohrni*, p. 68, Borneo.

*Neaspis sub-trifasciata*, p. 73, *sculpturata*, p. 74, Australia.

*Micropeltis incostata*, p. 85, *costulata*, p. 86, Chili.

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*Leperina brouni*, sp. n., F. P. Pascoe, Ann. N. H. (4) xviii. p. 57, New Zealand.

## Colydiidæ.

Sharp, D. On the *Colydiidæ* of New Zealand. Ann. N. H. (4) xviii. pp. 17–28.

18 species are described. *Bolitophagus antarcticus*, White, is referred to *Ulonotus*, Er., with which *Pristoderus*, Hope, is synonymous; but the latter is proposed to be dropped, as insufficiently characterized and erroneously located. *Ulonotus* is also admittedly insufficiently characterized, and with no species described as representing it by its author, and *Tarphiomimetes*, Woll. [a well formed and thoroughly intelligible name], is, though also identical, proposed to be dropped because of its being polysyllabic. *Ectomida lacerata*, Pasc., = *Tarphiomimus indentatus*, Woll.; *Aglycyderes* is referred to the *Colydiidæ*.

*Endophlœus spinosulus*, p. 116, and *Colobicus emarginatus*, p. 119; larvæ described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3.

*Mecedanum*, Er., = *Aprostoma*, Guér.; observations on its erroneous location in the *Brenthidæ*. C. A. Dohrn, S. E. Z. xxxvii. pp. 383–385.

*Anommatus 12-striatus*. On its subterranean habits; R. Guilbert, Feuil. Nat. vi. p. 60.

*Philothermus*. Revision of the known species; E. Reitter, Deutsche E. Z. 1876, p. 301.

*Ceylon*. Table of the European species; *id. l. c.* p. 313. A further and more complete revision, including species from adjoining lands; *id. l. c.* pp. 385–394, pl. ii. figs. 1–9. *C. attenuatum*, Fairm., = *semistriatum*, Perris; *C. forticorne*, Muls., and ? *foveolatum*, Baudi, = *fagi*, Bris.; *C. histeroides*, F., var. ? *caucasicum*, p. 389, pl. ii. fig. 5, Caucasus; *C. angustatum*, Er., = *ferrugineum*, Steph. The sexes appear to differ in the dimensions of the thorax.

*New genera and species :—*

*Ascomma*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 111. General build of *Endophlæus*, but with head not widened in front of eyes. For *A. torrida*, p. 112, Rodriguez Island.

*Endocoxelus*, id. *l. c.* p. 112. Closely allied to *Coxelus*, but with head not widened in front, club of antennæ more distinct, thorax margined, &c. For *E. variegatus*, ibid., Rodriguez Island.

*Æschyntelus*, id. *l. c.* p. 113. *Bothrideres* with the head of a *Deretaphrus*. For *Æ. ater*, ibid., Rodriguez Island.

*Syncalus*, D. Sharp, Ann. N. H. (4) xviii. p. 20. Facies of *Tarphius*, but with 3-jointed club, and more elongate basal joint to tarsi. *S. optatus*, p. 21, *hystrix*, p. 22, New Zealand.

*Epistrophus*, id. *l. c.* p. 22. Exhibiting an affinity with the *Tarphii*, but with the head protected by the front of the prosternum, as in the *Histeridæ*, and the antennæ received in deep thoracic excavations. *E. lawsoni*, ibid., Auckland.

*Rhizonium*, id. Ent. M. M. xiii. p. 27. Facies of *Rhizophagus*, but allied to *Teredus* and *Oxylæmus*. For *Rhizon. antiquum*, p. 28, New Zealand.

*Ulonotus brouni*, p. 18, *asper*, p. 19, *id.* Ann. N. H. (4) xviii. New Zealand.

*Coxelus dubius*, p. 19, *similis*, p. 20, *id. l. c.* New Zealand.

*Ithris gracilis*, id. *l. c.* p. 23, Auckland.

*Bothrideres mœstus*, id. *l. c.* p. 23, Tairua.

*Pycnomerus sophoræ*, p. 24, *simulans* and *minor*, p. 25, *id. l. c.* Tairua.

*Bitoma* [*Di-*] *vicina*, p. 25, *distans* and *rugosa*, p. 26, *nana*, p. 27, *id. l. c.* Tairua.

*Philothermus nitidus*, id. *l. c.* p. 28, Tairua; *P. cerylonoides* and *ellipticus*, p. 302, *crassus*, p. 303, Sta. Catharina, *gibbulus*, p. 303, Teapa, Reitter, *l. c.*

*Cerylon ætolicum*, p. 313, & p. 386, pl. ii. fig. 1, Ætolia and Transcaucasia, *evanescens*, p. 387, fig. 2, Transsylvanian Alps, Reitter, *l. c.*

*Myrmidius segregatus*, Waterhouse, *l. c.* p. 114, Rodriguez Island.

*Aglycyderes wollastoni*, Sharp, *l. c.* p. 28, Tairua.

## Cucujidæ.

*Passandra elongatula*, fig. 1, *Hectarthrum latum*, fig. 2, *Catogenus longicornis*, fig. 3, and *Cucujus mniszechi*, fig. 4, redescribed and figured by A. Grouvelle, Ann. Soc. Ent. Fr. (5) vi. pp. 487–489, pl. viii. *Læmophlæus juniperi*, p. 503, pl. ix. fig. 24.

*Hectarthrum*. The species tabulated: *H. smithi*, Murr., = *gemelliparum*, Newm.; C. O. Waterhouse, Ent. M. M. xiii. pp. 118–120.

*Ochrosanis dohrni*, Pascoe, = *Hemipeplus hemipterus*, Dej., MS., *ex. typ.*, which has accidentally short elytra, and it is quite different from *H. marginipennis*, Lec., which is apparently not the same as *H. (Nemicelus) marginipennis*, Dej. (described from Florida), the latter being provisionally renamed *dejeani*. Id. *l.* c. pp. 121 & 122.

*Parabrontes*, Redt., and *Pseudophanus*, Lec., = *Cryptamorpha*, Woll.; *Telephanus fasciatus*, Redt., *Ps. signatus*, Lec., *C. musæ*, Woll., and *Dendrophagus suturalis*, White, = *C. desjardinsi*, Guér. (described as *Psammœcus*); *Par. silvanoides*, Redt., and ? *Dendr. umbrinus*, Smith, = *C. brevicornis*, White (described as *Dendrophagus*), and *C. fasciata*, Woll., = *concinnula*, Walk. (described as *Monotoma*). *Psammœcus 3-maculatus*, Mots., is a *Telephanus*, and *Cucujus ? incommodus*, Walk., is apparently a var. of it; *id. l. c.* pp. 122–124.

*Dendrophagus brevicornis*, White, is a *Cryptamorpha*, and *D. suturalis* and *umbrinus*, Wh., are queried as varieties of it; *Prostomis mandibularis* ? in New Zealand. F. P. Pascoe, Ann. N. H. (4) xvii. p. 49.

*Lathropus sepicola*: larva described by E. Perris, in Gobert's Cat. Col. Landes, fasc. 3, p. 122.

*Prognatha decisa*, Walk., 1858 (*Staphylinidæ*), and *Euryplatus lateralis*, Mots., 1859, are identical; *Cucujus incommodus*, Walk., is probably a *Psammœcus*. C. O. Waterhouse, Tr. E. Soc. 1876, p. 14.

*Cathartus*. The species revised: they are all (except *C. quadricollis*, Guérin, which is as yet only North American, and is not identical with *C. advena*, Waltl) distributed over the earth in vegetable produce. *C. cassiæ*, Rche., *gemellatus*, Duv., and two new species, found in cigar boxes at Munich. E. Reitter, C. H. xv. pp. 125–130.

*New genera and species*:—

*Oryzococcus*, E. Reitter, C. H. xv. p. 37. *Passandrides*. Facies of *Cathartus cassiæ*; differs from *Passandra*, *Hectarthrum*, and *Catogenus* in its more cylindrical shape, longer head, and antennæ as in *Antherophagus*; and from *Ancistria* and *Scalidia* in the short first tarsal joint, &c. For *O. cathartoides*, p. 38, found in rice.

*Schedarosus*, id. *l.* c. p. 42. Between the *Cucujides* and *Brontides*; tarsi heteromerous in both sexes. To form a special group. *S. cucujiformis*, p. 43, Columbia, *scidarius*, p. 44, S. America.

*Diagrypnodes*, C. O. Waterhouse, Tr. E. Soc. 1876, p. 13. Next *Ino*. *D. wakefieldi*, ibid. New Zealand.

*Pseudochrodes*, Reitter, *l. c.* p. 53. Allied to *Silvanus* and *Psammœcus*, but also with many affinities to the *Cryptophagidæ*, especially *Telmatophilus*. For *Pseud. suturalis*, p. 54, Chili, Brazil.

*Myrabolia*, id. *l. c.* p. 55. *Silvanides*: allied to *Silvanus*, *Nausibius*, and *Pediacus*. *M. haroldiana*, p. 56, Australia.

*Passandra blanchardi*, Grouvelle, Bull. Soc. Ent. Fr. (5) vi. p. ccxvii. Philippine Isles.

*Hectarthrum murrayi*, p. cxxii. Gaboon, *goudoti*, p. ccxviii., Madagascar, Grouvelle, *l. c.*; *H. australicum*, N. Australia, *sociale*, New Guinea, and

var. *minor*, Java, Philippines, p. 119, *dejectum*, Batchian, *penicillatum*, Abyssinia, p. 120, C. O. Waterhouse, Ent. M. M. xiii.

*Ancistria tarsalis*, Waterhouse, *l. c.* p. 121, Java; *A. semicastanea* and *filum*, p. 39, *tenuissima*, p. 40, E. Reitter, *l. c.* ? East India.

*Ino* (to which *Euryplatus*, Mots., falls) *bifossulata*, p. 40, and *nigripennis*, p. 41, Reitter, *l. c.* Columbia.

*Dendrophagus capito*, Pascoe, Ann. N. H. (4) xvii. p. 49, New Zealand.

*Uliota costicollis*, Reitter, *l. c.* p. 44, Moulmein.

*Parabrontes reitenbacheri*, id. *l. c.* p. 45, Chili.

*Microbrontes unicornis*, id. *ibid.* Surinam, Cuba (figured and redescribed by Grouvelle, Ann. Soc. Ent. Fr. 5, vi. p. 502, pl. ix. fig. 23).

*Platamus mexicanus*, Grouvelle, *l. c.* p. 490, pl. viii. fig. 5, Mexico; *P. deyrollii*, Brazil, and *schaumi*, Columbia, *id. tom. cit.* Bull. p. xxxii.; *P. haroldi*, p. 386, Venezuela, *bipunctatus* and *quadripunctatus*, p. 387, Cuba, L. W. Schaufuss, Nunq. Ot. ii.

*Telephanus lateralis* and *reductus*, p. 390, *pallidus*, p. 391, and *bimaculatus*, p. 392, Schaufuss, *l. c.* New Friburg; *T. pictus*, Borneo, *spinicollis*, Aru, p. 123, *felix*, p. 124, Ceylon, *cruciger* (also from Siam), and *antennatus*, p. 125, New Guinea, C. O. Waterhouse, Ent. M. M. xiii.

*Læmophlæus salpingoides*, p. 490, pl. viii. fig. 6, *productus*, p. 491, fig. 7, *æneus*, p. 492, fig. 9, and *pilatii*, p. 496, pl. ix. fig. 15, New Friburg, *oblique-fasciatus*, p. 492, pl. viii. fig. 8, Caracas, *convexus*, p. 493, fig. 10, *gundlachi*, p. 499, pl. ix. fig. 19, and *pallentipennis*, p. 500, fig. 20, Central America, *teapensis*, p. 494, pl. viii. fig. 11, *costatus*, p. 501, pl. ix. fig. 21, and *minusculus*, p. 502, fig. 22, Teapa, *castaneipennis*, p. 494, pl. viii. fig. 12, Brazil, Columbia, *megacephalus*, p. 495, pl. ix. fig. 13, and *semiflavus*, p. 497, fig. 16, Columbia, *lecontii*, p. 496, pl. ix. fig. 14, N. America, *tasmanicus*, p. 498, fig. 17, Tasmania, *leachi*, p. 499, fig. 18, New South Wales, Grouvelle, Ann. Soc. Ent. Fr. (5) vi.; *L. curtus* and *impressus*, Brazil, *reitteri*, Brazil and ? N. America, and *turcicus*, Turkey, p. xxxiii., *perrisi*, p. cxxii., Corsica, *id. l. c.* Bull.; *L. palpalis*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 114, Rodriguez Island; *L. stramineus*, p. 46, *straminipennis*, p. 47, *pallidipennis*, p. 48, *repandus*, p. 50, and *ovipennis*, p. 51, Brazil, *macrognathus*, p. 48, *semiæneus* and *seminiger*, p. 49, *suturalis*, p. 50, and *recticollis*, p. 52, Columbia, *foveolatus*, p. 52, Ceylon, Reitter, *l. c.*

*Xenoscelis prolixus*, D. Sharp, Ent. M. M. xiii. p. 26, New Zealand.

*Cryptamorpha triguttata*, C. O. Waterhouse, Ent. M. M. xiii. p. 123, S. Australia.

*Silvanus denticollis*, p. 56, and *longicollis*, p. 60, Ceylon, *lewisi*, p. 57, *affinis* and *grouvellii*, p. 58, *angusticollis* and *parallelicollis*, p. 59, *triangulus*, p. 60, *recticollis*, p. 61, *cephalotes*, p. 62, and *inermis*, p. 63, Japan (some also in China), *quadraticollis*, p. 62, Madagascar, Reitter, *l. c.*

*Cathartus excisus*, p. 128, West Indies, and *C. fascipennis*, p. 129, West [illegible]s, Columbia, and Ceylon, Reitter, *l. c.* (both also found in cigar [illegible] Munich).

### Cryptophagidæ.

*Telmatophilus tropicus*, Kirsch, 1873, from Peru, is probably a *Loberus*, and ? = *L. floralis* or *undulatus*, Reitt.; E. Reitter, S. E. Z. xxxvii. p. 365.

*Telmatophilus brevicollis*: larva described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3, p. 128.

*Cryptophagus subfumatus*, Ktz., recorded from Britain; E. C. Rye, Ent. M. M. xii. p. 178.

*Loberogosmus*, g. n., E. Reitter, Deutsche E. Z. 1876, p. 291. Near *Pharaxonotha*, but with narrow prosternum, simple frons and abdominal segments, and abbreviated scutellar stria. Very like *Thallis*, but with 3rd tarsal joint not lobate. For *Engis fasciata*, Kolen.

*Telmatophilus depressus*, p. 28, *nitens*, p. 70, D. Sharp, Ent. M. M. xiii. New Zealand; *T. analis*, E. Reitter, S. E. Z. xxxvii. p. 364, Chili: spp. nn.

*Antherophagus priscus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 79, Tertiaries of Wyoming.

*Cryptophagus recticollis*, Taschkent, *bactrianus*, Desert near Lake Aral, Solsky, in Fedchenko's Turkestan, Col., p. 260; *C. nigricollis*, E. Reitter, Deutsche E. Z. 1876, p. 290, Elisabetopol; *C.* (? *Telmatophilus*, ? ? g. n.) *striatus*, A. Rouget, Bull. Soc. Ent. Fr. (5) vi. p. ccvii. Dijon: spp. nn.

*Atomaria uhagoni*, E. Reitter, Ent. MB. i. p. 10, Navacerrada; *A. divisa*, E. C. Rye, Ent. M. M. xii. p. 178, England; *A. dilutella*, Solsky, *l. c.* p. 261, Samarcand and Taschkent: spp. nn.

*Sternodea lederi*, *haroldi*, and *raddii*, spp. nn., Reitter, Deutsche E. Z. 1876, p. 292, Transcaucasia.

### "Monotomidæ."

E. Reitter, Deutsche E. Z. 1876, pp. 295–301, revises the family "*Monotomidæ* (sensu Le Conte)," in which elements of such varied affinities are discussed that it impossible to satisfactorily refer them to any group, as usually recognized. It includes genera heretofore included in the *Rhizophagidæ* by Reitter, but without *Rhizophagus* itself, which forms a separate tribe of the *Nitidulidæ*, and including *Monotoma*. The following observations occur:—*Mimema*, Woll. [*Colydiidæ*], = *Phyconomus*, Lec.; *Crine*, Pasc. [*Nitidulidæ*: script. *Crime* in Marschall's Nomenclator Zoolog.], = *Bactridium*, Lec.; *Hesperobænus*, Lec., and *Nomophlæus*, Lec., are at best only subgenera of the prior *Europs*, Woll. [*Colydiidæ*]; *Platycephala*, Montr. [from "Now. Celedon." !], is near *Phyconomus*; *Rhizophagus humeralis*, Reitt., is referred to *Ipsimorpha*; *R. corpulentus*, *quadricollis*, *heydeni*, *orientalis*, *striolatus*, *adustus*, and *angulicollis*, Reitt., and *R. cubensis*, Chevr., are referred to *Bactridium*.

The following new genera and species are characterized:—

*Mimemodes*, pp. 296 & 297. Differs from *Phyconomus* in the ante[illegible] club being uni-articulate, and from *Bactridium* in the form of the [illegible] with strongly widened temples. For *B. monstrosum*, *japonum*, [illegible] *bratum*, Reitt.

*Tisiphone* [Hübner, *Lepidoptera*, 1816; Fitzinger, *Reptilia*, 1826], *ibid.* Between *Hypocoprus* and *Monotoma*, differing from the former in the shape of the labrum, the 4-jointed tarsi, and the long free pygidium; and from the latter in the labrum, the mandibles uncovered at the base, the abbreviated clypeus, and the 3-jointed antennal club. For *T. nitidu-loides*, St. Domingo, and *hypocoproides*, Cuba, p. 301.

*Phyconomus subtestaceus*, and var. ? *discoideus*, and *P. luridipennis*, p. 299, Mexico.

*Europs germari*, p. 300, Mexico.

*Bactridium atratum* and *brevicolle*, p. 300, Brazil.

## LATHRIDIIDÆ.

*Langelandia anophthalma*: larva described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3, p. 130.

*Revelierea spectabilis*, Perris, ex. typ., = *Lathridius genei*, Aubé; Nouv. et faits, 1876, No. 22', p. xc.

*Merophysia*, *Coluocera*, and *Reitteria*. General critical notes, with table of species; L. W. Schaufuss, Nunq. Ot. ii. pp. 393–400, 412–414.

*Abromus*, g. n., E. Reitter, S. E. Z. xxxvii. p. 50. Closely allied to *Anommatus*, differing in the antennæ, which are 10-jointed, with the 2 basal joints very incrassate, and the club large, globose, and 2-jointed, and in the prosternum, which is somewhat produced between the anterior coxæ. For *A. brucki*, sp. n., *id. l. c.* p. 51, S. France.

*Enicmus carpathicus*, sp. n., *id. l. c.* p. 51, N.E. Hungary.

*Lathridius parallelipennis*, sp. n., Solsky, in Fedchenko's Turkestan, Col., p. 264, Sarafschan Valley.

*Merophysia ovalipennis*, sp. n., Coye, L'Ab. 1876, livr^s. 4, p. 376, Syria.

*Coluocera* (antennæ 8 joints only, ? g. n.) *gallica*, sp. n., Schaufuss, *l. c.* p. 398, France.

## MYCETOPHAGIDÆ.

*Mycetophagus piceus*, p. 134, *Litargus bifasciatus*, p. 136, *Typhæa fumata*, p. 138; larvæ described by É. Perris, in Gobert's Cat. Col. Landes, fasc. 3.

*Rhipidonyx*, g. n., E. Reitter, Deutsche E. Z. 1876, p. 304. Very like *Mycetophagus* in form, but thorax scarcely foveolate at base, penultimate joints of tarsi bilobed, claws pectinate internally, maxillary palpi slender, with a very transverse, large, sub-moniliate apical joint, of which the apex is truncate-excavate. For *R. adustus*, sp. n., *id. ibid.*, Ceylon.

*Triphyllus colchicus*, sp. n., *id. l. c.* p. 293, Transcaucasia.

*Diplocœlus humerosus*, sp. n., *id. ibid.*, Transcaucasia.

*Litargus sexnotatus*, sp. n., *id.* S. E. Z. xxxvii. p. 363, Monrovia.

## THORICTIDÆ.

*ictus circumflexus*, p. 371, *pubescens*, p. 373, *longipennis*, p. 374, Coye, L'Ab. 1876, livr^s. 4, Syria.

### Dermestidæ.

*Dermestes lardarius*. The larva utilized for preparing skeletons of small animals; Feuil. Nat. vi. p. 90.

*Attagenus pellio* very injurious to *Attacus yamamai* at Ferrussac; M. Girard, Bull. Soc. Ent. Fr. (5) vi. p. li.

*Megatoma undata*: larva, &c., described; Carpentier, Bull. Soc. L. N. Fr. iii. p. 183.

*Anthrenus scrophulariæ*, L.: the larva very injurious to carpets in houses in New York State; J. L. Leconte, P. Am. Ac. 1876, p. 195. *A. claviger*, Er., also occurs in N. America; G. H. Horn, Tr. Am. Ent. Soc. v. p. 252.

*Dermestes elegans*, p. 269, pl. i. fig. 10, Sarafschan Valley, *D. ratus*, ibid. note, Persia, spp. nn., Solsky, in Fedchenko's Turkestan, Col.

*Attagenus simulans*, Sarafschan Valley, and *byturoides*, Samarcand, p. 272, *suspiciosus*, p. 274, Sarafschan Valley, *fasciolatus*, p. 275, Samarcand and Kisil-kum Desert, spp. nn., *id. l. c.*

*Megatoma conspersa*, sp. n., *id. l. c.* p. 275, Sarafschan Valley.

*Telopes seniculus*, sp. n., *id. l. c.* p. 276, note, Krasnovodsk.

*Trogoderma ornata*[*-tum*], sp. n., *id. l. c.* p. 278, Sarafschan Valley.

*Anthrenus melanoleucus*, p. 279, and *leucogrammus*, p. 282, fig. 16, Sarafschan Valley, *picturatus*, p. 280, and *rufulus*, p. 281, fig. 15, Samarcand, *flavidus*, p. 281, fig. 14, Pjandschikent, spp. nn., *id. l. c.* pl. i.

### Byrrhidæ.

*Inclica solida*, Walker, is one of the *Cryptocephalides*, close to, if not congeneric with, *Monachus*; C. O. Waterhouse, Tr. E. Soc. 1876, p. 15.

*Curimus asiaticus*, S. Solsky, in Fedchenko's Turkestan, Col., p. 283, Kokand; *C. rudis*, L. Fairmaire, Pet. Nouv. ii. p. 25, Crete: spp. nn.

*Nosodendron testudinum*, sp. n., C. O. Waterhouse, *l. c.* p. 14, Pará.

### Psephenidæ.

*Tychepsephus*, g. n., C. O. Waterhouse, *l. c.* p. 15. General form of *Psephenus*, but convex. *T. felix*, sp. n., *id. l. c.* p. 16, Chili.

*Mateopsephus*, g. n., *id. l. c.* p. 16. Differs from *Psephenus* in its clypeus, which is well developed and distinctly separated from the head. *M. nitidipennis*, sp. n., *id. l. c.* p. 17, China.

### Parnidæ.

*Potamophilus perplexus*, sp. n., C. O. Waterhouse, *l. c.* p. 18, Java.

*Parnus fuscipennis*, sp. n., Solsky, *l. c.* p. 284, Taschkent and Kokand.

*Parygrus* (recharacterized, p. 18) *erichsoni*, Columbia, *indicus*, Indi[illegible] p. 19, *talpoides*, Philippine Islands, *elegans*, Celebes, p. 30, spp. Waterhouse, *l. c.* (*Dryops hardwicki*, McL., is also a *Parygrus*).

*Dryops longus*, Solsky, *l. c.* p. 285, Taschkent and Kokand.

*Sostea sodalis*, Java, *picea*, Sylhet, p. 21, *hirtifera*, p. 22, Borneo, spp. nn., Waterhouse, *l. c.*

*Helichus asiaticus*, sp. n., Solsky, *l. c.* p. 286, pl. i. fig. 17, Kokand.

## Lucanidæ.

*Lucanus*. Observations on various European species, especially as to *pentaphyllus*, Reiche., *europæus*, Mots., and *orientalis*, Ktz.; G. Kraatz, Ent. MB. i. pp. 71–74.

*Lucanus cervus*. On various trees attacked by its larva besides oak and willow; Schmidt-Goebel, S. E. Z. xxxvii. p. 392.

*Hoplogonus*, g. n., F. J. S. Parry, Cist. Ent. ii. p. 131. Habit of *Lissotes*, but with flat head, porrect and non-falcate mandibles, eyes small, and posterior angles of thorax and shoulders of elytra armed with a suberect spine. For *H. simsoni*, sp. n., *id. ibid.* pl. i. figs. 1–3, Tasmania.

*Chiasognathus higginsi*, sp. n., *id.* Ent. M. M. xii. p. 174, Bolivia.

*Odontolabis gouberti*, sp. n., C. O. Waterhouse, Ent. M. M. xii. p. 172, Mindoro, Philippines.

*Cyclommatus zuberi*, sp. n., *id. l. c.* p. 173, Mindoro.

*Ceratognathus zealandicus*, sp. n., T. Broun, Tr. N. Z. Inst. ix. p. 372, Canterbury, Tairua.

## Scarabæidæ.

E. v. Harold, Deutsche E. Z. 1876, Heft iv. pp. 97–106, gives a list of 47 species (2 new) of Coprophagous Lamellicorns taken by H. Leder in the Caucasus. With 2 or 3 exceptions, these agree precisely with south-east- and even with mid-European species.

G. H. Horn, Tr. Am. Ent. Soc. v. pp. 177–197, revises the United States species of *Ochodæus*, *Macrodactylus*, *Dichelonycha*, and allied g. n., *Trichius*, and *Gnorimus*.

D. Sharp, C. H. xv. pp. 64–90, continues (pt. iii.) his descriptions of new species from tropical Asia and Malasia.

### *Coprides.*

*Synapsis thoas*, Sharp, = *ritsemæ*, Lansb.; C. Ritsema, Tijdschr. Ent. xix. Verslag, p. xlvi. But *cf.* Sharp, *l. c.* note.

*Coptorrhina barratti*, sp. n., C. O. Waterhouse, Tr. E. Soc. 1876, p. 22, Transvaal.

*Canthidion imperiale*, sp. n., E. v. Harold, C. H. xv. p. 118, Brazil.

*Onthophagus speculifer*, p. 308, *leucomelas*, p. 309, S. Solsky, in Fedchenko's Turkestan, Col., Samarcand and Taschkent; *O. mayeri*, E. v. Harold, C. H. xv. p. 118, Jobi, New Guinea; *O. furciceps*, S. A. de Marseul, L'Ab. 1876, livrn. 4, p. 379, Syria: spp. nn.

### *Aphodiides.*

*Aphodius diversus*, C. O. Waterhouse, 1875, = *solskii*, Har., 1871; E. v. Harold, C. H. xv. p. 174.

*Aphodius derbesi*, Sol., redescribed from Buenos Ayres, and placed at the end of the genus as coming very near the true *Aphodii*; *A. integer*,

Har., = *platensis*, Blanch., redescribed; *A. scutellaris*, Har., fully described. E. v. Harold, CR. Ent. Belg. xix. pp. xciv.–xcvi.

*Aphodius* (? *Saprosites*) *distans* and *suspectus*, p. 70, New Zealand, *pascoei*, p. 71, note, ? New Zealand; *A.* (? *Atenius*) *brouni*, p. 71, New Zealand, D. Sharp, Ent. M. M. xiii.; *A. lederi*, p. 103, *flammulatus*, p. 104, E. v. Harold, Deutsche E. Z. 1876, Heft iv., Caucasus; *A. ravolxemi*, id. CR. Ent. Belg. xix. p. xciii. Barbacena, S. America; *A. nigrivittis*, p. 327, Kokand, *kisilkumi*, p. 332, Kisil-kum desert, *semipellitus*, p. 335, *edgardi*, p. 340, Samarcand and Taschkent, *lunifer*, p. 336, pl. i. fig. 18, Taschkent, *circumductus*, p. 338, Kisil-kum and Samarcand, Solsky, in Fedchenko's Turkestan, Col.: spp. nn.

*Ammœcius discolor*, sp. n., Solsky, *l. c.* p. 345, Samarcand.

*Mendidius bidens*, sp. n., *id. l. c.* p. 346, Samarcand.

*Rhyssemus tarsalis*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 115, Rodriguez Island.

*Atenius crenator*, sp. n., E. v. Harold, CR. Ent. Belg. xix. p. xcvii., San João del Rey.

*Saprosites aspericeps*, sp. n., *id. l. c.* p. xcviii., Botafogo.

### *Orphnides.*

*Ochodæus*. The United States species revised, and fresh characters pointed out in the mentum, prosternum, keel separating the fossæ for reception of clubs of antennæ, spurs (fig.), pygidium (fig.), posterior tibiæ (fig.), &c. A table is given of 8 recognized species. *O. americanus*, Westw., = *musculus*, Say; *O. complex*, Lec., = *frontalis*, Lec. G. H. Horn, Tr. Am. Ent. Soc. v. pp. 177–182.

*Ochodæus cornifrons*, S. Solsky, in Fedchenko's Turkestan, Col., p. 349, Samarcand; *O. ulkii*, Horn, *l. c.* p. 182, Nevada: spp. nn.

### *Geotrupides.*

*Geotrupes stercorarius*, *spiniger*, *foveatus*, and *mutator*. An analysis of Harold's observations, and comparison of specimens from various localities; G. Kraatz, Ent. MB. i. pp. 81–88.

*Bolboceras radoszkovskii*, sp. n., S. Solsky, in Fedchenko's Turkestan, Col., p. 352, pl. ii. fig. 1, Kokand.

*Geotrupes creticus*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 25, Crete.

*Thorectes variolipennis*, sp. n., [? De Marseul], Nouv. et faits, 1876, No. 25, p. ci., Dahr-el-Beida, near Mogador.

*Lethrus politus*, sp. n., Solsky, *l. c.* p. 366, Samarcand.

### *Trogides.*

Burmeister, H. Die Argentinischen Arten der Gattung *Trox*, Fabr. S. E. Z. xxxvii. pp. 241–268.

Contains a masterly review of the chief literature of the genus, with minute anatomical characters, especially of the mouth organs, and a tabulated list of species arranged geographically. *T. candezii*, Hay[illegible] *ciliatus*, Blanch., var.; *T. guttifer*, Har., = *gemmifer*, Blanch., var. The following new subgenera of *Trox* and new species are characterized [illegible] *Chesas*, p. 264, for *T. pastillarius*, Blanch.

*Polynoncus*, ibid., for *T. pedestris*, Har., &c., and *T. hemisphæricus*, p. 253, S. Patagonia, *pampeanus*, p. 255, Pampas and Patagonia.

*Lagopelus*, p. 265, for *T. ciliatus*, Blanch.

*Phœochroops* [*Phœo-*], g. n., E. Candèze, CR. Ent. Belg. xix. p. lxiii. Facies of *Phœochrous* in the *Hybosorides*, but allied to *Anaides*, Westw.; no differential characters given. For *P. lansbergii*, sp. n., *id. l. c.* p. lxiv., Java.

*Glaphyrides.*

*Glaphyrus.* Harold's Monograph in B. E. Z. xiii., translated by A. P. de Borre, L'Ab. 1876, livrn. 3, pp. 1–24 [it is impossible to quote a vol. or pagination for this unnecessary production].

*Amphicoma analis*, p. 387, Kisil-kum desert, *dubia* and *clypeata*, p. 389, Sarafschan Valley, spp. nn., Solsky, in Fedchenko's Turkestan, Col.

*Melolonthides.*

*Hymenoplia.* Synoptical table of species; L. v. Heyden, Nouv. et faits, 1876, No. 23, pp. xciv. & xcv.

*Calonota*, Hope, = *Pyronota*, Boisd., but the latter is uncharacterized; there are but 8 joints to the antennæ, and the piceous form is connected by intermediate examples with the bright green *festiva*. *Colymbomorpha*, Blanch., is not properly united to *Calonota*; the ♂ has 5 lamellæ to its 9-jointed antennæ. C. O. Waterhouse, Ann. N. H. (4) xvii. pp. 71 & 72.

*Macrodactylus* and *Dichelonycha*. The United States species revised, and fresh characters pointed out; *M. setulosus*, Lec., ♀, = *angustatus*, Beauv.; *M. angustatus*, Lec., ♂, = *subspinosus*, F.: G. H. Horn, Tr. Am. Ent. Soc. v. pp. 183–192.

*Rhizotrogus cuphytus*, Buquet, mostly ♀, found under stones in horizontal galleries, indicating a subterranean existence; A. Schultze, Deutsche E. Z. 1876, p. 162.

*Anoxia emarginata*: habits like those of *A. villosa*; E. Olivier, Bull. Soc. Ent. Fr. (5) vi. p. clxvii.

*Polyphylla variolosa*, Harris. On the antennæ of the ♂ as auditory organs, and the way it seeks the ♀; F. H. Snow, Rep. Agric. Kansas, iii. (1874), pp. 361 & 362.

*Melolontha vulgaris* and *hippocastani*. On periods of flight at Lemberg; Schmidt-Goebel, S. E. Z. xxxvii. p. 388.

*Melolontha hippocastani* (and var.) and *M. vulgaris*, at Naumburg; Von Schönfeldt, Ent. Nachr. ii. p. 126.

*Oxycorythus*, g. n., S. Solsky, in Fedchenko's Turkestan, Col., p. 395. Belonging to the *Sericini*, and probably representing a new section of that group. Clypeus large, semicircular, wider than head and eyes, as in *Aphodius rufipes* and *luridus*, angulated in front and at the sides; anterior tibiæ sharply 3-dentate, with strong, elongate, sharp, inwardly incurved apical spur. For *O. morawitzi*, sp. n., *id. l. c.* p. 397, pl. ii. fig. 2, Desert near the Syr-Daria.

*[illegible]llococerus*, g. n. (Hope, MS.), C. O. Waterhouse, *l. c.* p. 71. Intermediate between *Calonota* and *Colymbomorpha*. For *P. purpurascens*, *id. l. c.* p. 72. Swan River.

*Cænonycha*, g. n., G. H. Horn, Tr. Am. Ent. Soc. v. p. 192. Differs from *Dichelonycha* in its inserted head, eyes partly concealed by thoracic angles, abdomen with only 5 segments visible, and antennæ sometimes 8 or 10-jointed. For *D. rotundata*, Lec., and *C. socialis*, ibid., Island of Guadalupe, California, and *ovipennis*, p. 193, Nevada, spp. nn.

*Hoplia diana*, p. 65, Penang, *sobrina*, Celebes, and *simplex*, Philippine Isles, p. 66, D. Sharp, C. H. xv.; *H. detrita*, Solsky, *l. c.* p. 391, Samarcand: spp. nn.

*Serica arenicola*, Solsky, *l. c.* p. 394, Kisil-kum desert; *S. guttula*, Sumatra, *duplex*, Java, Sharp, *l. c.* p. 67: spp. nn.

*Pyronota edwardsi*, p. 72, *sobrina* and *munda*, p. 73, spp. nn., D. Sharp, Ent. M. M. xiii., New Zealand.

*Dichelonycha canadensis*, p. 188, Canada, *crotchi*, p. 189, and *clypeata*, p. 190, California, spp. nn., Horn, *l. c.*

*Macrodactylus uniformis*, sp. n., *id. l. c.* p. 185, Arizona.

*Plectrodes carpenteri*, sp. n., J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 296, California.

*Pachydema nitidicollis*, L. Fairmaire, Pet. Nouv. ii. p. 37, Bou-Sâada; *P. coyei*, S. A. de Marseul, L'Ab. 1876, livrn. 4, p. 379, Syria: spp. nn.

*Apogonia dux*, p. 68, Batchian, *farinosa* and *vestita*, p. 69, Celebes, spp. nn., Sharp, C. H. xv.

*Rhizotrogus batnensis*, sp. n., L. Fairmaire, Pet Nouv. ii. p. 38, Batna.

*Schizonycha algirica*, sp. n., *id. ibid.*, Bou-Sâada.

*Cyphochilus vestitus*, p. 82, Cambodia, *obscurus*, Laos, and *proximus*, Burma, p. 83, spp. nn., Sharp, *l. c.*

*Lachnosterna gradaria* and *rodriguezi*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 115, Rodriguez Island; *L. princeps*, p. 83, *lineata*, p. 84, and *vidua*, p. 85, Sharp, *l. c.*, Borneo: spp. nn.

*Cyphonotus* (a good genus) *zemindar*, sp. n., Sharp, *l. c.* p. 85, N. India.

*Melolontha* (*Hoplosternus*) *flabellata*, p. 86, and *M. guttigera*, p. 87, India, *mandarina*, p. 87, China, *pennata*, p. 88, Laos, and *vervex*, p. 89, Penang, spp. nn., Sharp, *l. c.*

*Leucopholis armata*, p. 79, Sarawak, *pollens*, Borneo, and *diffinis*, Penang and Malacca, p. 80, *aberrans*, p. 81, India, spp. nn., Sharp, *l. c.*

*Lepidiota florens*, p. 70, and *gracilipes*, p. 77, Penang, *guttata*, p. 70, and *tridens*, p. 74, Laos, *munda*, p. 71, Sarawak, *rufipennis*, p. 72, *rugosa*, p. 73, *pedator*, p. 75, North India, *discedens*, p. 73, Siam, *pumila*, p. 76, and *bicolor*, p. 78, India, *nana*, p. 76, China, spp. nn., Sharp, *l. c.*

*Rutelides.*

*Anomala discordabilis*, sp. n., C. A. Dohrn, S. E. Z. xxxvii. p. 79, Liberia.

*Popilia callipyga*, sp. n., *id. ibid.*, Liberia.

*Parastasia marmorata*, p. 514, New Guinea and Halmahera, *zoraidæ*, ibid., New Guinea, Dorey, &c., and varr. *kor*[*i*]*densis*, Korido, and *nig*... Ramoi, p. 515, and *P. caroline*, p. 515, Ramoi, spp. nn., R. Gestro, A... Mus. Genov. viii.

*Pelidnota rufipennis*, p. 23, Pernambuco, *cylindrica*, p. 24, Gua... spp. nn., C. O. Waterhouse, Tr. E. Soc. 1876.

*Dynastides.*

*Oryctes minor*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 115, Rodriguez Island.

*Cyphonistes burmeisteri*, sp. n., Dohrn, *l. c.* p. 80, Liberia.

*Oryctoderus albertisi*, sp. n., R. Gestro, Pet. Nouv. ii. p. 41, Goram.

*Chalcosoma beccarii*, sp. n., *id.* Ann. Mus. Genov. viii. p. 515, Mt. Arfak, New Guinea.

*Cetoniides.*

*Chordodera pentachordia*, Klug, ♂ described, from Monrovia; C. A. Dohrn, S. E. Z. xxxvii. p. 83.

*Diaphonia notabilis* ?, White, figured and described, from Cape York; O. E. Janson, Cist. Ent. ii. p. 391, pl. i. fig. 6.

*Trichius* and *Gnorimus*. Sexual characters in the pygidium and anterior tibiæ pointed out; G. H. Horn, Tr. Am. Ent. Soc. v. pp. 194 & 196.

*Dicranorrhina oberthuri*, sp. n., H. Deyrolle, Bull. Soc. Ent. Fr. (5) vi p. lxxxii., Zanzibar and ? Abyssinia.

*Heterorrhina rœpstorffi*, sp. n., J. Wood-Mason, J. A. S. B. (n. s.) xlv. pt. 2, p. 52, South Andaman.

*Gymnetis decem-guttata*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 423, Medellin, Granada.

*Lomaptera jamesi*, id. *l. c.* p. 422, New Guinea, Yule Island; *L. chloris*, Andai, and *salvadorii*, Roro, S. New Guinea, R. Gestro, Ann. Mus. Genov. viii. p. 516: spp. nn.

*Ischiopsopha ignipennis*, sp. n., Gestro, *l. c.* p. 517, Roro.

*Schizorrhina lansbergii*, sp. n., *id. ibid.*, Humboldt Bay.

*Anacamptorrhina corrusca*, sp. n., *id. ibid.*, Jobi.

*Cetonia kessleri*, p. 276, Sarafschan, *bogdanoffi*, p. 277, Khiva, S. Solsky, Hor. Ent. Ross. xi.; *C. lenzi*, E. v. Harold, Abh. Ver. Brem. v. p. 128, Hiogo: spp. nn.

*Cotinis polita*, sp. n., O. E. Janson, Cist. Ent. ii. p. 133, Chontales.

*Stenotarsia scotti*, sp. n., *id. l. c.* p. 134, pl. i. fig. 7, Madagascar.

*Pygora ornata*, sp. n., *id. l. c.* p. 135, Madagascar.

*Eupœcilia miskini*, sp. n., *id. l. c.* p. 136, pl. i. fig. 5, Cape York, N.E. Australia.

*Protætia nivco-guttata*, sp. n., *id. l. c.* p. 137, pl. i. fig. 4, Cambodia.

*Cremastochilus wheeleri*, sp. n., J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 296, Northern New Mexico.

*Trichius texanus*, sp. n., Horn, Tr. Am. Ent. Soc. v. p. 195, Texas and Florida.

BUPRESTIDÆ.

*Pœcilonota decipiens* and *conspersa*. Observations on the early stages: the ♀ lays her eggs in sound trees, when dead or sickly trees are not to be had, and the larva feeds on the bark only, without appearing to injure the tree. E. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 191 & 192.

*Anthaxia candens*, ♀, appears ong before the ♂; H. J. Erne, MT. schw. ent. Ges. iv. p. 518.

*Agrilus rugicollis* is not specifically distinct from *angustulus*, and *A. laticornis* and *scaberrimus* are dubiously separable from it; C. Brisout de Barneville, Bull. Soc. Ent. Fr. (5) vi. p. xxi.

*Trachys pumila*, Ill., recorded from S. England; G. C. Champion, Ent. M. M. xii. p. 226. *T. minuta*, L., from Vladivostok; S. Solsky, Hor. Ent. Ross. xi. p. 281.

*Julodis reboudi*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 49, Algerian Sahara.

*Iridotænia clotildæ*, sp. n., R. Gestro, Ann. Mus. Genov. viii. p. 518, Korido, Misor.

*Cyphogastra modesta*, sp. n., *id. ibid.*, Mafor, Geelvink Bay, New Guinea.

*Poecilonota balcanica*, sp. n., Kirschberg, Ent. MB. i. p. 29, Balkans.

*Melobasis cupreo-vittata*, p. 155, Gawler, *costata*, ibid., and *lata*, p. 156, Swan River, *rubro-marginata* and *igniceps*, p. 156, N.W. Australia, *viridiceps*, p. 157, New S. Wales, *obscura*, ibid., and *viridis*, p. 158, Adelaide, spp. nn., E. Saunders, Ent. M. M. xiii.

*Melanophila anthaxioides*, sp. n., Marquet, L'Ab. 1876, livrn. 4, p. 368, Hyères, Escorial.

*Stigmonota saundersi*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xvii. p. 70, New S. Wales.

*Chrysobothris haydeni*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 80, Colorado tertiaries.

*Agrilus melanopterus*, p. 277, River Oussouri, E. Siberia, *smaragdinus*, p. 279, River Souyfoun, Asiatic Russia, spp. nn., S. Solsky, Hor. Ent. Ross. xi.

*Cylindromorphus pinguis*, sp. n., L. Fairmaire, *l. c.* p. 49, Biskra.

*Aphanisticus amblyderus*, sp. n., *id. ibid.*, Biskra.

*Trachys auriflua*, sp. n., S. Solsky, *l. c.* p. 280, E. Siberia.

*Lius castor* and *pollux*, p. 48, Parana, *adonis*, ibid., *ares*, p. 49, and *hades*, p. 51, Santarem, *tereus*, p. 49, no locality mentioned, *cycnus*, ibid., Bahia, *hercules*, ibid., and *ephialtes*, p. 50, Brazil, *bacchus* and *helios*, p. 50, Ega, *otus*, ibid., New Friburg, spp. nn., E. Saunders, *l. c.*

## Eucnemidæ.

*Epiphanus deletus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 80, White River tertiaries.

## Elateridæ.

*Monocrepidius*? Phosphorescent spots observed to lie thickly behind the last pair of legs in a large species from the Tonga Islands; H. Leuchten, J. Mus. Godeffr. xii. p. 117.

*Cryptohypnus dermestoides*. A dissertation upon its synonymy—by Schmidt-Goebel, S. E. Z. xxxvii. pp. 396–398.

*Pyrophorus*? Description of a luminous larva found in Cordova; H. Weyenbergh, Hor. Ent. Ross. xii. pp. 177–180, pl. iv. B. [The author suggests the identity of this with a luminous larva described by Bur-

meister in P. L. S. xi. p. 416, which he quotes from Pet. Nouv. No. 69, but considers a second publication not superfluous, as he gives a figure, which he wrongly says Burmeister does not. The Recorder himself drew Burmeister's figure for the engraver, from that author's sketch.]

*Amychus*, g. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 49. General structure of *Lacon*, but with only a very slight trace of the lateral prosternal grooves. For *A. candezii*, sp. n., *ibid.*, Pitts Island, New Zealand.

*Adelocera drusa*, sp. n., S. A. de Marseul, L'Ab. 1876, livrn. 4, p. 380, Syria.

*Limonius collaris*, sp. n., Pascoe, *l. c.* p. 49, Auckland, New Zealand.

*Athous transcaucasicus*, p. 474, Tiflis, and *epirus*, p. 475, Janina, G. Stierlin, MT. schw. ent. Ges. iv.; *A. cribratus*, S. Colorado and N. New Mexico, and *simplex*, Colorado, J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 296: spp. nn.

*Asaphes* (must be united with *Corymbites* and *Athous*) *saccifer*, sp. n., J. L. Leconte, *l. c.*, N. New Mexico.

*Corymbites velatus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 81, tertiaries of Wyoming.

*Oxygonus* (?) *mortuus*, sp. n. (foss.), *id. ibid.*, White River tertiaries.

## Cebrionidæ.

*Cebrio striatifrons*, *gracilissimus* [*gracilimus*], and *convexiusculus*, Morocco, *perustus*, Hodna, *biskrensis*, Biskra, L. Fairmaire, Pet. Nouv. ii. p. 93; *C. hirundinis*, A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. clxxxvi., brought by parent birds to a nest of swallows in a house in Algiers (see also E. Olivier, *l. c.* p. clxxvii.): spp. nn.

## Telephoridæ.

*Eros thoracicus*; larva, and especially the oral organs, described; the mandibles have a vertical action, and the tips are never even approximated. H. L. Moody, Psyche, ii. pp. 185–187.

*Lampyris noctiluca* in Scotland; J. Shaw, Nature, xiii. p. 188; W. McLaurin, *tom. cit.* p. 208.

*Astychina*, g. n., J. O. Westwood, Tr. E. Soc. 1876, p. 494. Allied to *Podabrus*, but the antennæ in one sex [queried as the *female*, and in any case only a sexual character] have the two terminal joints produced into a remarkable prehensile apparatus, different from anything noticed in the insect world [this is only intended to refer to the apical position of the apparatus, as the basal joints of ♂ *Malachius* are somewhat analogous]. For *A. flavicollis*, pl. ii. fig. 2, and *funebris*, fig. 4, Dorei, *mœrens*, fig. 3, New Guinea, spp. nn., *id. l. c.* p. 495.

*Malthacodes*, g. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 116. Resembles *Haplocnemus*, and in the maxillary palpi approaching *Pelecyphorus*, but with basal joint of tarsi elongate. For *M. pictus*, sp. n., *ibid.*, Rodriguez Island.

*Chauliognathus pristinus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 81, Colorado tertiaries.

*Podabrus lateralis* [||], sp. n., J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 297, Colorado and N. New Mexico.

*Telephorus occipitalis*, Morocco, *deportatus*, Lambessa, spp. nn., L. Fairmaire, Pet. Nouv. ii. p. 38.

*Hapalochrus oberti*, sp. n., S. Solsky, Hor. Ent. Ross. xi. p. 281, pl. i. fig. 6, ? Lake Baikal.

*Collops hirtellus* and *reflexus*, spp. nn., Leconte, *l. c.* p. 297, N. New Mexico.

*Malachius montanus*, sp. n., *id. ibid.*, N. New Mexico.

*Dasytes ruficollis*, sp. n., H. Ulke, in Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. p. 812, pl. xli. fig. 5, Nevada.

## Cleridæ.

Gorham, H. S. Notes on the Coleopterous family *Clerida*, with description of New Genera and Species. Cist. Ent. ii. pp. 57–106.

The commencement of a useful paper, of which, apart from description of new forms, the aim has been to indicate the true type of every genus and eliminate therefrom all species erroneously introduced. It would be impossible to satisfactorily abstract this work, which practically consists of corrections as to position, localities, specific value, &c., of the species discussed; but among the more recent synonymy, the following may be given:—*Cylidrus pallipes*, Chevr., *alcyoneus*, Pasc., *vescoi*, Fairm., = *cyaneus*, F.; *Opilio apicalis*, White, *nec* Chevr., renamed *whitii*, p. 70; *O. mollis* occurs in the Philippines and Japan; *Stigmatium dimidiatum*, Chevr., = *Tillicera mutillicolor*, White; *Serriger coffini*, White, is not a *Serriger*, but belongs to the *Clerides*, near *Trogodendrum*; *Omadius nigro-punctatus*, Chevr., = *medio-fasciatus*, Westw.

*Cymatodera* and *Trichodes*. A synopsis of the United States species by G. H. Horn, Tr. Am. Ent. Soc. v. pp. 220–232, pl. i. figs. 1–28 (sexual characters in outline).

*Corynetes ruficornis* parasitic on *Anobium paniceum*; E. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 188.

*New genera and species:—*

*Gastrocentrum*, Gorham, *l. c.* p. 63. *Tillides*: claws bifid, without tooth; no differential characters given. For *G. pauper*, ibid. Luzon.

*Callimerus*, id. *l. c.* p. 65. *Tillides*, but with finely granulated eyes, widely separated antennæ, and simple 3-jointed club. Type, *Clerus dulcis*, Westw., also *Call. mirandus*, ibid. ? Penang, *amabilis*, Laos, and *gratiosus*, Mindanao, p. 66, *pulchellus* and *latifrons*, p. 67, Philippines, and *Lemidia insolata*, Pasc.

*Orthrius*, id. *l. c.* p. 74. Allied to *Thanasimus*, and in tarsal structure to *Clerus*, but more elongate and cylindrical; eyes scarcely at all emarginate. *O. cylindricus*, ibid., New S. Wales.

*Metabasis*, id. *l. c.* p. 75. Differs from *Thanasimus* in the antennæ, from *Clerus* in having only 4 joints visible above in middle and front tarsi, and from both in form and sculpture of thorax. Type, *T. accinctus*, Newm., of which *Thaneroclerus medianus*, Westw., is the ♂.

*Cleromorpha*, id. *l. c.* p. 83. Antennæ with 4-jointed club, terminal joint not falciform. For *Clerus novem-guttatus*, Westw.

*Phlogistus*, id. *l. c.* p. 84, suggested for the Australian species of *Aulicus*.

*Hemitrachys*, id. *l. c.* p. 92. Apparently nearest to *Stigmatium*, but with wide flat antennæ and granulose pronotum. *H. bizonatus*, ibid. Singapore, Borneo.

*Sisyrnophorus*, C. O. Waterhouse, Ent. M. M. xiii. p. 125. Closely allied to *Allochotes*, Westw., but with a very convex thorax, straight in front, and entirely rounded behind. For *S. maculatus*, Philippine Islands, and *bowringi*, Penang, p. 126.

*Anisophyllus*, J. O. Westwood, Tr. E. Soc. 1876, p. 493. Allied to *Enoplium*, but differs from it and all known beetles in the elongate branch of the 9th joint of the antennæ, the 10th joint having no branch. *A. obscurus*, p. 494, pl. ii. fig. 1, Mysol.

*Phymatophæa*, F. P. Pascoe, Ann. N. H. (4) xvii. p. 50. Allied to *Scrobiger* in sterna and abdomen, but with a large loose 3-jointed club. *P. electa*, ibid. Auckland, New Zealand.

*Eumede*, id. *ibid.* Somewhat of the habit of *Lemidia*, but with emarginate eyes; also somewhat near *Aulicus*, but with only the labial palpi securiform. *E. æraria*, ibid. Christchurch, New Zealand.

*Tillus semperanus*, Gorham, *l. c.* p. 62, Bohol.

*Cymatodera xanti*, p. 222, Cape San Lucas, *belfragii*, p. 226, Texas, *oblita*, p. 227, Arizona, G. H. Horn, Tr. Am. Ent. Soc. v.

*Phlæocopus pallicolor*, L. Fairmaire, Pet. Nouv. ii. p. 49, Biskra.

*Opilo sinensis*, p. 70, Foochow, *pascoii*, p. 71, New S. Wales, Gorham, *l. c.*

*Thanasimus rufimanus*, id. *l. c.* p. 74, New S. Wales.

*Clerus femoralis*, p. 77, *gaudens*, p. 79, and *felix*, p. 80, Parana, *sigma*, p. 77, Brazil, *binodulus*, p. 77 (Peru), *festivus*, p. 78, *hieroglyphicus*, p. 79, *deliciolus*, p. 82, and *melanocephalus*, p. 83, Amazon region, *salvini*, p. 78, *atriceps*, p. 82, Guatemala, *badeni* and *errans*, p. 80, *vulpinus* and *cuprascens*, p. 81, ? Mexico, *id. l. c.*

*Aulicus imperialis*, p. 84, *albo-fasciatus* and *smaragdinus*, p. 85, and *affinis*, p. 86 (? = *smaragdinus*, var.), *id. l. c.* Queensland.

*Trogodendrum monstrosum*, id. *l. c.*, p. 87, Queensland (antennæ with last joint bifid).

*Olesterus gracilis*, id. *l. c.* p. 87, Australia.

*Trichodes illustris*, Horn, *l. c.* p. 231, fig., Arizona.

*Eleale aulicodes*, N.W. Australia, *brevis*, Freemantle, and *late-fasciata*, Queensland, Gorham, *l. c.* p. 90; *E.* (?) *opiloides*, Pascoe, *l. c.*, p. 51, New Zealand (*cf.* Gorham, *l. c.* p. 89).

*Stigmatium philippinarum* and *encaustum*, p. 93, *sub-fuscum* and *centrale*, p. 94, *tapetum*, (*S.* ?) *iodinum*, and *violaceum*, p. 95, *scapulare*, *inscriptum*, and *omadioides*, p. 96, *obscuripenne* and *pallidiventre*, p. 97, *tergo-cinctum* and *pusillum*, p. 98, *lineare*, *ignobile*, *inconspicuum*, and *divisum*, p. 99, *egenum*, *vitreum*, and *audax*, p. 100, Malay Archipelago, *versipelle*, p. 101, Queensland, Gorham, *l. c.*

*Omadius aurifasciatus* and *nimbifer*, p. 102, *vespiformis* and *notatus*

(var. also from Siam), p. 103, *filifrons*, *radulifer*, and *femoralis*, p. 104, *posticalis* and *cylindricus*, p. 105, *angusticeps* and *abscissus*, p. 106, *id. l. c.*, Malay Archipelago.

*Hydnocera hamata*, J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 297, N. New Mexico.

## Ptinidæ.

*Ptinomorphus regalis*, Dufts. On the real and supposed differences between this species and *P. imperialis*; G. Kraatz, Ent. MB. i. pp. 149–151.

*Hedobia pubescens*, Ol. Description of metamorphoses and economy; the larva found in mistletoe, with notes on food-plants of other species of *Hedobia*; F. Wachtl, Verh. z.-b. Wien. xxvi. pp. 709–712, pl. xiv. figs. 1, 1*a*–1*d*.

*Niptus hololeucus*. The larva briefly described; it destroys insects in collections. P. Cameron, P. N. H. Soc. Glasg. ii. p. 302.

*Anobium plumbeum* and *Dorcatoma chrysomelina*; economy and larva described by H. J. Ernè, MT. schw. ent. Ges. iv. p. 517.

*Xylodes*, g. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 116. General form nearly that of *Hedobia*. *X. albo-varius*, sp. n., *id. l. c.* p. 117, Rodriguez Island.

*Ptinus coquereli*, sp. n., L. Fairmaire, Bull. Soc. Ent. Fr. (5) vi. p. ccxxvi., Cape of Good Hope.

*Sitodrepa defuncta*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 82, tertiaries of Wyoming.

## Lyctidæ.

*Lyctus brunneus* from Swan River, Australia; J. W. Douglas, Ent. M. M. xiii. p. 137.

*Ditoma rugicollis*, Walker, is a *Lyctus*, and occurs also at Rodriguez Island, China, and Siam; C. O. Waterhouse, Ann. N. H. (4) xviii. p. 117.

## Cioidæ.

Abeille de Perrin, E. Notes sur les Cisides européens et circa-méditerranéens. Ann. Soc. Ent. Fr. (5) vi. pp. 309–314.

Additions to the author's Monographic Essay. The fact of collectors sending *Cryphalus* and *Crypturgus* to be named, among their specimens of *Cis*, is considered an argument in favour of the intercalation of the *Cioides* between the *Scolytides* and *Tomicides*. To obtain many examples of any species observed, it is recommended that the fungi in or near which these are found should be collected and kept until the enclosed larvæ come to maturity. *Cis fagi*, Waltl, = *castaneus*, Mell.; *Cis nitidulus*, Mell., = *Ceracis castaneipennis*, Mell., and is doubtfully European; *Cis glabratus*, ♂, observed with thorax bidentate in front; *C. peyronis* Ab., = *striatulus*, Mell., monstr.

*Cedrinus*, g. n., dubiously proposed for *Rhopalodontus camelus*, sp. n.,

Abeille, *l. c.* pp. 312 & 313, from Lebanon; approaching *Xylographus* in the antennæ.

*Xylographus ceylonicus*, sp. n., Ancey, Pet. Nouv. ii. pp. 85 & 94, Point de Galle.

*Cis insularis*, p. 117, *sex-carinatus*, p. 118, spp. nn., C. O. Waterhouse, Ann. N. H. (4) xviii., Rodriguez Island.

### Tenebrionidæ.

F. Baudi, Deutsche E. Z. 1876, pp. 1–74, 225–267, continues his elaborate critical examination of the European species in Dejean's Catalogue (*Pimeliides—Helopides*). See Zool. Rec. xii. p. 332, for observations also applicable to this portion. Other species, not in this Catalogue, together with some not included in the European fauna in its widest sense, are also discussed and described. Much unnecessary confusion is caused by the author's involved plan, and by his describing as new various species already described in Bull. Ent. Ital. and Ann. Mus. Genov., and included in Zool. Rec. xii.

The same author, Ann. Mus. Genov. viii. pp. 316–321, enumerates, with localities, the species of the European and Circa-Mediterranean fauna of the *Trachyscelides*, *Bolitophagides*, *Diaperides*, *Ulomides*, *Cossyphides*, *Tenebrionides*, and *Helopides*, contained in the Genoa Museum, describing a few varieties.

The same author, Bull. Ent. Ital. viii. pp. 98–119, 199–207, 259–268, continues his enumeration and revision of species existing in Italian collections (*Trachyscelides*, *Bolitophagides*, *Diaperides*, *Ulomides*, *Cossyphides*, *Celometopides*, *Tenebrionides*, and *Helopides*). A genus and also some species are described as new, which are also treated as new (without any reference) in Deutsche E. Z. 1876.

S. A. de Marseul, Ann. Soc. Ent. (5) vi. pp. 93–142, 315–321, enumerates 57 species taken by Mr. G. Lewis in Japan, whereof 43 are new.

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*Lorelus*, g. n., D. Sharp, Ent. M. M. xiii. p. 76. An extremely anomalous genus, not to be satisfactorily placed in any of Lacordaire's groups, being referable to the first section by its coxæ, but nearer *Læna* and *Adelium* in its tarsi. Doubted by F. Bates to belong to the *Tenebrionidæ*. *L. priscus*, sp. n., *id. l. c.* p. 77, New Zealand.

### *Tentyriides.*

*Colposcelis indica* and *laticollis*, spp. nn., L. W. Schaufuss, Nunq. Ot. ii. p. 411, Bombay.

### *Adelostomatides.*

*Aspila dohrni*, sp. n., G. Haag, S. E. Z. xxxvii. p. 106, S. Africa.

*Dacoderus dominicensis*, sp. n., G. H. Horn, Tr. Am. Ent. Soc. v. p. 219, S. Domingo.

### *Akidides.*

*Akis heydeni*, sp. n., G. Haag, Ent. MB. i. p. 76, Morocco.

*Scaurides.*

*Scaurus kraatzi*, sp. n., *id. l. c.* p. 10, Morocco; = *marocanus*, Fairm., *id. l. c.* p. 76.

*Blaptides.*

*Prosodes persica*, Faust, = *lævigata*, Baudi; *P. pustulata*, Faust, = *cribrella*, Baudi; *P. ledereri*, Fairm., is a true *Blaps*; with observations on various characters of other species: G. Kraatz, Deutsche E. Z. 1876, p. 282.

*Asidides.*

*Asida*. Suggestions as to synonymy, observations on localities, and further characters for various species; Kraatz, *l. c.* pp. 283–285.

*Cardiogenius cicatricosus*, Burm. (1875, *nec* Sol., 1836), = *granulatus*, Fairm.; *C. hirsutus*, Burm., = *crinifer*, Fairm.; *C. subcostatus*, Burm., ? = *cicatricosus*, Sol., var.; G. Haag, S. E. Z. xxxvii. p. 108. *C. subcostatus*, Burm., = *cicatricosus*, Sol., *C. cicatricosus*, Burm., = *granulatus*, Fairm., *C. hirsutus*, Burm., = *crucifer*, Fairm.; L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 157, note.

*Nycteliides.*

L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. pp. 143–170, 341–383, revises the Chilian species (including some from Bolivia and Patagonia), with observations on the geographical distribution of the genera. *Gyriosomus lineatus* and *incertus*, Sol., ? = *parvus*, Sol., varr.; *G. whitii*, Sol., *nec* Waterh., renamed *batesi*, p. 148; *Nyctelia nodosa*, Sol., *nec* Germ., renamed *varipes*, p. 169; *Cerostena* is considered not generically distinct from *Psectrascelis*; *P. guerini* and *brevis*, Sol., = *pilipes*, Guér., varr.; *Nyctelia sulcicollis*, G. R. Waterh., is an *Epipedonota*, and *E. abnormis*, Burm., is probably identical with it; *Auladera* is sunk in *Mitragenius*; *Gyriosomus variegatus*, Er., is referred to *Pilobalia*.

The following new species are described:—

*Gyriosomus atacamensis*, p. 146, *subrugatus*, p. 147, *waterhousii*, p. 151, *foveo-punctatus* and *curtisi*, p. 153, Chili.

*Nyctelia alutacea*, p. 158, San Carlos, *oblita*, p. 160, *recte-striata*, p. 162, *sallæi*, p. 163, Patagonia, *parce-punctata*, p. 166, Mendoza, *vulcanica*, p. 170, Tucuman.

*Epipedonota expansicollis*, p. 344, *planiuscula*, p. 348, *lævisulcata*, p. 354, Chili.

*Psectrascelis intricaticollis*, p. 356, *sub-impressa*, p. 361, *lateripunctata*, p. 362, *politicollis*, p. 365, Bolivia, *conjungens*, p. 359, *æqualis*, p. 363, Bolivia ?, *costipennis*, p. 366, Mendoza, *convexipennis*, p. 370, Patagonia.

*Mitragenius quadricollis*, Patagonia, and *coarcticollis*, Bahia-Blanca, p. 374.

*Pilobalia bufo*, Bolivia, and *dorso-plicata*, Peru, p. 382.

*Pimeliides.*

*Thriptera varvasi*, Sol., var. n. *alternans*, Tripoli; F. Baudi, Deutsche E. Z. 1876, p. 10.

*Leucolæphus* wrongly printed *Lemophlæus*; id. *l. c.* p. 28.

*Leucolæphus perrisi*, Baudi, *nec* Lucas, with *Pimelia serie-perlata* Fairm., and *P. dayensis*, Muls., = *tuberculifera*, Luc.; L. Bedel, Bull. Soc. Ent. Fr. (5) vi. p. clxxxviii.

*Pachyscelis persica*, Redt., var. n. *gemmans*, Shahrud; Baudi, *l. c.* p. 14.

*Pimelia costata*, var. n. *graphica*, Spain, p. 22, *P. boyeri*, Sol., var. n. *graniventris*, Algeria, p. 25; *id. l. c.*

*Pimelia dayensis*: a ♂ character in the callosity of anterior femora; S. A. de Marseul, Nouv. et faits, 1876, No. 23, p. xciv.

*Pimelia fairmairii*, Ktz.: on its various races; W. Rolph, Deutsche E. Z. 1876, pp. 349–351. *P. mogadora*, Fairm., = *rotundipennis*, Ktz.; *P. maroccana*, Fairm., ex. typ., = *cordata*, Ktz.; G. Kraatz, *tom. cit.* p. 352. *P. tumidipennis*, Haag, = *fairmairii*, Ktz., var.; G. Haag, *ibid.*

*Pelorocnemis*, g. n., S. Solsky, Hor. Ent. Ross. xi. p. 283. Posterior tibiæ cylindrical. Between *Thriptera* and *Pachyscelis*. For *Pimelia punctigera*, Men., and *Pel. kraatzi*, sp. n., p. 285, Kara-kum Desert.

*Stalagmoptera*, g. n., *id. l. c.* p. 286. Very near *Pachyscelis*, but with still shorter antennæ, ridged and more or less tuberculate elytra, and more obese build. *S.* [illegible] *costata*, p. 287, Taschkent, *seriato-gemmata*, p. 288, and *latic*[illegible] p. 289, Sarafschan, *confusa*, p. 289, Samarcand, spp. nn.

*Sympiezocnemis*, g. n., *id. l. c.* p. 290. Differs from *Pimelia* in the tibiæ of the 2 hinder pairs of legs being laterally compressed. For *P. gigantea*, Fisch., and *S. kesleri*, sp. n., p. 291, Amu-Daria.

*Ocnera anoreviana*, F. Baudi, Deutsche E. Z. 1876, p. 3, ? Senegal.

*Thriptera kraatzi*, sp. n., Haag, *l. c.* p. 75, Arabia.

*Pachyscelis bilineata*, sp. n., Baudi, *l. c.* p. 12, S. Russia, &c.

*Gedeon abyssinium*[*-nicus*], sp. n., Haag, Ent. MB. i. p. 75, Abyssinia.

*Pimelia balcanica*, Kirschberg, Ent. MB. i. p. 30, Balkans (?= *mongeneti*, Sol., var.; G. Kraatz, *l. c.* p. 31); *P. amicta*, Baudi, *l. c.* p. 20, locality uncertain (= ? *latipes*, Sol.); *P. semi-asperula*, Constantine, *serie-perlata*, Tiaret, L. Fairmaire, Pet. Nouv. ii. p. 38 (the latter = *tuberculifera*, Luc.; L. Bedel, Bull. Soc. Ent. Fr. 5, vi. p. clxxxviii.); spp. nn.

*Podhomala nitida*, sp. n., Baudi, *l. c.* p. 30, Turkestan.

### *Physogastrides.*

*Pimelosomus*, Burmeister, according to a letter from the author, is rightly so spelt; and the reading *Pimeliosomus* in Zool. Rec. xii. p. 340, on the supposition of the derivation from *Pimelia*, is incorrect.

### *Coniontides.*

*Crypticus quisquilius*, L., var. n. *pyrenæus*, Pyrenees; F. Baudi, Deutsche E. Z. 1876, p. 33.

*Cælotaxis*, g. n., G. H. Horn, Tr. Am. Ent. Soc. v. p. 200. Characters of *Coniontis* and *Cœlus*: anterior tarsi stout, first joint prolonged beneath the second. *C. punctulata* and *muricata*, spp. nn., *id. l. c.* p. 201, Guadalupe Island, Lower California.

*Crypticus dactylispinus*, p. 381, Algeria, *suberi*, p. 382, Sarepta, spp. nn., S. A. de Marseul, L'Ab. 1876, livrn. 4.

### *Pedinides.*

*Dendarus* (*Bioplanes*) *saginatus*, Mill., described, with doubt as to its former publication; F. Baudi, Deutsche E. Z. 1876, p. 41.

*Dendarus rhodius*, id. *l. c.* p. 39, Rhodes; *D.* (*Pandarinus*) *armeniacus*, id. *l. c.* p. 266, Russian Armenia (the latter also described in Ann. Mus. Genov. viii. p. 321, from Northern Persia): spp. nn.

*Heliopathes* (*Holocrates*) *dendaroides*, sp. n., *id. l. c.* p. 46, Andalusia.

### *Opatrides.*

*Lichenum pulchellum*, Küst., var. n. (? sp. n.) *pumilum*, Egypt; F. Baudi, Deutsche E. Z. 1876, p. 73.

*Cædius marinus*, S. A. de Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 96, Japan; *C. chrysomelinus*, Costa, Atti Acc. Nap. 1875, Upper Egypt: spp. nn.

*Sclerum sulcatum*, sp. n., Baudi, *l. c.* p. 59, Arabia.

*Opatrum* (*Gonocephalum*) *pubens*, p. 97, and *sexuale*, p. 98, spp. nn., Marseul, *l. c.*, Japan (the latter = *recticolle*, Mots., ex. typ.; E. v. Harold, Pet. Nouv. ii. p. 85).

*Phylax oxyholmus*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 38, Biskra.

*Hadrus scaphoides*, sp. n., Marseul, *l. c.* p. 99, Hiogo.

*Idisia vestita*, sp. n., Marseul, *l. c.* p. 100, Kiu-Siu.

*Lichenum seriz-hispidum*, p. 101, Kagosima, *foveistrium*, p. 102, Arabia, spp nn., Marseul, *l. c.*

### *Trachyscelides.*

*Phaleria.* Table of European species; F. Baudi, Deutsche E. Z. 1876, p. 227. The structure of 4 basal joints of anterior tarsi in male beneath especially emphasized.

*Phaleria nigriceps*, var. n. *dorsigera*, id. Bull. Ent. Ital. viii. p. 101, Syria.

*Ectomida*, g. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 51. Simply referred to the *Tenebrionidæ* by the author. Compared with *Pristoderus* [*Colydiidæ*], but with base of tarsi widened and tibiæ denticulate externally. Observations are made on the possible synonymy of *Dermestes scaber* and *limbatus*, F., the latter of which is one of the author's species of *Phycosecis*. For *E. lacerata*, sp. n., *ibid.* New Zealand.

*Trachyscelis anisotomoides*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 38, Bou-Sâada.

*Phaleria sub-humeralis*, sp. n., S. A. de Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 102, Japan.

### *Bolitophagides.*

*Dicræus*, g. n., S. A. de Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 101. Approaches *Calymmus*, with facies of certain species of *Apate*; last joint of tarsi bi-ungulate, as long as the preceding joints together. *D. bacillus*, sp. n., *id. l. c.* p. 103, Nagasaki.

*Diaperides.*

*Diaperis boleti*, var. n. *cypria*, F. Baudi, Bull. Ent. Ital. viii. p. 104, Cyprus.

*Menimus*, g. n., D. Sharp, Ent. M. M. xiii. p. 73. Apparently near *Diaperis* and *Scaphodema*: antennæ short, stout, elevate, 10-jointed, eyes very small, tarsi with long hairs beneath, with the basal joint of the posterior pair not elongate. For *M. batesi* and *crassus*, p. 74, *cæcus*, p. 75, spp. nn., New Zealand.

*Diaperis* ? *maculipennis*, sp. n., Marseul, *l. c.* p. 105, Hiogo.

*Platydema chlorodium*, Baudi, Deutsche E. Z. 1876, p. 247, and Bull. Ent. Ital. viii. p. 104, W. Persia; *P. umbrata* [*-tum*], p. 107, Nagasaki, *malaccus* [*-ccanum*], Malacca, *holosericeus* [*-ceum*], Marotao, and *timorensis* [*-se*], Timor, Marseul, *l. c.*: spp. nn.

*Alphitophagus plagiatus*, p. 108, and *japanus*, p. 109, Japan, *tasmanus* [*-nicus*, vel *-nix*], Tasmania, and *quadrinotatus*, Australia, p. 110, spp. nn., Marseul, *l. c.*

*Hemicera zigzaga* [!], sp. n., Marseul, *l. c.* p. 111, Japan (? = *Tetraphyllus latreillii*, Cast., in the *Cnodalonides*; E. v. Harold, Pet. Nouv. ii. p. 85).

*Ulomides.*

*Bius tetraphyllus*, Fairm., apparently = *Lyphia ficicola*, Muls.; *Hypophlœus madagascariensis*, Gory, is also a *Lyphia*; Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 113. *Tribolium ferrugineum*, *Alphitobius diaperinus* and *piceus*, and *Hypophlœus depressus*, all occur in Japan; *id. l. c.* p. 112.

*Tribolium ferrugineum* often observed destroying suspended pupæ of *Bombyx mori* at Selve, Adriatic; F. Baudi, Deutsche E. Z. 1876, p. 230.

*Uloma perroudi*, var. n. (? sp. n.) *crenulata*, Cyprus and Asia Minor; *id. ibid.*

*Ulomina*, g. n., *id. l. c.* p. 235. Between *Erelus* and *Uloma*. For *Ulomina carinata*, sp. n., *id. l. c.* p. 236, Tuscany. (Both genus and species are treated as new in Bull. Ital. Ent. viii. pp. 112 & 113.)

*Lyphia exigua*, sp. n., Marseul, *l. c.* p. 113, Hiogo.

*Uloma bonzica*, id. *l. c.* p. 114, Nagasaki; *U. cyprius* [*-ia*], E. Allard, L'Ab. 1876, p. 21, Cyprus: spp. nn.

*Alphitobius* (*Diaclina*) *gracilipes*, sp. n., Baudi, *l. c.* p. 231 (and Bull. Ent. Ital. viii. p. 115), Cyprus, and var. from Sclavonia.

*Hypophlœus floricola*, p. 115, and *exilis*, p. 116, Marseul, *l. c.*, Nagasaki; *H. versipellis*, Baudi, *l. c.* p. 234 (and Bull. Ent. Ital. viii. p. 118), ? Central Italy: spp. nn.

*Tenebrionides.*

C. O. Waterhouse, Ann. N. H. (4) xvii. pp. 287–289, protests against the publication of posthumous and imperfect papers of Motschoulsky [in which he will be joined by all working naturalists], and endeavours to elucidate some of that author's recent genera and species. *Mederis* = *Promethis*, Pasc.; *Asiris* = *Meneristes*, Pasc.; *Tænobates* = *Xylopinus*, Lec.; *Menechides* = *Centronopus*, Sol.; *Lobetas* = *Hipalmus*, Bates;

observations are also made on various species of *Nyctobates* described by Westwood.

*Dilamus rufipes*, var. n. *andalusiæ*, F. Baudi, Deutsche E. Z. 1876, p. 240, Andalusia (redescribed as var. *andalusicus*, id. Bull. Ent. Ital. viii. p. 206).

*Taraxides*, g. n., C. O. Waterhouse, *l. c.* p. 289. Allied to *Deriles* and *Amenophis*, but with 4 posterior tibiæ cylindrical, not channelled. For *Tenebrio sinuatus*, Fab., which cannot be left in *Nyctobates*, Guér., as the type of that genus is *T. gigas*, F.

*Dilamus obsoletus*, p. 240, Beyruth, *laticollis*, p. 241, Jerusalem, spp. nn., Baudi, *l. c.* (and Bull. Ent. Ital. viii. pp. 207 & 205).

*Nyctobates valgipes*, p. 117, Japan, *villosipes*, p. 118, Manchuria, spp. nn., Marseul, Ann. Soc. Ent. Fr. (5) vi.

*Upis violaceipennis*, p. 118, *foveolatus*, p. 119, spp. nn., *id. l. c.* Japan.

*Menephilus arciscelis*, p. 119, *medius*, p. 120, *lucens*, p. 121, spp. nn., *id. l. c.* Japan.

*Tenebrio ventralis* and *alternicostis*, p. 123, Japan, *tuberifer*, p. 124, E. Indies, spp nn., *id. l. c.*

### *Heterotarsides.*

*Lyprops cribrifrons*, p. 125, *sinensis*, p. 126, spp. nn., Marseul, *l. c.* Kiu-Siu, Nippon (*rotundicollis*, Dej., and *shanghaicus*, indicated by Lacordaire, briefly diagnosed, p. 125).

*Heterotarsus carinula*, p. 127, Japan, *inflatus*, Java, *indicus* (Dej.), E. Indies, *auricularis*, Moradabad, and *bogosicus*, Bogos, p. 128, spp. nn., *id. l. c.*

### *Cyphaleides.*

*Artactes lunuliger*, sp. n., Marseul, *l. c.* p. 129, Kiu-Siu.

### *Cnodalonides.*

*Scotæus* (?) *purpuricinctatus*, sp. n., Marseul, *l. c.* p. 130, Japan.

*Tromosternus*, g. n., E. v. Harold, Abh. Ver. Brem. v. p. 130. Near *Scotæus*, but with a narrow and posteriorly acuminate prosternum. For *T. haagi*, sp. n., p. 131, Hiogo.

### *Helopides.*

ALLARD, E. Révision des Hélopides vrais de Lacordaire. L'Ab. 1876 (xiv.), pp. 1–80.

The following new genera and species are characterized :—

*Lamperos*, p. 4. Allied to *Eubœus*, Boield., but with truncate epistoma, and thorax bisinuate at base and apex, with prominent anterior angles. For *H. micans*, F., &c.

*Catomus*, ibid. Allied to *Helops*, but with base of elytra rounded and falling shoulders. For *H. gibbicollis*, Küst., &c., and *C. flavus*, p. 28, Albania, *semiruber*, p. 29, N. Persia, *persicus*, Persia, and *obsoletus*, Oran, p. 30, *politicollis*, p. 31, Algeria.

*Coscinopter* [*Coscinoptera*, Lacordaire, *Chrysomelidæ*, 1849], p. 4. Differing from *Helops* in its filiform antennæ and the entire outer reflexed margin to its elytra. *C. gracilicornis*, p. 35, Mexico.

*Odo* [*nto*] *cnemis* ‖ [*-mus*, Zoubkoff, Col.], p. 4. Differs from *Cylindronotus*, Fald., in the front tibiæ being curved and toothed in the ♂. For *H. tuberculatus*, Küst., and *O. caudatus*, p. 36, *clarus*, p. 37, and *punctatus*, p. 38, Syria.

*Stenomax*, p. 4. Differs from *Cylindronotus* in its cordiform and slightly transverse pronotum. For *H. lanipes*, L., &c., and *S. douei*, Caucasus, and *planivittis*, Trebizond, p. 39.

[*H*] *Omalus* ‖ [Jurine, *Hymenoptera*, 1807], p. 4. Differs from *Stenomax* in its trapezoidal pronotum and depressed elytra. For *H. congener*, Reiche, &c.

*Nesotes*, p. 5. Allied to *Nalassus*, Muls., but with the reflexed elytral margin interrupted. For *H. vulcanus*, Woll., = *asper*, Küst., &c.

*Raibosceles* [*Rhæbosceles* ‖ ; *-lis*, Deyrolle, *Buprestidæ*, 1863], p. 5. Differs from *Entomogonus*, Sol., in its subquadrate pronotum, of which the sides are arched. For *H. corvinus*, Küst., &c., and *R. cyprius*, p. 44, Cyprus.

*Diastixus*, p. 5. Differs from *Raibosceles* in its simple straight front tibiæ and oval convex elytra. For *H. perforatus*, Dej., = *punctipennis*, Luc., &c.

*Helops obesus*, Kabylia, and *granulatus*, Portugal, p. 32, *rufipes*, p. 33, Turkey, *vicinus*, Caucasus, and *graius*, Salonica, p. 34, *adimonius*, p. 35, Anatolia.

*Cylindronotus batesi*, p. 38, Kurdistan.

*Nalassus fusculus*, p. 40, Tangiers, *pharnaces*, p. 41, S. Russia, *heydeni*, p. 42, Algeciras.

*Entomogonus elongatus*, p. 42, Turkey, *saphyrinus* [*sapphirinus*], p. 43, Anatolia.

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*Apolites blaptoides*, Kiud., = *Ceratinisus tristis*, Fald., and *A. mucoreus*, Küst., belongs to another genus near it, neither of them really belonging to the *Helopides*; *Epitrichia tomentosa*, Gebl., belongs to the *Epitragides*, near *Himatismus*, and *Helops melanarius*, Germ., is an *Eryx*; E. Allard, Nouv. et faits, 1876, No. 25, p. cii. *Helops mucoreus*, Waltl, the type of *Apolites*, Duv., is in Reiche's collection, and *Ansiocerus*, Fald., = *Ceratanisus*, Gemm., is identical with Duval's genus; indications of errors in Gemminger and Von Harold's Catalogue are also given; *l. c.* p. ciii.

*Seirotrana* united to *Adelium*; *Amarosoma*, Redt., = *Pheloneis*, Pasc.; F. P. Pascoe, Ann. N. H. (4) xvii. p. 52.

*Læna ferruginea*, var. n. *syriaca*, F. Baudi, Deutsche E. Z. 1876, p. 243 (and Bull. Ent. Ital. viii. p. 261), Beyruth, Cyprus.

*Hamerophygus*. Additional diagnostic characters; *id. l. c.* p. 266.

*Helops*. The species descriptively tabulated. *H. quadraticollis*, Küst., *nec* Mén., provisionally renamed *kuesteri* (p. 272), and *H. tentyrioides* (? auctt.), *nec* Mén., renamed *parvicollis* (p. 280). *Id. l. c.* pp. 268–281.

*Helops æreus* surviving immersion for three hours in alcohol, and supposed to possess a respiratory receptacle under the elytra, as in some water-beetles; C. F. Gissler, Psyche, i. p. 178.

*Arthopus*, g. n., D. Sharp, Ent. M. M. xiii. p. 75. Dubiously near the *Helopides*, but of no exact position, and doubted by F. Bates to belong to the *Tenebrionidæ*. Almost of the facies of *Phyllodecta* (*Chrysomelidæ*). For *A. brouni*, sp. n., *id. l. c.* p. 76, New Zealand.

*Misolampidius*, g. n., S. Solsky, Hor. Ent. Ross. xi. p. 292. Near *Misolampus* and *Heliophygus*, and very like the latter. Facies of *Tentyria*. *M. tentyrioides*, sp. n., p. 293, pl. i. fig. 7, River Souyfoun, E. Siberia.

*Stenophanes*, g. n., *id. l. c.* p. 294. Differs from the preceding in its bilobed ligula, with connate paraglossæ, its more elongate form, and very long legs, with simple femora. For *Hedyphanes mesostena*, Solsky, of which the male is described and figured, p. 295, pl. i. fig. 8.

*Adelium bullatum*, sp. n., Pascoe, *l. c.* p. 52, Otago.

*Laena clivinoides*, Baudi, *l. c.* p. 243 (and Bull. Ent. Ital. viii. p. 261), Cyprus; *L. longula*, Lebanon, *lacordairii*, India, p. 133, *rotundicollis*, p. 134, Nagasaki, Marseul, Ann. Soc. Ent. Fr. (5) vi.: spp. nn.

*Heliophygus* ? *molytopsis*, sp. n., Marseul, *l. c.* p. 135, Japan.

*Gnesis helopioides* (Pascoe), sp. n., *id. l. c.* p. 136, Kiu-Siu.

*Helops rubripennis*, p. 137, *strigipennis*, p. 138, *clavicrus*, p. 139, *brunneus*, p. 140, *cordicollis*, p. 141, *id. l. c.* Japan; *H. prælongus*, p. 250, Damascus and Kurdistan, *ghilianii*, p. 253, and *subæneus*, p. 258, Spain, *monilicornis*, p. 260, S. Russia, Baudi, *l. c.*, spp. nn.

*Parablops oculatus*, sp. n., Baudi, *l. c.* p. 264, Sicily.

### *Amarygmides.*

*Amarygmus curvus*, sp. n., Marseul, *l. c.* p. 316, Nagasaki.

*Plesiophthalmus sericeifrons*, p. 317, *anescens*, p. 318, and *obesus*, p. 319 (= *spectabilis*, Har.; E. v. Harold, Pet. Nouv. ii. p. 85), spp. nn., Marseul, *l. c.* Japan.

### *Strongyliides.*

*Strongylium chalconotum*, Kby., from Brazil, found among Cacti in a greenhouse at Zwickau; W. Fickentscher, Ent. Nachr. ii. p. 159.

*Strongylium japanum*, sp. n., Marseul, *l. c.* p. 320, Nagasaki.

## Cistelidæ.

*Allecula obscura*, E. v. Harold, Abh. Ver. Brem. v. p. 132, Hiogo (= *fuliginosa*, Mäkl.; *id.* C. H. xv. p. 167, note); *A. velutina* (= *fuliginosa*, Mäkl.; *id.* Pet. Nouv. ii. p. 85), and *rufipes* (= *melanaria*, Mäkl.; *id. ibid.*), p. 322, *A.* ? *bilamellata*, p. 323, *A. cruralis*, p. 324, *acicularis*, p. 325, *tenuis*, p. 326, spp. nn., Marseul, Ann. Soc. Ent. Fr. (5) vi. Japan.

*Cistela brunnea*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 118, Rodriguez Island; *C. oculata*, p. 327, and *C.* (*Gonodera*) *rufipennis*, p. 328, Japan, Marseul, *l. c.*: spp. nn.

*Cteniopus hypocrita*, sp. n., Marseul, *l. c.* p. 329, Nagasaki and Shanghai.

*Eucaliga pallidicollis*, sp. n., L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 383, Chili.

## MONOMMATIDÆ.

*Monomma glyphysternum*, sp. n., Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 330, Japan, Formosa, Touranne, Malacca.

## PYTHIDÆ.

*Pytho depressus*, L., fig. 18, *kolwensis*, C. Sahlb., fig. 19, *abieticola*, fig. 20; head, thorax, and base of elytra in each of these species figured: Deutsche E. Z. 1876, pl. i. [*cf.* Zool. Rec. xii. p. 343].

*Salpingus bilunatus*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 52, Auckland, New Zealand.

*Lissodema lævipennis*[*-ne*], p. 331, and *myrmido*, p. 332, spp. nn., Marseul, *l. c.* Nagasaki.

## MELANDRYIDÆ.

*Serropalpus filiformis*, sp. n., Marseul, *l. c.* p. 333, Maiyasan.

*Phlœotrya rugicollis*, sp. n., *id. l. c.* p. 334, Japan.

*Penthe* (table, p. 336) *japana*, Japan, *brevicollis*, Java, p. 335, *rufopubens*, p. 336, E. India, spp. nn., *id. l. c.*

## LAGRIIDÆ.

*Lagrioda brouni*, sp. n., F. P. Pascoe, Ann. N. H. (4) xviii. p. 58, New Zealand.

*Lagria rufipennis*, p. 337, *vervex*, p. 338, and *decora*, p. 339, spp. nn., Marseul, *l. c.* Japan.

*Statyra rufo-brunnea*, sp. n., *id. l. c.* p. 340, Kiu-Siu.

## PEDILIDÆ.

*Scraptia minuta* myrmecophilous; reared from a larva found in nest of *Lasius fuliginosus*. É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 218.

*Macratria gigas*, p. 447, *serialis*, p. 448, *cingulifera*, p. 449, spp. nn., Marseul, *l. c.* Japan.

*Xylophilus rubrivestis* and *brunnidorsis*, p. 450, *rufulus*, p. 451, *cinctus* and *quadrimaculatus*, p. 452, *scapularis*, p. 453, *gibbulus*, p. 455, spp. nn., *id. l. c.* Japan.

*Scraptia livens*, p. 456, *brunnea* and *dimidiata*, p. 457, spp. nn., *id. l. c.* Japan.

## ANTHICIDÆ.

*Formicomus lewisi*, p. 458, *cribriceps*, p. 459, *trigibber*, p. 460, spp. nn., Marseul, *l. c.* Japan.

*Notoxus digitatus*, sp. n., J. L. Leconte, in Wheeler's Ann. Rep. Surv. 1876, p. 298, S. Colorado.

*Mecynotarsus minimus*, sp. n., Marseul, *l. c.* p. 461, Japan.

*Anthicus lepidus*, p. 462, North India, *varus* and *tortiscelis* (? = *œdipus*,

Chevr.), p. 469, Algeria, *lepidulus*, p. 461, *scoticus* (J. Rye, 1872), p. 462, *fugiens*, p. 463, *confucii*, p. 464 (also in China), *monstrosicornis*, p. 465, *pilosus*, p. 466, *puberulus*, p. 467, *valgipes*, p. 468, *protensus* and *nigrocyanellus*, p. 470, *lævipennis*, p. 471, spp. nn., *id. l. c.* Japan.

*Anthicoxenus paulseni*, sp. n., L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 385, Chili.

## Pyrochroidæ.

*Pilipalpus*, g. n., L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 384. Provisionally placed near *Lemodes*, but considered aberrant, from its simple antennæ, with the apex of each joint villose; head contracted behind, but not abruptly so. For *P. dasytoides*, sp. n., *id. ibid.* Chili.

## Mordellidæ.

Emery, C. Essai Monographique sur les Mordellides de l'Europe et des contrées limitrophes. L'Ab. 1876 (xiv.), pp. 1–128.

The author considers that this work may be considered as nearly exhaustive for Italy, Corsica and Sardinia, France and Germany, but he has had little material from Spain, E. Europe, Africa, and Asia. The following observations occur:—*Anaspis vulcanica*, Costa, = *geoffroyi*, Müll.; *Silaria picta*, Hampe, = *A. maculata*, Fourcr.; *A. thoracica*, Muls., pt., = *lateralis*, Thoms., is renamed *confusa*, p. 21; var. n. *alpicola* of *A. ruficollis*, F., p. 22; var. n. *basalis* of *A. flava*, p. 118, Armenia; *A. forcipata*, Muls., = *pulicaria*, Costa; *Mordella albo-signata*, Muls., = *bisignata*, Redt., *ex. typ.*; *M. sacheri*, Friv., = *vittata*, Gemm., = *aurofasciata*, Com., *ex. typ.*; *M. interrupta* and *basalis*, Costa, *villosa*, Muls., = *fasciata*, F., varr. and var. n. *habelmanni*, p. 66, is described from Greece; *M. brachyura*, Muls., *brevicauda*, Costa, *viridescens*, Costa, and ? *insidiosa*, Luc., = *aculeata*, L., varr., of which varr. nn. *vestita* and *fleischeri*, from S. Europe and Moravia respectively, are described, p. 69. *Mordellistena nana*, Mots., var. n. *baudueri*, p. 88, Sos; *M. inæqualis*, Muls., *picipes*, Costa, *troglodytes*, Mann., *pusilla*, Redt., and ? *liliputiana*, Muls., = *parvula*, Gyll.; *M. externa*, Ros., = *episternalis*, Muls., of which var. n. *intersecta* is described from the East, p. 93; *M. obtusata*, Bris., *subtruncata*, Muls., = *brevicauda*, Boh., of which var. n. *dives*, from S. Russia, is described, p. 94; *M. rectangula*, Thoms., *grisea*, Muls., *minima* and *purpurascens*, Costa, = *micans*, Germ.; *M. stricta*, Costa, = *pumila*, Gyll.; *M. flexipes*, Muls., = *stenidea*, Muls., of which 3-*lineata* and *infima*, Muls., are probably also forms.

The following new genera, &c., and species are described:—

*Cyrtanaspis*, p. 10. Between *Pentaria* and *Anaspis*, having the pygidium not produced, the posterior tibiæ longer than the first 2 joints of the tarsi, and the 4th joint of anterior tarsi very minute, enclosed between the lobes of the preceding. For *A. phalerata*, Germ.

*Nassipa*, p. 13, subg. of *Anaspis*, having moniliform or submoniliform antennæ, of which joints 6–10 are subequal. For *A. flava*, L., of which *thoracica*, L., is a var., *A. monilicornis*, Muls., = *melanostoma*, Costa, *Plesianaspis thoracica*, Costa, renamed *costæ*, p. 33, and *A. rufilabris*, Gyl.

*Spanisa*, p. 13, subg. of *Anaspis*, having joints 9 & 10 of the antennæ larger than the preceding, forming with the 11th joint a more or less distinct club. For *A. subtilis*, Hampe, and *labiata*, Costa.

*Larisia*, p. 13, subg. of *Anaspis*. Allied to *Silaria*, but with 1st joint of posterior tarsi scarcely shorter than tibia, 5th ventral segment of ♂ deeply impressed, &c. For *A. rufitarsis*, Luc., *Silaria ochracea*, Stierl., = *A. steppensis*, Mots., *A. chevrolati*, Muls., *A. mulsanti*, Bris., and *A. revelierii*, p. 38, and *dichroa*, p. 39, Corsica, Italy, &c., and *A. stierlini*, p. 39, Derbent and Syria.

*Mordellochroa*, subg. of *Mordellistena*, p. 80. Spurs of 2nd pair of legs scarcely visible. For *M. abdominalis*, F., and *M. milleri*, p. 83, Mehadia, Hungary.

*Anaspis kiesenwetteri*, p. 26, Tatra Mts., Hungary, *A.* (*Silaria*) *scapularis*, p. 46, Syria, Cyprus, Parnassus, *suturalis*, p. 47, Corsica, Sardinia, *occipitalis*, p. 118, Sarepta, *schneideri*, p. 119, Caucasus.

*Mordella palmæ*, p. 68, Sanseverino and Porto-Vecchio.

*Mordellistena reichii*, Naples, Syria, and *kraatzi*, Sarepta, p. 91, *brevicollis*, p. 102, Algeria, *M.* (*Tolida*) *tournieri*, p. 102, Geneva, Silesia.

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*Silaria latiuscula*, Muls., in Germany; G. Kraatz, Deutsche E. Z. 1876, p. 173.

*Mordella funerea* and *detracta*, F. P. Pascoe, Ann. N. H. (4) xvii. p. 53, New Zealand; *M. flavimana*, Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 472, Japan: spp. nn.

*Mordellistena rosseola* and *comes*, p. 473, *alte-strigata*, p. 474, *brunneotincta*, p. 475, *signatella*, p. 376, spp. nn., Marseul, *l. c.*, Japan.

*Anaspis sericea* and *luteola*, id. *l. c.* p. 477, Japan; *A. clavifera*, p. 25, *lutea*, p. 26, *id.* L'Ab. 1876, Egypt; *A.* (*Silaria*) *palpalis*, J. Gerhardt, Deutsche E. Z. 1876, p. 381, Silesia: spp. nn.

*Pentaria dimidiata*, sp. n., Marseul, L'Ab. 1876, p. 27, Lebanon.

## Rhipidophoridæ.

*Rhipidophorus paradoxus*. Directions for breeding this beetle from wasp nests, with figures of box and apparatus for keeping nest in, &c.; Erné, MT. schw. ent. Ges. iv. pp. 536–561.

*Emenadia bifasciata*, sp. n., Marseul, Ann. Soc. Ent. Fr. (5) vi. p. 478, Japan.

*Rhipidophorus elegans*, id. L'Ab. 1876, p. 27, Arabia; *R. cyanivestis*, id. Ann. Soc. Ent. Fr. (5) vi. p. 479, Japan: spp. nn.

## Stylopidæ.

A. Laboulbène, in article "Rhipiptères," Dechambre's Dictionnaire Encyclopédique des Sciences Médicales (Paris: 1876, 8vo), regards these insects as forming a separate order.

## Cantharidæ.

General observations on the early stages of *Meloe* and *Cantharis*: the "triungulins" of the former reared on eggs of *Vespa vulgaris*, and of the latter on stomachs of *Apis mellifica*. Honey from the latter was greedily eaten by the 2nd stage of larva of *Meloe*, which however died without further change. The larvæ of *Cantharis* avoided the honey, and fed up on bee-stomachs, burying themselves in the ground. J. Lichtenstein, Nouv. et faits, No. 20, 1876, pp. lxxxi. & lxxxii.

"Pseudonymph" of a vesicant found in a colony of *Colletes fodiens* at Montpellier; J. Lichtenstein & V. Mayet, Bull. Soc. Ent. Fr. (5) vi. p. cxciv.

**Mylabris fulgurita*, Rche., employed in Egypt as a remedy for hydrophobia, with observations on other insects medicinally used; Sonsino, Bull. Ent. Ital. viii. pp. 229–233.

*Meloe tuccius* and *Mylabris tenebrosa* used in like manner by Arabs at Gabès, in Tunis; De Chevarrier (in litt. to De Saulcy), Bull. Soc. Ent. Fr. (5) vi. pp. clxiii. & clxiv. See also p. clxxiv.

*Mylabris cichorii* never occurs on chicory, but on *Achillea* and other plants; H. Pelletier, Feuil. Nat. vi. p. 131.

*Mylabris* 4-*punctata*, L. Triungulin described, with notes on habits, &c.; V. Mayet, Bull. Soc. Ent. Fr. (5) vi. pp. cxcvi. & cxcvii.

*Cantharides*. Slight descriptions of North American species, with notes; W. Saunders, Canad. Ent. viii. pp. 221–228..

Insects enclosed in a tube in which *Cantharides* had died, found to be rapidly asphyxiated: Goll, Bull. Soc. Vaud. xiv. p. 685.

*Cantharis flavipes*, Muls., ♀ described, from Syria; S. A. de Marseul, L'Ab. 1876, p. 382.

*Epicauta frontalis*, Fairm., = *Cantharis philippii*, Reed; L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 386.

*Cephaloon pallens*, Mots., var. from E. Siberia; S. Solsky, Hor. Ent. Ross. xi. p. 295.

*Meloe auriculatus*, p. 480, *corvinus*, p. 482, spp. nn., Marseul. Ann. Soc. Ent. Fr. (5) vi., Japan.

*Mylabris isis*, p. 28, Egypt, *raphael*, p. 29, Persia, *id.*, L'Ab. 1876, spp. nn.

*Cantharis thiebaulti* and *cinereo-vestita*, p. 49, *mendax*, p. 50, Algeria, *myrmido*, p. 93, El-Amri and Yemen, Fairmaire, Pet. Nouv. ii.; *C. semivittata* and *platycera*, id. Ann. Soc. Ent. Fr. (5) vi. p. 386, Chili: spp. nn.

*Lytta lugubris*, sp. n., H. Ulke, in Wheeler's Rep. *l. c.* p. 812, pl. xli. fig. 2, California.

*Epicauta wheeleri*, id. *ibid.* fig. 4, Arizona; *E. chanzii*, L. Fairmaire, Pet. Nouv. ii. p. 38, Bou-Sâada: spp. nn.

*Diaphorocera promelana*, sp. n., Fairmaire, *l. c.* p. 49, Biskra.

*Zonitis xanthoptera*, sp. n., *id. l. c.* p. 94, Algeria.

*Nemognatha nigritarsis*, p. 477, and *flavicornis*, p. 478, spp. nn., G. Stierlin, MT. schw. ent. Ges. iv., South coast of the Caspian.

## ŒDEMERIDÆ.

*Anaaca*, Fairm., & Germ., = *Sessinia*, Pasc., to which *Dryops lineata*, F., and *D. strigipennis*, White, are referred; it differs from *Nacerdes* in its 2-spurred tibiæ. F. P. Pascoe, Ann. N. H. (4) xvii. p. 53.

*Thelyphassa*, g. n., *id. op. cit.* xviii. p. 58. Allied to *Xanthochroa*, with entire eyes, different maxillary palpi, and all the tibiæ bi-calcarate. For *T. diaphana*, sp. n., *ibid.*, Tairua, New Zealand.

*Sessinia pauperata*, sp. n., *id. ibid.*, Christchurch, New Zealand.

*Anaaca nigro-lineata*, L. Fairmaire, Ann. Soc. Ent. Fr. (5) vi. p. 387, Chili; *A. japonica*, E. v. Harold, Abh. Ver. Brem. v. p. 133, Hiogo: spp. nn.

*Nacerdes brevipennis*, sp. n., Fairmaire, *l. c.* p. 388, Chili.

*Xanthochroa cyanipennis*, p. 483, and *luteipennis*, p. 484, Marseul, Ann. Soc. Ent. Fr. (5) vi., Japan; *X. auberti*, E. A. de Perrin, *tom. cit.* Bull. p. clxvi., Toulon: spp. nn.

*Œdemera montana*, p. 485, and *sexualis*, p. 486, spp. nn., Marseul, *l. c.*, Japan.

*Anoncodes stenodera*, sp. nn., L. Fairmaire, Pet. Nouv. ii. p. 50, Biskra.

*Chitona semividua*, sp. n., *id. ibid.*, Biskra.

## CURCULIONIDÆ.

J. L. LECONTE, P. Am. Phil. Soc. xv. (No. 96), pp. 1–455, under the heading of "The Rhynchophora of America north of Mexico," and with the assistance of G. H. Horn as regards the *Otiorrhynchidæ*, fully carries out the scheme already proposed by him, of which an outline is given in Zool. Rec. xi, pp. 305–307 (see also Zool. Rec. xii. p. 348). From this work, the *Brachyceridæ*, *Amycteridæ*, and *Belidæ* are omitted, as not represented in the fauna, the following only being discussed:—HAPLOGASTRA, *Rhinomaceridæ*, *Rhynchitidæ*, and *Attelabidæ*; ALLOGASTRA, *Byrsopidæ*, *Otiorrhynchidæ*, *Curculionidæ*, and *Brenthidæ*; HETEROGASTRA, *Calandridæ*, *Anthribidæ*, *Scolytidæ*, and *Apionidæ*. These are recorded separately *infrà*, with the exception of the *Curculionidæ*, the arrangement of which now differs from that mentioned in Zool. Rec. xi. p. 306, being as follows:—

Family vi., *Curculionidæ*. Mandibles without scar, tarsi with third joint more or less dilated, not spinous beneath, antennæ with annulated or articulated club.

A. Condyles of mandibles on outer side, motion lateral.
  *a*. Mandibles stout, feebly emarginate at tip, with inner edge sharp, gular peduncle broad; rostrum short, broad . . . . . Subf. 1 *Sitonidæ*.
  *aa*. Mandibles with sharp inner edge; apparently emarginate at tip, with an additional cusp:
    *b*. Antennæ geniculate; gular margin prominent; peduncle and mentum retracted Subf. 2 *Alophidæ*.

*b b.* Antennæ straight; gular margin not prominent; claws toothed. (This is the nearest approach to the *Rhynchitidæ*.) Subf. 3 *Ithyceridæ*.

*a a a.* Mandibles varying in form, usually 3-toothed, sometimes oblique without teeth, gular margin not prominent, peduncle usually long. Subf. 4 *Curculionidæ*.

B. Condyles of mandibles on upper side, motion vertical Subf. 5 *Balaninidæ*.

The subfamily *Bathyrini*, formerly proposed, and coming next after the *Sitonidæ*, is now dropped, its typical genus, *Bathyris*, Lec., being found identical with *Coleocerus*, contained in the *Promecopini*, a tribe of the author's *Otiorrhynchidæ*. The fourth subfamily is substituted for the *Mecorrhynchi*, and the *Balaninidæ* are added.

The "*Curculionidæ* (genuini)" consist of the following tribes:—1, *Phytonomini* (groups *Phytonomi* and *Listroderi*), 2, *Emphyastini*, 3, *Hylobiini*, 4, *Cleonini*, 5, *Erirrhini* (groups *Erirrhini*, *Desmorrhines*, *Eugnomi*, *Cryptopli*, *Stenopelmi*, *Brachypi*, *Hydronomi*, *Phycocætes*, n.), 6, *Trachodini*, 7, *Otidocephalini*, 8, *Magdalini*, 9, *Anthonomini*, 10, *Prionomerini*, 11, *Tychiini*, 12, *Cionini*, 13, *Derelomini*, 14, *Lamosaccini*, 15, *Cryptorrhynchini* (groups *Ithypori*, *Acampti*, and *Cryptorrhynchi*), 16, *Zygopini*, 17, *Tachygonini*, 18, *Ceuthorrhynchi* (groups *Mononychi*, *Cœliodes*, *Ceuthorrhynchi*, and *Phytobii*), 19, *Barini* (groups *Barides* and *Centrini*), 20, *Hormopini* (nov.).

Many new genera and species are proposed or characterized, and these will in the present Record be noticed, wherever practicable, under the usual headings according to the system of Lacordaire, now universally adopted. It may, indeed, be observed that endless confusion is likely to arise if works like the one under notice, based upon the study (however accurate) of the fauna of a limited district or country, are allowed by entomologists to disturb a generally accepted classification, founded upon cosmopolitan material. That eminent naturalists, such as Drs. Leconte and Horn, should be able to add materially to our knowledge, is, of course, a subject both of expectation and congratulation; but it is to be regretted that they have thought it expedient to construct a new system in order to include their comparatively local novelties, the characters of which, in very many cases, appear from their own showing to be reconcilable to an equal extent with that already in vogue.

In the Appendices, the author reproduces the descriptions of 31 unrecognized N. American species, with occasional suggestions as to their identity, and also gives a list of corrections (p. 437) to Gemminger and Von Harold's Catalogue, concluding with some useful bibliographical tables, by B. Pickman Mann, of memoirs relating to the Economic Entomology of the *Rhynchophora* of the United States.

For another remodelling of the whole classification of *Rhynchophora*, see infrà, *Scolytidæ* (Lindemann).

Suffrian, E. Verzeichniss der von Dr. Gundlach auf der Insel

Cuba gesammelten Rüsselkäfer. Arch. f. Nat. xlii. (2) pp. 125–168.

Refers to *Cryptorrhynchus* and *Macromerus*, reaching (in continuation) 129 species.

A. Rouget, Pet. Nouv. ii. p. 73, draws attention to the fact that Schönherr almost systematically gave masculine terminations to his genera; and deprecates the creation of feminine and neuter words for new genera. [This is indeed an imaginary grievance.] M. Girard & H. Tournier reply; *l. c.* pp. 78 & 79. Retort by Rouget, p. 83.

Species new or rare to the Belgian fauna; — Donckier, CR. Ent. Belg. xix. pp. lxxiii.-lxxvi.

*Brachyderides.*

*Cneorrhinus.* The European and circum-European species discussed by H. Tournier, Ann. Ent. Belg. xix. pp 125–163. *Catapionus* is associated with it. Desbrochers' ♂ character of dilatation of the front tibiæ at the apex does not exist. 19 species are described, contained in the following groups:—

(1) *Dactylor[r]hinus*, subg. n. of *Cneorrhinus*, p. 128, having the outer angle of the anterior tibiæ projecting. For *Leptolepyrus asiaticus*, Desbr., = *olivieri*, Desbr., ♂, = *C. siculus*, Rott., = *meridionalis*, Duv. (*Leptolepyrus*, Desbr., being founded on a specific character, is not admitted), *C. geminatus*, F., = *globatus*, Hbst., with var. *andalusicus*, p. 135, *C. albicans*, Boh., = *parapleurus*, Msh., and *D. maroccanus*, sp. n., p. 136, Tangiers.

(2) *Cneorrhinus* proper, without projecting angle to the front tibiæ, for *C. barcelonicus*, Hbst., *argentatus*, Perris, *tingitanus*, Desbr., = *prodigus*, F., *ludificator*, Gyl., *bellieri*, C. Bris., and *heydeni*, sp. n., p. 142, Lisbon.

(3) *Attactagenus*, subg. n., p. 143, differing from the last in having no deep furrow sharply marked off between the eyes. For *C. pyriformis*, Boh., of which *lateralis*, Graells, is probably a ♂; *C. dispar*, Graells, *cordulensis*, Kirsch, *hypocyaneus*, *albinus*, and *carinirostris*, Boh., *exaratus*, Msh. [= *D. parapleurus*, Tourn., *nec* Msh.], and *A. tarsalis*, p. 147, Andalusia, and *diecki*, p. 148, Algesiras and Andalusia, spp. nn.

*Cneorrhinus 4-lineatus* and *argentatus*, Gebl., *C. angusticollis*, *cuprescens*, *fossulatus*, and *nodosus*, Mots., and *C. rugosicollis*, Desbr., are referred to *Catapionus*; p. 153.

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*Sitones* is elevated to the rank of a sub-family (dissociated from the *Brachyderides*); its mandibles are exposed, and, with *Cratopus* and *Elytrodon*, it is therefore wrongly classed by Lacordaire in his *Adélognathes Cyclophthalmes*. It differs from the *Naupactides* in its short, very stout mandibles, which are sharp internally, &c. Of the 7 North American species, 4 are British; *S. indifferens* and *scissifrons*, Say, = *linecllus*, Gyll.; *Grypidius vittatus*, Couper, = *S. tibialis*, Germ. J. L. Leconte, P. Am. Phil. Soc xv. pp. 113–115. *S. hispidulus* subsequently also recorded as North American; *id. l. c.* p. 413.

*Sitones hispidulus.* Larva and pupa described; G. S. A. Brischke, Ent. MB. i. p. 42.

*Sitones giganteus*, Fairm., ex. typ., = *gressorius*, F.; *S. bituberculatus*, Mots., = *ocellatus*, Küst.; *S. fairmairii*, All., = *fodus*, Gyll.; *S. arreticollis*, Gyll., = *tibialis*, Hbst., var.; *S. tenuis*, Rosenh., = *callosus*, Gyll., var.; *S. meliloti*, Walt., = *cylindricollis*, Fahr.; *S. serpentarius*, All., = *audax*, All.; L. Bedel, Bull. Soc. Ent. Fr. (5) vi. pp. cxciii. & cxciv. (Allard protests; *l. c.* p. ccxvi.)

*Brachystylus* is erroneously placed by Lacordaire among the *Otiorrhynchides*; its entire structure is that of the *Cyphides*, notwithstanding the slight irregularity in the form of the scrobes. G. H. Horn, P. Am. Phil. Soc. xv. pp. 88.

*New genera and species*:—

*Minyomerus*, G. H. Horn, *l. c.* p. 17. Type of a proposed new group of *Otiorrhynchidæ*, but to be placed in the true *Brachyderides* in Lacordaire's arrangement. Head feebly transversely impressed behind the eyes. *M. innocuus*, Colorado, *languidus*, Arizona and California, p. 18.

*Anomalus*, id. *l. c.* p. 21. Allied to *Epicærus*: articular face of hind tibiæ scaly, support of deciduous piece of rostrum very prominent, antennæ rather slender, club distinct. *Artipus*, according to Lacordaire's arrangement. *An. obliquus*, ibid., Lower California.

*Hormorus*, id. *l. c.* p. 23. Type of a group of *Otiorrhynchidæ*, but not satisfactorily located, and stated to be apparently placed (with the next genus) in Lacordaire's *Blosyrides*, having open posterior corbels, and a straight first abdominal suture. Closely resembling *Otiorrhynchus* in facies. Type, *Chlorophanus undulatus*, Uhler.

*Agaspharops*, id. *l. c.* p. 24. Differs from *Hormorus* in having spherical prominent eyes, with posterior orbit, and the scape of the antennæ barely reaching the anterior margin of the eye. Type, *A. nigra*, p. 25, California.

*Diamimus*, id. *l. c.* p. 46. Apparently allied to *Mimetes*, differing in the prominent support of the deciduous piece of its rostrum. Placed by the author in his group *Ophryastini* of the *Otiorrhynchidæ*. *D. subvericeus*, ibid., New Mexico, Colorado.

*Peritaxia*, id. *ibid.* Differs from the preceding in its open hind corbels and rectangular shoulders. Apparently allied to *Amomphus*. *P. rugicollis* and *hispida*, p. 47, Colorado.

*Aramigus*, id. *l. c.* p. 93. "Would probably belong to Lacordaire's *Brachyderides*, and its position near *Eurymetopus*." Resembles an elongate *Strophosomus*. For *Liparus tessellatus*, Say, of which var. n. *pallidus*, from Kansas to Texas, is described, p. 94 (? = *Sitona durius*, Germ., *teste* Pascoe, *ibid.*), and *A. fulleri*, p. 94, New Jersey to Montana. In a note, *l. c.* p. 94, *Liparus tessellatus*, Say, is stated on Jekel's authority to be a *Naupactes*, of a group for which the latter author has created the genus *Aomopactus*.

*Phacepholis*, id. *l. c.* Differs from *Aramigus* in the articular surfaces of the hind tibiæ being strongly cavernous, the tips having an oval scaly space, and in its more distinct scutellum (apparently = *Pantopactus*,

Jekel, according to a note, *l. c.* p. 96). *Ph. elegans* and *obscura*, p. 96, Texas, *candida*, p. 97, Colorado, Kansas.

*Achrastenus*, id. *l. c.* p. 97. Belongs to the *Eustylides* of the *Otiorrhynchides* in Lacordaire's system, but preferred to be retained in the *Cyphides* as a degraded member, having affinities with the *Otiorrhynchides*. Rostrum, scrobes, and facies of *Peritelus*. *A. griseus*, p. 98, Texas.

*Omileus*, id. *l. c.* p. 101. This, and an unnamed new genus, of which *Geonemus alternans*, Boh., is the type, constitute a group, *Omilei*, of a tribe *Evotini*, constructed at the expense of Lacordaire's *Cyphides*, to contain those genera in which the rostrum is elongate, the tenth stria entire, and the genæ not or very feebly emarginate. The author thinks the differences between this group and the one preceding it, *Exophthalmi* (represented by *Lachnopus* only, in the N. American fauna), are feeble, and that both will probably be united. Facies of elongate *Epicærus*. Type, *O. epicæroides*, p. 102, Texas.

*Heydenia*, H. Tournier, Ann. Ent. Belg. xix. p. 158. Differs from *Cneorrhinus* in its sub-compact funicle, and in having no transverse furrow separating the frons and rostrum. *H. crassicornis*, p. 159, Irkoutzk.

*Mimetes* (?) *seniculus*, Horn, *l. c.* p. 45, California.

*Liophlæus hungaricus*, Banat, *robusticornis*, Valais, *laticollis*, Silesia, *quadricollis*, Piedmontese Alps, H. Tournier, Pet. Nouv. ii. p. 13.

*Cataplonus intermedius*, p. 156, E. Siberia, *maculatus*, ibid., and *viridanus*, p. 157, Lake Baikal, *id.* Ann. Ent. Belg. xix.

*Barynotus fairmairii*, id. Pet. Nouv. ii. p. 13, Piedmont.

*Strophosomus desbrocheri*, id. *l. c.* p. 14, Geneva.

*Foucartia elongata*, Blidah, *similaris*, Greece, *id. l. c.* p. 14.

*Sitones* [?] *grandævus* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 83, tertiaries of Wyoming.

*Hadromerus opalinus*, Horn, *l. c.* p. 85, Arizona.

*Pandeletius* (with which *Polydacris* should be united) *cinereus*, id. *l. c.* p. 87, Texas.

*Polydrosus raffrayi*, Marseul, Nouv. et faits, 1876, No. 21', p. lxxxviii. Algeria.

*Pachnæus roscipes*, A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. ccxxvii., Porto Rico; *P. distans*, Horn, *l. c.* p. 83, Florida.

*Cyphus placidus*, Horn, *l. c.* p. 90, Arizona.

*Lachnopus trilineatus*, Chevrolat, *l. c.* p. ccxxviii., Porto Rico; *L. floridanus*, Horn, *l. c.* p. 101, Florida.

*Cratopus inornatus*, *virescens*, and *magnificus*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 120, Rodriguez Island.

*Eupholus bennetti*, R. Gestro & L. M. D'Albertis, Ann. Mus. Genov. viii. p. 387, fig., S. New Guinea, near Yule Island.

*Artipus floridanus*, Horn, *l. c.* p. 92, Florida.

*Apocyrtus quadriplagiatus*, W. Roelofs, CR. Ent. Belg. xix. p. vii., Luzon, Philippine Isles (see also p. xii.)

*Platyomida niger*, T. Broun, Tr. N. Z. Inst. ix. p. 373, Tairua, New Zealand.

*Otiorrhynchides.*

The family *Otiorrhynchidæ*, as employed by G. Horn in Leconte's "Rhynchophora of America, North of Mexico," P. Am. Phil. Soc. xv. p. 13 *et seq.*, has little to do with Lacordaire's tribe of the same name, including not only the greater portion of the Adélognathes, but also several tribes of the Phanérognathes of the French author. The presence of a mandibular scar is considered the primary essential character [Zool. Rec. vi. p. 272]. In this extension, the author follows Leconte, whose classification is set forth in Zool. Rec. xi. p. 306. The following is the scheme now proposed: Division I—Tribes, *Brachyderini*, *Ophryastini*, *Otiorrhynchini*, and *Dirotognathini*. The tribe Brachyderini consists of groups *Minyomeri* (new, p. 17), *Epicæri*, *Hormori* (new, p. 23), *Trigonoscutæ*, and *Calyptilli* (new, p. 26); the Ophryastini of *Ophryastes*, *Rhigopses*, *Strangaliodes* (not precisely the same as the *Strangaliodides* of Lacordaire, including several of his *Eremnides*), and *Phyxeles*; the Otiorrhynchini of *Agraphi*, *Otiorrhynchi*, *Periteli*, and *Trachyphlœi*; and the Dirotognathini of a single new genus (p. 79). Division II.—Tribes, *Tanymecini*, *Cyphini*, *Evotini* (wrongly printed *Exophthalmini*; see p. 100), *Phyllobiini*, and *Promecopini*. Of these, the Tanymecini are not subdivided, being, in fact, too heterogeneous; the Cyphini consist of groups *Cyphi*, *Artipi*, and *Aphrasti*; the Evotini of *Exophthalmi*, *Omilei* (new, p. 101), and *Evoti*. The Phylobiini and Promecopini are not subdivided. As the classification of Lacordaire is in general use, the new genera and species described will be referred in the present Record to that author's divisions, wherever practicable. In *Otiorrhynchus* proper, there are two short fixed spurs at the apex of the hind tibiæ (pp. 59 & 60). The 5 American species are also British.

*Lithocryptus helveticus*, Desbr., = *Otiorrhynchus septentrionis*, Hbst., *ex. typ.*, and *L. arvernicus*, Desbr., ? = *O. obtusus*, Boh., or *porcatus*, Hbst., if not also *O. septentrionis*. *Lithocryptus* must, of course, be suppressed. H. Tournier, Pet. Nouv. ii. p. 85.

*Otiorrhynchus*. The species described as new by Stierlin in Deutsche E. Z. 1875 [Zool. Rec. xii. pp. 350 & 351], are redescribed in MT. schw. ent. Ges. iv. pp. 483–492, by the author. *O. branksiki* = *proximus*, Stierl.; *id. l. c.* p. xii.

*Otiorrhynchus sulcatus*. Observations on destruction to plants by the larva; S. C. Snellen van Vollenhoven, Tijdschr. Ent. xix. p. 210. It attacks the Kauri Pine (*Dammara australis*) in New Zealand, having been imported; T. Broun, Tr. N. Z. Inst. ix. p. 370.

*Otiorrhynchus picipes*. On its economy, and means for its destruction; E. Newman, Ent. ix. pp. 135–137.

*Otiorrhynchus hungaricus*, Germ., from Vichy, near to France; C. Roger, Pet. Nouv. ii. p. 5.

*Eurychirus*. Table of species; Stierlin, *l. c.* pp. 492 & 493.

*New genera and species:—*

Horn, *l. c.*, characterizes the following:—

*Calyptillus*, p. 27. Type of a new group, not satisfactorily placed in

any of Lacordaire's tribes, being neither Phanérognath nor Adélognath. Tarsi narrow: general facies of *Trachyphlœus*. *C. cryptops*, p. 27, New Mexico.

*Amnesia*, p. 48. Part of *Dysolobus*, Lec., but with the first suture of abdomen arcuate. Provisionally retained here as a lead to the *Phytoscaphides*. Type, *D. granicollis*, Lec., also *D. decoratus*, Lec., and *A. ursina*, Oregon, and *rauca*, California, p. 51, *alternata*, Montana, *sordida* and *decidua*, California, p. 52, and *elongata*, p. 53, California.

*Sciopithes*, p. 62. *Otiorrhynchides vraies*, but with scrobes superior, cavernous, and oval. Represents the S. African *Sciobius*. Type, *Sciop. obscurus*, p. 63, California, &c.

*Agronus*, p. 63. Allied to *Paramira*, differing in its shorter scrobes and more slender antennæ. Differs from *Sciopithes* in having no spurs to hind tibiæ, no mucro to middle and front tibiæ, &c. *A. cinerarius* and *deciduus*, p. 64, California.

*Neoptochus*, p. 64. Differs from *Ptochus* in its broad intercoxal process and free claws. For *P. adspersus*, Sch. (being, with the 7 genera next recorded, included in the author's *Peritelî*).

*Thricolepis*, p. 68. Closely allied to *Peritelus*, but clothed with scales and setæ, also with much shorter scrobes, which are very decidedly convergent above, and with non-divergent rostral alæ and shorter antennæ. Also allied to *Mylacus*, which, however, is pubescent. *T. inornata*, N. California to Utah, and *T. simulator* [*-trix*], California, p. 69.

*Peritelopsis*, p. 70. Possibly might enter one of Seidlitz's groups of *Peritelus*, to which it is doubtless very near. The alæ of the rostrum are not at all divergent, and the rostrum is very short. For *Ptochus globiventris*, Lec.

*Geoderces*, ibid. Seems allied to *Epiphanens*; resembles *Trigonoscuta*, with a somewhat narrower thorax: hind tibiæ with 2 short fixed spurs. Type, *Trachyphlœus melanothrix*, Kby.; also *G. incomptus*, p. 72, San Francisco to Vancouver.

*Aragnomus*, p. 72. Differs from the preceding in having the scape much shorter than the funicle, and the tibiæ not denticulate. Of doubtful position, near *Sciobius* in its frontal impression: scrobes neither superior nor lateral. For *A. griseus*, ibid., California.

*Dysticheus*, p. 73. Scrobes superior, slightly convergent above, more open for their entire extent than in any known genus. Eyes indistinctly surrounded by a groove. Resembles no non-American genus. *D. insignis*, ibid., California.

*Eucyllus*, p. 74. Near *Trachyphlœus*. Differs from *Dysticheus* in its deep, lateral, not at all convergent scrobes. *E. vagans*, ibid., Arizona and California.

*Thinoxenus*, ibid. Differs from *Eucyllus* in its feebly arcuate scape and the structure of its funicle; also in its shorter scrobes, which are shallow behind, and slightly convergent above. *T. squalens*, p. 75, California.

*Rhypodes*, p. 75. Exactly of the form of *Trachyphlœus*. Eyes very feebly prominent, scarcely visible from above, orbital groove very well defined; differs from *Thinoxenus* in its deep scrobes, which reach the

eyes, and from *Eucyllus* in its shorter form and feeble arcuate scape, &c. For *R. dilatatus*, ibid., California, and *R. brevicollis*, p. 76, Colorado.

*Chatechus*, p. 77. *Trachyphlœi*, with considerable affinity to the type genus and *Cathormiocerus*: scrobes lateral, long, passing directly backwards and enclosing the eyes; tibiæ strongly mucronate. *C. setiger*, p. 78, Massachusetts (the smallest American species with a mandibular scar).

*Cyphomimus*, p. 105. Follows *Phyllobius* in a tribe *Phyllobiini* which includes *Scythropus*; also stated to have a well marked affinity to the *Cyphides*, and the facies of *Brachystylus*. Its type, *C. dorsalis*, ibid., Missouri, further complicates the question by being dubiously referred as a synonym to *Polydrosus americanus*, Gyll.

*Mitostylus*, p. 107. Follows *Scythropus* in the author's *Phyllobiini*; having the facies of *Eusomus*, and having been mentioned by Lecoute as probably a *Macrostylus* (both in the *Brachyderides*). Gular notch rhomboidal, mentum narrow, submentum very slightly pedunculate, maxillæ entirely exposed; labial palpi very prominent, elytra elongate. *M. tenuis*, ibid., Texas.

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*Otiorrhynchus granulato-striatus*, p. 495, Caucasus, *kasbekianus*, p. 497, Kasbek, *aberrans*, p. 512, Syria, *rotundicollis*, p. 513, Antioch, *O. (Eurychirus) lederi*, p. 498, Transcaucasia, *schmonli*, p. 507 (in error for *schmorli*, id. p. xii.), Krasnovodsk, *christophi*, p. 510, Inderskischer Lake, S. of the Caspian, *O. (Tournieria) reitteri*, p. 500, *schneideri*, p. 501, *nasutus*, p. 503, *kirschi*, p. 505, *erinaceus*, p. 506, Transcaucasia, G. Stierlin, MT. schw. ent. Ges. iv.; *O. perditus* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 84, tertiaries of Wyoming.

*Peritelus damrii*, H. Tournier, Pet. Nouv. ii. p. 11, Corsica.

*Paramira caucasica*, Stierlin, *l. c.* p. 509, Caucasus.

*Trachyphlœus porculus*, F. P. Pascoe, Ann. N. H. (4) xviii. p. 59, Otago.

*Aphrastus unicolor*, Horn, *l. c.* p. 99, Texas.

*Myllocerus atjehensis*, C. Ritsema, Tijdschr. Ent. xix. p. 45, Atchin, N. Sumatra.

*Eremnides.*

*Thricomigus*, g. n., G. H. Horn, P. Am. Phil. Soc. xv. p. 48. Placed by the author in his group *Ophryastini* of the *Otiorrhynchidæ*, but only compared with *Phyxelis*, differing in not having the scrobes superior. *T. luteus*, sp. n., *id. ibid.*, Colorado.

*Nocheles*, g. n., *id. l. c.* p. 54. Considered "a lead towards the *Eremnini*" by the author, and stated to have been pronounced identical with *Phyxelis* by Lacordaire. For *Hylobius torpidus*, Lec., and *N. æqualis*, sp. n., Horn, *ibid.*, Kansas to British Columbia.

*Leptopides.*

*Eupagoderes*, g. n., G. H. Horn, P. Am. Phil. Soc. xv. p. 32. *Ophryastes* without lateral thoracic tuberosities, and associated with that genus and others as a tribe of *Otiorrhynchidæ*. For *Ophr. speciosus, decipiens,*

*sordidus*, *argentatus*, and *varius*, Lec., and *E. lucanus* and *desertus*, p. 34, *geminatus* and *plumbeus*, p. 35, Horn, *l. c.* spp. nn., California.

*Dichoxenus*, g. n., *id. l. c.* p. 39. Scrobes strongly arcuate, distant from eyes beneath, scape short, 2nd segment of abdomen rather short, with straight first suture. Probably to be referred here, or to the *Strangaliodides*, in which, as a group of the *Ophryastini* (*Otiorrhynchidæ*), it is placed by the author. *D. setiger*, sp. n., *id. l. c.* p. 40, Texas.

*Melamomphus*, g. n., *id. l. c.* p. 40. Resembles *Amomphus* in form; differs from *Dyslobus* in its cavernous corbels and distinctly mucronate hind tibiæ. *M. niger*, sp. n., *id. ibid.*, Nevada.

*Anametis*, g. n., *id. l. c.* p. 43. Differs from *Dichoxenus* in its scrobes being moderately arcuate, and immediately beneath the eye. *A. grisea*, sp. n., *id. ibid.*, Kansas to Georgia.

*Orimodema*, g. n., *id. ibid.* Apparently allied to *Dasydema* and *Orimus*. Differs from *Mimetes* (? Lac.) in its anterior tibiæ being denticulate within, its scaly and hairless surface, and the open corbels to its hind tibiæ. *O. protracta*[*-tum*], sp. n., *id. l. c.* p. 44, Colorado, New Mexico.

*Cimbocera*, g. n., *id. l. c.* p. 55. Approaches *Eupagoderes* in the form of its tarsi and the 7th joint of funicle, differing in the structure of the abdomen and metasternal side pieces. *C. pauper*, sp. n., *id. l. c.* p. 56, Dacota.

*Entimus primordialis*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 84, White River tertiaries.

### *"Dirotognathides."*

*Dirotognathus*, g. n., G. H. Horn, P. Am. Phil. Soc. xv. p. 79. The sole representative of a new tribe, *Dirotognathini*, associated by the author with the *Otiorrhynchidæ*, but which he states his entire inability to place in or near any tribe indicated by Lacordaire, further than that it is *Phanérognath Synmeride*, and belongs to the first section of the latter Phalanx. Thorax with feeble ocular lobes; mentum very small, maxillæ exposed, mandibles prominent, free edge rather thin, scar small and very narrow. Metasternal pieces narrow, connate with sternum. Facies of *Phyxelis*. Type, *D. sordidus*, sp. n., *id. l. c.* p. 80, Arizona and California.

### *Byrsopides.*

*Lithodus rectus*, *affinis*, *rudis*, *erosus*, *longior*, and *morbillosus*, Lec., ? = *Thecesternus humeralis*, Say, varr.; J. L. Leconte, P. Am. Phil. Soc. xv. p. 12.

*Eremia*[*r*]*rhinus*, g. n., L. Fairmaire, Pet. Nouv. ii. p. 50. Near *Borborocœtes*, Sch., but of different facies. For *E. margarinotus*, sp. n., *id. ibid.*, Tougourt, Algeria.

### *Rhyparosomides.*

*Phrynixus astutus*, sp. n., F. P. Pascoe, Ann. N. H. (4) xviii. p. 59, New Zealand.

*Dichotrachelus knechti* (= *freyi*, Tourn., *olim*), sp. n., G. Stierlin, MT. schw. ent. Ges. iv. p. 481, Piedmont, south of Aosta.

*Cylindrorrhinides.*

The larger North American species heretofore considered to belong to *Listroderes* are properly included in *Listronotus*, Jekel, which with *Hypcrodes*, Jek. (= *Macrops*, Kby.) is associated with *Lepyrus* and *Phytonomus* as a tribe *Phytonomini* of the "Curculionidæ genuini." J. L. Leconte, P. Am. Phil. Soc. xv. pp. 127 & 136.

*Irenimus*, g. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 54. Allied to *Perperus*, but with base of elytra exceeding base of thorax. For *I. parilis*, sp. n., *ibid.*, New Zealand.

*Empecotes*, g. n., F. P. Pascoe, *op. cit.* xviii. p. 59. Allied to *Inophlœus*, Pasc., but with scrobes deeply impressed to the eyes. For *E. crispatus* and *censorius*, spp. nn., *id. l. c.*, p. 60, New Zealand.

*Listronotus obliquus*, p. 129, Texas, *tuberosus* and *callosus*, p. 130, *americanus*, p. 131, *rotundicollis* and *sulcirostris*, p. 132, *frontalis*, p. 133, *cribricollis*, *impressifrons*, and *setosus*, p. 134, Georgia and other States, *nebulosus*, p. 133, Missouri, *punctiger*, Dacota, *gracilis* and *nevadicus*, Nevada, p. 135, Leconte, *l. c.* spp. nn.

*Molytides.*

*Plinthus*, on the authority of *Hilipus scrobiculatus*, Mann., = *P. carinatus*, Boh., from Oregon and Alaska, is placed at the head of the *Hylobiini*, from the other N. American genera of which it is diagnosed by the very short mesosternum. J. L. Leconte, P. Am. Phil. Soc. xv. p. 138.

*Trachodes* is removed from the *Molytides*, and made the type of a tribe, *Trachodini*, of the "Curculionidæ genuini." *T. fasciculatus*, Mots., *ex typ.*, = *ptinoides*, Germ. *Id. l. c.* p. 190.

*Liosomus ovatulus*, Clairv., and *impressus*, Boh., are ♂ & ♀ of one species, the groove at the base of the elytra varying, and not being confined to the ♀ exclusively; T. Kirsch, Deutsche E. Z. 1876, p. 189.

*Lyperobius*, g. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 54. Characters of *Molytes*, but with tibiæ not laminate at apex, and club of antennæ distinctly marked off from funicle. *L. huttoni*, sp. n., p. 55, New Zealand.

*Padaretus*, g. n., *id. l. c.* p. 55. Differs from *Psaldus*, Pasc., in its normal scrobes and pro-pectus, the latter having no trace of a canal. *Pad. hispidus*, sp. n., *ibid.*, New Zealand.

*Anchonus angulicollis*, sp. n., A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. ccxxviii., Porto Rico.

*Scythropides.*

*Scythropus.* L. W. Schaufuss, Nunq. Ot. ii. pp. 408 & 409, tabulates the species known to him (7, one new).

*Myochlamys*, g. n., L. Fairmaire, Pet. Nouv. ii. p. 50. Differs from *Scythropus* in its obtuse shoulders, deeply sulcate and apically emarginate rostrum, and shorter antennæ. For *M. acutipennis*, sp. n., *id. ibid.*, Bou-Sâada.

*Scythropus balearicus*, Schaufuss, *l. c.* p. 409, Balearic Isles; *S. californicus*, G. H. Horn, P. Am. Phil. Soc. xv. p. 107, California; *S. warioni*, S. A. de Marseul, Nouv. et faits, 1876, No. 21, p. lxxxvii. Oran: spp. nn.

*Promecopides.*

*Eudiagogus saxatilis*, p. 84, *examinis* and *effossus*, p. 85, spp. nn. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii., tertiaries of Wyoming.

*Coleocerus* (with which *Bathyris*, Lec., is identical) *marmoratus*, sp. n., G. H. Horn, P. Am. Phil. Soc. xv. p. 109, Texas.

*Hyperides.*

J. L. LECONTE, P. Am. Phil. Soc. xv. p. 115 *et seq.*, separates *Alophus*, *Lepidophorus*, and some allied new genera from the *Hyperides*, elevating them to the rank of a sub-family, *Alophidæ*, of a family *Curculionidæ* (antea, p. 76). The characters relied upon are in the mandibles, which are nearly flat externally and punctured, pincer-shaped, with a sharp edge at the apex, which is more or less emarginate, and without apical scar or deciduous piece. The antennæ are geniculate, the gular margin prominent, and peduncle and mentum retracted. Besides *Lepidophorus*, Kby. (*L. lineaticollis*, Kby., ? = *Phytonomus trivittatus*, Say, p. 120), the following new genera are here associated and described:—

*Triglyphus*, p. 116. Somewhat of the facies of *Molytes*: elytra oval, perpendicular towards the tip, nearly smooth, with faint striæ. Rostrum deeply channelled. *T. ater*, sp. n., p. 117, California.

*Plinthodes*, p. 117. Differs from the preceding in its oblong oval elytra, with distinct shoulders, scabrous-punctate, with distinct striæ. For *Hylobius ? taniatus*, Lec.

*Acmægenius*, p. 118. Differs from the two preceding genera in its rostrum being more finely channelled, and its tarsi setose instead of brush-like beneath. For *A. hylobi[i]nus*, sp. n., *ibid.*, Oregon.

*Trichalophus*, ibid. Differs from *Acmægenius* in the obsolete striæ of its elytra, and in the pubescence not being mixed with scales. *Alophus* with obliterated striæ. For *A. didymus*, Lec., *A. alternatus*, Mann. (*nec* Say), = *constrictus*, Lec., *A. seriatus*, Mann., *Hypsonotus alternatus*, Say, and *T. simplex*, p. 119, Manitoba and Hudson's Bay Territory, and *T. planirostris*, p. 413, Colorado, spp. nn.

*Lophalophus*, p. 120. Differs from the above in its finely carinate rostrum and punctate-striate elytra, which are squamose, with small intermixed bristles. For *Liophlœus inquinatus*, Mann.

The same author, *l. c.* p. 123 *et seq.*, associates under the name *Phytonomini*, as a tribe of another sub-family "Curculionidæ genuini" of his above-mentioned family *Curculionidæ*, two groups, *Phytonomi* (*Phytonomus* and *Lepyrus*) and *Listroderi* (*Listronotus* and *Macrops*). These will be here noticed in their usual positions. *Phytonomus elongatus*, Gyll., and *P. nigrirostris*, Gyll., are recorded from Greenland and Canada respectively. The structure of the scales in the North American species is discussed; *id. l. c.* p. 414.

*Phytonomus opimus*, p. 124, Pennsylvania and Canada, but queried as indigenous, *setigerus*, Kansas, *pubicollis*, Vancouver Island, p. 125, *castor*, Canada, *quadricollis*, Dacota, p. 126, *eximius*, p. 414, Kansas, *id. l. c.*, spp. nn.

*Cleonides.*

*Stephanocleonus saintpierrii*, Chevr., from Oran, ? = *excoriatus*, Gyll.

var., with which *fastigiatus*, Er., agrees well from description; *Cyphocleonus sardous*, Chevr., is a good species, very near *sulcicollis*, of which latter, *scutellatus* is apparently a large form; *C.* (*Leucomigus*) *tessellatus*, Fairm., is probably an Andalusian form of *candidus*, Ol., and observations are made on other Andalusian species: G. Kraatz, Deutsche E. Z. 1876, pp. 134–136.

*Cleonus sulcirostris* does good, by destroying *Cirsium arvense*; *C. marmoratus* in roots of *Achillæa millefolium*: Coret, Régimbart & Leprieur, Bull. Soc. Ent. Fr. (5) vi. p. clxviii.

*Plagiographus crinipes*, ? Fhs., var. n. *signifer*, A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. cxlvii., Syria.

*Lixus*. Notes on the species found in the environs of Metz; Bellevoye, Bull. Soc. Metz (2) 1876, p. 23.

*Lixus rubellus*, Randall, common on *Polygonum amphibium* in Massachusetts; F. Blanchard, Psyche, i. pp. 153 & 154. *L. calandroides*, Randall, is a *Cleonus*; J. L. Leconte, P. Am. Phil. Soc. xv. p. 417.

*Centrocleonus*, g. n., J. L. Leconte, *l. c.* p. 145. Prosternum armed with short spines in front of the coxæ: prothorax suddenly and strongly angulated near the tip, which is then strongly narrowed and constricted. For *Cleonus angularis* and *molitor*, Lec., and *Centr. pilosus*, ibid., and *porosus*, p. 146, spp. nn., *id. l. c.*, California.

*Cleonopsis*, g. n., *id. l. c.* p. 147. Differs from *Cleonus* in its stouter and flatter rostrum, form and method of coloration, and joints 2–6 of funiculus being more closely united: from *Stephanocleonus* it may be known by its broader hind tarsi, of which the 3rd joint is not shorter, deeply bilobed, with lobes spongy beneath. For *Cleonus pulvereus*, Lec.

*Cleonaspis*, g. n., *id. l. c.* p. 153. Differs from *Cleonus* in its narrow hind tarsi, of which the first joint is longer than the 2nd, and the 3rd evidently shorter, wider, and emarginate, not bilobed, and not spongy beneath; also in its more slender antennæ. For *Cleonus lutulentus*, Lec.

*Stephanocleonus plumbeus*, sp. n., *id. l. c.* p. 146, Lake Superior, New Mexico (= *C. obliquus* of Lake Superior list).

*Bothynoderes lineiventris*, p. cxlvi., W. Caucasus, *duplicarina*, p. cxlvii., Germany, spp. nn., A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi.

*Isomerus wagæ*, sp. n., *id. l. c.* p. cxlviii., W. Caucasus.

*Cleonus furcifrons*, [? De Marseul] Nouv. et faits, 1876, No. 22', p. xc., no locality given; *C. inornatus*, p. 149, *virgatus*, p. 150, California, *frontalis*, p. 150, Wyoming and Nevada, *canescens*, p. 151, *carinicollis* and *sparsus*, p. 152, Colorado, *puberulus*, p. 151, Nevada, Leconte, *l. c.*: spp. nn.

*Liocleonus amœnus*, sp. n., Chevrolat, *l. c.* p. cxlviii., W. Caucasus.

*Gonocleonus multicostatus*, sp. n., *id. l. c.* p. cxlviii., locality unknown.

*Mecaspis hemigrammus*, sp. n., *id. l. c.* p. cxlix. Caucasus.

*Pseudocleonus pustulosus*, sp. n., *id. l. c.* p. cxlix., Syria.

*Neocleonus livingstonii*, sp. n., *id. l. c.* p. cl., White Nile.

*Lixus texanus*, p. 155, Texas, *caudifer*, p. 156, *mucidus*, p. 158, Illinois, *asper*, p. 156, *parcus*, p. 157, *perforatus*, p. 159, California, *punctinasus*, p. 157, Ohio, *terminalis*, ibid., Middle and Western States, *rectus*, p. 158, New York, *placidus*, p. 159, Colorado, *macer*, p. 160, S. and W. States to

Colorado and Texas, *mixtus*, Colorado, and *fossus*, Florida, p. 416, Leconte, *l. c.*, spp. nn.

*Hylobiides.*

*Hylobius abietis* and *pinastri* differentiated, the latter occurring at about the rate of 10 per cent. compared with the former; Kellner, in Protokoll der 15 Versammlung thüringischer Forstwirthe, 1875, p. 17, quoted in Ent. Nachr. ii. pp. 53–55.

*Lepyrus* is associated with *Phytonomus* in a tribe *Phytonomini* of subfam. "Curculionidæ genuini" (*anteà*, p. 76). It differs from *Hylobius* in the form of the mandibles, which are simply emarginate, the oblong and rather large mentum, the much smaller ligula and palpi, and in the oblique form of the articular surface of the tibiæ. *L. colon* occurs in Hudson's Bay Territory. J. L. Leconte, P. Am. Phil. Soc. xv. p. 127.

Leconte, *l. c.* p. 137, associates *Plinthus* with recognized and new N. American genera as a tribe *Hylobiini* of the same subfamily. *Pissodes* should possibly be placed as a separate tribe, p. 142.

*Hypomolyx*, g. n., Leconte, *l. c.* p. 139. Thighs feebly clavate, not toothed, eyes small, elytra oval, convex. For *Hylobius pinicola*, Couper.

*Pachylobius*, g. n., *id. ibid.* Differs from *Hylobius* in its much shorter and stouter tibiæ, which are expanded at the tip, so that the corbels are much wider. For *Hylobius picivorus*, Germ.

*Pissodes fasciatus*, Oregon, *rotundatus*, Lake Superior, spp. nn., *id. l. c.* p. 143.

*Hylobius provectus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 86, tertiaries of Wyoming.

*Erirrhinides.*

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 160–189, on the authority of *Tychius amœnus*, Say, and a new sp., includes *Pachytychius*, Jekel, in a new group *Desmorrhines* of his tribe *Erirrhinini*, which comprehends all Lacordaire's groups, with others. The *Desmorrhines* include *Smicronyx*, besides the new typical genus, and have the rostrum strongly constricted at the base, and the claws connate or approximate. *Stenopelmus*, Sch., was unnecessarily renamed *Monius* by the author, and is removed from Lacordaire's *Storeides* to form a separate group *Stenopelmi*, with simple 3rd joint to the tarsi and short stout rostrum, diverging towards *Prionomerus* in the form of the head and antennæ. Two new genera, apparently allied to *Brachypus*, constitute with that genus a distinct group, *Brachypi*, of narrow linear form, differing from the *Hydronomi* in the more or less bilobed 3rd joint of the tarsi, and truncate apex of the hind tibiæ, which are only feebly mucronate. Another new group is *Phycocætes*, with very short meso-sternum. *Procas picipes*, Steph., *Grypidius equiseti*, and *brunnirostris*, Gyll., and *Tanysphyrus lemnæ*, Gyll., are recorded from N. America. *Anthonomus tessellatus*, Walsh, is a *Dorytomus*, and is renamed *squamosus*, p. 166. *Tychius corniculatus*, Fahr., is a *Smicronyx*, p. 173.

*Erycus brancsiki*, Tourn., = *Erirrhinus gerhardti*, Letzn., = *E. (Phleo-*

*phagus*!) *aterrimus*, Hampe; H. Tournier, Bull. Soc. Ent. Fr. (5) vi. p. ccxxvi.

*Erirrhinus dorsalis*. Larva and its habits described; G. S. A. Brischke, Ent. MB. i. p. 38.

*Anoplus depilis*, Thoms., and *plantaris*, Suffr., are the ♂, and *A. plantaris*, Thoms., and *roboris*, Suffr., the ♀, of one species, *A. plantaris*, Naezen; Kiesenwetter & Kirsch, Deutsche E. Z. 1876, p. 190.

*New genera and species*:—

*Desmoris*, Lecoute. *l. c.* p. 167. Corresponds closely with *Erirrhinus*, except in the connate claws, oblique antennal grooves, which are nearly confluent behind, and basally constricted rostrum. *Balaninus* in miniature. For *Rhynchænus constrictus*, Say, and *D. scapalis*, p. 168, Kansas.

*Onychilis*, id. *l. c.* p. 178. *Cryptopli*: differs from *Brachybamus* in the last joint of its tarsi projecting, with two slender claws. Facies of *Bagous*. For *Notiodes nigrirostris*, Boh., and *O. longulus*, Michigan, and *alternans*, Texas, p. 179.

*Anchodemus*, id. *l. c.* p. 181. *Brachypi*: facies of *Lyprus*, but with non-excavated prosternum, broad, hairy tarsi, &c. For *A. angustus* and *hubbardi*, ibid., and *schwarzi*, p. 182, Michigan.

*Lixellus*, id. *l. c.* p. 182. Differs from *Anchodemus* in the 3rd joint of its tarsi being not wider than the 2nd, and not bilobed. *L. filiformis*, ibid., Canada and Oregon.

*Lissor*[*r*]*hoptrus*, id. *l. c.* p. 183. *Hydronomi*: a genus of transition; club of antennæ partly smooth and shining, prosternum not excavated; approaching *Onychylis*. For *Bagous simplex*, Say, and *Notiodes apiculatus*, Gyll.

*Pnigodes*, id. *l. c.* p. 188. *Hydronomi*: closely allied to *Bagous*, but with the thorax very strongly constricted in front. For *P. setosus*, p. 189, Texas.

*Phycocætes*, id. *l. c.* p. 189. Representative of a new group of the same name. Colour, form, and sculpture of *Emphyastes*: lives under sea-weed. Front coxæ separated by a very narrow lamina of prosternum; metasternum only one-third the length of the first ventral segment. *P. testaceus*, ibid., California.

*Aneuma*, F. P. Pascoe, Ann. N. H. (4) xvii. p. 56. *Erirrhinus* with a pectoral canal. For *A. fulvipes*, ibid., New Zealand.

*Pactola*, id. *l. c.* p. 57. Hind legs of *Hoplocneme* and *Stephanorrhynchus*, but with no constricted neck. For *P. variabilis*, p. 58, and *P. demissa*, id. *op. cit.* xviii. p. 56, New Zealand.

*Erycus punctipennis*, J. L. Leconte, *l. c.* p. 163, Middle & Western States and Lake Superior.

*Erirrhinus acalyptoides*, Pascoe, *l. c.* p. 55, Otago.

*Dorytomus laticollis*, p. 164, Lake Superior and Iowa, *brevicollis*, p. 165, W. & M. States and Lake Superior, *longulus*, Alaska, *hirtus*, California, p. 166, *hispidus*, p. 167, New Mexico, Leconte, *l. c.*

*Mecinus tournieri*, L. Fairmaire, Pet. Nouv. ii. p. 50, Kef-el-Hameur, Algeria.

*Bagous sellatus*, p. 184, *planatus*, *obliquus*, and *americanus*, p. 185,

*cavifrons*, *magister*, and *nebulosus*, p. 186, *californicus*, *restrictus*, and *pusillus*, p. 187, *bituberosus* and *transversus*, p. 188, Leconte, *l. c.*, various N. American States, also Canada.

*Endalus setosus* and *æratus*, p. 176, *cribricollis*, *punctatus*, and *ovalis*, p. 177, *id. l. c.*, various N. American States, chiefly Texas.

*Smicronyx corpulentus* and *ovipennis*, p. 170, *griseus*, *obtectus*, *flavicans*, *pusio*, and *tych*[*i*]*oides*, p. 171, *vestitus*, *seriatus*, and *fulvus*, p. 172, *sordidus* and *squamulatus*, p. 173, *id. l. c.*, various States of N. America.

*Eugnomus elegans*, p. 61, *picipennis* and *fervidus*, p. 62, F. P. Pascoe, Ann. N. H. (4) xviii., New Zealand.

*Stephanorrhynchus lawsoni*, D. Sharp, Ent. M. M. xiii. p. 97, New Zealand; *S. purus*, p. 56, Pitt's Island, and *brevipennis*, p. 57, Christchurch, F. P. Pascoe, *l. c.*, New Zealand.

*Hoplocneme punctatissima*, Pascoe, *op. cit.* xvii. p. 57, Otago.

*Phyllotrox* (?) *nubifer*, California, Colorado, *ferrugineus*, Florida, Leconte, *l. c.* p. 174.

### *Amalactides.*

*Emphyastes* represents, in the N. America fauna, a tribe *Emphyastini*, between *Phytonomini*, and *Hylobiini* in subfamily "Curculionidæ genuini" (*anteâ*, p. 76). It is evidently closely allied to the *Hylobiini*, agreeing with it in the structure of the mouth, but differing in the fossorial tibiæ. J. L. Leconte, P. Am. Phil. Soc. xv. p. 137.

*Brexius ascitus*, sp. n., F. P. Pascoe, Ann. N. H. (4) xviii. p. 59, New Zealand.

### *Apionides.*

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 409–411, in opposition to Lacordaire's statement that the species of this group are apterous, remarks that all he has examined have quite fully developed wings. [Wencker, L'Ab. i. 1864, p. 112, says that the body is far from being apterous, as Lacordaire states, and that he does not know one single species not provided with wings. Curtis, so long ago as 1857, not only drew *Apion pomonæ* flying, but corrected Markwick's error in supposing that *A. fagi* had no wings.] 22 N. American species are recorded, some of which have appendiculate or toothed claws.

### *Attelabides.*

*Evops* (*Synaptops*) *jekeli*, sp. n., W. Roelofs, CR. Ent. Belg. xix. p. viii., Luzon, Philippine Isles.

*Attelabus* (*Euscelus*) *sex-maculatus*, A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. ccxxviii., Porto Rico; *A. genalis*, J. L. Leconte, P. Am. Phil. Soc. xv. p. 11, New Mexico: spp. un.

### *Rhinomacerides.*

*Pterocolus*, Sch., constituting a sub-family *Pterocolidæ*, is removed from the immediate neighbourhood of the *Cleuthorrhynchides*, where it was placed by Lacordaire, and is considered to be allied to *Auletes* and *Rhynchites*, from the structure of its mouth-organs and antennæ, though

it must be received as a very peculiar and distinct type. J. L. Leconte, P. Am. Phil. Soc. xv. p. 9.

*Rhynchites auratus* and *bacchus* are called "Urbec" near Blois, and particularly affect calcareous soil; H. Pelletier, Feuil. Nat. vi. p. 131.

*Rhynchites betulæ* rolling alder-leaves; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 196.

*Rhinomacer pilosus*, Lake Superior, Virginia, California, *elongatus*, Canada, *comptus*, California, p. 2, *bombifrons*, p. 412, British Columbia, spp. nn., J. L. Leconte, P. Am. Phil. Soc. xv.

*Auletes ater*, Illinois, Maryland, *subcæruleus*, Nebraska, p. 4, *cassandræ*, p. 5, Michigan and Florida, *nasalis*, p. 412, California, spp. nn., *id. l. c.*

*Eugnamptus striatus*, p. 5, Florida, *puncticeps*, p. 6, Illinois, Georgia, spp. nn., *id. l. c.*

*Rhynchites planifrons*, Cape St. Lucas, *aureus* and *fossifrons*, California, *cyanellus*, Massachusetts and Illinois, p. 8, *eximius*, p. 413, New Mexico, spp. nn., *id. l. c.*

### *Ectemnorrhinides.*

*Agonelytra*, C. O. Waterhouse [*Brachyderides*: Zool. Rec. xii. p. 349], = *Ectemnorrhinus*, and *A. longipennis*, C. O. W., = *E. viridis*, G. R. Waterhouse; C. O. Waterhouse, Ent. M. M. xiii. p. 52.

*Ectemnorrhinus eatoni*, sp. n., *id. l. c.* p. 51, Kerguelen's Island.

### *Scolopterides.*

*Ancistropterus brouni* and *mundus*, D. Sharp, Ent. M. M. xiii. p. 97, New Zealand; *A. pilosus*, T. Broun, Tr. N. Z. Inst. ix. p. 373, Tairua: spp. nn.

### *Otidocephalides.*

*Otidocephalus elegantulus*, Summers, "Our Home Journal," Jan. 30 and Dec. 19, 1875, New Orleans (= *Cylas formicarius*, Ol., referred to the *Brenthidæ*; J. L. Leconte, P. Am. Phil. Soc. xv. p. 191, note, and p. 327); *O. dichrous*, J. L. Leconte, *l. c.* p. 191, Florida: spp. nn.

### *Magdalinides.*

*Magdalis ænescens*, p. 192, Oregon, *subtinctus*, p. 417, and *gentilis*, p. 418, California, *hispoides*, p. 418, British Columbia, spp. nn., J. L. Leconte, *l. c.*

### *Anthonomides.*

*Coccotorus*, g. n., J. L. Leconte, P. Am. Phil. Soc. xv. p. 193. Apparently established insufficiently upon a sexual character, the only difference from *Anthonomus* upon which any stress is laid being the structure of the additional dorsal segment in the ♂, which is large and perpendicular, or rather slightly inflexed, the last ventral segment being broadly emarginate behind, so that in the middle it is shorter than the fourth segment. For *Anthonomus*? *prunicida*, Walsh, = *A. scutellaris*, Lec.

*Macror*[*r*]*hoptus*, g. n., *id. l. c.* p. 208. Somewhat of the facies of a small *Magdalis*, but with the hind angles of prothorax not laminate, and of the usual obtuse *Anthonomus*-form. Pygidium entirely covered, ventral

segments nearly equal, claws toothed. Placed here by the author, who, however, states that in Lacordaire's arrangement it should be placed in the *Ceratopides*, after *Acanthobrachium*, "from which it seems to differ by having only the front thighs toothed." Type, *M. cotriatus*, sp. n., *id. l. c.* p. 209, Texas and California.

*Alyca*, g. n., *id. l. c.* p. 209. Differs from the other genera of the group in having the last ventral segment as long as the two preceding, and the claws divergent and broadly appendiculate. For *Erirrhinus ephippiatus*, Say.

*Sphincticærus*, g. n. [? De Marseul; but no signature or indication is given], L'Ab. 1876, p. 386. Intermediate between *Anthonomus* and *Bradybatus*; with distant intermediate coxæ, free and bifid claws, very unequal abdominal segments, and head much constricted behind the eyes. For *S. constrictus*, sp. n., *id. l. c.* p. 385, Algiers.

*Hypotagea*, g. n., F. P. Pascoe, Ann. N. H. (4) xviii. p. 61. Allied to *Anthonomus*, but with untoothed anterior femora. For *H. rubida*, sp. n., *ibid.*, Otago.

*Anthonomus dentipennis*, A. Chevrolat, Bull. Soc. Ent. Fr. (5) vi. p. ccxxviii., Porto Rico; *A. defossus* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 86, tertiaries of Colorado; *A. gularis*, p. 197, *profundus* and *ater*, p. 198, *variegatus* (provisional) and *rubidus*, p. 199, *rufipennis*, p. 200, *sulcifrons*, *morulus*, and *corvulus*, p. 201, *pusillus*, *elegans*, and *squamosus*, p. 202, *tectus*, *hirtus*, and *subvittatus*, p. 203, *pauperculus*, *disjunctus*, *rufipes*, and *elongatus*, p. 204, *subfasciatus*, *robustulus*, and *nubilus*, p. 205, *ungularis*, *mixtus*, and *decipiens*, p. 206, *canus*, *affinis*, and *nanus*, p. 207, Leconte, *l. c.*, various States and territories of N. America: spp. nn.

*Orchestes rufipes*, Vermont, *parvicollis*, California, spp. nn., Leconte, *l. c.* p. 208.

*Ceratopides.*

*Macrorrhoptus*, Lec. (for characters, see *Anthonomides*, suprà) should be placed here, after *Acanthobrachium*, to which it is very closely allied; J. L. Leconte, *l. c.* p. 209.

*Prionomerides.*

*Piazorrhinus pictus*, sp. n., J. L. Leconte, P. Am. Phil. Soc. xv. p. 211, Georgia (the thighs have a small acute tooth, and are not unarmed in this genus, as Lacordaire states).

*Tychiides.*

*Proctorus*, g. n., J. L. Leconte, *l. c.* p. 212. Facies of a small *Erirrhinus*, but with shorter rostrum, curved ventral sutures, and broadly appendiculate claws; fifth ventral segment of ♂ with acute processes. *P. armatus*, sp. n., *id. ibid.*, Lake Superior.

*Encalus*, g. n., *id. l. c.* p. 213. Differs from *Proctorus* in the longer [illegible]re slender rostrum, and the unarmed fifth ventral segment of the [illegible]ics of *Macrops*. For *E. decipiens*, sp. n., *id. ibid.*, Illinois and

[illegible] n., *id. ibid.* Suggestive of a small *Pissodes*. Rostrum

stout and carinate, claws toothed. For *Pl. ulmi*, sp. n., *id. ibid.*, M., S., & W. States of America.

*Thysanocnemis*, g. n., *id. l. c.* p. 214. Somewhat resembling *Anthonomus*, but with front tibiæ of ♂ broader than usual, sinuate, and densely fringed on the inner side with long hair; rostrum slender, fourth ventral suture indistinct. *T. fraxini*, Pennsylvania and Canada, and *helvolus*, Illinois, spp. nn., *id. ibid.*

*Tylopterus*, g. n., *id. l. c.* p. 215. Clothed with dense silky pubescence, with small tufts of hair, and very prominent elytral callus. For *T. pallidus* and *varius*, spp. nn., *id. ibid.*, Texas.

*Paragoges*, g. n., *id. l. c.* p. 219. Has all the essential characters of *Tychius*, except that the pygidium is somewhat exposed, and the claws are small, simple, and approximate. *P. maculatus*, sp. n., *id. ibid.*, California.

*Pachytychius discoideus*, sp. n., *id. l. c.* p. 169, New York, Illinois, Texas, and California (associated with *Smicronyx* in a new group, *Desmorrhines*, of the *Erirrhini*).

*Tychius lineellus* and *semi-squamosus*, p. 217, *setosus*, p. 218, California, *tectus*, p. 217 (? = *aratus*, Say, nec *arator*, Gyll.), Kansas, *hirtellus*, p. 218, Texas, spp. nn., *id. l. c.*

*Sibynes fulvus*, id. *l. c.* p. 219, California; *S.* (*Sibinia*) *tychioides*, F. P. Pascoe, Ann. N. H. (4) xviii. p. 62, New Zealand: spp. nn.

### *Cionides.*

*Nanophyes pallidulus*, Sch., and *Cionus scrophulariæ*, Ol., occur in N. America; J. L. Leconte, P. Am. Phil. Soc. xv. p. 220.

*Nanophyes geniculatus*, Aubé, = *gracilis*, Redt., which has nothing to do with *cheevrieri*, Bob.; E. C. Rye, Ent. M. M. xii. p. 178.

*Cionus scrophulariæ*. Notes on its early stages; Sci. Goss. 1876, p. 17.

### *Gymnetrides.*

*Gymnetron teter*, F., occurs in Pennsylvania; *Gymnetron* and *Miarus* are included in the *Cionini*. J. L. Leconte, *l. c.* p. 220.

*Miarus hispidulus*, sp. n., Leconte, *l. c.* p. 221, Texas, &c.

*Gymnetron marseuli*, Coyc, L'Ab. 1876, livrn. 4, p. 376, Syria; *G. vittipennis*, S. A. de Marseul, *tom. cit.* p. 383, Syria; *G. pipistrellus* [? De Marseul, but no indication or signature appears], *tom. cit.*, p. 386, Algeria: spp. nn.

### *Derelomides.*

*Notolomus*, g. n., J. L. Leconte, P. Am. Phil. Soc. xv. p. 222. Differs from *Derelomus* in its nearly contiguous front coxæ and broadly toothed claws. Abundantly different from *Everyes* in form of body. *N. bicolor* and *basalis*, ibid., and *N. myricæ*, p. 418, spp. nn., *id. l. c.*, Florida.

### *Cholides.*

*Cholus forbesi*, sp. n., F. P. Pascoe, P. E. Soc. 1876, p. xxx only), found in Orchids, supposed to be from Ecuador.

*Cryptorrhynchides.*

J. L. Leconte, P. Am. Phil. Soc. xv. p. 223, *et seq.*, discussing the N. American species, establishes a new group, *Acampti*, for a new genus, in which the pectoral groove is confined to the prosternum and open behind, the rostrum is broad, and the tarsi are narrow. Schönherr wrongly states that the antennæ in *Conotrachelus* are "longe *pone* medium rostri sitæ"; he should have written "ultra." *Chalcodermus pruinosus*, Boh., is removed to *Rhyssematus*, in which the claws are cleft, and the two outer striæ of the elytra are separated by a costa. *Tyloderma*, Say, 1831, is restored for *Analcis*, Sch., 1837, and these names stand also for subgenera. *Cryptorrhynchus oblique-fasciatus*, Boh., = *luctuosus*, Boh., var., = *bisignatus*, Say.

*Ithyporus bigibbosus*, Lucas, is wrongly placed in the *Cryptorrhynchides*, being closely allied to *Trachodes*; L. Bedel, Bull. Soc. Ent. Fr. (5) vi. p. lxxi.

*New genera and species:—*

*Micralcinus*, Leconte, *l. c.* p. 235. *Ithypori*: resembles *Tyloderma*; closely allied to *Conotrachelus*, but of different shape, emarginate at base, with shorter rostrum and untoothed claws. For *M. cribratus*, p. 236, Florida.

*Zaglyptus*, id. *l. c.* p. 236. Resembles miniature *Rhyssematus*, but with slender simple tarsi and different antennæ. For *Z. sulcatus*, Alabama, and *striatus*, Pennsylvania, p. 237.

*Microhyus*, id. *l. c.* p. 237. Resembles small *Conotrachelus*, but with simple divergent claws and different funiculus. *M. setiger*, p. 238, Georgia.

*Acamptus*, id. *l. c.* p. 238. *Acampti*: differs from the *Ithyporides* as *Camptorrhinus* does from the true *Cryptorrhynchides*, by the shorter rostrum resting on the front coxæ. Body elongate, tibiæ stout, sinuate internally, strongly hooked at tip; tarsi not dilated or spongy beneath, antennæ with pubescent club. Relations indicated with *Byrsopides* and *Cossonides*. For *A. rigidus*, p. 239, S. Carolina to Texas.

*Eur[r]hoptus*, id. *l. c.* p. 245. *Cryptorrhynchi*: differs from *Acalles* in the club of the antennæ, which is stouter, less elongate, and annulated only near the tip. For *E. pyriformis*, ibid., Illinois.

*Micromastus*, id. *l. c.* p. 246. Differs from *Acalles* in the mesosternum being small, and very slightly prominent, and the larger, divergent claws. For *Crypt. gracilis*, Boh.

*Phyrdenus*, id. *l. c.* p. 249. Form of *Conotrachelus*, but with pectoral canal as in *Cryptorrhynchus*; claws broadly appendiculate at base. For *P. undatus*, ibid., Missouri, Georgia, Texas.

*Zascelis*, id. *l. c.* p. 256. Allied to *Chemargus* and *Enteles*, but with toothed tibiæ. For *Z. serripes*, *squamigera*, and *irrorata*, p. 257, California.

*Bar[id]opsis*, id. *l. c.* p. 258. Differs from *Celosternus* essentially [illegible] first ventral suture being more distinctly sinuate and nearly obliterate[illegible] the middle, with the second segment as long as the two following [illegible] Facies of *Tyloderma*, sculpture of *Baris*. For *Bar[id]opsis* [illegible] 259, Kansas and Texas.

*Tychanus*, F. P. Pascoe, Ann. N. H. (4) xviii. p. 64. Near *Acalles*, but with the thorax bisinuate at base and a conspicuous scutellum. For *T. gibbus* and *ferrugatus*, ibid., and *verrucosus*, p. 65, New Zealand.

*Sympedius*, id. *l. c.* p. 65. Differs from *Tychanus* in its non-callose elytra and untoothed femora. For *S. testudo* and *vexatus*, ibid., New Zealand.

*Crisius*, id. *l. c.* p. 66. Also allied to *Acalles*, but with the elytra greatly exceeding the thorax in breadth. For *C. binotatus*, ibid., New Zealand.

*Conotrachelus juglandis* and *albicinctus*, p. 226, *seniculus*, p. 227, *nicosus*, p. 229, *adspersus*, p. 230, *naso*, p. 231, *plagiatus* and *tuberosus*, p. 233, *fissunguis*, p. 234, *crinaceus* and *hispidus*, p. 235, *belfragii*, p. 419, J. L. Leconte, *l. c.*, various N. American States and Territories.

*Pscpholax simplex*, Pascoe, *l. c.* p. 62, New Zealand.

*Acalles nobilis* and *basalis*, p. 241, *porosus*, *turbidus*, *clathratus*, and *carinatus*, p. 242, *granosus* and *sordidus*, p. 243, *crassulus*, *longulus*, and (*A.* ?) *nuchalis*, p. 244, and (*A.* ?) *pectoralis*, p. 254, Leconte, *l. c.*, various N. American States and Territories; *A. intutus*, *erroneus*, and *hystriculus*, Pascoe, *l. c.* p. 63, New Zealand.

*Crypharis oberthueri*, L. Fairmaire, Pet. Nouv. ii. p. 38, Bou-Sâada.

*Tyloderma longum*, p. 248, Florida, *T.* (*Analcis*) *bari* [*dor*] *dium*, p. 249, Texas, Leconte, *l. c.*

*Pseudomus truncatus*, id. *l. c.* p. 246, S. Carolina and Georgia.

*Oreda brevis*, Pascoe, *l. c.* p. 60, New Zealand.

*Cryptorrhynchus* (g. n.?) *calandroides*, p. 126, *C. fusco-æneus*, p. 127, *decipiens*, p. 129, *pilosulus*, p. 130, *lepidus*, p. 131, *trilineatus*, p. 132, *griseolus*, p. 133, *gracilirostris*, p. 135, *inconspicuus*, p. 136, *histrionicus*, p. 141, *suberosus*, p. 142, *posticatus*, p. 144, *stercorarius*, p. 145, *variegatus*, p. 147, *multituberculatus*, p. 148, *bisignatus*, p. 149, *cordiger*, p. 151, *strigirostris*, p. 152, *squamiger*, p. 153, *plagiellus*, p. 155, *discophorus*, p. 156, *pulchellus*, p. 157, *curticollis*, p. 158, *pectinatus*, p. 159, *nigritellus*, p. 160, *salebrosus*, p. 161, *muticus*, p. 162, *sulcicollis*, p. 163, *palmicola*, p. 164, *scrofula*, p. 166, and *peregrinus*, p. 167, E. Suffrian, Arch. f. Nat. xlii. (2) Cuba, and adjacent Isla de Pinos; *C. annosus* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 86, tertiaries of Wyoming; *C. fuscatus*, p. 251, *fallax*, p. 253, *minutissimus*, p. 254, *tristis*, p. 255, *oblongus*, p. 256, Leconte, *l. c.*, various N. American States.

*Cœlosternus* (?) *hispidulus*, Leconte, *l. c.* p. 258, Lower California.

*Aldonus celator*, Pascoe, *l. c.* p. 60, New Zealand.

*Zygopides.*

*Acoptus*, g. n., J. L. Leconte, P. Am. Phil. Soc. xv. p. 264. Differs from *Copturus* by the ventral surface being nearly horizontal, the segments much less unequal, and sutures nearly straight, as in *Zygops*, from which its covered pygidium and only the first joint of its funiculus being elongate will distinguish it. For *A. suturalis*, sp. n., *id. ibid.*, York.

*Piazurus californicus*, California, *subfasciatus*, New York, *l. c.* p. 260.

*Copturus nanulus*, p. 261, Georgia, &c., *mammillatus*, p. 262, *longulus* (also Canada) and *lunatus*, p. 263, California, *aspersus*, p. 262, Texas and California, *binotatus*, p. 263, Pennsylvania and Texas, spp. nn., *id. l. c.*

*Idotasia cyena*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 58, New Zealand.

*Tachygonides.*

The distribution of species in America and Burma, and their extraordinary mixture of characters, indicate the preservation of an ancient form, out of place in any linear arrangement. J. L. Leconte, P. Am. Phil. Soc. xv. p. 265.

*Tachygonus tardipes*, Texas, and *fulvipes*, Illinois, spp. nn., *id. l. c.* p. 266.

*Ceuthorrhynchides.*

*Mononychus* is separated as type of a tribe *Mononychi*, in which the pygidium is not carinate in front, and has no transverse line for the reception of the tip of the elytra. *Cœliodes epilobii*, Gyll., occurs at Great Slave Lake and in British Columbia, and is made type of a new genus. *Ceuthorrhynchus rapæ*, Gyll., *Phytobius velatus*, Gyll., and *Rhinoncus pericarpius*, Gyll., occur in N. America. J. L. Leconte, *l. c.* pp. 267, 271, 274, 281, & 284. The following new genera and species are described by him:—

*Craponius*, p. 268. Differs from *Cœliodes* in its tibiæ being flattened, and toothed and broadly grooved on the outer side, and in its pectoral groove extending to the metasternum. For *Ceuthorrhynchus inæqualis*, Say.

*Cnemogonus*, p. 269. Differs from *Cœliodes* in its tibiæ being much flattened and dilated externally, so as to form a large angle near the knee; also in the untoothed femora, and the claws being armed with a short tooth, not cleft. From *Craponius*, it differs in the ungrooved tibiæ, and in the pectoral groove not being prolonged into the metasternum. For *Cœliodes epilobii*, Payk.

*Acallodes*, p. 271. With the pyriform body of *Scleropterus*, but the funiculus has seven distinct joints, &c. For *A. ventricosus*, p. 272, Middle and Western States of N. America.

*Cœliodes tenuipes* and *asper*, p. 270, and *nasalis*, p. 271, Texas, *cruralis*, p. 270, Anticosti, Lake Superior, Texas, &c., and *nebulosus*, p. 271, Michigan, Georgia, &c.

*Ceuthorrhynchus subpubescens*, p. 273, *sulcipennis*, p. 274, *decipiens*,* *rudis*, and *sericans*, p. 275, *convexicollis* and *pusillus*, p. 276, *squamatus*, and *angulatus*,* p. 277, *obliquus*,* *tau*,* and *semirufus*,* p. 278, *medialis*,* and *puberulus*,* p. 279, various N. American States and Territories [the species marked * belong to *Ceuthorrhynchideus*].

*[illegible]gonus squamosus*, p. 281, New York, Michigan, and British [illegible]a, *cavifrons*, p. 282, California.

*[illegible]ter obscurus*, p. 283, Florida.

*[illegible] longulus*, p. 284, Southern and Western States.

*Baridiides.*

*Baridius quadratus*, Lec., = *transversus*, Say; *B. pubescens*, Uhler, = *Centrinus holosericeus*, Gyll., = *C. penicellus*, Hbst.; J. L. Leconte, P. Am. Phil. Soc. xv. pp. 291 & 308.

The following new genera and species are described by Leconte, *l. c.*:

*Orthoris*, p. 286. *Baridiides*:—Facies of *Orchestes*. Pygidium oblique; fifth ventral segment longer, rounded at tip; outer joints of funiculus but little broader, club large, elongate-oval, pubescent. Rostrum long, slender, straight. For *Orth. crotchi*, ibid., California.

*Rhoptobaris*, p. 287. Differs from *Orthoris* in its shorter, less slender, and curved rostrum. Facies of *Trichobaris*. *R. canescens*, ibid., Colorado.

*Trichobaris*, ibid., of elongate form, densely clothed, and with front coxæ very narrowly separated. For *Baridius trinotatus*, Say, *B. plumbeus*, Lec., and *T. texana*, p. 288, Texas.

*Aulobaris*, p. 288. Differs from *Baris* proper by the more slender antennæ, the second joint of the funiculus being quite as long as the first, &c. For *Baridius scolopax*, Say, *B. ibis* and *nasutus* (renamed *naso*), Lec., and *B. anthracinus*, Boh. (subsequently transferred to *Pseudobaris*, p. 419).

*Onychobaris*, p. 294. Differs from *Baris* in the more oval, entirely sensitive and pubescent antennal club, of which the first joint forms less than half; the larger and divergent claws, &c. For *Baridius denens*, *distans*, and *seriatus*, Lec., and *O. subtonsa* and *pectorosa*, p. 295, *cribrata*, p. 296, Texas, *rugicollis*, p. 297, Middle and Southern States.

*Pseudobaris*, p. 297. Differs from *Trichobaris* in the widely separated front coxæ and absence of dense scaling. For *Baridius farctus*, *angustus*, (renamed *angustula*, p. 420), and *pusillus*, Lec., *nigrinus*, Say, and *t-signum*, Boh.; also *P. albilatus*, p. 298, and *P. pectoralis*, p. 420, Florida. *Baridius anthracinus*, Boh., is transferred to this genus from *Aulobaris*, p. 419.

*Ampeloglypter*, p. 299. Differs from *Madarus* in the shorter and stouter rostrum, stouter antennæ, broadly excavated prosternum, which is not suddenly declivous between the coxæ, untoothed front femora, and claws connate at base. For *Madarus vitis*, Riley, = *Baridius sesostris*, Lec., and *A. ater* (= *M. ampelopsis*, Walsh & Riley, undescribed), S. and W. States, and *crenatus*, Virginia and Maryland, p. 300.

*Pachybaris*, p. 302. *Centrini*: characters of *Onychobaris*, except that the elytra are conjointly rounded behind, so as to cover the pygidium, and the fifth ventral segment, though very transverse, is broadly rounded behind. *P. porosus*, sp. n., *ibid.*, Florida.

*Stethobaris*, ibid. Differs from *Pachybaris* especially in the deep and sharply defined pectoral groove. For *Baridius ovatus*, Lec., = *Campylorrhynchus tubulatus*, Say, and *S. corpulentus*, p. 420, Florida.

*Microcholus*, p. 303. Differs from the two preceding genera in its slender ungrooved tibiæ; side margin of prothorax well defined of *Baris*, but stouter and more convex, with a few scattered sc *M. striatus* and *punctipollis*, Florida, and *levicollis*, Missouri.

*Calandrinus*, p. 305. Facies of miniature *Sphenophorus*, but with scale-like hairs, as in *Centrinus*: third joint of tarsi narrow. *Cal. grandicollis*, ibid., Rocky Mountains.

*Zygobaris*, p. 317. Form of small robust *Centrinus*, but very coarsely sculptured and not densely scaled, claws connate at base. *Z. nitens*, Florida, and *conspersa*, Illinois, p. 318, and *Z.* (?) *convexus*, p. 422, Florida.

*Barilepton*, p. 318. Very elongate; claws single. For *B. filiforme*, p. 319, Virginia and Illinois, *lineare* and *cribricolle*, p. 422, Florida, *quadricolle*, p. 423, Nebraska.

*Euchætes*, p. 319. Form of robust *Centrinus*, but with larger and laterally more rounded thorax, a dense crust of scales, and very long, stiff, erect bristles. *E. echidna*, p. 320, Illinois.

*Plocamus*, p. 320. Form of elongate *Centrinus*, clothed with dense scales and short erect bristles intermixed. *P. hispidulus*, ibid, Southern States of N. America.

*Baris nitida*, p. 292, Florida, *pruinosa*, p. 294, Texas.

*Centrinus lævirostris* (? = *pistor*, Gyll., ♂), Missouri, *punctirostris*, Colorado, and *striatirostris*, Texas, p. 309, *neglectus*, p. 310, Louisiana, Kansas, *capillatus*, p. 311, *griseus*, p. 312, *punctiger*, p. 314, *longulus*, p. 316, Texas, *decipiens*, p. 313, Florida and Texas, *calvus*, p. 314, Georgia and Florida, *rectirostris*, S. Carolina and Illinois, *falsus*, Middle and Southern States, p. 315, *concinnus*, p. 316, *confinis*, p. 317, New York, and *prolixus*, p. 317, Massachusetts and Illinois, *canus*, Florida, and *strigatus*, Colorado.

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*Eurrhinus occultus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 87, tertiaries of Colorado.

*Baridius chevrolati*, sp. n., Coye, L'Ab. 1876, livrn. 4, p. 378, Syria.

## *Calandrides.*

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 328–341, under the name *Calandridæ*, associates as the eighth family of his arrangement of the N. American *Rhynchophora*, the three subfamilies of *Calandridæ*, *Rhinidæ* (corresponding nearly with Lacordaire's *Sipalides*) and *Cossonidæ*. This family and the *Anthribidæ* form the first section of his *Heterogastra*, having the pygidium vertical or declivous. It is distinguished by its geniculate clubbed antennæ, wanting labrum, and last spiracle covered by ventral segments, and is also characterized by having the genital segment of the ♂ not articulated directly at the end of the last dorsal, but either retractile or concealed under it. The *Calandridæ* proper are composed of three tribes, *Rhynchophorini*, *Sphenophorini*, and *Calandrini*. In *Calandra*, it is noted that the anterior part of the last dorsal segment of the abdomen is channelled for the reception of the sutural edge of the elytra, almost as in the *Anthribidæ*. The *Rhinidæ* [*Sipalides*] and *Cossonidæ* will be noticed infrà. *Rhynchophorus palmarum* (with which *R. noxius*, Gyll., is perhaps identical) is recorded from S. California, p. 424; *Sphenophorus callosus*, Ol., = *cariosus*, Ol., and *S. zeæ*, Walsh, = *sculptilis*, Uhler, p. 425.

*Cactophagus*, g. n., *id. l. c.* p. 331. *Sphenophorini*: differs from *Sphenophorus* in the absence of inequalities or coarse sculpture, and in the third joint of the tarsi being somewhat transverse, patellate, and uniformly densely spongy beneath, not divided. For *S. procerus*, Lec., = *validus*, Lec.

*Rhodobænus*, g. n., *id. l. c.* p. 332. Differs from the preceding in its tibiæ being subtruncate at the tip, and the third joint of the tarsi being narrowly divided, &c. For *Sphenophorus* 13-*punctatus*, Ill., and *S. pustulosus*, Gyll.

*Trichischius*, g. n., *id. l. c.* p. 426. Allied to *Sphenophorus*, but clothed with long hair in many parts, and with the third joint of all the tarsi slender, not at all dilated or emarginate, glabrous beneath, fringed at the sides, quite as long as the second joint, which is as long as the first. For *T. crenatus*, sp. n., *id. ibid.*, Colorado.

*Rhinocles*, g. n., C. A. Dohrn, S. E. Z. xxxvii. pp. 86–88. Rostrum exceedingly long; scape of antennæ much longer than the head, and inserted at the very base of the rostrum, the apical joint of club being as long as the two preceding, conic, and compressed; scutellum subtriangular, with the sides not bent inwards; pygidium with a spathiform impression. For *R. nasica*, sp. n., *id. l. c.* pp. 88–90, Monrovia.

*Rhynchophorus ceylanensis*, sp. n., W. Roelofs, CR. Ent. Belg. xix. p. v., Ceylon.

*Sphenophorus velutinus*, Florida, and *variolosus*, Colorado, p. 424, *oblitus*, p. 425, Texas, Leconte, l. c.; *S. siculus*, G. Stierlin, MT. schw. ent. Ges. iv. p. 476, Sicily: spp. nn.

### *Sipalides.*

J. L. Leconte, P. Am. Phil. Soc. xv. p. 333, distinguishes this group (as subf. *Rhinidæ*) from the *Calandrides* chiefly by the buccal opening being entirely at the end of the rostrum.

*Yuccaborus*, g. n., *id. l. c.* p. 333. Allied to *Rhina* and *Harpacterus*, differing in the form of the antennal club, the eyes being widely distant above, and the third tarsal joint much smaller and not spongy beneath. For *Rhina frontalis*, Lec.

### *Hormopides.*

J. L. Leconte, *l. c.* p. 320, closes his subfamily of genuine *Curculionidæ* (anteà, p. 76) with a new tribe, *Hormopini*, differing from all the others in having eyes nearly contiguous beneath. It is founded on

*Hormops*, g. n., *id. l. c.* p. 321. Eyes very large, transverse, and coarsely granulated; antennæ received in front of eyes in deep oblique grooves, suddenly and acutely deflexed. Suggestive of *Procas* in facies, but with possible relations to certain of Wollaston's anomalous *Cossonidæ*. For *H. abducens*, sp. n., *ibid.*, Florida, "one specimen."

### *Cossonides.*

J. L. Leconte, *l. c.* p. 334 *et seq.*, neglects the number of joints in the funicle of the antennæ as being rather of generic than of tribal value, and adopts as tribes for the N. American species the three following: *Dryophthorini*, *Cossonini*, and *Rhyncolini*. The last is distinguished

from the *Cossonini* by having the prosternum very narrow between the coxæ, and by possessing a deep transverse gular groove beneath in front of the eyes. *Phlœophagus*, with its longer rostrum and weaker gular groove, is almost intermediate. *Dryotribus*, Horn, would be placed, in Wollaston's arrangement, in the first group of his *Pentarthrides*. An arrangement is proposed differing radically from that offered by Wollaston for the *Cossonini*, and which, "if found in accordance with natural affinities, will result in a great reduction of the number of genera." This new arrangement is based upon an examination of no more than eight N. American genera, whereof two are new, the proportion of one-fourth of novelty in such a limited number being at variance with the proposed reduction above mentioned. *Homaloxenus dentipes*, Woll., is recorded from Florida; *Borophlœus*, Woll., is merged in *Cossonus*, Clairv., and *B. minor*, Woll., dubiously referred to *C. corticola*, Say; *Rhyncolus protractus*, Horn, is a *Macrorrhyncolus*; *Phlœophagus pallidus*, Boh., is a *Stenomimus*; *Cossonus pinguis*, Horn (*fide* Horn), = *Caulophilus latinasus*, Say, and is dubiously queried as identical with *C. sculpturatus*.

*Gononotus*, g. n., *id. l. c.* p. 336. Probably near *Lymantes*, and perhaps with some relation to the European *Styphloderes*. Differs from *Dryophthorus*, and from *Dryotribus* (with which latter it is associated as a group, *Dryotribi*) by its 7-jointed funiculus. For *G. lutosus*, sp. n., *id. l. c.* p. 337, Florida.

*Macrancylus*, g. n., *id. l. c.* p. 338. *Cossonini*: slender, cylindrical, not depressed; with stout rostrum, not separated from the front, gradually but slightly tapering externally, and with the antennæ inserted near its base. No affinities suggested. For *M. linearis*, sp. n., *id. l. c.* p. 339, Florida.

*Allomimus*, g. n., *id. l. c.* p. 339. Nearly allied to the preceding genus, but less elongate, and very much more coarsely sculptured, with the antennæ inserted near the middle of the rostrum, and the antennal grooves directed towards the eyes. For *Cossonus dubius*, Horn.

*Himatium errans*, sp. n., *id. l. c.* p. 427, Columbia (the genus is hitherto only known from Malabar).

*Penthartbrum wollastoni*, W. Roelofs, CR. Ent. Belg. xix. p. vi., Ceylon (7 millim. long); *P. rodriguezi*, C. O. Waterhouse, Ann. N. H. (4) xviii. p. 120, Rodriguez Island: spp. nn.

## Scolytidæ.

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 341–391, rejecting the *Eutomides* (which, having the flanks separate from the pronotum, are allied to *Rhipidandrus*, Lec., and associated with the *Tenebrionidæ*, though still of doubtful position and affinities), follows Lacordaire's arrangement in the main features, though inverting it, and proposing various minor [illegible]. In the *Platypodidæ*, *Platypus disciporus*, Chapuis, = *flavicornis*, [illegible]; *P. blanchardi*, Chap., = *4-dentatus*, Ol.; *P. parallelus*, Chap., [illegible]*niferus*, *perfossus*, and *rugosus*, Chap., = *compositus*, Say (*paral-* [illegible] being irrecognisable). *Crypturgus* and *Dolurgus* are removed

from the *Tomicides* to a tribe variously termed *Hylesini* (p. 345) and *Hylurgini* (p. 373), representing Lacordaire's "Hylésinides." *Crypturgus punctatissimus*, Zimm., is a *Corthylus*. *Pterocyclum simile*, Eichh., = *Bostrychus fasciatus*, Say, *Cryphalus cavus*, Lec., = *Corthylus scutellaris*, Lec., ♀, *Cryphalus dentiger*, Lec., and *Pt. longulum*, Eichh., = *Tomicus mali*, Fitch, are all referred to *Monarthrum*, Kirsch (*Corthylomimus* and *Cosmocorynus*, Ferr., being deposed as subgenera). Most of the author's former *Cryphali* are referred to *Pityophthorus*, Eichh., of which *Gnathotrichus*, Eichh., is a subgenus; *Cryphalus sulcatus*, Lec., = *Pit. retusus*, Lec., ♂; *Gnathotr. corthyloides*, Eichh., = *P. materarius*, Fitch; *Crypturgus minutissimus*, Zimm., *nec* Fitch, = *pusillus*, Harris; *P. bisulcatus*, Eichh., ? = *pullus*, Zimm.; *P. cribripennis*, Eichh., ? = *Cryph. atratulus*, Lec., = *P. nitidulus*, Mann.; *P. infans*, Eichh., ? = *comatus*, Zimm., ♂. *Cryph. hispidulus* and *striatus*, Lec., and *Crypt. dissimilis*, Zimm. (? *Cryph. robustus*, Eichh.), are referred to *Hypothemenus*, Westw. *Apate rufitarsis*, Kby. (p. 426), = *Xyloterus bivittatus*, Kby., of which *X. retusus*, Lec., is probably a monstrosity. *Xyleborus pini*, Eichh., = *xylographus*, Say; *X. vicinus*, Lec., = *calatus*, Zimm. *Tomicus pramorsus*, Eichh., ? = *calligraphus*, Germ.; *T. præfractus*, Eichh., *dentatus* and *pallipes*, Stm., = *pini*, Harr. & Say (*nec* Zimm.). *Scolytus muticus*, Chap., *nec* Say, and *S. caryæ*, Riley, = *4-spinosus*, Say. *Rhopalopleurus*, Chap., = *Chramesus*, Lec. (for which priority is claimed, although the author admits his having failed to perceive the great characteristic of the genus), and *R. lecontii*, Chap., = *C. icoriæ*, Lec. *Phlœophthorus granicollis*, Eichh., = *Phlœotribus frontalis*, Zimm., with which species, however, *P. setulosus* and *dubius*, Eichh., are now stated to have nothing to do. *Nemophilus strigillatus*, Chap., = *Cnesinus strigicollis*, Lec. *Hylesinus aculeatus*, Say, = *imperialis*, Eichh., which is however barely distinct from *H. pruinosus*, Eichh., = *aculeatus*, Say; *H. nebulosus*, Lec., = *sericeus*, Mann., var.; *Phlœosinus liminaris*, Chap., = *H. opaculus*, Lec. *Hylurgus analogus*, Lec., = *Blastophagus piniperda*, accidentally introduced. *Hylastes salebrosus*, Eichh., ? = *porculus*, Er.; *H. scobinosus*, Eichh., ? = *cavernosus*, Zimm.

LINDEMANN, K. Monographie der Borkenkäfer Russlands. Die Cryphaloiden Tomiciden. Bull. Mosc. 1876, pt. 2, pp. 148–169, 320–380, figs. 1–55.

The author refers to a commencement by him of this work in 1875, in the Russian language, of which the part published includes *Scolytus* and *Phlœophthorus*. This scheme he intends to abandon, meaning to write the whole in German, including a translation of the part already issued in Russian. The present portion consists of a general introduction, a classification of *Rhynchophora* and *Tomicidæ*, and a system of the Cryphaloid species. He follows Thomson to a certain extent, dividing Latreille's Curculionites into twelve separate equivalent groups, viz., *Bruchidæ*, *Anthribidæ*, *Rhinomaceridæ*, *Attelabidæ*, *Apionidæ*, *Curculionidæ*, *Rhynchænidæ*, *Rhyncolidæ*, *Scolytidæ*, *Hylesinidæ*, *Tomicidæ*, *Platypodidæ*. To these conclusions, the author has been led [illegible] minute anatomical study of the digestive apparatus of a limited

of species, assisted by modifications of the genital organs, of which a new feature, in the shape of a plate with palpi and pedicel, is described and figured. A peculiar apparatus is found in the proventriculus [*cf.* Zool. Rec. xii. p. 361] of the last 7 of the above-named groups, but never occurs in the first 5 of them; and all these groups are characterized by various different features in the structure of the copulatory and digestive organs. The *Tomicides* are raised to the rank of a family, with 4 subfamilies, *Cryphaloidæ*, *Tomicoidæ*, *Dryocœtoidæ*, and *Xyleteroidæ*, characterized by similar modifications.

The European *Cryphaloidæ* consist of *Ernoporus*, *Stephanoderes*, *Cryphalus*, *Hypoborus*, *Pityophthorus*, *Pseudocryphalus*, *Xyloctonus*, *Hylocurus*, and—

*Homœocryphalus*, g. n., p. 168, note; funiculus 4-jointed, suture of club quite straight, above and below. For *H. chlersi*, sp. n., not described.

The genus *Ernoporus* is then very minutely discussed, with observations on points of internal and external anatomy (which are in many cases also figured), both generally, and as regards *E. tiliæ*, F., *fagi*, N., *caucasicus* (sp. n., pp. 373–377, figs. 49–53, Piatigorsk, N. Caucasus), and *jalappæ*, Letzn.

Synonymical observations by W. Eichhoff, S. E. Z. xxxvii. pp. 378 & 379. "*Bostrichus*" [*Tomicus*] *marshami*, Rye, = *Dryocœtes alni*, Georg [this was noted in Zool. Rec. vii. 1870]; *B. septentrionis*, Mann., = *semicastaneus*, Mann., = *D. autographus*, Ratz.; *B alni*, Muls. & R., = *Xyleborus pfeili*, Ratz.; *X. carinipennis*, Eichh., ex. typ., = *Phlœotrogus oliquecauda*, Mots.; *B. oblitus*, Perr., = *longicollis*, Gyll.; *B. tachygraphus*, Sahlb., ex. typ., = *X. dispar*, F., ♀; *Tomicus præmorsus*, Eichh., = *B. calligraphus*, Germ.; *Xyloterus bivittatus*, Mann., = *cavifrons*, M., ♀, = *lineatus*, Ratz., ? Ol.; *X. quercûs*, Eichh., ? = *B. 5-lineatus*, Adams, = *Apate signata*, F.; *Ernoporus thomsoni*, Ferr, = *B. fagi*, F.; *Dryocœtes capronatus*, Perr., = *B. bulmerincqi*, Kol., a good species near *bicolor*; *Pterocyclum longulum*, Eichh., = *T. mali*, Fitch; *B. decolor*, Boield., = *Xyleb. saxeseni*, Ratz., ♂; *Hypoborus mori* and *genistæ*, Aubé, belong to *Liparthrum*, Woll.; *Cryphalus piceæ*, Ratz., is a good species; *Xyleb. abnormis*, Eichh., = *Eccoptopterus sex-spinosus*, Mots., but the latter genus does not stand.

*Hylastes trifolii* feeding on *Trifolium pratense*, *Sarothamnus scoparius*, and *Ononis natrix*; L. Bedel, Bull. Soc. Ent. Fr. (5) vi. p. clviii.

*Bostrychus amitinus*, Eichh., and *typographus*, L. On the differences of these species, and the occurrence of the former in Thüringia; Kellner, Deutsche E. Z. 1876, pp. 191 & 192. On these species and *B. cembræ*, Heer; Doebner, S. E. Z. xxxvii. p. 315. On the range of distribution of *B. amitinus*, and its supposed identity with *duplicatus*, Sahlb., and *rectangulus*, Ferr.; G. Kraatz, Ent. MB. i. pp. 24 & 25, and Kellner, *l. c.* p. 40.

*Tomicus omissus* in Silesia; G. Kraatz, *l. c.* p. 39.

[illegible]te, *l. c.*, describes the following new genera and species.

[illegible]noes, p. 369. Group *Micracides* of the *Tomicini*: differs from [illegible] in its antennal club being sparsely hairy, corneous, without

sutures on the upper surface and with two indistinct sutures on the lower surface; outer joints of funicle transversely produced and fringed with long hairs; elytra not aculeate at tip. *T. fimbricornis*, p. 370, Pennsylvania.

*Chætophlœus*, p. 282. Group *Hylurgi* of the *Hylurgini*: differs from *Phlœosinus* in the outer joints of the funicle being scarcely broader than the rest. For *Hylesinus hystrix*, Lec.

*Hylurgops*, p. 389. Group *Crypturgi* of the *Hylurgini*: differs from the *Hylurgi* in the non-depressed scutellum and deeper antennal grooves, and from *Hylastes* in the bilobed 3rd tarsal joint. For *Hylastes granulatus*, Lec., *pinifex*, Fitch, *rugipennis*, *costulatus*, and ? *cristatus*, Mann., and ? *H. rufipes*, Eichh.

*Scierus*, p. 390. Differs from *Hylurgops* and *Hylastes* in the front coxæ being widely separated by the prosternum, and in the 3rd joint of the tarsi being not so deeply bilobed as in the former but broader than in the latter. For *S. annectens*, ibid., Anticosti and Vancouver Islands, and British Columbia.

*Pityophthorus cariniceps*, Michigan, and *fossifrons*, Vancouver Island, p. 353, *confinis*, p. 354, California.

*Hypothemenus erectus*, p. 356, Texas (= ? *Stephanoderes chapuisi*, Eichh.).

*Cryphalus rigidus*, p. 362, Canada.

*Tomicus confusus*, S. California and Arizona, and *emarginatus*, Oregon, p. 364, *rectus*, p. 365, New Mexico and Oregon, *hudsonicus*, p. 366, Hudson's Bay Territory.

*Micracis nanula*, p. 368, Florida, *rudis*, Michigan, and *hirtellus*, S. California, p. 369.

*Scolytus unispinosus*, p. 372, Oregon, *præceps*, California, and *subscaber*, Vancouver, &c., p. 373.

*Chramesus chapuisi*, p. 375, Louisiana.

*Hylesinus aspericollis*, p. 380, California.

*Phlœosinus punctatus*, p. 382, Oregon and Lake Superior (? = *Dendroctonus haagi*, Eichh.).

*Carphoborus simplex*, p. 383, California.

*Dendroctonus brevicornis*, p. 386, California.

*Hylastes longus*, p. 389, Colorado.

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*Trypodendrum impressus*[*-sum*], sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 83, tertiaries of Wyoming.

## Brenthidæ.

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 323–328, discussing the N. American species, includes Lacordaire's tribes *Cylades* (placed by him between the *Eurrhynchides* and *Apionides* in the "Phanérognathes [illegible] mérides") as a sub-family *Cyladidæ*, distinguished by the antennæ 10-jointed, with the last joint very elongate. Observations ar[illegible] upon the "complication of domestic life" in various members

family, and on development of the head in the ♂ of *Eupsalis*. *Cylas* has very well developed wings, and the elytra not connate.

*Ectocemus granulirostris*, Halmahera, and *pterygorrhinus*, Somerset, Cape York, spp. nn., R. Gestro, Ann. Mus. Genov. viii. p. 519.

*Amorphocephalus jickelii*, sp. n., L. W. Schaufuss, Nunq. Ot. ii. p. 402, Nubia (with table of known species).

## Anthribidæ.

J. L. Leconte, P. Am. Phil. Soc. xv. pp. 391–409, adopts for the N. American species practically the same tribes as those employed by Lacordaire, separating, however, as a distinct group, *Hormisci*, of his *Tropiderini*, the genus *Hormiscus* of Wollaston and two new genera, defined by the emarginate eyes and distinct suture to the mentum. *Cratoparis* is also separated from the *Anthribi*, chiefly by the 3rd joint of the tarsi being bilobed, not visible from above. *Anthribus cornutus*, Say, is wrongly referred to *Tropideres* by Harold & Gemminger, and *A. mœstus*, Lec., is not an *Arwocerus* but a *Piazocorynus*; *Brachytarsus obsoletus*, Fahr., ? = *variegatus*, Say, var.

The following new genera and species are described:—

*Gonotropis*, p. 393. Differs from *Tropideres* in the narrow, not compressed club of its antennæ. *G. gibbosus*, p. 394, Colorado.

*Eurymycter*, p. 394. Represents the European *Platyrrhinus*, but with the rostrum narrower than the head and strongly dilated at the tip. Differs from its ally *Gonotropis* in the prothoracic ridge being straight in the middle, with the base deeply bi-emarginate, and in the acutely toothed claws. For *Macrocephalus fasciatus*, Ol.

*Allandrus*, p. 396. *Tropiderini*: differs from *Tropideres* in its longer rostrum, very long antennæ in the ♂, and rounded eyes. *A. bifasciatus*, ibid., Canada, Illinois.

*Toxotropis*, p. 397. *Hormisci*: differs from *Hormiscus* in its elongate-oval compressed club, which is composed of 3 distinct joints equal in length. For *T. pusillus*, Florida, and *approximatus*, California, p. 398.

*Gonops*, p. 398. Differs from *Toxotropis* in its strongly emarginate eyes, and claws cleft almost to the base, with the inner portions converging as in *Anthonomus*. For *G. fissunguis*, ibid., California.

*Eusphyrus*, p. 399. *Anthribi*: eyes emarginate, hind angles of prothorax directed outward; front coxæ contiguous. For *E. walshi*, p. 400, Illinois.

*Phœnicobius*, p. 400. Allied to the preceding: claws almost cleft, body elongate-cylindrical, hind angles of thorax not directed outward. *P. chamæropis*, p. 401, Florida.

*Anthribulus*, p. 406. *Brachytarsi*: differs from *Brachytarsus* in the basal ridge of the prothorax being gently rounded and becoming obsolete at the hind angles. *A. rotundatus*, p. 407, Massachusetts to Louisiana.

[illegible]*us*, p. 409. *Xenorchestini*: prothorax punctured, elytra with double rows of punctures [only specific characters]. For *E.* [illegible], p. 409, Michigan, Canada.

[illegible]*eres rectus*, p. 395, Florida.

*Hormiscus saltator*, p. 397, Middle and W. States of N. America.
*Piezocorynus mixtus*, p. 402, M. and S. States.
*Anthribus lividus*, p. 403, Florida.
*Brachytarsus griseus*, p. 405, Colorado, *plumbeus*, Middle States, and *vestitus*, Louisiana, p. 406.
*Choragus zimmermanni*, N. Carolina, and *sayi*, Washington, p. 408.

Sharp, D. On the *Anthribidæ* of New Zealand. Ann. N. H. (4) xvii. pp. 422–439.

In dealing with no less than 17 species from this country, the author finds great difficulty in defining their generic divisions, retaining *Anthribus* for all of them. As *Lawsonia*, Shp., = *Exillis*, Pasc., Sharp proposes the name *Exillis lawsoni* for his *Lawsonia longicornis*.

*Balanodes*, g. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 118. Closely allied to *Araeocorynus*, but differing in form, in slightly narrower tarsi, and tibiæ not apically dilated. For *B. tomentosus*, sp. n., *id. l. c.* p. 119, Rodriguez Island.
*Mecocerus sulphureus*, sp. n., *id.* Tr. E. Soc. 1876, p. 24, Andaman Islands, Cambodia.
*A. brouni* (? a *Tropideres*), p. 426, *bullatus*, p. 427, *vates*, p. 428, *hetæra* and *discedens*, p. 429, *altus* (a *Cratoparis*), p. 430, *huttoni*, p. 431, *crassus*, p. 432, *nanus* and *atomus*, p. 433, *inflatus* (? a *Notioxenus*), p. 434, *rugosus*, p. 435, *spinifer*, p. 436, *ornatus*, p. 437, *rudis*, p. 438, spp. nn., Sharp, *l. c.*, New Zealand.
*Brachytarsus pristinus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 87, tertiaries of Wyoming.
*Caranistes annulipes*, sp. n., Waterhouse, *l. c.* p. 119, Rodriguez Island.
*Araeocerus pardalis*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 58, New Zealand and Ceylon.

## Bruchidæ.

*Urodon concolor*, All. (B. E. Z.), *nec* Sch., = *allardi*, Jekel; *U. concolor*, All. (Ann. Ent. Belg.), *nec* Sch., = *villosus*, Stierl.; and *U. concolor*, Sch.: characters discussed by H. Jekel, MT. schw. ent. Ges. iv. p. 536.
*Caryoborus* sp., entirely devouring the interior of Corozo nuts (*Phytelephas macrocarpa*), the "vegetable ivory," from Guyaquil; J. W. Douglas, P. E. Soc. 1876, pp. xiv. & xvi.
*Caryoborus bactris*, L., infesting the nuts of *Copernicia conifera*, a palm from Rio Janeiro, one larva in each only; R. McLachlan, P. E. Soc. 1876, p. xvi.
*Bruchus* sp., noticed as destroying 50 per cent. of the seeds of a leguminous plant from Egypt; E. A. Fitch, *ibid.*
*Bruchus brachialis*, Fahr., and its ♂ *ruficornis*, All., reared in abu[illegible] from vetch pods; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 237.
*Aglycyderes* is referred to the *Colydiidæ*, and a new species from New Zealand [*suprà*]; D. Sharp, Ann. N. H. (4) xviii. pp.

*Spermophagus vivificatus*, sp. n. (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 82, tertiaries of Colorado.

*Bruchus anilis*, sp. n. (foss.), *id. l. c.*, White River tertiaries.

## CERAMBYCIDÆ.

### *Prionides.*

*Hypocephalus*. J. L. Leconte, Tr. Am. Ent. Soc. v. pp. 209–218, having been able to study at leisure a good specimen of *H. armatus*, discusses its structure at great length, and reviews all former opinions as to its affinities, without, however, mentioning its position in Lacordaire's arrangement (which, for convenience, is mainly followed in this Record). He is driven to the "fragment of a very old fauna" theory again (all reasonable relationships having been already indicated for it), and proposes a new and isolated family, *Hypocephalidæ*, for its reception. Westwood's opinion that it belonged to a series connecting *Passandra*, *Catogenus*, and *Rhysodes* with *Calodromus* and the *Brenthidæ*, is stated to agree with the author's ideas.

*Acanthophorus hahni*, Dohrn (? = *longipennis*, Hope), discussed in detail, especially as to its generic status compared with *Tithoes* and *Dorycera*. A new genus is indicated, under the algebraic formula "*x*", for its reception. C. A. Dohrn, S. E. Z. xxxvii. pp. 118–123.

*Ochrocydus*, g. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 59. Dubiously placed in Lacordaire's *Monodesmides*. No differential characters given. *O. huttoni*, sp. n., *ibid.*, New Zealand.

*Macrotoma simplex*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 121, Rodriguez Island.

### *Cerambycides.*

Larvæ, apparently of a species of *Hesperophanes*, so numerous in oaken planking of the upper rooms in a house at Périgord, that the noise of their mandibles absolutely disturbed sleepers in the rooms below: all detergents failed to get rid of these pests. M. Girard, Bull. Soc. Ent. Fr. (5) vi. p. cii.

*Zorion batesi*, Sharp, = *guttiferum*, Westw.; C. O. Waterhouse, Tr. E. Soc. 1876, p. 14.

*Cortodera*, Muls., and *Grammoptera*, Serv.: the European species revised. *C. monticola*, Ab., = *humeralis*, Schall., var.; *C.* (*Pachyta*) *beckeri*, Desbr., redescribed. L. v. Heyden, Deutsche E. Z. 1876, pp. 317–320.

*Vadonia*. Observations on localities and specific characters; *V. globicollis*, Desbr., = *litigiosa*, Muls.; *id. l. c.* p. 320.

*Acmæops* (*Pachyta*) *collaris*: larva described, from chestnut; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 239.

*Pachyta excellens*, Brancsik, ♂ described; K. Brancsik, Deutsche E. Z. 1876, p. 316.

*Necydalis abbreviata*, Panz., *nec* F. (= *major*, L.), renamed *panzeri*; E. v. Harold, C. H. xv. p. 174.

*Aromia moschata*. Observations on its secretion, &c.; Schmidt-

Goebel, S. E. Z. xxxvii. p. 398. In Scotland; A. B. Hepburn, Scot. Nat. ii. p. 112.

*Vesperus xatarti* appeared rarely at Prades, E. Pyrenees, on 15th Feb., 1876; on the 18th it was plentiful; on 25th less common; and disappeared after 8th March. Xambeu, Nouv. et faits, 1876, No. 21', p. lxxxvii.

*Plocaederus caroli*, sp. n., C. E. Leprieur, Bull. Soc. Ent. Fr. (5) vi. p. viii., borders of Algerian Sahara.

*Didymocantha agrota*, sp. n., H. W. Bates, Ent. M. M. xiii. p. 52, New Zealand.

*Astetholea lepturoides*, sp. n., *id. l. c.* p. 53, New Zealand.

*Agapanthi* [*oi*] *d* [*c*] *a scutellaris*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 60, New Zealand.

*Julodia tibialis*, sp. n. [? De Marseul], Nouv. et faits, 1876, No. 25', p. cii., Sarepta.

*Grammoptera* (*Cortodera*) *frivaldszkii*, Budapest, and *G. rufipes*, Asia Minor, spp. nn., G. Kraatz, Deutsche E. Z. 1876, p. 344 (*cf.* also p. 318).

*Molorchus discicollis*, sp. n., L. v. Heyden, Deutsche E. Z. 1876, p. 383, Rheingau.

*Callichroma sphinx*, sp. n., C. A. Dohrn, S. E. Z. xxxvii. p. 126 (with preliminary discussion, pp. 123–126), Monrovia.

*Sympiezocera persica*, sp. n., S. Solsky, Hor. Ent. Ross. xi. p. 296, Shahrud, N. Persia.

*Crossidius intermedius*, sp. n., H. Ulke, in Wheeler's Rep. Geogr. Explor. W. of the 100th Mer. v. p. 813, pl. xli. fig. 1, Arizona.

### *Lamiides.*

*Batocera albo-fasciata*, Dej., attacks *Arctocarpus integrifolia* and *Mangifera indica* at Saigon; H. Lucas, Bull. Soc. Ent. Fr. (5) vi. p. lxxi.

*Phytoecia.* Unconnected observations on various species; *P. fuscicornis*, Muls., *orientalis*, Ktz., = *geniculata*, Friv., ♂; *P. cyclops*, Küst., probably = *virgula*, Charp., ♂, and *vulnerata*, Muls., and *algerica*, Desbr., are also dubiously referred to that species; *P. acuminata*, Fisch., is referred to *Agapanthia leucaspis*, Stev.; and some synonymy is reproduced from Küster's Käf. Europas; G. Kraatz, Deutsche E. Z. 1876, pp. 286–288. Further observations on the 16 German species; *id. l. c.* p. 380.

*Phytoecia caroni*, Muls. & God., re-characterized at length, as compared with *P. solidaginis* and *P. flavicans*; E. Mulsant, Pet. Nouv. ii. p. 45. *P. caroni*, Muls., = *julii*, Muls., ♂, = *solidaginis*, Bach, = *nigricornis*, F.; L. Bedel, Bull. Soc. Ent. Fr. (5) vi. p. clxxxix. *P. flavicans*, Muls., ex. typ., = *virescens*, F., var.; *id. l. c.* pp. ccxxv. & ccxxvi. *P.* (*Opsilia*) *flavicans*, Muls., is only a sex of *Phytoecia solidaginis*, Bach, which occurs on *Tanacetum vulgare*; S. A. de Marseul, Bull. Soc. Ent. Fr. (5) vi. p. lx.

*Xylotoles traversi*, F. P. Pascoe, Ann. N. H. (4) xviii. p. 66, Chatham Islands; *X. bullatus* and *pictulus*, H. W. Bates, Ent. M. M. xiii. p. 53, New Zealand: spp. nn.

*Psilocnæia brouni*, sp. n., H. W. Bates, *l. c.* p. 54, New Zealand.

*Disterna obtusipennis*, sp. n., *id. l. c.* p. 54, New Zealand.

*Hybolasius pedator*, p. 54, *wakefieldi* and *cristatellus*, p. 55, *id. l. c.*, New Zealand; *H. concolor*, T. Broun, Tr. N. Z. Inst. ix. p. 374, Tairua: spp. nn.

*Stenellipsis pumila*, sp. n., Pascoe, *l. c.* p. 67, New Zealand.

*Praonetha kuhleri*, sp. n., C. Ritsema, Tidjschr. Ent. xix. p. 47, Atchin, N. Sumatra.

*Apriona straussi*, sp. n., R. Gestro, Ann. Mus. Genov. viii. p. 520, Mt. Arfak, New Guinea.

*Olenocamptus lineatus*, sp. n., *id. l. c.* p. 520, Sorong.

*Arsysia spilonota* and *guttulata*, Jobi, *leptura*, Ramsi, New Guinea, p. 521, *vittata*, p. 522, Cape York, spp. nn., *id. l. c.*

*Tmesisternus jobiensis*, sp. n., *id. l. c.* p. 522, Jobi Island.

*Sphingnotus albertisi*, sp. n., *id. l. c.* p. 523, Mt. Epa, S. New Guinea.

*Phytœcia murina*, S. A. de Marseul, L'Ab. 1876, livrn. 4, p. 384, Sarepta; *P. excisa*, G. Stierlin, MT. schw. ent. Ges. iv. p. 479, no locality given: spp. nn.

## CHRYSOMELIDÆ.

On account of its uncertain place in classification, the following genus is here placed:—

*Aphilon*, g. n., D. Sharp, Ent. M. M. xiii. p. 100. Placed by the author in the "*Phytophages*, Section iii., *Cycliques*, Chapuis; in which section, however, it must apparently form a distinct tribe." At first associated with the *Erotylidæ*. For *A. enigma*, sp. n., *id. ibid.*, New Zealand.

Species new or rare for the Belgian fauna; H. Donckier, CR. Ent. Belg. xix. pp. lix.–lxi. (including *Orina tristis*).

### *Donaciides.*

*Hæmonia zosteræ*, F., and *H. ruppiæ*, Germ.; on the distinctness and synonymy, &c., of these species, *cf.* G. Kraatz, Deutsche E. Z. 1876, pp. 179 & 180. *H. curtisi*, Lac., is probably a variety of *H. ruppiæ*; *H. zosteræ*, Thoms., = *ruppiæ*; *H. gyllenhali*, Lac., Thoms., and *sahlbergi*, Lac., = *zosteræ*, F.; *id. l. c.* pp. 181–183.

*Hæmonia*: general observations by Montillot, Bull. Soc. L. N. Fr. iii. iii. pp. 164, 177.

*Donacia sericea*. Observations on noteworthy specimens in Von Heyden's collection, &c.; G. Kraatz, Deutsche E. Z. 1876, p. 397.

### *Criocerides.*

*Lema emarginata*, p. 6, Cape of Good Hope, *transverso-notata* and *haroldi*, p. 7, Camaroons, *saundersi*, Brazil, *buckleyi*, Ecuador, p. 8, *rufolimbata*, Parana, *ariadne*, Para, p. 9, J. S. Baly, Ent. M. M. xiii.; *L. purpurascens*, M. Jacoby, P. Z. S. 1876, p. 808, Madagascar: spp. nn.

*Crioceris australis*, sp. n., Jacoby, *l. c.* p. 807, Australia.

### *Megalopides.*

*Mastostethus picticollis*, p. 123, and *pictus*, p. 125, Columbia, *speciosus*

and *buckleyi*, p. 124, Ecuador, *jansoni*, p. 126, River Amazon, *basalis*, Minas Geraes, and *placidus*, Mexico, p. 127, *fraternus*, p. 128, Brazil, spp. nn., J. S. Baly, Cist. Ent. ii.

*Megalopus elongatus*, p. 128, Bogota, *vittaticollis*, p. 129, Nauta, Upper Amazons, spp. nn., *id. l. c.*

*Agathomerus dubiosus*, sp. n., Jacoby, *l. c.* p. 808, Mexico.

*Clithrides.*

*Clithra 4-punctata*: *Myrmetes piceus* and *Myrmedonia limbata* coming from cocoons of this beetle found in a nest of *Formica rufa*; Levoiturier, Bull. Soc. Ent. Fr. (5) vi. p. lxxxi.

*Minturnia dimidiata*, Lac. Metamorphosis fully described and figured; E. Dugès, Ann. Ent. Belg. xix. pp. 178–183, pl. i.

*Labidostomis elegans*, sp. n., E. Lefèvre, Bull. Soc. Ent. Fr. (5) vi. p. lxxii., Asterabad.

*Gynandrophthalma apicitarsis*, L. Fairmaire, Pet. Nouv. ii. p. 50, Lambessa; *G. cincta*, Caucasus, and *oberthuri*, Spain, Lefèvre, *l. c.* p. lxxiii.: spp. nn.

*Coptocephala crassipes*, sp. n., Lefèvre, *l. c.* p. lxxiv., Bou-Sâada.

*Megalostomis basilaris*, Peru, *amazona*, Amazons, spp. nn., M. Jacoby, P. Z. S. 1876, p. 809.

*Saxinis propinqua*, California, *guatemalensis*, Guatemala, spp. nn., *id. l. c.* p. 810.

*Cryptocephalides.*

*Pachybrachys limbatus*, Newm., from Indian River country, Florida, redescribed; E. A. Schwarz, Psyche, i. pp. 154 & 155.

*Monachus flaveolus*, *basalis*, *suturalis*, *nigro-limbatus*, and *acutangulus*, Mots., 1866, are probably colour varieties of one species, with which *Inclica solida*, Walker, 1859 (*Byrrhidæ*!), is also probably identical; C. O. Waterhouse, Tr. E. Soc. 1876, p. 15.

*Monachus peregrinus*, Suffr., from North Siberia, *Cryptocephalus sanguinolentus*, Ol., from Guinea, and *C. billardierii*, Ol., from the Sunda Isles: observations and errors in localities mentioned. E. Suffrian, S. E. Z. xxxvii. pp. 229 & 230.

*Cryptocephalus*. Observations on species found in the neighbourhood of Schmiedeberg (Silesia); *C. diagrammus*, Suffr., taken *in copulâ* with *labiatus*, of which it is apparently only a variety; Klette, Deutsche E. Z. 1876, pp. 161 & 162. Observations on Andalusian species, with note of a nearly black form of *C. lusitanicus*, Suffr.; G. Kraatz, Deutsche E. Z. 1876, pp. 137 & 138. *C. pexicollis* is not closely like *imperialis*, as Kraatz says; E. v. Harold, Ent. Nachr. ii. p. 52. *C. imperialis*, Waltl, *nec* Laich., was referred to; G. Kraatz, Ent. Nachr. ii. p. 82.

*Cryptocephalus melanostictus*, Fairm., = *senegalensis*, var.; L. Fairmaire, Pet. Nouv. ii. p. 50.

*Cryptocephalus sericeus* ♂ in copulation with *Chrysomela varians* ♀; Schmidt Goebel, S. E. Z. xxxvii. p. 392.

*Schizosternus*, g. n., F. Chapuis, CR. Ent. Belg. xix. p. xliv. *Cryptocephalites*: a remarkable modification of *Loxopleurus*, the prosternum being

produced in front, dilated, reflected, rhomboidal behind, and narrowly and very deeply emarginate at the apex, for the reception of a long median projection of the mesosternum. For *S. albo-gularis*, sp. n., *id. ibid.*, Australia.

*Arnomus*, g. n., D. Sharp, Ent. M. M. xiii. p. 99. Somewhat allied to *Stylosomus*, but with widely separated coxæ, ample elytra, and a visible scutellum. For *A. brouni*, sp. n., *id. ibid.*, New Zealand.

*Scolochrus batesi*, p. 81, *congruus*, p. 82, spp. nn., T. Kirsch, Deutsche E. Z. 1876, Peru.

*Metallactus regulus*, sp. n., *id. l. c.* p. 83, Peru.

*Cryptocephalus melanoxanthus*, p. 297, and var., p. 298, Taschkent, *bitæniatus*, p. 298, Valley of Sarafshan, &c., S. Solsky, Hor. Ent. Ross. xi.; *C. infirmior*, G. Kraatz, *l. c.* p. 138, S. France, E. Pyrenees: spp. nn.

*Loxopleurus sturmi*, p. xxxvii., *plagicollis*, *verticalis*, *æneolus*, *postremus*, and *erythrotis*, p. xxxviii., *collaris*, *piceitarsis*, *conjugatus*, and *difficilis*, p. xxxix., *chalceus*, *corruscus*, and *metallicus*, p. xl., *gibbus*, *gravatus*, *nigritus*[-*ta*], and *atramentarius*, p. xli., *subeirens*, *obtusus*, *læviusculus*, and *genialis*, p. xlii., *chalybæus*, *pauxillus*, *crassicostatus*, and *semicostatus*, p. xliii., *nigro-lineatus*, p. xliv., spp. nn., F. Chapuis, *l. c.*, various parts of Australia.

### *Chlamydides.*

*Chlamys bartletti*, p. 810, Peru, *unicolor*, p. 811, *pallida*, and *excavata*, p. 812, Amazons, spp. nn., M. Jacoby, P. Z. S. 1876.

### *Eumolpides.*

Lefèvre, E. Descriptions d'Eumolpides nouveaux ou peu connus. R. Z. (3) iv. pp. 278–311.

A new group and 6 new genera are characterized, besides the new species. *Colaspis jugularis*, Er., and *australis* and *corinthius*, Boisd., are referred to *Agetus*, Chap.; *Thasycles cordiformis*, Chap., = (*Edusa*) *laboulbenii*, Montrouz., ex. typ.; *Colaspis viridula* and *proxima*, Er., are referred to *Tomyris* [‖], Chap.; *Melina calceata*, Chap., = (*Eumolpus*) *tibialis*, Germ.

——. Synopsis des Eumolpides d'Europe et confins. Paris: 1876, 12mo, pp. 1–20 (with Appendix by De Marseul, pp. 21–32, comprising short descriptions of the species already described and only referred to by name by Lefèvre).

This little work bears the sheet-mark "L'Abeille, Eumolp., 1876," and forms the 8th livre. of L'Ab. xiv. *Pseudocolaspis variabilis*, Schauf., and *cyanea*, Raffr., = *brunnipes*, Ol.; *Acis cyanea*, Mots., ex. typ., = *Colasposoma dauricum*, Mann.; *Pachnephorus corinthius*, Fairm., and *hipponensis*, Desbr., = *cylindricus*, Luc.; *Colaspidea abbreviata*, Desbr., = *metallica*, Rossi, var.

*Chalcoparia*, Crotch, = *Chrysodina*, Baly; *Colaspis tristis*, Ol., belongs to *Noda*, Chap.; *Heteraspis*, Lec., *nec* Blanch., = *Scelodonta*, Westw.; *Tymnes verticalis*, Chap. = *Typophorus tricolor*, Crotch, = *Stenodiloba simplex*, Dej., = *Colaspis viridis*, F., Ol., = *Chrysomela tricolor*, F., for

which *Tymnes*, Chap., stands generically; *id.* Bull. Soc. Ent. Fr. (5) vi. pp. ccxxix. & ccxxx.

*Bromius vitis*. Observations on the different opinions as to the economy of this species; É. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 216 & 217.

*New genera and species, &c.:—*

Odontionopites. A new group, having great affinities with the *Tomyrites* of Chapuis, but glabrous above, with dentate femora, and the 4 hinder tibiæ widely emarginate on the outer side near the apex; founded on *Odontionopa* (Chevr., not characterized, *nec* Mots., *nec* Er.), for *Colaspis dentipes*, Wied., = *sericea*, Gyl., and *C. dentata*, Ol. E. Lefèvre, R. Z. (3) iv. pp. 300 & 301.

*Polysarcus*, id. *l. c.* p. 286. *Iphimeites*, with the facies of *Abirus* in the *Edusites*; for *P. abiroides*, p. 288, *foveicollis* and *dejeani*, p. 289, Brazil.

*Acanthixus*, id. *l. c.* p. 290. *Colaspites*; readily distinguished by the form of the prosternum. For *A. serratipes*, p. 292, Cayenne.

*Campylochira*, id. *l. c.* p. 293. *Colaspites*: with a remarkable curving and dilation of the front tibiæ in the ♂. For *C. fulvipes* and *pectoralis*, p. 294, Brazil.

*Lamprophœs* [*-phaes*], id. *l. c.* p. 298. *Chalcophanites*: differing from *Chalcophana* by the deeply immersed head and the intermediate tibiæ being widely sub-emarginate before the apex. For *Colaspis gemma*, Perty.

*Sphæropis* (Chevr., uncharacterized), *id. l. c.* p. 302. *Pseudocolaspites*: near *Trichostola*, from which it differs in the antennæ and prosternum. For *S. æruginosa*, p. 303, Brazil, *aureo-pilosa*, *brunnipes*, and *nigricornis*, p. 304, Peru.

*Peniticus*, D. Sharp, Ent. M. M. xiii., p. 101. No near ally as yet discovered. For *P. suffusus*, ibid., and *antiquus*, p. 102, New Zealand.

*Chrysodina viridis*, p. 278, *incerta* and *versicolor*, p. 279, Lefèvre, R. Z. (3) iv., Brazil.

*Chalcoplacis dimidiata* and *gloriosa*, id. *l. c.* p. 280, Cayenne.

*Chalcophyma fulgida* [*-dum*], p. 281, Cayenne, *discolor*, Bahia, and *collaris* [*-re*], Brazil, p. 282, *id. l. c.*; *C. striatum*, p. 813, and *reticulatum*, p. 814, Amazons, *tuberculatum*, p. 813, Cayenne, M. Jacoby, P. Z. S. 1876.

*Iphimeis fulva*, Lefèvre, *l. c.* p. 283, Bogota.

*Noda angulicollis*, p. 283, *aurulenta*, p. 284, *id. l. c.*, Peru.

*Lepronota peruana*, id. *l. c.* p. 285, Peru.

*Chalcophana carinata*, p. 297, Columbia, *insignis*, p. 298, Peru, *id. l. c.*

*Pseudocolaspis crassipes*, p. 3, *leprieuri*, p. 6, *carbonaria*, p. 7, Algeria, *græca*, p. 4, Mt. Taygetus, *heydeni*, p. 5, Morocco, *id.*, Synopsis; *P. serie-sericans*, *gossypiata*, and *pachydera*, L. Fairmaire, Pet. Nouv. ii. p. 94, El-Amri.

*Abirus harmandi*, p. 305, Saigon, *puberulus*, p. 306, Java, Lefèvre, R. Z. (3) iv.

*Pachnephorus ruficornis*, id., Synopsis, p. 10, Persia, Turkey.

*Colaspidea inflata*, id. *l. c.* p. 17, Algeria.

*Typophorus sanguinicollis*, p. 306, *maculipennis*, *spadiceus*, and *bisig-*

*natus*, p. 307, Brazil, *cyanipennis*, Mexico, *intermedius* and *pusillus*, Peru, p. 308, *minutus*, p. 309, Peru, *id.* R. Z. (3) iv.; *T. mexicanus*, p. 814 (and *humeralis*, Baly, var. n. *rufa*, p. 815), Guatemala, *melanocephalus*, p. 814, Mexico, *quadriplagiatus*, Amazons, *minutus*, Rio Janeiro, p. 815, M. Jacoby, P. Z. S. 1876.

*Colaspoides amabilis*, Bogota, *inedita*, Cayenne, p. 310, *reticulata*, p. 311, Brazil, Lefèvre, R. Z. (3) iv.

*Chrysomelides.*

*Phædon graminicola*, Duft., = *pyritosus*, Rossi, Ol., Suffr.; *P. neglectus*, Dej., *nec* Sahlb., = *pyritosus*, Duft., *nec* Rossi, ? Redt., = *hederæ*, Suffr.; *P. betulæ*, Suffr., *cochleariæ*, Gyll., Redt., = *armoraciæ*, L., Thoms.; *P. omissus*, Sahlb., *grammicus*, Duft., Suffr., = *cochleariæ*, F., Thoms.; of which *P. neglectus*, Sahlb., *nec* Dej., is probably a variety. G. Kraatz, Deutsche E. Z. 1876, pp. 185–188.

*Lina longicollis.* Observations on its economy; R. de Tinseau, Feuil. Nat. vi. 105.

*Doryphora decemlineata.* A general account, condensed from his own State Reports, by C. V. Riley, in "Potato Pests" (New York: 1876, 12mo, pp. 108, 49 cuts). General observations; G. C. Siemoni, Bull. Ent. Ital. viii. pp. 41–47. Found in New Granada in 1845; W. S. M. D'Urban, Ent. M. M. xii. p. 215. On its spread in America during 1875; in Missouri and other central States, little injury was done, but it increased much in the Atlantic States, and in the autumn reached Vermont and Boston, but had not then occurred in Maine; C. V. Riley, Rep. Ins. Mo. viii. pp. 1–12. It did not reach Quebec until 1875; V. Huart, CR. Ent. Belg. xix. p. ci. On the chances of its reaching Europe, &c.; G. Kraatz, Ent. MB. i. pp. 36 & 37, 55 & 56. Its occurrence at Garasbo in Sweden; Ent. Nachr. ii. p. 22. This contradicted; *l. c.* p. 93. Found alive near the Weser; *l. c.* p. 110. Experiments upon frogs with concentrated tincture of the beetle, resulting in the unavoidable conclusion that they are not poisonous, and that any injurious result probably arises from arsenic, commonly used to destroy the beetle in America; A. R. Grote & A. Kayser, Am. Nat. x. pp. 205–207, also translated by Dohrn, S. E. Z. xxxvii. p. 438. The innoxious nature not considered satisfactorily proved; J. S. Kingsley, *l. c.* p. 303.

*Entomoscelis adonidis* destroying cabbages in South Germany; G. Kraatz, Ent. MB. i. p. 39. See also K. von Weidenbach, *l. c.* p. 57.

*Phyllodecta cavifrons*, Thoms., = *laticollis*, Suffr.; E. v. Harold, C. H. xv. p. 174.

*Chrysomela alternata*, p. 84, *citrinella* and *fraudulenta*, p. 85, *ucayalis*, p. 86, *stillata*, p. 87, T. Kirsch, Deutsche E. Z. 1876, Peru; *C. peyroni*, F. Ancey, Pet. Nouv. ii. p. 94, Beyrouth: spp. nn.

*Doryphora rugosa* and *costata*, spp. nn., M. Jacoby, P. Z. S. 1876, p. 816, Columbia.

*Æsernia sumptuosa*, p. 523, Misor, *formosa*, Humboldt Bay, and *pulchella*, Sorong, p. 524, spp. nn., R. Gestro, Ann. Mus. Genov. viii.

*Timarcha punctella*, p. 387, Algeria, *scabripennis*, p. 388, Andalusia, [? De Marseul] L'Ab. 1876, spp. nn.

*Horatopyga ornata*, Camaroons, *saundersi*, Algoa Bay, *sejuncta*, South Africa, spp. nn., J. S. Baly, Ent. M. M. xiii. p. 79.

*Carystea micans*, sp. n., *id. l. c.* p. 80, W. Australia.

*Halticides.*

HAROLD, E. VON. Beiträge zur Kenntniss der Fauna von Neu-Granada. Halticinæ. ii. C. H. xv. pp. 1–36. [Zool. Rec. xii. p. 377.]

*Disonycha glabrata*, F., *Cacoscelis marginata*, F., and other species, are redescribed, with synonymy. A second division is formed, under the name of *Halticinæ haplopodes*, for all species with no transverse basal groove to the thorax, the hinder tibiæ not emarginate at the apex, and the hindmost claws non-appendiculate. These are divided into sections with the anterior acetabula open and shut respectively.

*Graptodera longicollis* and *helianthemi*, All., *Thyamis ferruginea*, Foudr., and *Psylliodes instabilis*, Foudr., substantiated as British; the *G. pusilla* of British collections = *oleracea*. E. C. Rye, Ent. M. M. xii. pp. 179 & 180.

*Sphæroderma cardui* in the larval state mines the leaves of Artichoke, *Cynara cardunculus*, *Cirsium arvense*, *Centaurea nigra*, and other *Carduaceæ*, pp. 177–179; *Psylliodes chrysocephala*, from turnips, pp. 181 & 182; *Crepidodera lineata*, from *Erica scoparia*, pp. 198–200; *Graptodera lythri*, from *Circæa lutetiana*, also found on *Epilobium*, *Œnothera biennis*, *Isnardia palustris*, and *Lythrum salicaria*, pp. 214 & 215. E. Perris, Ann. Soc. Ent. Fr. (5) vi. The larvæ of all these species described.

*Phyllotreta lepidii*, *obscurella*, and *nemorum*. On their food-plants; the first two are omitted from Taschenberg and Kaltenbach's works [*obscurella* is in the latter, under *pœciloceras*,—a name given by Schenck *l. c.* as *psecitoceras*], and the food-plant of *Haltica oleracea* discussed; Schenck, Ent. Nachr. ii. p. 91.

*Œdionychus*, *Homophœta*, *Aspicela*, and *Asphæra*. The generic characters discussed at length, and a fresh scheme proposed, based upon the structure of the metatarsus, frontal tubercles, and metasternum. E. v. Harold, C. H. xv. pp. 91–98.

*Asphæra nobilitata*, Hübn., *nec* Fab., renamed *huebneri*; id. *l. c.* p. 174.

*New genera and species:—*

*Alema*, D. Sharp, Ent. M. M. xiii. p. 98. A "highly important synthetic form," indicating a separate tribe of Chapuis' Eupodes, connecting that section with the *Halticides* of the section Cycliques. For *A. paradoxa*, ibid., New Zealand.

*Oryctoscirtetes* (foss.), S. H. Scudder, Bull. U. S. Geol. Surv. ii. p. 82. Near *Œdionychus*; apical joint of hind tarsi as long as all the preceding joints together, enlarging gradually from base to apex, with apparently simple claws, which are nearly half as long as the apical joint itself. *O. protogæum* [*-us*] (foss.), *id. l. c.* p. 83, tertiaries of Colorado.

*Trichaltica*, Harold, C. H. xv. p. 2. Allied to *Diphaulaca*, with pubescent upper side and deeply and regularly punctured striæ to the elytra. For *D. etipennis*, Boh., and *Crepidodera scabricula*, Crotch; also *T. denticollis*, ibid., San Carlos, *rugicollis*, p. 3, Medellin, and *bogotana*.

p. 4, Bogota, *T. amazona*, p. 586, Pará, *elegantula* (type, of which *Crepidodera elegantula*, Baly, 1865, is a var.), p. 587, and *dentata*, p. 588, Brazil, J. S. Baly, Tr. E. Soc. 1876.

*Sangaria*, Harold, *l. c.* p. 13. Between *Systena* and *Iphitrea*. With the long metatarsus of *Longitarsus*, but thorax transversely sulcate at base. Claws evidently appendiculated. For *Sang. haagi*, ibid., Bogota.

*Ptocadica*, id. *l. c.* p. 25. *Haplopodes*, with open front acetabula. Superficially like *Sphæroderma*, but allied to *Aphthona*. For *P. straminea*, p. 26, New Granada.

*Nasidia*, id. *l. c.* p. 32. Allied to *Oxygona*, but with the middle joints of antennæ the shortest, the posterior tibiæ sharply carinated longitudinally on the outside, &c. For *N. haagi*, p. 33, Canoas.

*Pentamesa*, id. *l. c.* p. 124. Near *Argopus*, but with a pentagonal mesosternum, with one angle pointing forwards, and emarginate behind. *P. 12-maculata*, ibid., E. India.

*Sutrea*, Baly, *l. c.* p. 435. Allied to *Sebæthe*, but narrower, with less dilated sides to the thorax and elytra, and no longitudinal sulcation on the dorsal surface of the tibiæ; from *Aphthona*, it differs in the unarmed apices of the four front tibiæ. For *S. elegans* and *hexaspilota*, p. 436, *albo-fasciata*, p. 437, *wallacii* and *bipustulata*, p. 438, New Guinea.

*Eucyla*, id. *l. c.* p. 439. No affinities suggested; placed between *Argopus* and *Chirodica*. For *E. quadripustulata* and *æneipennis*, p. 440, Borneo.

*Phygasia*, id. *l. c.* p. 445. Follows *Phrynocepha*. For *Phy. ornata*, Hong Kong, and *hookeri*, Kasia Hills, India, *ibid.*

*Lypnea*, id. *l. c.* p. 446. Separated from *Lactica* and its allies by the punctate-striate costate elytra, and from *Diphaulaca* by the thorax and the want of a transverse elytral depression. *L. flava*, ibid., New Guinea, Batchian.

*Syphrea*, id. *l. c.* p. 447. Strongly resembles *Hermaophaga*, but with thoracic basal furrow extending right across. *S. pretiosa*, ibid., Guatemala.

*Sphærophysa*, id. *l. c.* p. 581. No differential characters given. *S. clavicornis*, p. 582, Madagascar.

*Enneamera*, new name for *Nonarthra*, Baly (vox hybrida); E. v. Harold, C. H. xiii. p. 185. *Enneamera sumatrensis*, id. S. E. Z. xxxvii. p. 233, Sumatra; *E. thoracica*, Manilla, *limbata*, Menado, *fulviventris*, Amboyna, *australis*, W. Australia, Baly, *l. c.* p. 82.

*Elithia lenzi*, Harold, C. H. xv. p. 118, Chili.

*Apocrypta aureipennis*, Baly, *l. c.* p. 435, Borneo.

*Chirodica fulvipes*, p. 441, *fulva*, *wollastoni*, and *elongata*, p. 442, *id. l. c.*, Cape of Good Hope.

*Podagrica chapuisi* and *tarsata*, p. 443, *psyche*, p. 444, Java, *id. l. c.*

*Elytropachys quadripustulata*, Singapore, and *cæruleipennis*, Cambodia, *id. l. c.* p. 448.

*Nisotra bowringi*, id. *l. c.* p. 584, Hong Kong.

*Balanomorpha limbata*, E. Allard, L'Ab. 1876 (xiv.) p. 24, Syria.

*Oxygona columbica*, p. 35, New Granada, *signata*, p. 119, Surinam, Harold, *l. c.*

*Plectroscelis ingenua* and *simplicifrons*, p. 594, *bella* and *philoxena*, p. 595, *discreta* and *granulifrons*, China, *compressipes*, Camaroons, and *australica*, Australia, p. 597, Baly, *l. c.*

*Crepidodera interrupta*, p. 584, and *flavescens*, p. 585, Brazil, *dimidiata*, p. 586, Australia, *id. l. c.*; *C. judæa*, Allard, *l. c.* p. 21, Syria; *C. pleuralis*, Harold, *l. c.* p. 16, Bogota.

*Epitrix villosa*, Harold, *l. c.* p. 17, Medellin; *E. subcestita*, p. 588, *nucea*, p. 589, *torrida* and *cæruleata*, p. 592, Brazil, *apicicornis*, p. 589, *sejuncta* and *serratula*, p 591, *cyanella*, p. 593, Pará, *segregata*, p. 590, Bahia, Baly, *l. c.*

*Orestia parallela*, p. 22, *brulerieri*, p. 23, Allard, *l. c.*, Syria.

*Iphitrea balyi*, Harold, *l. c.* p. 15, note, Central America.

*Systena chloropus*, id. *l. c.* p. 12, Ocana.

*Haltica discors*, p. 9, *tutelaris* and *nugatrix*, p. 10, *integricollis*, p. 11, New Granada, *sallei* [*sallæi*], and *complicata*, p. 119, Mexico, *id. l. c.*

*Phrynocepha heydeni*, id. *l. c.* p. 119, Paraguay; *P. degrollii*, Baly, *l. c.* p. 444, Mexico.

*Cacoscelis pectoralis*, Harold, *l. c.* p. 8, Fusagasuga, New Granada.

*Disonycha eximia*, p. 6, and *steinheili*, p. 7, *id. l. c.* Calamar and other New Granadan localities; *D. ornata*, Baly, Ent. M. M. xiii. p. 80, Upper Amazon.

*Aphthona maculata*, Allard, *l. c.* p. 23, Jericho; *A. cœlestina*, p. 19, *lioptera* and *substriata*, p. 20, *brevicollis* and *lineolata*, p. 21, *frontalis*, p. 22, *erythrostoma*, p. 23, *difficilis* and *ubaquensis*, p. 24, Harold, *l. c.*, New Granada.

*Phyllotreta æmula*, Harold, *l. c.* p. 18, Bogota.

*Longitarsus oopterus*, p. 29, *subcinctus*, p. 30, *columbicus*, p. 31, and *bogotanus*, p. 32, New Granada, *subtilis*, p. 31, note, Venezuela, *id. l. c.*

*Thyamis binotata* and *godmani*, Baly, Tr. E. Soc. 1876, p. 583, Shanghai; *T. angusta*, Allard, *l. c.* p. 24, Syria.

*Sebœthe 4-pustulata*, Baly, Ent. M. M. xiii. p. 80, Java.

*Sphærometopa ornata*, p. 433, Java, *cumingi*, Philippine Isles, and *diversa*, Singapore, p. 434, *id.* Tr. E. Soc. 1876.

*Homopheta æquatorialis*, p. 119, Eucador, *sexnotata*, p. 120, no locality given, Harold, *l. c.*

*Asphæra cyanopis* and *xanthocephala*, Mexico, *auripennis*, Bahia, *wagneri*, Eucador, p. 120, *schaufussi*, New Friburg, *t-album*, Buenos Aires, p. 121, *id. l. c.*

*Œdionychis militaris*, p. 121, Minas Geraes, *reichii* and *mexicana*, ibid., *boucardi*, p. 122, and *maculata*, p. 124, Mexico, *concolor*, p. 121, *zygogrammica*, *vittata*, and *blanda*, p. 122, *arcifera*, *faceta*, *femorata*, and *nigro-maculata*, p. 123, Brazil, *cosmogrammica*, p. 123, New Friburg, *jocosa*, p. 124, N. America, *icteridera*, p. 122, no locality given, *id. l. c.*

*Lactica fulvipes* and *apicicornis*, Amazons, *sellata*, *nigripennis*, and *subnitida*, Pará, *binotata*, Mexico, Baly, Ent. M. M. xiii. p. 81.

*Hermæophaga tricolor*, Brazil, *ventralis*, Pará, *id. l. c.* p. 80.

*Argopus haroldi*, id. Tr. E. Soc. 1876, p. 439, India.

*Sphæroderma picea* [*-ceum*], id. *l. c.* p. 582, Shanghai.

*Dibolia intermedia*, p. 598, and *trimeni*, p. 599, S. Africa, *gravida*, p. 599, Camaroons, *id. l. c.*

*Psylliodes novæ-caledoniæ*, p. 600, New Caledonia, *breweri* and *quadridentata*, p. 601, W. Australia, *id. l. c.*

*Galerucides.*

*Lyperus flavus*, Rosenh., destructive to apple-trees near Algiers; M. Girard, Pet. Nouv. ii. p. 51, and Bull. Soc. Ent. Fr. (5) vi. p. cxxvi.; *L. xanthopus*, Dufts., nec Schrank, renamed *violaceus*; E. v. Harold, C. H. xv. p. 174.

*Galerucella australis*, Boh., belongs rather to *Dircema*; Harold, *l. c.*

*Ensiforma*, g. n., M. Jacoby, P. Z. S. 1876, p. 817. Bears a close affinity to *Diabrotica*, but with antennæ as long as the body, and with their three subapical joints broadly flattened, the apical joint being long and pointed. For *E. cærulea*, sp. n., *id. ibid.*, Brazil.

*Aulacophora albicornis, postica, uniformis*, and *tibialis*, p. xcix., *sexnotata, viridipennis, pectoralis, flavicornis, limbata, quadrimaculata, flavescens*, and *varians*, and *A.* (*Ceratia*) *marginalis, quadrinotata*, and *vittula*, p. c., *nigripennis* and *marginata*, p. ci., spp. nn., F. Chapuis, CR. Ent. Belg. xix., Philippine Isles (short diagnoses only).

*Hispides.*

A review of the species known to occur in the Philippine Islands; F. Chapuis, *l. c.* pp. xvii.–xxviii.

*Prionispa nitida*, Chap., = *Hispa sexspinosa*, Guér.; J. S. Baly, Ent. M. M. xiii. p. 129.

*Callispa elegans*, p. 126, Sumatra, *africana*, p. 127, R. Niger, *id.* l. c.; *C. duodecim-maculata*, Chapuis, *l. c.* p. xvii., Bojol: spp. nn.

*Hispodonta semperi*, Luzon, *tarsata*, Mindanao, spp. nn., Chapuis, *l. c.* p. xviii.

*Cryptonychus limbatus*, sp. n., C. O. Waterhouse, Ann. N. H. (4) xviii. p. 121, Rodriguez Island.

*Botryonopa purpurascens*, sp. n., Chapuis, *l. c.* p. xix., Mindanao.

*Anisodera thoracica*, Luzon, *parallela*, Mindanao, spp. nn., *id. l. c.* p. xx.

*Hispopria crenata*, p. xxi., Mindanao, *punctatissima*, p. xxii., Luzon, *id.* l. c.; *H. terminalis*, Baly, *l. c.* p. 127, Mindanao; spp. nn.

*Promecotheca callosa*, Baly, *l. c.* p. 128, Port Essington, Australia; *P. octostriata*, Chapuis, *l. c.* p. xxiii., Bojol: spp. nn.

*Gonophora chapuisi*, sp. n., Baly, *l. c.* p. 129, Philippine Islands.

*Distolaca bimaculata*, sp. n., Chapuis, *l. c.* p. xxiii., Mindanao.

*Oncocephala bicristata*, sp. n., *id. l. c.* p. xxiv., Luzon.

*Downesia strigicollis*, sp. n., Baly, *l. c.* p. 128, Cochin China.

*Hispa leonardi*, C. Ritsema, Tijdschr. Ent. xix. p. 48, Atchin, N. Sumatra; *H. palliata* and *vittula*, p. xxv., *puberula*, p. xxvi., Mindanao, *infuscata*, p. xxvi., Bojol, Chapuis, *l. c.*: spp. nn.

*Platypria longispina* and *subopaca*, spp. nn., Chapuis, *l. c.* p. xxvii., Mindanao.

*Prionispa gemmata*, sp. n., Baly, *l. c.* p. 129, Batchian.

*Cassidides.*

*Cassida.* A list of the European species of which the habits are more or less known, with food-plants. Observations on the larval structure, and on the existence in them of lateral ocelli. *C. margaritacea* proved to feed on *Dianthus prolifer*. E. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 203–208.

*Cassida nebulosa*, L., var. *affinis*, destroying an introduced plant, *Chenopodium quinoa*, from the Peruvian Andes; H. Lucas, Bull. Soc. Ent. Fr. (5) vi. p. cxx.

*Tauroma reticulata* and *insculpta*, spp. nn., T. Kirsch, Deutsche E. Z. 1876, p. 88, Peru.

*Canistra cruentata*, sp. n., *id. l. c.* p. 89, Peru.

*Calaspidea andicola*, sp. n., *id. l. c.* p. 90, Peru.

*Mesomphalia obscura* and *consanguinea*, spp. nn., *id. l. c.* p. 91, Peru.

*Chely*[*o*]*morpha cincta*, sp. n., *id. l. c.* p. 92, Peru.

*Physonota dilatata*, sp. n., *id. l. c.* p. 93, Peru.

*Charidotis quadrimaculata*, sp. n., *id. l. c.* p. 94, Peru.

*Cassida cori*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 25, Crete.

*Coptocycla subramosa*, p. 95, *laqueifera* and *peruviana*, p. 96, *jucunda*, p. 97, spp. nn., Kirsch, *l. c.*, Peru.

## Erotylidæ.

F. Chapuis, Gen. Col. xii. p. 10, considers that this family has too much analogy with the *Chrysomelidæ* to be removed by any considerable interval. He adopts three tribes, Langurides, Hélotides, and Érotylides. The larva of *Engis humeralis* described by Bedel is considered probably to be that of a *Cis* (p. 20). *Orestia* is considered to be probably an intermediate form between the *Erotylidæ* and *Endomychidæ* (p. 76).

Crotch, G. R. A revision of the Coleopterous family *Erotylidæ*. Cist. Ent. i. (No. xlvi., Feb. 26, 1876) pp. 377–572, also separately paged, 1–196.

Amongst many synonymical and other observations, the following occur:—*Languria convexicollis*, C. O. Wat., *nec* Horn, is renamed *waterhousii*, p. 14; *Langurites ventralis*, Chevr., ? = *lineata*, Lap., var.; *Dacne* [*Engis*] *notata*, Gmel., adopted for *bipustulata*, F., *nec* Thunb.; *Episcapha oculata*, Lac., = *annulata*, Macl.; *Pselaphacus gracilis*, Lac., = *curvipes*, Guér.; *Megischyrus grammistes*, Lac., = *lineatus*, Lac.; *Amblyopus testaceus*, Lac., = *senegalensis*, Lac., var.; *Tritoma præposita*, Walker, ? = *Amblyopus vittatus*, Ol., var. imm.; *Mycotretus* 14-*guttatus*, Lac., var. n. ? *conjunctus*, p. 64; *M. pulicarius* and *gentilis*, Lac., = *gemmula*, Lac.; *M. terminalis*, *intermedius*, *difficilis*, *ornatus*, *maculosus*, *dubius*, *coronatus*, *nigro-punctatus*, *graphoderus*, and *cognatus* are probably all one species; *M. posticus*, Lac., = *godarti*, Lac.; *M. tigrinus*, Ol., var. n. *pardalis*, p. 75; *M. nigro-cinctus*, Lac., = *tigratus*, Lac., var., and both ? = *trabeatus*, Lac.; *M. siloceus*, Lac., = *sobrinus*, Guér.; *Tritoma bifaciens*, Walk., is a *Cychramus*, and *T. proposita*, Walk., ? an *Amblyopus*; *Triplax menetriesi*, Fald., probably does not belong to this family; *Cyclomorphus*

*infaustus*, Lac., = *humboldti*, Lac.; *Ægithus consularis*, Guér., = *cyanipennis*, Guér., var.; *Æ.* 6-*maculatus*, Kirsch, = *andrewi*, Lac., var.; *Æ. rufipennis*, Chevr., = *cardinalis*, Chevr., var., and var. n. *meridionalis*, p. 117; *Æ. cassidens*, Lac., = *lebasi*, Lac.; *Brachysphenus mediatus*, Lac., = *duplicatus*, Lac., var.; *B. tricinctus*, Dup., var. n. *recte-signatus*, p. 125, Amazons; *B. nigro-pictus*, Lac., var. n. *decoloratus*, p. 126, Amazons; *B. detritus*, Lac., adopted for *Morphoides ? nebulosus*, Guér., which clashes with *Ischyrus nebulosus*, Guér., both in this genus; *B. litigiosus*, Lac., = *mendax*, Lac.; *B. m-nigrum*, Lac., = *varians*, Lac.; *B. hæmatopterus*, Lac., = *dorso-notatus*, Lac., var.; *B. 5-fasciatus*, Lac., varr. nn. *orthozonius* and *anisozonius*, Ecuador, *basicinctus*, Amazons, p. 142; *B. fasciato-punctatus*, Lac., = *brongniarti*, Lac.; *B. ramosus*, Ol., varr. nn. *dilaceratus*, Columbia, *carmineus* and *apicicinctus*, Ecuador, p. 145; *Spheneoxus*, Lac., is entitled to generic rank; *Erotylus dryas*, Lac., = *agrotas*, Lac., immat.; *E. fulgurator*, Lac., = *teniatus*, Lac.; *E. lacordairii*, Lac., = *helopioides*, Dup.; *E. unifasciatus*, Lac., *nec* Fab., renamed *theodori*, p. 159; *Cypherostylus foraminosus*, Lac., = *apiatus*, Lac., var.; *C. melanostigma*, Lac., = *vicinus*, Guér.; *Erotylus californicus*, Lac., = *C. boisduvali*, Chevr.; *Zonarius xanthomelas*, Lac., = *indicus*, Hbst.; *Scaphidomorphus boscii*, Guér., = 5-*punctatus*, L.; *S. undatus*, F., varr. nn. *præustus*, *zigæna*, *atro-flavus*, *interruptus*, *deficiens*, *thoracicus*, *inchoatus*, and *basi-signatus*, Venezuela, p. 171; *Priotelus equestris*, Lac., var. n. *amazonicus*, p. 177, Amazons; *Homæotelus dorbignii*, Guér., is distinct from *testaceus*, Fab.; *H.* 3-*maculatus*, Kirsch, = *umbonatus*, Lac.

The following new genera and species are characterized:

*Pachylanguria*, p. 1; type, *Languria paiva*, Woll., also *P. collaris*, ibid., and *metasternalis*, p. 2, India.

*Tetralanguria*, p. 2; closely resembles *Pachylanguria*, but with thorax elongate, anterior angles well marked, posterior produced, acute. Type, *Languria splendens*, Wied. (*L. splendens*, Mots., renamed *splendida*), also *Trogosita elongata*, Fab., &c.

*Languriosoma*, p. 3, for *L. mouhoti*, Laos, *cardiophoroides*, Cambodia, *brookii* and *cyanipennis*, Borneo, *ibid.*

*Pentelanguria*, p. 4, for *P. clateroides* and *notopedalis*, ibid., India.

*Ozylanguria*, ibid., for *O. acutipennis*, p. 5, Sarawak.

*Callilanguria*, p. 5, for *C. luzonica*, Luzon, and *wallacii*, Sumatra, *ibid.*

*Teretilanguria*, p. 18, for *T. kirschi*, Bogota, and *panamæ*, Panama, *ibid.*, also *L. basalis*, Guér.

*Goniolanguria*, p. 19, for *L. latipes*, S. Saunders, and ? *G. reichii*, ibid., Brazil.

*Ortholanguria*, ibid., for *O. batesi*, ibid., Ega, Cayenne, and *concolor*, p. 20, New Granada.

*Pseudodacne*, p. 22, for *P. admirabilis*, ibid., Sarawak.

*Thallisella*, p. 26, for *T. peruviana*, Peru, and *malasiæ*, Sarawak, p. 27.

*Tetrathallis*, p. 27, for *T. carminea*, ibid., Sarawak.

*Coptengis*, p. 28, for *Triplatoma sheppardi*, Pascoe, and *C. pascoii* and *chapuisi*, Gilolo, *wallacii*, Batchian, ibid., *multiguttatus*, p. 29, Malasia.

*Episcaphula*, p. 33. *Episcapha* with 3rd joint of antennæ elongate. For *E. amboinensis*, *oblique-signata*, *insularis*, and *nigro-rufa*, ibid., *argus*

and *quadrisignata*, p. 34, *xanthosticta*, p. 35, *proxima*, *subparallela*, and *denticulata*, p. 37, *sublævis*, p. 39, Malasia, *rude-punctata*, p. 34, *pictipennis*, p. 35, *opaca*, p. 36, Australia, *hislopi*, Berah, *aulacochiloides* and *dubia*, Natal, *thoracica*, New Guinea, p. 36, *recte-signata*, Africa, *trichroa*, Old Calabar, *savagii*, Cape Palmas, p. 38, *abnormalis*, p. 39, locality unknown.

*Epytus* (Dej. Cat.), p. 57. For *Erotylus violaceus*, Stm., and *Ischyrus tarsalis*, Lac., = *Oocyanus tarsatus*, Lac.

*Callischyrus*, p. 58. Allied to *Ischyrus* in palpi and mentum, but with eyes much less strongly granulated. For *Erotylus insignis*, Lap., &c., and *C. candezii*, ibid., Guatemala.

*Spondotriplax*, p. 93. For *S. endomychoides*, Sarawak, *cyanecula*, Salwatty, and *ceramensis*, Ceram, p. 94.

*Mycolybas*, p. 97. Differs from *Mycotretus* in its convex surface, want of coxal lines and basal margin to thorax, and truncate basal lobe; and from *Lybas* in the mentum, dilated tibiæ, &c. For *L. lucidus*, Lac., &c., and *M. ega*, p. 98, Ega.

*Palæolybas*, p. 98. Represents the S. American *Lybas*; tibiæ triangularly dilate for their whole length. *P. andreæ*, *humeralis*, *nigripennis*, and *coccinelloides*, p. 99, W. Africa.

*Neozestus*, p. 100, near *Xestus*, but with trapezoidal mentum, raised and denticulate margin to base of elytra, and very transverse [illegible] *N. chilensis*, ibid., Chili.

*Micrencaustes*, p. 102. Differs from *Encaustes* in its [illegible]um being compressed, elevated, and produced into a point under the mentum. For *E. sinuata*, Lac., = *Dacne lunulata*, MacL., &c.

*Typocephalus* (Dej. Cat.), p. 147. For *Erotylus dimidiatus*, Ol., &c. and *T. interpunctatus*, Venezuela, and *vespoides*, Amazons, p. 148.

*Micrerotylus*, p. 165. Agreeing with *Barytopus* in the geminate striation of the elytra, but otherwise nearer *Erotylus*. For *Chrysomela gronovii*, Hbst., &c., and *M. dubitabilis*, Amazons, *hesitans*, Ecuador, and *funerellus*, New Granada, *ibid.*

*Perithonius*, p. 173. Resembles *Euphanistes*, but with rather coarsely granulated eyes, emarginate clypeus, no keel to prosternum, &c. For *E. misolampoides*, Lac.

*Rhynchothonius*, p. 174. With very long and narrow rostrum, large and prominent eyes, deflexed head, narrow prosternum, &c. For *R. albido-guttatus*, ibid., Amazons.

*Phricobacis*, p. 181. Differs from *Bacis* in its large size and oblong form, close rugulose punctuation, and different prosternum. For *P. batesi*, *pulcher*, and *rufo-limbatus*, p. 182, Amazons, *Erotylus hopii*, Guér., &c.

*Doubledaya whitii*, p. 6, Sumatra.

*Fatua scalii*, Madras, *lambi*, Penang, p. 6, *bowringi*, Cambodia, *crassa*, Penang, p. 7.

*Languria promontorii*, p. 7, *formosa*, p. 8, Cape of Good Hope, *cyanipennis*, p. 8, *sellata*, p. 9, Mexico, *rufipes*, Morty, *gilolæ*, Gilolo, *papuensis*, Dorey, p. 10, *coarctata* and *barbara*, Macassar, *nigro-cyanea*,

Tonda, *menadensis*, Menado, p. 11, *propinqua* and *scutellata*, Sumatra, *tarsata*, Ceram, *nitidior*, Penang, *cambodiæ*, Laos, p. 12, *aviloides* and *cuneiformis*, p. 13, Sarawak.

*Trapezidera prolongata*, *chalcea*, and *ænea*, p. 17, Mexico.

*Dacne* [*Engis*, auctt.] *capensis*, p. 21, Natal.

*Thallis nigro-ænea*, p. 23, New Caledonia, *xantho-sticta*, Gilolo, and *indica*, India, p. 25, *T.* (?) *bifasciata*, p. 23, Rockhampton, *erichsoni*, Sydney, and *wallacii*, Aru, p. 24, *insueta*, p. 25, Queensland, *humeralis*, Waigiou, and *mycetocharoides*, Batchian, p. 26.

*Triplatoma attenuata*, p. 29, *bizonata*, p. 30, Borneo, *pubescens*, p. 30, Ceylon.

*Episcapha africana*, Old Calabar, *intermedia*, Java, *antennata*, Manilla, &c., p. 31, *consanguinea*, China, *indica*, Darjeeling, p. 32.

*Megalodacne batesi*, p. 40, Amazons, *chinensis*, China, *luteo-guttata*, Tringano, *simillima*, Sarawak, and *elongatula*, Malacca, p. 41.

*Pselaphacus ducalis*, p. 43, New Granada, *confusus*, *nigro-pictus*, and *punctato-striatus*, p. 44, *amazonicus*, p. 45, *approximatus*, p. 46, Amazons.

*Megischyrus chevrolati*, Minas Geraes, *connexus*, New Granada, and *mesomelas*, Ecuador, p. 47, *guatemalæ*, Guatemala, *bogotæ*, Bogota, and *catenatus*, Amazons, &c., p. 48.

*Ischyrus impresso-punctatus*, no locality given, and *agnatus*, New Granada, p. 50, *vittatus*, p. 51, *sheppardi*, p. 52, Brazil, *bahiæ*, p. 52, Bahia, *pallidior*, ibid., and *insolens*, p. 53, Mexico, *boucardi*, *nobilis*, and *consimilis*, p. 53, *nitidior*, p. 54, Amazons, *bogotæ*, p. 54, Bogota, *nigro-lineatus* and *similior*, p. 56, locality unknown, *collatinus*, p. 57, New Granada.

*Amblyopus natalensis*, p. 59, S. Africa, *murrayi*, p. 60, Old Calabar.

*Cyrtomorphus inversus*, *angustior*, and *wallacii*, p. 61, Malasia.

*Mycotretus mutabilis*, *basalis*, and *cinctiger*, p. 62, *pebasensis*, p. 63, *decorus*, *separandus* (? = *decorus*, var.), and *egæ*, p. 66, *signatellus* (and var. *imperfectus*), *reticulatus*, and *psylloboroides*, p. 67, *tricolor*, *dimidiatus* (*nec* Taschenb., 1870; renamed *seminiger*, E. v. Harold, C. H. xv. p. 174), and *opalescens*, p. 68, *nitescens*, *sericeo-nitens*, *balteatus*, and *rastratus*, p. 69, *triplacoides*, *fulvilabris*, and *fulviceps*, p. 71, *parallelus*, p. 77, *cordiger* and *lissomoides*, p. 79, *episcaphoides*, p. 80, *mycetophagoides*, and var.? *erythrocerus*, p. 81, *mycetophiloides* and var. *careus*, and *M.* (?) *xanthomelas*, p. 82, Amazon region, *illustris*, p. 64, *sallæi*, p. 76, *nigro-tinctus* and *laviventris*, p. 78, Mexico, *guatemalæ*, p. 65, Guatemala, *bis-septem-guttatus*, p. 65, Cayenne, *brasilianus*, p. 66, *deyrollii*, p. 75, Brazil, *peruæ*, p. 70, *adalioides*, p. 72, *quadripunctatus*, p. 74, Peru, *corallipennis*, p. 72, Venezuela, *succinctus*, p. 76, *puncticeps*, p. 78, *sanguinosus*, p. 82, Columbia, and *chilensis*, p. 78, Chili.

*Cyrtotriplax maacki*, p. 84, Siberia, *senegalensis*, p. 85, Senegal, and *C.* (?) *anisotomoides*, *dentipes*, and *postica*, p. 86, Sarawak.

*Triplax sibirica*, p. 90, Lake Baikal, *indica*, *apicata*, and *coccinea*, p. 91, and *T.* (?) *sanguinea*, p. 92, India.

*Tritomidea* (?) *chrysospila*, Singapore, and *nigro-cruciata*, Sarawak, p. 93.

*Encaustes opaca*, Ligor, *marginalis*, Penang, p. 101, *humeralis*, New Guinea, and *wallacii*, Tonda, p. 102.

*Thonius substriatus*, *nebrioides*, and *flexus-signatus*, Columbia, *buckleyi*, Ecuador, p. 106.

*Cyclomorphus laviusculus*, p. 107, Venezuela, *alienus*, p. 108, *extricatus* and *sub ocellatus*, p. 109, *apicicornis*, *æneo-maculatus*, *coccinellinus*, and *gibbosus*, p. 110, Columbia, *iphicloides*, p. 109, Ecuador.

*Strongylosomus peruvianus*, p. 112, Peru.

*Ægithus separandus*, p. 114, *truncatus*, p. 116, *politissimus*, p. 117, *striatellus*, p. 119, Ecuador, *inflatus* and *cordatus*, p. 117, *dichrous* and *assimilis*, p. 119, Amazons.

*Brachysphœnus fasciunculus* and *fasciellus*, p. 121, *masculinus* and *lætus*, p. 123, *epigraphus*, p. 124, *luteo-pictus*, p. 125, *paraffinis* and *bizonatus*, p. 126, *deficiens* and *tetrastictus*, p. 129, *cordiger*, p. 131, *basalis*, p. 134, *erotyloides*, p. 139, *amazonus*, p. 140, *epipleuralis*, p. 141, *luteo-zonatus* and *odyneroides*, p. 142, *eburneus*, p. 143, *obsolete-signatus* and *hexastictus* (with var. *discretus*), p. 144, *subsanguineus* and var. *disjunctus*, p. 145, Amazon region, *luteo-niger*, p. 122, *melanostictus*, p. 129, *ecuadorensis*, p. 133, *nigriventris*, p. 140, *lateripunctatus*, p. 141, Ecuador, *columbicus*, p. 140, Columbia, *venezuelæ*, p. 143, Venezuela.

*Typocephalus interpunctatus*, Venezuela, *vespoides*, Amazons, p. 148.

*Eurycardius concolor*, p. 148, Minas Geraes.

*Erotylus margine-guttatus*, p. 150, *rude-punctatus*, p. 151, *nautæ*, p. 152, *varians* and *cingulatus*, p. 154, *scaphidomorphoides*, p. 156, *melanostictus* and *cassidoides*, p. 157, *geminatus*, p. 158, *nigro-tibialis* and *flavangulus*, p. 159, Amazon region, *margine-maculatus* and *buckleyi*, p. 151, *picturatus*, p. 153, *ecuadoricus*, p. 154, *bifasciatus*, p. 156, *imperfectus*, p. 157, *parce-punctatus*, p. 159, *decipiens*, p. 160, Ecuador, *peruvianus*, p. 151, Peru, *intermedius*, p. 154, *rufipes*, p. 159, Columbia, *connectens*, p. 155, Brazil, *confluens*, p. 155, Mexico, *hieroglyphicus*, p. 156, Venezuela, and *elongatulus*, p. 157, locality unknown.

*Cypherotylus maximus* and *impunctatus*, p. 161, Amazon region, *æneo-niger*, p. 163, *variolosus*, p. 164, Ecuador, *guatemalæ*, p. 164, Guatemala, *apicalis*, ibid., Columbia.

*Zonarius quadrifasciatus*, p. 167, Mexico, *guatemalæ*, ibid., Guatemala, *erythrogonus*, ibid., *convexiusculus* and *convexus*, p. 168, Amazons, *fractus*, p. 168, Columbia, *rugipunctatus*, p. 168, *buckleyi*, p. 169, Ecuador.

*Scaphidomorphus partitus*, p. 172, Columbia, *disputabilis*, *maculiforus* and *pustuliforus* [sic], p. 172, *duplicatus*, *barytopoides*, and *varicollis*, p. 173, Amazons.

*Pristelus orphanus*, *sex-maculatus*, and *detrahens*, p. 175, *debilis*, p. 176, *ovatus*, *minor*, *habrodactyloides*, and *nitidior*, p. 178, *lineatulus* and *rugithorax*, p. 179, Amazon region, *transverso-fasciatus*, p. 175, *difficilis*, p. 177, Columbia, *macasensis*, p. 175, Ecuador, *obsoletus*, p. 176, Brazil, *limbatus*, p. 177, Guyaquil.

*Tapinotarsus kirschi* and *T.* (?) *brachymeroides*, p. 180, Amazons.

*Bacis immaculicollis*, p. 180, Amazons, *nigro-pictus*, p. 181, Venezuela.

*Homæotelus distinguendus* and *vitiosus*, p. 184, *prioteloides* and *rugosus*, p. 185, Amazon region, *hepaticus*, p. 184, *albidipennis*, p. 186, Ecuador, *mexicanus*, p. 185, Mexico.

*Coptengis*, g. n., Chapuis, *l. c.* p. 23. *Engidites*: approaches *Engis* in the structure of its tarsi; but with truncate elytra, sub-cylindrical femora, thorax semicircularly emarginate behind, &c. For *C. splendidus*, sp. n. (not described), Morty Island, and *Triplatoma sheppardi*, Pasc.

*Triplax brouni*, sp. n., F. P. Pascoe, Ann. N. H. (4) xvii. p. 60, New Zealand.

T. Kirsch, Deutsche E. Z. 1876, describes the following new species from Peru:—

*Languria cylindricollis*, p. 98.

*Ischyrus planior*, p. 99.

*Mycotretus suturalis*, p. 99, *pelliciens* and *dichrous*, p. 100, *bicolor*, p. 101.

*Mycophthorus peruvianus*, p. 101.

*Cyrtomorphus pusillus*, p. 102.

*Megaprotus octo-punctatus*, p. 103.

*Habrodactylus thoracicus*, ibid.

*Barytopus andicola* and *puncticollis*, p. 104.

*Erotylus imitans*, p. 105, *dilaceratus*, p. 106, *singularis* and *aterrimus*, p. 107, *placitus* and *zebu*, p. 108, *ater*, p. 109.

*Bacis hepaticus*, p. 110.

*Homœotelus peruvianus*, ibid., and *octo-maculatus*, p. 111.

## Endomychidæ.

This family is closely allied to the *Cryptophagidæ*; Puton, Pet. Nouv. ii. p. 46.

*Œdiathrus*, Gerst., = *Danae*, Reiche; F. Chapuis, Gen. Col. xii. p. 116.

*Mycella*, g. n., *id. l. c.* p. 104. Lycoperdinites, recalling *Indalmus*, Gerst., by the structure of its prosternum, but with 2nd joint of tarsi oblong, 8th joint of antennæ narrower than 7th, slightly curved tibiæ, &c. Type, *M. lineella*, sp. n., *id. l. c.* p. 105, note, Rockhampton, Queensland (the only known Endomychid from Australia).

*Anidrytus unicolor*, p. 111, *gerstæckeri* and *concolor*, p. 112, *glaber*, p. 113, spp. nn., T. Kirsch, Deutsche E. Z. 1876, Peru.

*Epopterus decoratus*, sp. n., *id. l. c.* p. 114, Peru.

*Stenotarsus conspicuus*, ibid., *vulpes*, p. 115, *varicornis*, p. 116, spp. nn., *id. l. c.*, Peru.

*Trochoideus peruvianus*, sp. n., *id. l. c.* p. 116, Peru.

*Agaricophilus subæneus*, sp. n., E. Reitter, Deutsche E. Z. 1876, p. 294, Transcaucasia. To this genus belongs also *Clemmus troglodytes*, Hampe; but *A. glabratus*, Kolenati, = *Epistemus globulus*: id. *ibid.*

## Coccinellidæ.

F. Chapuis, Gen. Col. xii. p. 166, divides this family into two tribes: one, Aphidiphages, in which the mandibles are simple or at most bifid at the extremity; the other, Phytophages, in which the mandibles are multidentate at the apex. The latter consists of *Epilachna* and its

allies *Cynegetis*, *Lasia*, and *Chnootriba*,—all other *Coccinellidæ* being included in the former tribe. *Hysia* and *Nesis*, Muls., are considered subgenera of *Adalia*, Muls.; *Harmonia*, a subg. of *Coccinella*; *Anatis*, *Clynis*, *Sospita*, *Myrrha*, *Calvia*, *Egleis*, *Cleobora*, *Psyllobora*, *Vibidia*, *Thea*, *Cleis*, and *Propylea*, Muls., subgenera of *Halyzia*, Muls.; *Synia*, *Lemnia*, *Artemis*, *Procula*, *Dysis*, *Bura*, and *Œnopia*, Muls., subgenera of *Calophora*, Muls.; *Pelina* (*Ballia* and *Palla*, Muls.), *Leis*, *Daulis* (renamed *Cyclonada*, p. 201, because of *Daulis*, Er., 1842, in the *Endomychidæ*), and *Isora*, Muls., subgenera of *Neda*, Muls.; and *Verania*, Muls., a subg. of *Alesia*, Muls. *Platyomus*, Muls., has 11-jointed antennæ and normally granulated eyes. *Oryssomus* and *Cranophorus* are separated from the *Scymnites* as a special group, on account of their having the pronotum dilated in front. *Thalassa*, Muls., is considered a subg. of *Menoscelis*, and *Œneis* of *Cryptognatha*; *Aspidimerus*, Muls., = *Cryptogonus*, Muls.

*Hyperaspis woffeti*, Muls., var. n. *fraudulenta*, T. Kirsch, Deutsche E. Z. 1876, p. 124, Peru.

*Hypocoras*, g. n., Chapuis, *l. c.* p. 225. *Chnoodites*, having an emarginate epistoma; resembles *Pentilia* in general form and outline. Type, *H. mulsanti*, sp. n., *id. l. c.* p. 226, note, Eastern Australia.

*Hippodamia impictipennis*, sp. n., L. Fairmaire, Pet. Nouv. ii. p. 50, Oran.

*Coccinella whitiangii* [*-giana*], sp. n., T. Broun, Tr. N. Z. Inst. ix. p. 374, Whitiangi, Mercury Bay, New Zealand.

*Chnoodes bis-tri-pustulata*, sp. n., C. Ritsema, Tidjschr. Ent. xix. p. 50, Atchin, N. Sumatra.

*Lithophilus cribratellus*, sp. n., L. Fairmaire, *l. c.* p. 50, Bou-Sâada.

*Alexia hirtula*, sp. n., E. Reitter, Deutsche E. Z. 1876, p. 294, Transcaucasia [in Heft 2, October 1876; *A. hirtula*, Kirsch, from Peru, being published in Heft 1, Feb. 1876, of the same publication].

T. Kirsch, Deutsche E. Z. 1876, describes the following new species from Peru:—

*Pentilia dispar* and *specularis*, p. 117, *minuta* and *cincta*, p. 118.

*Brachyacantha propria*, p. 119.

*Cleothera mulsanti*, ibid., *propria*, p. 120, *cincta*, p. 121, *renifera* and *pardalis*, p. 122, *abendrothi*, p. 124.

*Epilachna sex-maculata*, p. 125.

*Zenoria peruviana*, ibid.

*Chnoodes abendrothi* and *dorsalis*, p. 126.

*Siola discoidalis*, p. 127.

*Dioria zonata*, ibid.

*Scymnus mesomelas* and *curviger*, p. 128, *labiatus* and *discimacula*, p. 129, *vulneratus* and *suturalis*, p. 130, *notatus*, *quadrimaculatus*, and *reyi*, p. 131.

*Alexia hirtula*, p. 132.

# HYMENOPTERA.

BY

E. C. Rye, F.Z.S., M.E.S.

## The General Subject.

Brandt, E. Recherches anatomiques et morphologiques sur le système nerveux des Insectes hyménoptères (Hymenoptera). C. R. lxxxiii. pp. 613–616.

The author has examined the nervous system of the perfect insect in 78 species of all families and of the majority of genera, and of the larva in 22 species. He has also observed the metamorphosis of the ganglional chain in 15 species.

In the adult, there are 2 cephalic (super- and sub-œsophageal), 2 or 3 thoracic, and from 3 to 7 abdominal ganglions. *Vespa*, *Odynerus*, *Eumenes*, *Ectennius*, *Thyreopus*, and *Chrysis* have only 2 thoracic; *Cerceris*, *Ammophila*, *Pompilus*, *Formica*, *Mutilla*, *Myrmosa*, *Cimbex*, *Tenthredo*, and *Sirex* have 3. A fusion of two ganglions is indicated in the aftermost one, in the first-mentioned series. In *Odynerus*, this indication is so accentuated that the ganglion becomes double. In each form, there is a different number (from 3 to 7) of abdominal ganglions. The "pedunculated bodies" do not give off the ocellar nerves, and they are much more developed in the working bee than in the queen or male, as is also the case in wasps and ants. The greatest number of abdominal ganglions is found in the *Tenthredinidæ* and *Urocerida*, the inferior representatives of the order, in which also they are simple, as in the larvæ. There is also a sexual difference in the number of these ganglions. All Hymenopterous larvæ have 13 simple ganglions (as against 12 in *Lepidoptera*), of which 8 are abdominal. The *Pteromalides*, however, have no ganglional chain, but a simple compact nervous mass, as in Dipterous larvæ. In the pupa, the number diminishes in different species. Any changes in the nervous system are effected by fusion.

An English translation in Ann. N. H. (4) xviii. pp. 504–506.

Cresson, E. T. Report upon the Collections of *Hymenoptera* made in portions of Nevada, Utah, Colorado, New Mexico, and Arizona, during the years 1872, 1873, and 1874, with list of *Formicidæ* by Edward Norton. Chapter vii. of Wheeler's Rep. Geogr. Explor. W.

of 100th Mer. (Washington: 1875, 4to), v., Zoology, pp. 705–736, pls. xxxiii. & xxxiv.

133 species are recorded (whereof 17 are treated as new), and one new genus is briefly characterized, by Cresson. Norton mentions 22 species of ants (3 indicated as new) contained in seven genera. 10 species are common to Europe.

Kriechbaumer, J. Das Studium der Hymenopteren, Winke für Anfänger in diesem Zweige der Entomologie. Ent. Nachr. ii. pp. 17–22, 33–37, 49–52, 65–72, 85–88, 101–107, 117–119, 133–136, 149–152, 165–168, 181–184.

Bibliographical and critical observations intended for beginners.

Lubbock, Sir J. Observations on Ants, Bees, and Wasps. Part iii. J. L. S. xii. pp. 445–514.

Elaborate details of experiments on the powers of communication, &c., exhibited by these insects, in continuation of the author's former paper [Zool. Rec. xii. p. 384].

Müller, Hermann. On the Relation between Flowers and Insects. Nature, xv. pp. 178–180; abstract of an article in the "Bienen Zeitung."

Relates exclusively to *Hymenoptera* (see also *Insecta*, General Subject, *suprà*, p. 2). The author's conclusions are: 1, that the *Tenthredinidæ*, in general intelligence, rearing their young, and finding honey in plants, are the lowest of all *Hymenoptera* observed; 2, that the hunting-wasps have a decidedly higher power of finding honey, and some of them are even known to seek flowers, the formation of which is adapted to the *Fossores*; 3, that *Prosopis*, the least-developed bee, not standing higher than the hunting-wasps, is compelled to visit flowers with concealed honey, and flowers with only pollen, needed by its young; 4, that some hunting-wasps have a greater development of proboscis than *Prosopis*, but only seek food for themselves, not for their young. The structure of organs specially employed in these functions is traced in various salient genera, the perfection in solitary bees consisting of increased development of pollen-bearing apparatus, prolongation of the lower part of the mouth, and increased size of individuals. Hive-bees are more led by colour and size than apprehension of form of flowers.

Radoszkovsky, O. Matériaux pour servir à une faune hyménoptérologique de la Russie. Hor. Ent. Ross. xii. pp. 82–110.

Two new genera of very vague systematic location and many new species are described, chiefly in the *Apidæ*. From the localities of some of these, Russia would logically include Italy, Greece, Persia, France, and Egypt.

——. Compte-rendu des Hyménoptères recueillis en Égypte et Abyssinie en 1873. *Tom. cit.* pp. 111–150.

Enumerates 113 species, including some described as new, one from the Caucasus.

Vollenhoven, S. C. Snellen Van. Bijvoegsel tot de Nieuwe Naam-

lijst van Nederlandsche Vliesvleugelige Insecten (Hymenoptera). Tijdschr. Ent. xix. pp. 211–257.

Additions and corrections to the author's Catalogue of Netherlands Hymenoptera [Zool. Rec. x. p. 346].

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*Local Lists* :—

Scotland : P. Cameron, P. N. H. Soc. Glasg. ii. pp. 290–294, 304.

S. England : E. Saunders, Ent. M. M. xiii. p. 114.

Hamburg : A second instalment towards a Catalogue of the *Hymenoptera* of this district [Zool. Rec. xii. p. 384] ; H. Benthin, Verh. Ver. Hamb. 1875 (1876), pp. 225–234.

Mark Braudenburg : F. Rudow, Ent. Nachr. ii. p. 169.

Colorado, Wyoming, Utah, Iowa, Kansas, and New York (with descriptions by Cresson of two new species) ; J. D. Putnam, P. Davenport Ac. i. pp. 206–211.

New Zealand : F. Smith, Tr. E. Soc. 1876, p. 473 *et seq.* 30 new species, all from the South Island.

## APIDÆ.

MORAWITZ, F. Zur Bienenfauna der Caucasusländer. Hor. Ent. Ross. xii. pp. 3–69.

Adds 173 to the known species from the Caucasus. One new genus and several new species are characterized.

——. In A. Fedchenko's Puteshestvie v Turkestan [Travels in Turkestan] ; Part 13, Section ii., Zoogeographicheskia Izledovania, Division 5. Pcheli (*Mellifera*), fasc. 2, pp. 161–304, pls. i.–iii. St. Petersburg and Moscow : 1876, 4to (forms part 3 of vol. xxi. of Nachr. Ges. Mosc.).

Completes the discussion of the species, 438 in all, observed by the late A. Fedchenko in his explorations of Turkestan. This fasciculus refers to the *Andrenides*, but contains tables and index for the whole *Apidæ*, the plates also in part illustrating the preceding portion [Zool. Rec. xii. p. 385]. Pt. iii. consists of highly magnified drawings of the copulatory organs of the males of 16 species of *Anthophora*, admirably delineated by Mme. Fedchenko.

SMITH, F. Catalogue of British *Hymenoptera* in the British Museum. Second Edition. Part 1. *Andrenidæ* and *Apidæ*. (Catalogue of the British Bees in the collection of the British Museum). London : 1876, 8vo, pp. 236, pls. A, & i.–x. (same as in the first edition).

211 species are described, being only five more than those in the first edition of 1855 ; several forms, however, treated as species in that edition are now known to be merely sexes of others already recorded, and two are dropped entirely, the absolutely new additions being 10. One new species is described.

*Andrenides.*

*Cyathocera*, Smith, 1875, = *Steganomus*, Ritsema, 1873; C. Ritsema, Tijdschr. Ent. xix. Verslag, p. xliv.

*Prosopis rubicola*, Smith, *nec* Saunders, renamed *perforator*; F. Smith, *l. c.* p. 13.

*Sphekodes* [sic]. Notes on British species; E. Newman, Ent. ix. pp. 97–104, figs.

*Eunomia*, g. n., E. T. Cresson, in Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. p. 723. Apex of antennæ enlarged and much flattened in the male, in which sex also the legs exhibit structural peculiarities. For *E. marginipennis*, sp. n., *id. l. c.* p. 722, Colorado, New Mexico, *N. heteropoda*, Say, and *N.* ? *apacha*, Cress. [This genus, being founded on sexual characters only, cannot stand].

*New species :—*

*Colletes montana*, p. 262, Alpine region of Sarafschan, *arenaria*, p. 263, Taschkent, *annulicornis*, p. 266, Sarafschan Valley, *cretacea* and *flavicornis*, p. 267, Kisil-kum desert, *clypearis*, p. 268, Kokand, Morawitz, *l. c.*

*Dasycolletes vestitus*, Smith, Tr. E. Soc. 1876, p. 485, Wellington, New Zealand.

*Lamprocolletes fulvescens*, id. *l. c.* p. 486, New Zealand.

*Hylæus dolichocephalus*, p. 271, *pusillus* and *nasalis*, p. 272, *affinis*, p. 273, *punctiscapus*, p. 274, *frontalis* and *vulgaris*, p. 275, *arenarius*, p. 277, *bi-areolatus*, p. 278, *turanicus* and *trisignatus*, p. 279, *distinguendus*, p. 280, *angustifrons* and *nigricollis*, p. 281, *punctiventris*, p. 282, *jugorum* and *ferghanicus*, p. 283, *tegularis* and *tibialis*, p. 284, *flavipes*, p. 285, *variolaris*, p. 286, *breviceps* and *nigritarsis*, p. 288, *bivittatus*, p. 289, *pallidicornis*, p. 290, *laticeps*, p. 291, Morawitz, *l. c.*, Samarcand, Taschkent, Kokand, and other localities in Turkestan.

*Prosopis agilis*, p. 484, *relegatus* and *capitosus*, p. 485, Smith, *l. c.*, South Island, New Zealand.

*Megacilissa yarrowi*, Cresson, *l. c.* p. 723, New Mexico.

*Sphecodes rufithorax*, p. 255, Taschkent, *pectoralis*, p. 256, Kisil-Kum, *nigripennis*, p. 257, Sarafschan Valley, Morawitz, *l. c.*

*Halictus annulipes*, p. 221, *rhynchites*, p. 222, *varipes*, p. 223, *croceipes*, p. 224, *cariniventris*, p. 226, *sogdianus*, p. 227, *aprilinus* and *desertorum*, p. 228, *fuscicollis* and *nasica*[-*cus*], p. 229, *fucosus*, p. 230, *determinatus* and *minor*, p. 233, *palustris*, p. 234, *modernus* and *funerarius* (pl. ii. fig. 38), p. 235, *longirostris*, p. 236, *scutellaris*, p. 238, *fulvitarsis*, p. 239, *trifasciatus*, p. 240, *melanarius*, p. 241, *equestris*, p. 242, *ferghanicus*, p. 243, *picipes*, p. 244, *obscuratus* and *cingulatus*, p. 245, *albitarsis*, p. 246, *maculipes*, p. 247, *levinodis*, p. 248, *limbellus* and *nigrilabris*, p. 249, *vulgaris*, p. 250, *nigripes* and *pectoralis*, p. 251, *hyalinipennis*, p. 253, *atomarius*, p. 254, Morawitz, *l. c.*, various localities in Turkestan; *H. salinus*, id. Hor. Ent. Ross. xii. p. 58, Sardárabad; *H. tectus*, p. 87, Caucasus, *dybowskii*, p. 110, Amour, O. Radoszkovsky, tom. cit.; *H. trizonatus*, Cresson, *l. c.* p. 720, pl. xxxiii. fig. 3 (Trans. Am. Ent. Soc. 1875), E. Nevada; *H. familiaris*, Smith, *l. c.* p. 486, New Zealand.

*Agapostemon melliventris*, Cresson, *l. c.* p. 721, pl. xxxiii. fig. 4 (Trans. Am. Ent. Soc. 1875), no locality given.

*Nomia nevadensis*, id. *l. c.* p. 722, pl. xxxiv. figs. 3 & 4 (Trans. Am. Ent. Soc. 1875), E. Nevada; *N. edentata*, p. 259, Dschysack and Samarcand, *rufescens*, p. 261, Sarafschan Valley, Morawitz, *l. c.*

*Nomioides turanica*, p. 214, *parviceps*, p. 215, Morawitz, *l. c.*, Samarcand, &c.

*Andrena rufina*, p. 167, *quadrifasciata*, p. 168, *leucor*[*r*]*hina*, p. 169, *hairacumensis*, p. 170, *sarta*, p. 171, *sordida*, p. 173, *planirostris*, p. 174, *acutilabris* and *urmitana*, p. 175, *sogdiana* and *oralis*, p. 177, *maculipes*, p. 178, *rufilabris* and *nitidicollis*, p. 180, *lucidicollis*, p. 181, *majalis* and *lævicentris*, p. 182, *tuberculiventris* and *feltschenkoi* (= *calabra*, Rad.), pl. ii. fig. 35, p. 184, *ravicollis*, p. 185, *punctiventris*, p. 186, *aulica*, p. 187, *comparata*, p. 188, *ferghanica* (pl. ii. fig. 36) and *combusta*, p. 189, *nupta*, p. 191, *hieroglyphica* and *turkestanica*, p. 192, *infirma*, p. 195, *mordax* and *nigrita*, p. 196, *pannosa* and *bicarinata*, p. 197, *carinifrons*, p. 198, *initialis*, p. 199, *lateralis*, p. 200, *arenaria*, p. 201, *punctifrons* and *discophora*, p. 202, *corallina*, p. 203, *temporalis* and *flavitarsis*, p. 204, *capillosa*, p. 205, *viridigastra*, p. 206, *subænescens*, p. 207, *fuscicollis*, p. 208, *virescens*, p. 209, *ahenea*, p. 210, *smaragdina* and *amœna*, p. 211, *mucorea*, p. 212, *semiænea*, p. 213, pl. ii. fig. 37, Morawitz, *l. c.*, from various localities in Turkestan, chiefly Sarafschan Valley, Kokand, Taschkent, Kisil-Kum desert, and Samarcand; *A. adjacens*, p. 55, *semirubra*, p. 57, *id.* Hor. Ent. Ross. xii., Caucasus; *A. tecta*, p. 82, *fasciata* and *metallica*, p. 83, and *assimilis*, p. 84, Caucasus, *amasia*[*na*], p. 85, Amasia, *elongata*, p. 86, Astrabad, O. Radoszkovsky, Hor. Ent. Ross. xii.; *A. beuthini*, Schenck, Ent. Nachr. ii. p. 92, Hamburg (incidentally diagnosed).

*Melitta dimidiata*, F. Morawitz, Hor. Ent. Ross. xii. p. 54, Mastara.

*Cilissa robusta*, O. Radoszkovsky, *l. c.* p. 87, Caucasus.

*Dasypoda italica*, id. *l. c.* p. 89, Italy, Syra.

*Apides.*

*Megachile centuncularis*, L., *versicolor*, Sm., and *8-insignata*, N., differentiated; Schenk, Ent. Nachr. ii. p. 92.

*Ceratina*. Review of the species, and confusion in synonymy suggested; *C. cærulea*, Chevr., *nec* Leach, *nec* Duf., is renamed *chevrieri*: H. Tournier, Pet. Nouv. ii. p. 86. Tournier's treatment criticized, and shown to arise from insufficient knowledge, resulting in the addition of three more synonyms; J. Lichtenstein & A. Puton, *tom. cit.* p. 90. *Cf.* also É. Perris, *l. c.* p. 94, and reply by Tournier, p. 95.

*Xylocopa*. A list with bibliographical and locality references of the species not included by F. Smith in his Monograph [Zool. Rec. xi. p. 348]. *X. ramulorum*, Rond., = *valga*, Gerst.; *X. canuta*, Rond., = *cyanescens*, Brullé; C. Ritsema, Tijdschr. Ent. xix. pp. 61–64. The species of La Plata discussed by H. Burmeister, S. E. Z. xxxvii. pp. 151–159: ten species are recognized, including two new.

*Centris*. 11 La Plata species described (five new); Burmeister, *l. c.* pp. 159–166.

*Bombus senilis*, Sm., = *muscorum*, F. Kirby, *nec* L., renamed *venustus*,

p. 201 ; *B. scrimshiranus*, K., Sm., = *jonellus*, Kby., p. 209 ; *B. terrestris*, Kby., *nec* L., = *virginalis*, Kby., p. 214 : F. Smith, Cat. Hym. B. M. (2).

Humble-bees perforating the base of the calyx of *Ribes aureum* and *Robinia pseudacacia* in N. America, to get at the honey : W. F. Bundy, Am. Nat. x. p. 238.

*Bombus* and *Psithyrus*, with their lower wings cut away, flew as well as if these had not been removed ; in *Apis mellifica*, flight was very materially affected by the removal of the lower wings. Reference is made to C. G. Thomson's characters of different structure of lower wings in these genera. M. Girard, Bull. Soc. Ent. Fr. (5) vi. pp. cl. & cli.

WATEL, RAVERET. Rapport sur les Mélipones. Paris : 1875, 8vo.

[Not seen by the Recorder.]

GIRARD, M., Notice sur les Mélipones et Trigones brésilliennes, and DRORY, E., Notice sur la Mélipone scutellaire. Paris : 1876, 8vo.

*Melipona scutellaris* has a *Gamasus* for parasite, and ? also a *Microgaster* : M. Girard, Bull. Soc. Ent. Fr. (5) vi. pp. l. & li.

CLERICI, —. Anatomia dell' Ape. Milano : 1876.

Consists of 30 plates of anatomical detail, issued under the supervision of the Central Italian Bee-keepers' Association.

*Apis mellifica*. "Manual of the Apiary," by A. J. Cook (Lansing, Michigan : 1876, 8vo, pp. 59), is well spoken of in Am. Nat. x. p. 621.

*Epimethea*, g. n., F. Morawitz, Hor. Ent. Ross. xii. p. 61. Next *Panurginus*, Nyl., but with the second cubital cell subequal to the first, &c. ; facies of *Camptopœum*. For *E. variegata*, p. 62, and *pictipes*, p. 64, spp. nn., Alexandropol.

*New species* :—

*Panurginus alticola*, p. 59, *punctiventris*, p. 60, Morawitz, *l. c.*, Caucasus.

*Rhophites caucasicus*, id. *l. c.* p. 35, Gudaur.

*Osmia bidentata*, p. 38, *linguaria*, p. 39, *longiceps*, p. 40, *cerinthidis*, p. 41, *antennata*, p. 43, *bicallosa*, p. 44, *tiflensis*, p. 45, *id. l. c.*, Caucasus ; *O. incerta*, Radoszkovsky, Hor. Ent. Ross. xii. p. 113, Egypt.

*Lithurgus apicalis*, E. T. Cresson, in Wheeler's Rep. *l. c.* p. 724, Colorado, New Mexico.

*Megachile australis*, H. Lucas, Ann. Soc. Ent. Fr. (5) vi. p. 305, pl. iv. fig. 9, ♀, nest, p. 303, fig. 13, Nouméa, New Caledonia ; *M. nigrita*, p. 114, *incerta* and *branicki*[*i*], p. 115, *minutissima*, p. 116, Radoszkovsky, *l. c.*, Egypt ; *M. ruficrus*, Morawitz, *l. c.* p. 47, Sardarabad.

*Anthidium carduele*, p. 48, *ducale*, p. 50, *nigricolle*, p. 52, Morawitz, *l. c.*, Caucasus ; *A. amurensis*[*-ense*], p. 90, E. Siberia, *superbum*, p. 91, Amasia, Radoszkovsky, *l. c.*

*Ceratina savignii*, Radoszkovsky, *l. c.* p. 120, Egypt.

*Nomada amurensis*, p. 91, E. Siberia, *morawitzi*, Caucasus, and *dyborskii*, Baical, p. 93, *amabilis*, p. 94, pl. ii. fig. 5, and *bicolor*, p. 95, Caucasus, *sabulosa*, p. 121, and *vagans*, p. 122, Egypt, *id. l. c.* ; *N. grandis*, Cresson, *l. c.*, p. 725, Colorado ; *N. putnami*, id., P. Davenport Ac. i. p. 210, Spring

Lake, Utah; *N. bridgmanniana*, F. Smith, Cat. Hym. B. M. (2) p. 115, E. England.

*Ammobates armeniacus*, Morawitz, *l. c.*, p. 67, Erivan.

*Stelis simillima*, id. *l. c.* p. 68, Akstafa-Thal, Caucasus.

*Stelidomorpha ægyptiaca*, Radoszkovsky, *l. c.* p. 120, Egypt.

*Melecta calabrina*, p. 95, Calabria, *italica*, p. 96, Italy, *assimilis*, p. 122, *ægyptiaca*, p. 123, and *octo-maculata*, p. 124, Egypt, *id. l. c.*

*Crocisa abyssinica*, id. *l. c.* p. 125, Abyssinia.

*Eucera graca*, p. 98, Syra, *bifasciata*, p. 126, Egypt, *id.* l. c.; *E. punctipollis*, p. 33, Alexandropol, *tristis*, p. 34, Borshom, Morawitz, *l. c.*

*Tetralonia dziedzickii*, Radoszkovsky, *l. c.* p. 126, Egypt (= *T. atricornis*, Spin., *nec* Panz.); *T. vicina*, Morawitz, *l. c.* p. 31, Borshom, Caucasus.

*Melissodes nevadensis*, Cresson, in Wheeler's Rep. *l. c.* p. 726, pl. xxxiv. fig. 6, E. Nevada (Trans. Am. Ent. Soc. 1875).

*Anthophora albata*, Cresson, P. Davenport Ac. i. p. 211, Denver, Colorado; *A. onosmarum*, p. 15, *carbonaria*, p. 17, *raddei*, p. 18, *sieversi*, p. 23, *croceipes*, p. 25, *fixseni*, p. 26, *salviæ*, p. 29, Morawitz, Hor. Ent. Ross. xii. Caucasus; *A. eburnea*, p. 98, Erivan, *persica*, p. 99, Persia, Radoszkovsky, *l. c.*

*Xylocopa myops*, p. 177, Banka, *aruana*, p. 178, *nigro-plagiata*, p. 179, Aru Isles, *tricolor*, p. 180, Sula Island, *combinata*, p. 181, Obi Islands, *leucocephala*, Solor, *smithi*, Gorontalo, p. 182, *splendidipennis*, p. 183, Sumatra, C. Ritsema, l. c.; *X. serripes*, p. 156, Rio Janeiro, *ciliata*, p. 158, Buenos Aires and Parana, H. Burmeister, S. E. Z. xxxvii.; *X. abyssinica*, p. 127, *taczanovskii*, p. 129, Radoszkovsky, *l. c.*, Abyssinia.

*Centris pectoralis*, p. 161, Corrientes, *muralis*, p. 162, Mendoza and Patagonia, *vulpecula*, p. 164, all the La Plata states, *nigriventris*, Mendoza and Buenos Aires, and *nudipes*, Parana, p. 165, H. Burmeister, *l. c.*

*Bombus nevadensis*, E. T. Cresson, in Wheeler's Rep. *l. c.* p. 728, pl. xxxiv. fig. 5, E. Nevada, Arizona, New Mexico (Tr. Am. Ent. Soc. 1875); *B. apicalis*, F. Morawitz, Hor. Ent. Ross. xii. p. 13, Erivan; *B. intercedens* (Sichel, MS.), p. 99, Montpelier and Ararat (? = *rufescens*, Eversm., *nec* Lep.), *morawitzi*, p. 101, Samarcand, Radoszkovsky, *l. c.*

## Vespidæ.

*Odynerus reniformis*, Gmel., new to Britain; E. Saunders, Ent. M. M. xiii. p. 114.

*Eumenes coloradensis*, E. T. Cresson, in Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. p. 717, Colorado; *E. germaini*, H. Lucas, Ann. Soc. Ent. Fr. (5) vi. p. 300, pl. iv. figs. 2, 3, 5, ♂, p. 301, figs. 4 & 6, ♀, pupa, p. 299, fig. 8, nest, pp. 296–298, fig. 7, Nouméa, New Caledonia (clypeus bidentate in ♂); *E. wagæ*, O. Radoszkovsky, Hor. Ent. Ross. xii. p. 142, Caucasus: spp. nn.

*Hoplopus eversmanni*, sp. n., Radoszkovsky, *l. c.* p. 144, Egypt.

*Odynerus raffrayi*, sp. n., *id. l. c.* p. 145, Abyssinia.

*Pterochilus dives*, sp. n., *id. ibid.*, Egypt.

*Vespa occidentalis*, sp. n., Cresson, *l. c.* p. 719, pl. xxxiv. figs. 1 & 2 (Tr. Am. Ent. Soc. 1875), E. Nevada, New Mexico, Colorado.

## Crabronidæ.

*Myzine*. 15 species from Brazil and La Plata described. *Myzine* proper is characterized as having the radial cell of upper wings reaching the margin in both sexes, and the eyes of the ♂ simple; in the subgenus *Plesia*, the radial cell of the ♀ leaves a free space before the margin, broadest at the apex. H. Burmeister, S. E. Z. xxxvii. pp. 166–183.

*Scolia rufa*, St. F., ♂, from Rodriguez Island; F. Smith, Ann. N. H. (4) xvii. p. 448.

*Pompilus niger*, F., attacking and dismembering *Clubiona pallidula*, Clk., with observations on other instances of spiders being as it were paralysed by hymenopterous enemies; H. Lucas, Bull. Soc. Ent. Fr. (5) vi. pp. ccxviii. & ccxix.

*Pompilus fugax*? or *P. monachus*? Notes on the habits of the "Black Spider-wasp" of New Zealand; W. L. Buller, Tr. N. Z. Inst. ix. pp. 343–347, pl. iii. figs. 1–3.

*Pompilus concinnus* and ? *Mellinus* sp. Cocoons in galleries eaten by larva of *Sesia spheciformis*; G. A. Brischke, Ent. MB. i. p. 11.

*Salius sanguinolentus*. Cocoon and pupa; *id. l. c.* p. 12.

*Pelopæus destillatorius* at Lemberg; Schmidt-Goebel, S. E. Z. xxxvii. p. 389 [recorded as one of some "*Coleopterologische* Kleinigkeiten"].

*Pelopæus histrio*, Lep.: nest from Bahia figured; P. de Borre, CR. Ent. Belg. xix. p. lviii.

*Psammophila viatica* associated in numbers, apparently all ♀, at the end of September; G. A. Brischke, Ent. MB. i. p. 11 [this circumstance has also been noticed by the Recorder].

*Ampulex compressum* "wrestling" with *Pseudomyrma bicolor*, near Barrackpore; G. A. J. Rothney, Ent. M. M. xiii. p. 87.

*Rhopalum carbonarium*, Smith, ♀ figured; Tr. E. Soc. 1876, pl. iv. fig. 7.

"*Pseudo-Scolia*," g. n., O. Radoszkovsky, Hor. Ent. Ross. xii. p. 103. Placed by the author between *Bombus* and the vague new genus next below mentioned, the only comparative character given being that the aspect of the body and of the abdomen is very much like that of *Scolia*. For *P.-S. maculata*, sp. n., *ibid.* pl. ii. fig. 6 (not published with the parts issued), Taschkent and S.E. Caucasus.

"*Pseudo-Nysson*," g. n., *id. l. c.* p. 104. The author does not know in what family this should be placed. Its eyes are strongly emarginate as in the *Diploptera*, but the wings are not folded, and the body is not glabrous. In form and marking of abdomen, it approaches *Tachytes*; in neuration of upper wings, clypeus, and mandibles, it comes near "*Nisson*;" but the maxillæ, labrum, and labium form a tube as in the *Apides*. For *P.-N. fasciatus*, sp. n., p. 105, pl. ii. fig. 7, S.E. Caucasus.

*Myzine carbonaria*, p. 168, New Friburg, *erythropyga*, p. 169, *maculatissima*, p. 173, *elegans*, p. 178, *albo-signata*, p. 179, Cordova, *M.* (*Plesia*) *paranensis*, p. 171, Parana, *duplicata*, p. 172, *frontalis*, p. 177, *pallidipennis*, p. 180, S. Corrientes, *robusta*, p. 175, Banda Oriental, *gemellata*, p. 176, Corrientes, *cuyana*, p. 181, Mendoza, *bonaerensis*, p. 182, Buenos

Aires, H. Burmeister, l. c.; *M. frontalis*, E. T. Cresson, in Whee'er's Rep. Geogr. Explor. W. of 100th Mer. v. p. 711, New Mexico: spp. nn.

*Pompilus radoszkovskii* ("Ersch. in litt."), sp. n., Radoszkovsky, *l. c.* p. 133, Abyssinia.

*Priocnemis rufo-pictus*, p. 133, and *incertus*, p. 134, *id. l. c.*, Abyssinia; *P. conformis* and *maculipennis*, p. 482, *diligens*, fig. 3, and *marginatus*, fig. 2, p. 483, F. Smith, Tr. E. Soc. 1876, South Island, New Zealand: spp. nn.

*Ammophila yarrowi*, sp. n., Cresson, *l. c.* p. 713, Colorado.

*Pelopœus convexus*, sp. n., F. Smith, Ann. N. H. (4) xvii. p. 419, Rodriguez Island.

*Sphex grandis*, sp. n., Radoszkovsky, *l. c.* p. 132, Abyssinia.

*Tachytes funebris*, sp. n., *id. l. c.* p. 135, Egypt.

*Miscophus sericeus*, sp. n., *id. l. c.* p. 134, Egypt.

*Stizus spinulosus*, id. *l. c.* p. 136, Egypt; *S. nevadensis*, Cresson, *l. c.* p. 716, pl. xxxiii. fig. 1 (Tr. Am. Ent. Soc. 1875), Eastern Nevada: spp. nn.

*Rhopalum perforator*, sp. n., F. Smith, Tr. E. Soc. 1876, p. 483, New Zealand.

*Psen ornatus*, sp. n., C. Ritsema, Ent. M. M. xii. p. 185, woodcut, East Java.

*Mimesa ægyptiaca*, sp. n., Radoszkovsky, *l. c.* p. 131, Egypt.

## Thynnidæ.

*Ælurus flavo-pictus*, sp. n., Ritsema, *l. c.* p. 185, Aru.

## Mutillidæ.

*Mutilla europæa* simultaneously found to be parasitic upon *Bombus muscorum* in England and Russia; F. Smith, P. E. Soc. 1876, p. xxvii.

*Mutilla ægyptiaca*, p. 138, and *mniszechi*, p. 139, Egypt, *raffrayi*, p. 138, Abyssinia, spp. nn., Radoszkovsky, Hor. Ent. Ross. xii.

*Agama nitida*, p. 710, and *albipes*, p. 711, pl. xxxiii. fig. 2, Colorado, E. T. Cresson, in Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. spp. nn. (a reference nevertheless to Tr. Am. Ent. Soc. 1875, as to *A. albipes*).

## Formicidæ.

Mayr, G. Die Australischen Formiciden. J. Mus. Godeffr. xii. pp. 56–115.

In both the continental and oceanic fauna, there is a marked want of genera, usually of wide distribution, e.g., *Formica* and *Myrmica*. There are also no representatives of *Gnamptogenys*, *Eciton*, *Atta*, *Pogonomyrmex*, *Cryptocerus*, *Echinopla*, *Typhlopone*, *Myrmicaria*, or *Cataulacus*. The continental fauna is marked by many very characteristic forms, especially as to the thoracic structure of the workers; but the present work can only be considered as materials for a knowledge of the Ants of Australia,

seeing that the numerous new species are from Queensland only, with one or two exceptions. The oceanic-fauna has 19 characteristic species (whereof no less than 6 are in *Colobopsis*), 8 common to Australia or India, and 8 cosmopolitan. *Formica terebrans*, Lowne, = *Camponotus testaceipes*, Smith; *Colobopsis mutilata*, Smith, worker described; *Polyrrhachis guerini*, Rog., varr. nn. *aurea*, *vermiculosa*, and *palleus*, p. 74, Queensland; *P. quadricuspis*, Mayr, = *sidnica*, Mayr; *Myrmecopsis*, Smith, 1865, clashes with *Myrmicopsis*, Guér. (*Mutillidæ*); *Formica perminuta*, *picea*, and *terricola*, Buckley, = *Prenolepis vividula*, Nyl.; *Polyrrhachis foveolatus*, Lowne, = *Hypoclinea scabrida*, Rog.; *Acantholepis tuberculatus*, Lowne, = *H. nitida*, Mayr; *Formica smithi*, Lowne, = *H. purpurea*, Sm.; *A. mamillatus*, Lowne, = *H. rufo-nigra*, Lowne; *Myrmecia pumilio*, Mayr, = *ureus*, Lowne, = *picta*, Sm.; *M. simillima*, Sm., = *forficata*, F.; *Ischnomyrmex*, Mayr, is founded on workers of *Aphænogaster*, Mayr; *Cremastogaster piceus*, Lowne, = *pallipes*, Mayr.

S. Norton mentions 22 species of ants (whereof 3 are indicated as new), contained in 7 genera, and collected in portions of Nevada, Utah, Colorado, New Mexico, and Arizona, during 1872–1874. These have been examined by Mayr, and 10 species found identical with European forms. Chap. vii. of Wheeler's Rep. Geogr. Explor. W. of 100th Mer. v. Zoology, pp. 729–736.

"Ants" attracted to the "bull's-horn Acacia" by a special growth at the base of the petiole, and their presence believed to be protective against leaf-cutting ants (*Œcodoma*), with other observations on economy in Brazil. Fritz Müller, Nature, xiii. p. 305.

*Formica sanguinea* and *rufa*, and *F. truncicola* and *pratensis*, respectively nesting together; a remarkable nest of *F. rufa*; *Stenamma westwoodi* with *F. rufa* and *pratensis*; an immense nest of *Lasius umbratus*; *F. fusca*, with root-lice in its nest; three nests of *F. pratensis* near each other, of which the inhabitants of one were observed to be deadly enemies of the other two; *Tapinoma magnum*, Mayr, is ♂ & ♀ of *T. nigerrimum*, Nyl., which ? = *erraticum*, Latr. A. Forel, Bull. Soc. Vaud. xiv. pp. 57–62.

*Formica gagates*, Latr. (*picea*, Nyl.) in society with *F. sanguinea* in Finland; J. Sahlberg, Medd. Soc. Fenn. i. pp. 134–136.

*Formica pennsylvanica*, Deg. Notes on the architecture and habits of this carpenter-ant; H. C. McCook, Tr. Am. Ent. Soc v. pp. 277–289, pls. ii.–iv. Figured in various stages, with its architecture (columnar and cavernous).

*Brachymyrmex heeri*, Forel. The ♀ & ♂ described, with fresh observations upon the habits of the species, which probably comes from Central America. Anatomico-physiological notices are also given upon *Dactylopius adonidum*, *Lecanium hemisphæricum*, and *Boisduvalia latania*, species of *Coccidæ*, with which it has social habits. Forel, *l. c.* pp. 49–56.

*Micromyrma*, Duf., is founded on an erroneous character; and the type, *Plagiolepis pygmæa*, Latr., has only 11 joints to the antennæ. E. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 219.

F. Smith, Tr. E. Soc. 1876, pp. 603–612, pl. xi., increases the number of *Cryptocerus*, *Meranoplus*, and *Cataulacus*, to 48. The three sexes of *Meranoplus* discovered; the ♂ greatly resembles the worker, but has ocelli; the ♀ has an elongate abdomen, and more ovate thorax. Its formicarium was made in the thorns of an *Acacia*. *Cryptocerus discocephalus*, Sm., ♀, p. 608.

*New species* :—

*Formica berthoudi*, Forel, *l. c.* pp. 33–38, Lessouto, Orange Free State.

*Cataglyphis argentata*, Radoszkovsky, Hor. Ent. Ross. xii. p. 140, Egypt.

*Camponotus albo-pilosus*, *similis*, and *splendidus*, p. 61, *purpureus* and *cinereus*, p. 62, *arcuatus*, p. 63, *capito*, *crenatus*, and *claripes*, p. 64, *subnitidus*, and *extensus*, p. 65, and *rubiginosus*, p. 66, Queensland, *kubarii*, p. 66, Pelew Islands, Mayr, *l. c.*

*Colobopsis conica*, id. *l. c.* p. 67, Tonga Islands (= *rufifrons*, Mayr, *nec* Sm.)

*Polyrrhachis semiaurata*, p. 71, Sydney, *trapezoidea* and *dæmeli*, p. 72, *punctiventris* and *ornata*, p. 73, *contempta*, p. 74, *hirsuta*, p. 75, *micans*, p. 76, *id. l. c.*, Queensland.

*Hypoclinea scrobiculata*, id. *l. c.* p. 80, Queensland.

*Tapinoma pallipes* and *fragile*, F. Smith, Ann. N. H. (4) xvii. p. 447, Rodriguez Island; *T.* (?) *pusillum*, Mayr, *l. c.* p. 83, Queensland.

*Odontomachus coriarius* and varr. nn. *semicircularis* and *magnus*, Mayr, *l. c.* p. 85, Queensland.

*Anochetus rectangularis*, id. *l. c.* p. 86, Queensland.

*Tetramorium nitidum*, p. 480, and *striatum*, p. 481, F. Smith, Tr. E. Soc. 1876, New Zealand.

*Ponera castanea*, id. *l. c.* p. 489, Tairua, New Zealand; *P. insulana*, Mayr, *l. c.* p. 87, Samoa.

*Lobopelta fallax*, p. 88, *conigera* and *excisa*, p. 89, Mayr, *l. c.*, Queensland.

*Ectatomma scabrum*, p. 90, *cristatum* and *nudatum*, p. 91, *concavum* and *impressum*, p. 92, *id. l. c.*, Queensland.

*Amblyopone cephalotes*, Smith, *l. c.* p. 490, Auckland, New Zealand.

*Myrmecia varians*, Mayr, *l. c.* p. 94, Queensland.

*Vollenhovia samoensis*, id. *l. c.* p. 99, Samoa Isles.

*Orectognathus* (recharacterized) *perplexus*, Smith, *l. c.* p. 491, Tairua.

*Monomorium impressum*, p. 447, *elongatum*, p. 448, *id.* Ann. N. H. (4) xvii., Rodriguez Island; *M. rubriceps* and *læve*, Mayr, *l. c.* p. 101, Queensland.

*Phidole variabilis* p. 103, *proxima*, p. 104, *opaciventris* and *impressiceps*, p. 105, *longiceps* and *brevicornis*, p. 106, Mayr, *l. c.*, Queensland.

*Cremastogaster fusca*, p. 107, and *australis*, p. 108, Queensland, *rufotestacea*, p. 109, Sidney, *id. l. c.*

*Podomyrma micans* and *inermis*, id. *l. c.* p. 111, Queensland.

*Cryptocerus fercidus*, p. 605, pl. xi. fig. 1, Rio, *gibbosus*, ibid., fig. 2, *jucundus*, p. 606, fig. 3, *pallidicephalus* [vox hybr.], *ibid.*, fig. 5, Mexico, *varians*, ibid., fig. 4, Cuba, *maculatus*, p. 607, fig. 6, Bahia, *fenestralis*, ibid., San Paulo, *basalis*, p. 608, Chontales, Smith, Tr. E. Soc. 1876.

*Meranoplus intrudens*, p. 609, pl. xi. fig. 7, Natal, *vestigator*, fig. 8, Matabello, E. Archipelago, *attenuatus*, fig. 9, and *puncticeps* (? = *attenuatus*, worker), fig. 10, Pará, p. 610, *id.* l. c.; *M. hirsutus*, Mayr, *l. c.* p. 112, Queensland.

*Cataulacus hispidus*, Smith, *l. c.* p. 611, pl. xi. fig. 11, Singapore.

## Chrysididæ.

J. Lichtenstein, Pet. Nouv. ii. p. 27, avowedly anticipating the publication by Radoszkovsky and Gribodo of exhaustive works upon this family, gives names to the 8 'Phalanges' of Dahlbom, based upon the structure of the 3rd segment of the abdomen, as follows:—

[*H*] *Olochrysis*, for *austriaca*, Fab.

*Gonochrysis*, for *integra*, Fab.

*Monochrysis*, for *hybrida*, Lep.

*Dichrysis* [no exponent known! Entomology of the future].

*Trichrysis*, for *cyanea*, L.

*Tetrachrysis*, for *ignita*, L.

*Pentachrysis*, for *fusca*, Fab.

*Hexachrysis*, for *dives*, Dahlb.

Many other species are referred to the above group, except in *Dichrysis* and *Trichrysis*; but the variability of armature in the same species is not taken into consideration, and the completeness or incompleteness of the marginal cell, a more important, because more stable, character is ignored. In the first group, *austriaca*, F., and *bicolor*, Dahlb., has the last segment entire; but the former has the cell complete, and the latter incomplete.

E. Frey-Gessner enumerates 55 Swiss species, with observations on economy and stucture, &c.; MT. schw. ent. Ges. iv. pp. 570–578.

*Chrysis mirabilis*, fig. A, and *obscura*, fig. B, p. 106, *caucasica*, p. 108, fig. 8, Caucasus, *branicki* [*i*], p. 107, fig. C, *taczanovskii*, p. 146, *minutissima*, p. 147, Egypt, *dubia* and *abyssinica*, p. 148, Abyssinia, spp. nn., O. Radoszkovsky, Hor. Ent. Ross. xii. pl. ii.

*Hedychrum callosum*, p. 108, pl. ii. figs. D & E, Syra, and *mlokosiewitzi*, p. 109, Caucasus, spp. nn.

## Ichneumonidæ.

Additions to the recorded species of Quebec, including some described as new; L. Provancher, Nat. Canad. viii. pp. 315–318, 327 & 328 [see Zool. Rec. xii. p. 392.

*Ichneumon*. Tischbein, S. E. Z. xxxvii. pp. 273–292, 413–428, gives some additions and further observations to his Synopsis of the European species [Zool. Rec. x. p. 359]. *I. bohemani*, Holmgr., ♂, p. 373, *I. vivacior*, Tischb., ♂, p. 281, with varr., and *I. cædator*, Gr., ♂, p. 282 (*decipiens*, Holmgr., is probably this species), are described, and many fresh characters and tables are given for the known species.

*Ophion macrurum* bred in autumn from cocoons of *Telea polyphemus*; C. E. Worthington, Canad. Ent. viii. p. 220.

*Rhyssa persuasoria* parasitic upon *Sirex* larvæ, and its habits described; H. J. Erné, MT. schw. ent. Ges. iv. p. 518.

*Pimpla* (*Theronia*) *flavicans* parasitic upon *Campoplex* (*Limneria*) *tricolor*, which is itself parasitic upon the Lepidopterous *Zerene grossulariata*; *P. scanica* also found in a small *Campoplex* cocoon. Brischke, Ent. MB. i. p. 159.

*Pimpla graminellæ* bred from a gall of *Nematus viminalis*, in which there was no saw-fly larva; P. Cameron, P. N. H. Soc. Glasg. iii. p. 84.

*Ichneumon perfidiosus*, pl. iv. fig. 5, *inrectus* and *conspiratus*, p. 475, *placidus*, *insidiator* (♀ = *lotatorius*, F., ♂), and *consanguineus*, p. 476, *exhilaratus* and *deceptus*, p. 477, F. Smith, Tr. E. Soc. 1876, New Zealand (South Island); *I. percussor* and *explorator*, p. 274, *dubius*, p. 275 (♀ = *falcatus*, Tischb., ♀), *strangulator*, p. 283, *coniger* and *cuneatus*, p. 284, *glaucus* and *immisericors*, p. 285, *venustus*, p. 286, *auxifer*, p. 288, *nemoralis*, p. 292, Birkenfeld, Crefeld, Vienna, &c., *lichtensteini*, p. 291, Montpelier, *vafer*, p. 286, Hungary, *insidiator*, p. 287, Danzig, Tischbein, *l. c.* (with none of the usual indications of novelty): spp. nn.

*Trogus mellosus*, sp. n., E. T. Cresson, in Wheeler's Rep. Geogr. Explor. W. of 100th M. v. p. 708, New Mexico.

*Mesostenus albo-pictus*, sp. n., Smith, *l. c.* p. 477, pl. iv. fig. 1, North Island, New Zealand.

*Phygadeuon niger*, p. 317, *cressoni*, p. 318, spp. nn., L. Provancher, Nat. Canad. viii., Quebec.

*Cubiea inutilis*[*-le*] and *peregrinus*[*-num*], spp. nn., Smith, *l. c.* p. 478, [illegible]nd, New Zealand.

[illegible]*a croceipes*, sp. n., T. A. Marshall, Ent. M. M. xii. p. 194, Scot-

[illegible]*cus rufulus*, Provancher, *l. c.* p. 328, Quebec; *P. perforator*, F. [illegible]nn. N. H. (4) xvii. p. 449, Rodriguez Island: spp. nn.

[illegible]*ctodes singularis*, sp. n., Provancher, *l. c.* p. 328, Quebec.

[illegible]*niscus rufus*, sp. n., *id. l. c.* p. 318, Quebec.

[illegible]*ryphon clapini*, sp. n., *id. l. c.* p. 327, Quebec.

*Bassus peronatus*, sp. n., Marshall, p. 194, Scotland (parasitic on *Nematus*).

*Coleocentrus rufus*, sp. n., Provancher, *l. c.* p. 316, Quebec.

*Rhyssa antipodum*, sp. n., Smith, Tr. E. Soc. 1876, p. 479, pl. iv. fig. 4, N. & S. Islands, New Zealand.

## Braconidæ.

*Ichneutes reunitor*, Nees, var. *brevis*, Wesm., bred from *Nematus viminalis*, L., in Scotland, and queried as specifically distinct; *I. reunitor*, type, bred from *Cladius padi*. T. A. Marshall, Ent. M. M. xii. p. 195.

*Microgaster*. Observations on economy; Méline, Feuil. Nat. vi. p. 107.

*Pachylomma* [Brébisson, 1825, = *Hybrizon*, Fall., 1813] *buccata*[*-tum*], Bréb. Notes on its very peculiar habits, hovering over ants and even over man; doubts as to its parasitism suggested. E. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 220 & 221.

### Evaniidæ.

*Fænus crassipes*, p. 479, and *unguicularis*, p. 480, pl. iv. fig. 8, spp. nn., F. Smith, Tr. E. Soc. 1876, South Island, New Zealand.

### Chalcididæ.

André, E. Notes sur les larves de quelques Chalcidites (Tribu des Torymiens). Feuil. Nat. vi. pp. 133–135, 145–147, pl. iv.

A list of species observed, with the insects on which they are parasitic. The following larvæ are described and figured:—*Oligosthenus stigma*, F., p. 135, figs. 8 & 9, *Callimome bedeguaris*, L., p. 145, figs. 1–4, and *C. auratus*, Fonsc., p. 146, figs. 5–7, with other stages. The dorsal pseudopodal tubercles are especially discussed.

The pupa of a Chalcididous parasite upon ants living in "Imbauba" plants (*Cecropia*) found to be suspended to the wall of the cell by its posterior extremity, like that of a Nymphalidous butterfly. F. Müller, Nature, xiii. p. 305.

*Ericydnus paludatus*, Hal., fig. 1, *Panstenon*, Walk., sp. ?, fig. 5, and *Eulophus fulvicollis*, Walk., fig. 6, figured, with observations; G. A. Six, Tijdschr. Ent. xix. pp. 134–136, pl. vi.

*Tetrastichus* sp., reared from a phytophagous larva, found in *Melilotus macrorrhiza*; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 223.

*Isosoma eximium*, Gir., var. n. *sabuleti* (? sp. n.), from Holl[illegible] Snellen van Vollenhoven, Tijdschr. Ent. xix. p. 168.

*Chalcis unicolor*, p. 149, and *argenteo-pilosa*, p. 150, spp. nn., C[illegible] kovsky, Hor. Ent. Ross. xii., Egypt.

*Encyrtus vindemmiæ*, C. Rondani, Bulletino del Comizio Agr[illegible] mense, 1875, and Bull. Ent. Ital. viii. p. 84, from pupæ of *Dry*[illegible] Italâ; *E. flavo-scutatus*, Six, *l. c.* p. 135, fig. 3, The Hague: spp. n[illegible]

*Eupelmus* [script. *Emp-*] *cerealnus*, Rondani, *l. c.* and Bull. Ent. viii. p. 85, from larvæ of *Galleria cereana*, Italy.

*Ectroma dunense*, sp. n., Six, *l. c.* p. 134, pl. vi. fig. 2, The Hague.

*Merisus bicolor*, sp. n., *id. ibid.*, fig. 4, The Hague.

*Megastigmus cynorrhodi*, sp. n. ?, É. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 222 & 223, in seed-pods of *Rosa sempervirens*. Doubts suggested as to its being parasitic.

### Proctotrypidæ.

*Ceranisus* sp., described and figured from the Hague district; G. A. Six, Tijdschr. Ent. xix. p. 136, pl. vi. fig. 7.

### Cynipidæ.

Mayr's "Mitteleuropäischen Eichengallen" continued to be abstracted and translated, with copied figures, and original notes to various species, by E. A. Fitch, Ent. ix. pp. 1–3, 26–29, 50–52, 74–78, 115–117, 121–124, 146–150, 171 & 172, 194–197, 219–221, 245–247, 268 & 269.

Additions to the British list; P. Cameron, Ent. M. M. xii. p. 226.

*Allotria halterata*, Thoms., ? = *melanogaster*, Htg., with wings imperfectly developed; *id. l. c.* p. 227.

Additions to Marshall's list of parasitic British *Cynipidæ*, including *Ceroptres arator*, Htg.; *id.* P. N. H. Soc. Glasg. ii. pp. 323 & 324.

Supplemental notes to the late F. Walker's List of insects inhabiting Oak-apples by E. A. Fitch, Ent. ix. pp. 34–42. Parasites from *Cynips kollari*; F. Walker, *l. c.* pp. 52–54 (posthumous).

Jumping galls. Observations on a gall "*Quercus saltatorius*," which is moved by the enclosed pupa of a *Cynips*, and makes a noise like rain pattering under trees infested by the insect in N. America. Am. Nat. x. (quoting Riley), p. 218.

*Diastrophus mayri*, sp. n., H. Reinhard, Verh. z.-b. Wien, xxvi. (SB.) p. 12, bred from *Potentilla argentea*, Austria.

*Andricus schræckingeri*, sp. n., F. Wachtl, Verh. z.-b. Wien, xxvi. p. 713, pl. xiv. figs. 2 & 3, on *Quercus cerris*, Vienna.

*Aphilothrix kirchsbergi*, sp. n., *id. l. c.* p. 714 (= *Cynips gemmea*, Gir., Mayr, of which only the gall was hitherto known), W. Galizia, Moravia, Vienna.

*Xystus musti*, sp. n., C. Rondani, Bulletino del Comizio agrario Parmense, 1875, and Bull. Ent. Ital. viii. p. 83, parasitic upon *Drosophila*, Italy.

*Aulax graminis*, sp. n., P. Cameron, P. N. H. Soc. Glasg. ii. pp. 321–323. Larvæ found in cells in the roots of a grass (either *Triticum repens* or *Arrhenarthum avenaceum*), in Scotland. Chalcididous parasites also mentioned.

## Urocerida.

*Sirex gigas*. The larva eating through bullets in cartridges at the Grenoble arsenal; Feuil. Nat. vi. p. 89.

*Tremex smithi*, sp. n., P. Cameron, Tr. E. Soc. 1876, p. 470, N. India.

*Sirex xanthus*, sp. n., *id. l. c.* p. 471, N. India.

*Derecyrta deceptus* [*-pta*], sp. n., F. Smith, Tr. E. Soc. 1876, p. 474, pl. iv. fig. 6, New Zealand.

## Tenthredinidæ.

S. C. Snellen van Vollenhoven, Tijdschr. Ent. xix. pp. 258–277, in the 19th part of his work "De inlandsche Bladwespen in hare Gedaantewisseling en Levenswijze beschreven," describes and figures the life-histories of *Selandria candidata*, Fall., pl. x., *Nematus crassulus*, Dbm., pl. xi., *Selandria albipes*, L., pl. xii., figs. 1–7, and *Nematus luridiventris*, Fall., pl. xii. figs. A–E. J. W. May, Ent. ix. pp. 3–8, 247–251, continues his translation of former parts of this work.

Observations upon species occurring at Kingussie, Scotland, and their food-plants. *Trichiosoma lucorum* produces a decided humming noise, and the males fight in the air. Larvæ of *Tenthredo dispar* and *T. mesomela* described. P. Cameron, P. N. H. Soc. Glasg. iii. pp. 86–90.

Injury to cherries at Besançon, from *Tenthredo* larva ; Pet. Nouv. ii. p. 66.

*Cimbex axillaris*. A monstrosity taken in Macedonia, with a claw joint growing at the apex of the left antennæ, instead of the normal clava ; G. Kraatz, Deutsche E. Z. 1876, p. 376, pl. i. fig. 8.

*Trichiosoma sorbi*, Htg., in Scotland ; P. Cameron, P. N. H. Soc. Glasg. ii. p. 303. Larva diagnosed.

Additions to the British list ; *Nematus humeralis*, Zett., ? = *striatus*, Htg., var., and suggestions as to the synonymy of species of *Nematus* described by Newman. *Id.* Ent. M. M. xii. pp. 227–229.

*Nematus luteus*, var. n. *trimaculatus*, from Scotland ; *id.* P. N. H. Soc. Glasg. ii. p. 259. *N. crassipes*, Thoms., var. n. *vacciniellus*, from Scotland ; *id.* Ent. M. M. xii. p. 190. *N. pallescens* ( ? = *testaceus*, Dbm.), larva described ; *id.* P. N. H. Soc. Glasg. ii. p. 292, note. *N.* sp. from Spitzbergen ; *id. l. c.* p. 307. *N. abietinus*, Dahlb., from Scotland ; with synonymy ; *id. l. c.* p. 311. *N. brachyacanthus*, Thoms. (?), var. n. *palliditarsus*, from Spitzbergen ; *id. l. c.* p. 313. *N. crassulus*, Dbm., economy ; *id. l. c.* pp. 313–315. Observations on other British species ; pp. 311 & 312. *N. gallicola*, Steph. : three specimens of the male reared out of many hundreds of females ; it closely resembles the latter, but has a narrower body, longer antennæ, and pale abdominal tip ; F. Smith, P. E. Soc. 1876, p. xxii.

*Cladius*. The British species monographed ; Cameron, P. N. H. Soc. Glasg. iii. pp. 15–27.

*Leptopus*, Htg., is preoccupied [6 times, in *Reptilia*, *Pisces*, *Crustacea*, *Coleoptera*, *Hemiptera*, and *Diptera*], and *Camponiscus*, Newm., must be used for it ; *id. l. c.* p. 16.

*Eriocampa æthiops*, Fab., from rose trees, recharacterized ; the common pear-infesting species with slimy larva is *E. adumbrata*, Klug, and observations are made on its allies, their synonymy, &c. *Id.* Ent. M. M. xii. p. 192.

*Phyllotoma*. A monographic revision of the British species ; *id.* P. N. H. Soc. Glasg. ii. pp. 315–321.

*Fenusa* [altered to *Phœnusa*, which is equally meaningless]. The British species monographed ; *id. op. cit.* iii. pp. 5–15, 95 & 96. *F. nigricans*, Thoms., ? Klug & Hartig, renamed *melanopoda*, p. 6.

*Fenella nigrita*. Observations on the confusion of two species under this name ; *id. l. c.* p. 15.

*Crœsus*. Observations on the British species, and descriptions of larvæ of *C. varus* and *latipes*, Villar ; *id. op. cit.* ii. pp. 300–302.

*New genera and species :—*

*Anisoarthra* [*Anisarthra* ; *-ria*, Waterhouse, *Col.*, 1830 ; *-ron*, Dej., *Col.*, 1833], P. Cameron, Tr. E. Soc. 1876, p. 461. Joints of antennæ very unequal : alar neuration of *Monophadnus*. For *A. cærulea* and *cyanella*, p. 462, Ceylon.

*Allomorpha*, id. *l. c.* p. 463. Body of *Tenthredo*, but neuration of *Strongylogaster*. *A. incisa*, ibid., N. China.

*Anisoneura* [Löw, *Diptera*, 1864], *ibid.* Body of *Macrophya*, lanceolate cellule of *Strongylogaster*. *A. stigmaticalis*, p. 464, N. China.

*Pachycephus*, J. P. E. F. Stein, S. E. Z. xxxvii. p. 60. *Cephus*, with 16-jointed antennæ. For *P. smyrnensis*, ibid., Smyrna, and var. ? from Brousa, p. 61.

*Cimbex scapularis*, Stein, *l. c.* p. 53, Balkans, Smyrna, Greece.

*Amasis krueperi*, Attica and Smyrna, *concinna* (= *Abia mutabilis*, Tischb. ; Tischbein, S. E. Z. xxxvii.), *id. l. c.* p. 54, Roumelia.

*Tarpa albicincta*, p. 55, Macedonia, *læwi*, p. 56, Patara, *id. l. c.*

*Lyda maculipennis*, id. *l. c.* p. 57, Smyrna.

*Xyela græca*, id. *l. c.* p. 57, Greece.

*Cephus spectabilis*, p. 58, Attica and Spalato, *albo-maculatus* and *variegatus*, p. 59, Ragusa, *id. l. c.*

*Hylotoma tergestina*, J. Kriechbaumer, Verh. z.-b. Wien, xxvi. (SB.) p. 12, Trieste; *H. albo-cincta* and *xanthogaster*, Nepaul, and *lutea*, N. India, p. 459, *microcephala*, Amoy, and *flavicollis*, Hong Kong, p. 460, P. Cameron, Tr. E. Soc. 1876.

*Athalia tibialis*, Cameron, *l. c.* p. 460, E. Indies.

*Monophadnus rufus*, N. China, *cærulescens*, Nepaul, *bengalensis*, Bengal, *id. l. c.* p. 461.

*Eriocampa ruficornis*, id. *l. c.* p. 462, N. China.

*Allantus flavo-maculatus*, N. China, and *trochanteratus*, N. India, *id. l. c.* p. 464.

*Pachyprotasis versicolor*, id. *l. c.* p. 465, N. India.

*Macrophya rotundiventris*, id. *l. c.* p. 465, N. India.

*Tenthredo* (subg. n. ?) *incerta*, p. 465, Burma, *T.* (*Perineura*) *amoorensis*, Amoor, and *T. metallica* and *clypeata*, N. India, p. 466, *xanthoptera*, Nepaul, *trimaculata* and *melanotarsus*, N. China, *xanthotarsus* and *xanthopus*, Japan, p. 467, *indica*, p. 468, N. India, *flavo-balteata*, ibid., and *obscura*, p. 469, N. China, *id. l. c.*

*Dolerus rufo-cinctus*, India, and *bicolor*, N. China, p. 469, *affinis*, p. 470, China, *id. l. c.*

*Dineura* (g. n. ?, near *Blennocampa*) *africana*, id. *l. c.* p. 470, Sierra Leone.

*Nematus flavipennis* and *baccarum*, p. 189, and *sharpi*, p. 191, P. Cameron, Ent. M. M. xii., Scotland ; *N. interstitialis*, p. 260, *dorsatus*, pp. 291 & 292, note, *femoralis* (Zaddach, MS.), pp. 295–299 (habits described), *herbaceæ*, pp. 304–307 (also in England), *leucostigmus* and *furvescens*, p. 308, Scotland, *id.* P. N. H. Soc. Glasg. ii.

# LEPIDOPTERA.

BY

W. F. KIRBY, M.E.S., &c.

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## GENERAL NOTES.

Parts 97–99 of W. C. Hewitson's "Exotic Butterflies," part 5 of vol. ii. of W. H. Edwards's "Butterflies of North America," and part 13 of H. Strecker's "Lepidoptera" have appeared within the year.

The question of entomological nomenclature, and the validity of recently proposed genera, chiefly with reference to the *Lepidoptera*, is discussed by various authors, from different points of view, in Canad. Ent. viii. pp. 41–52, 56–58, 81–94, 112–119, 131–135, 232–238.

P. C. Zeller gives a list of the *Lepidoptera* figured in Hübner's "Sammlung auserlesener Vögel und Schmetterlinge," with notes on the identification of the species. S. E. Z. xxxvii. pp. 321–332.

The date of Hübner's "Tentamen" is 1805; Zeller & Edwards, Canad. Ent. viii. p. 160.

C. Oberthur has commenced a new work, entitled, "Études d'Entomologie, Faunes Entomologiques, Descriptions d'Insectes nouveaux ou peu connus." Two parts have appeared (Rennes: July and November, 1876, roy. 8vo, pp. 74 & 34) each with 4 col. plates. Part i. contains a list of the *Lepidoptera* of Algeria, with descriptions and figures of new species; Part ii., descriptions and figures of 22 butterflies and one *Abraxas*, collected by A. David in Thibet and China.

C. Dietze makes some remarks on mimicry in *Lepidoptera*, finally concluding "that God gave these animals this protection, in order that they might not have to struggle for existence." S. E. Z. xxxvii. pp. 448–450.

On melanism in *Lepidoptera*; E. Birchall, Ent. M. M. xiii. pp. 130–133. On melanochroism and leucochroism, with tables of the species exhibiting these forms of variation; F. B. White, *op. cit.* pp. 145–149.

On the fertilisation of Alpine flowers by *Lepidoptera*; H. Müller, Nature, xiii. pp. 210–212, 289–292 [*anteâ*, p. 2].

The flowers of *Physcanthus albus* (*Asclepiadaceæ*) capture the *Noctuæ* and *Sphinges* which visit them by their trunks, which are often broken off and left sticking in the flowers; C. V. Riley, P. Ac. St. Louis, iii. p. cxv.

The effects of light and coloured glass on the colours of *Lepidoptera* discussed by J. B. Capronnier, CR. Ent. Belg. xix. pp. xiii. & xiv., li. & lii. The colours are least affected by yellow light.

On variation of *Lepidoptera*, and the possible alteration of their colours by electricity, *cf.* De Lafitole and B. de la Chavignerie, Pet. Nouv. 1876, pp. 62, 63, 69, & 70, and J. J. Weir, Ent. ix. pp. 251–254.

*Vanessa urticæ* and *Gonoptera libatrix* hibernating in a church bell, regardless of the vibration; H. Jenner Fust. jun., Ent. M. M. xiii. p. 16.

On hybernating *Lepidoptera*; H. C. Plötz, MT. Vorpomm. 1873 & 1874.

H. Poulin has published a pamphlet on transferring the colours of the wings of *Lepidoptera* to paper (Paris: 1876, 8vo).

On bleaching or denuding the wings of *Lepidoptera*: G. Dimmock, P. Am. Ass. xxiv. pp. 228–230; H. B. Möschler, Ent. Nachr. ii. pp. 122 & 123; and V. T. Chambers, Canad. Ent. viii. pp. 39 & 40.

Observations on the senses of *Lepidoptera*; "P. G.," Pet. Nouv. 1876, pp. 1 & 2.

Moths exhibit a decided sense of hearing a highly-pitched note; G. J. Romanes, Nature, xi. p. 177.

Notes on rearing various *Lepidoptera*; "P. G.." Pet. Nouv. 1876, p. 87.

On relaxing and preserving *Lepidoptera*; E. Newman, J. Greene, and others, Ent. ix. pp. 137–140, 150–157, 180–182.

A new moth-trap invented by H. Schirl described; J. A. Richter, Ent. Nachr. ii. pp. 26–29, pl. ii.

Sulphate of zinc recommended for killing *Lepidoptera*; Eugster, MT. schw. ent. Ges. iv. pp. 514–517.

Sugaring: W. Sanderson, G. T. Porritt, and W. W. Keyworth, Ent. M. M. xii. pp. 207 & 236, xiii. p. 16, Ent. ix. pp. 20–22.

The comparative anatomy of the silk-glands in the full-grown larvæ of many species of *Lepidoptera*, and the changes which they undergo during the larval and pupal states are described at length by F. E. Helm, Z. wiss. Zool. xxvi. pp. 434–469, pls. xxvii. & xxviii.

On preserving larvæ; H. A. Auld and others, Ent. ix. pp. 78–82, 104–107, 139 & 140, 157.

An unknown larva (ichneumoned) noticed; G. de Rossi, Ent. Nachr. ii. pp. 80 & 81.

On a new method of rearing pupæ, with diagram of the apparatus employed; H. Backhaus, S. E. Z. xxxvii. pp. 192–194; translated Ent. M. M. xiii. pp. 16 & 17.

Notes on some *Lepidoptera* from Guayaquil, the Philippines, and China; C. Crüger & G. Semper, Verh. Ver. Hamb. ii. pp. 129–131, 144–146.

### *Great Britain.*

F. B. White has continued his list of the *Lepidoptera* of Scotland, from *Hydrelia* to *Fidonia*; Scot. Nat. iii. pp. 227–230, 274–276, 319, 320, 360–367.

Captures at Pembroke by C. G. Barrett, Ent. M. M. xii. pp. 181–184, xiii. pp. 36 & 37, 92 & 93; at Ventnor, by C. J. Buckmaster, *op. cit.* xii.

p. 229; in East Sussex, by G. T. Porritt and others, *op. cit.* xiii. pp. 37 & 38; in the Isle of Wight, by J. B. Blackburn & C. J. Buckmaster, *tom. cit.* p. 139; at Rannoch, by N. M. Richardson & F. D. Wheeler, *tom. cit.* pp. 139–141; in the Isle of Man, by E. Birchall, *tom. cit.* p. 143; in the S.W. of England, by A. H. Jones, *tom. cit.* pp. 162 & 163; near Whittlesford, by A. Thurnall, Ent. ix. pp. 17 & 18; in Norfolk, by W. H. Thornthwaite, *tom. cit.* pp. 18 & 19; at Witherslack, by J. H. Threlfall & J. B. Hodgkinson, *tom. cit.* pp. 124–126; at Great Malvern in 1875, by W. Edwards, *tom. cit.* pp. 126–128; in the Isle of Wight, by H. Rogers, *tom. cit.* p. 231; in the Highlands, at sallow-bloom, by J. T. Carrington, *tom. cit.* pp. 272–274; in Cornwall, by J. Hodge, *tom. cit.* pp. 274 & 275; at Loch Luggeu, by N. Cook (including some varieties), P. E. Soc. 1876, p. xxix.; in Scotland, by W. A. Forbes, Scot. Nat. iii. pp. 262–265.

On British *Lepidoptera* of which the larvæ feed habitually or accidentally on oak-galls; E. A. Fitch, Ent. ix. pp. 40–42.

Additions to list of *Macro-Lepidoptera* of Guernsey; W. A. Luff, Ent. ix. p. 16.

*France.*

A. Guénée's "Statistique Scientifique du Département d'Eure-et-Loir, Lépidoptères" (Chartres: 1875, 8vo, pp. 298; *cf.* Zool. Rec. xii. pp. 406 & 407), contains, in addition to matters of purely local interest, remarks on species injurious to agriculture, and characters of the groups and genera. His classification of the *Macro-Lepidoptera* (omitting details fully given in the second edition of Doubleday's List), is inserted below, because in the present unsettled state of the classification of *Lepidoptera*, the views of so experienced a Lepidopterist are of real importance :—

Diurni, Latr.

Div. *Bicalcarati*, Guén.
Legio *Fusiformes*, Guén.
Phalang. *Hexapi*, Linn.
Tribu *Tentaculatæ*, Guén.
Fam. *Papilionidæ*, Godt.
Tribu *Granulosæ*, Guén.
Fam. *Peridæ*, Boisd.
*Rhodoceridæ*, Dup.
Phalang. *Tetrapi*, Linn.
(Here belong the *Danaides* and *Heliconides*).
Tribu *Spinosæ*, Guén.
Fam. *Argynnidæ*, Dup.
*Vanessidæ*, Dup.
Tribu *Carunculatæ*, Guén.
Fam. *Nymphalidæ*, Latr.
*Apaturidæ*, Boisd.
Tribu *Furculæ*, Guén.
(Here belong the *Morphides* and *Pavonides*.)
Fam. *Satyridæ*, Boisd.
Legio *Oniscifornes*, Guén.
Phalang. *Micropi*, Guén.
Tribu *Sulcatæ*, Guén.
Fam. *Theclidæ*, Guén.
G. *Amblypodia*, Horsf. [!] including *A. quercus*, Linn.
G. *Thecla*, Fabr., including *betulæ*, *w-album*, &c.
Fam. *Lycænidæ*, Boisd.
Phalang. *Heteropi*, Guén.
Fam. *Nemeobiidæ*, Guén.
Divis. *Quadricalcarati*, Guén.
Fam. *Hesperidæ*, Latr. (including *Erynnis*, Schrank, restricted to *tages*, L.).

Nocturni, Latr.

Divis. *Areolati*, Guén.
Legio *Spinicornes*, Guén.
Fam. *Sesidæ*, Boisd.

Legio *Prismaticornes*, Guén.
Fam. *Sphingidæ*, Latr.
Legio *Lignivoræ*, Guén.
Fam. *Zeuzeridæ*, Boisd.
*Cossides*, Herr. Schäff.
Legio *Infrenatæ*, Guén.
Tribu *Terricolæ*, Guén.
Fam. *Hepialidæ*, Boisd.
Legio *Apodæ*, Guén.
Fam. *Cochliopodæ*, Boisd.
Legio *Pellucidæ*, Guén.
Tribu *Saccophoræ*, Guén.
Fam. *Psychidæ*, Boisd.
Legio *Crassicornes*, Guén.
Tribu *Globulosæ*, Guén.
Fam. *Procridæ*, Boisd.
(Here insert *Verrucosæ—Gynautocerides.*).
Tribu *Verticillatæ*, Guén.
Fam. *Zygænidæ*, Latr.
Fam. *Syntomidæ*, Boisd.
(Here insert *Penicillatæ—Glaucopides.*)
Legio *Plicatulæ*, Guén.
Tribu *Lichenivoræ*, Guén.
Fam. *Nolidæ*, Guén.
*Lithosidæ*, Boisd.
Tribu *Plantivoræ*, Guén.
Fam. *Emydidæ*, Guén.
*Euchelidæ*, Guén.
*Callimorphidæ*, Guén.
Legio *Plumicornes*, Guén.
Tribu *Hirsutæ*, Guén.
Fam. *Chelonidæ*, Boisd.
Tribu *Verrucosæ*, Guén.
Fam. *Liparidæ*, Boisd.
Tribu *Pannosæ*, Guén.
Fam. *Bombycidæ*, Latr.
Legio *Pectinicornes*, Guén.
Tribu *Nudæ*, Guén.
Fam. *Endromidæ*, Boisd.
(Here insert *Sericarides.*)
Tribu *Stellatæ*, Guén.
Fam. *Saturnidæ*, Boisd.
Tribu *Cuspidatæ*, Guén.
Fam. *Drepanulidæ*, Boisd.
*Cilicidæ*, Herr. Schäff.
Legio *Phalænidæ*, auct.
Tribu *Fimbriatæ*, Guén.
Fam. *Aventidæ*, Guén.
Tribu *Geometræ*, auct.
Legio *Pseudo-Bombyces*, Latr.
Tribu *Tortriciformes*, Guén.
Fam. *Cymbidæ*, Guén.
Tribu *Erectæ*, Guén.
Fam. *Pygaridæ*, Guén.
Fam. *Harpyidæ*, Guén. (*Dicranuridæ*, Dup.).
Fam. *Notodontidæ*, Boisd. (including *Asteroscopus*, Tr.).
Legio *Noctuæ*.
Divis. *Trifidæ*, Guén.
Tribu *Bombyciformes*.
Fam. *Thyatyridæ*, Guén.
*Cymatophorides*, Boisd.
Fam. *Bryophilidæ*, Guén.
*Acronyctidæ*, Guén.
Tribu *Genuinæ*, Guén.
Fam. *Leucanidæ*, Guén.
*Gortynidæ*, Dup. (*Gortyna*, *Hydrœcia*).
*Apamidæ*, Guén.
*Caradrinidæ*, Boisd.
*Episemidæ*, Guén. (*Rusina*, *Pachetra*, *Episema*, *Heliophobus*).
*Noctuides*, Guén.
*Orthosidæ*, Guén.
*Cosmidæ*, Guén.
*Hadenidæ*, Guén.
*Xylinidæ*, Guén.
*Cucullidæ*, Herr. Schäff. (*Cucullia* only).
*Heliothidæ*, Boisd.
Tribu *Minores* (*Acontidæ*, *Erastridæ*, *Brephidæ*).
Divis. *Quadrifidæ*, Guén.
Tribu *Variegatæ*, Guén.
Tribu *Intrusæ*, Guén.
Fam. *Amphipyridæ*, Guén.
*Manïidæ*, Guén.
*Toxocampidæ*, Guén.
Tribu *Limbatæ*, Guén.
Tribu *Serpentinæ*, Guén.
Legio *Deltoidæ*, Latr.
Fam. *Hypenidæ*, Herr. Schäff.
*Rivulidæ*, Guén. (*Rivula*).
*Madopidæ*, Guén. (*Madopa*).

Fam. *Herminidæ*, Dup.
*Boletobidæ*, Guén. (*Boletobia*).
Legio *Pyralidæ*, Linn.
Tribu *Squamosæ*, Guén.
*Pulverulentæ*, Guén.
Tribu *Heterogenidæ*, Guén.
Fam. *Sarothripidæ*, Guén.
Tribu *Luridæ*, Guén.
Divis. *Radiati*, Guén. (Micro-Lepidoptera, auct.).
Legio *Elongata*, Guén.
Tribu *Depressæ*, Guén.
Fam. *Stenopteridæ*, Guén.
*Scoparidæ*, Guén.
Tribu *Inclinatæ*, Guén.
Subtribu *Crambidæ*, Latr.
*Chilonidæ*, Staud.
Fam. *Scirpophagidæ*, Guén. (*Scirpophaga*, *Sindris*, the latter Mascarene).
*Schœnobidæ*, Guén.
Tribu *Involutæ*, Guén.
Fam. *Galleridæ*, Guén.
Subtribu *Phycidæ*, Guén.

Captures of spring *Lepidoptera* at Caunes; Peyerimhoff, Pet. Nouv. 1876, pp. 17 & 18.

Notes on various French *Lepidoptera*; De Lafitole, *tom. cit.* pp. 46, 59, 62 & 63, 74 & 75, 89 & 90.

*Switzerland.*

Captures in Switzerland, with notes on many of the species; R. C. R. Jordan, Ent. M. M. xiii. pp. 57–61.

*Italy.*

A. Curò has continued his Catalogue of Italian *Lepidoptera*, from *Nycteolidæ* to *Cymatophoridæ*, inclusively, and publishes some additions and corrections to the *Sphinges* and *Bombyces*; Bull. Ent. Ital. viii. pp. 25–40, 139–162, 269 & 270.

P. Stefanelli publishes additions and corrections to his catalogue of the *Sphingidæ* of Tuscany; *tom. cit.* pp. 163–167.

Notes on new Sicilian *Lepidoptera*, by A. v. Kalchberg, with descriptions by O. Staudinger; S. E. Z. xxxvii. pp. 138–150.

*Holland.*

Captures at Breda, supplementary list No. 6; F. J. M. Heylaerts, fils., Tijdschr. Ent. xix. pp. cxiv. & cxv. (total number of species now obtained, 591 *Macro-Lepidoptera*, and 630 *Micro-Lepidoptera*; in all 1221 species).

*Germany and Austria.*

Captures in the district of Glatz; R. Brauner, Ent. Nachr. ii. pp. 62 & 63.

Additional notes on the *Macro-Lepidoptera* of Hamburg and Altona; G. Semper, Verh. Ver. Hamb. ii. pp. 235–240.

Notes on some *Lepidoptera* of Nassau (the most important of which will be noticed in their places); A. Fuchs, S. E. Z. xxxvii. pp. 94–106. Additions to the fauna are noticed; *l. c.* p. 106, note.

A catalogue of the *Macro-Lepidoptera* of Salzburg has been commenced in MT. Ges. Salzb. Landeskunde.

On collecting at sallow-blossom, with list of captures in Schleswig; H. Tetens, Verh. Ver. Hamb. ii. pp. 153–162.

Notes on new Würtemberg *Lepidoptera*; O. Hofmann, JH. Ver. Württ. xxxii. pp. 467 & 468.

*Norway, Sweden, and Denmark.*

Captures of *Lepidoptera* in the south of the province of Bergen (235 known species); J. S. Schneider, Förh. Selsk. Chr. 1875, pp. 169–209.

J. S. Schneider & H. Siebke, Enumeratio Insectorum Norvegicorum, Fasc. 3, Catalogus Lepidopterorum Norvegiæ, pp. xii. & 188, Christiania: 1876, 8vo. 934 species enumerated, one new *Dianthœcia* described.

H. D. J. Wallengren has published a list of the Scandinavian *Tortrices* (255 spp.), *Tineæ* (434 spp.), *Pterophori* (28 spp.), and *Alucitæ* (1 sp.); Sv. Ak. Handl. (n. f.) iii. Bihang, No. v. pp. 90. He appends some additions to his former lists of *Noctuæ* and *Geometræ*; but no new genera or species are described.

A. B. Haas has published the concluding portion of his catalogue of the *Lepidoptera* of Denmark, Nat. Tids. (3) x. pp. 1–56. He enumerates 1234 species, as follows:—*Rhopalocera*, 71, *Sphinges*, 32, *Bombyces* (inclusive of *Nyeteolidæ* and *Cymatophoridæ*), 99, *Noctuæ*, 245, *Geometræ*, 219, *Pyrales*, 96, *Tortrices*, 206, *Tineæ*, 239, *Micropterygidæ*, 5, *Pterophori*, 21, *Alucitæ*, 1 (*cf.* also C. Crüger, Verh. Ver. Hamb. ii. pp. 140 & 141.

*Japan.*

List of Japanese butterflies; R. P. Murray, Ent. M. M. xiii. pp. 33–35 (nearly 150 species recorded: but some of these are probably synonyms, and others erroneous indications).

*East Indies.*

Notes on Mr. Atkinson's collection of East Indian *Lepidoptera*, with descriptions of new species of *Rhopalocera*; W. C. Hewitson, Ent. M. M. xiii. pp. 149–152.

On the *Lepidoptera* of Batavia, M. C. Piepers & P. C. T. Snellen, Tijdschr. Ent. xix. pp. 129–167. 81 *Rhopalocera* noticed, 5 as new.

Piepers has observed assemblies of *Pieridæ* seated on the damp sand in Celebes, and presenting the appearance of a flower. One was formed of two concentric rings of *Callidryas scylla*, with a centre of some white *Pieris*, and another of *Pieris zarinda*, and a white *Pieris*. He has also observed *Pap. helenus* bathing. Tijdschr. Ent. xix. pp. xv.–xviii. Translated, C. A. Dohrn, S. E. Z. xxxvii. pp. 336 & 337.

Further interesting remarks on the habits of East Indian *Lepidoptera* are given by Piepers, *l.c.* pp. xviii.–xxiv., and translated by C. A. Dohrn, S. E. Z. xxxvii. pp. 441–446. He has seen *Precis iphita* and a party of *Pieridæ* mob and drive away a *Papilio remus*, as small birds drive away a hawk. A *P. iphita* returned to spend the night for six evenings in a verandah, being absent by day. In the mornings, *Micro-Lepidoptera* sit on the ends of grass-blades, &c., and creep down to the roots, when the [illegible] off, while it is the reverse with the *Lycænidæ*, which creep up [illegible]oots of the plants into the sun, as it becomes stronger. Many [illegible]*ra* are twilight fliers, as *Cyllo leda*, *Amathusia phidippus*, [illegible]*thrax*, *Debis europa*, *Elymnias nais*, and several species of

*Mycalesis*. In the south-west of Celebes, an undescribed species of *Scirpophaga* flies in swarms into lighted rooms, and covers everything. It causes an intolerable itching when it alights on the skin; and it covers the walls of the rooms with clusters of eggs. Larvæ of *Lepidoptera* are seldom observed in the East Indies in any abundance. They frequently desert their natural food to attack introduced plants. Mimicry is common among larvæ, many widely removed species having great superficial resemblance. A curious phenomenon is presented by the larva of *Miresa nitens*, Horsf., the hairs alternately appearing like bristles and pencils.

*Oceania.*

A. G. Butler has published a revised list of the butterflies of New Zealand, including one new genus and species, in which he raises the number now known to 14 species; Ent. M. M. xiii. pp. 152–154.

On a small collection of butterflies from the New Hebrides; *id.* P. Z. S., 1876, pp. 251–253 (10 species, 1 new).

A. G. Butler's list of Polynesian butterflies (P. Z. S., 1874, pp. 274–291) is discussed, with instructive comments, by J. D. E. Schmeltz, Verh. Ver. Hamb. ii. pp. 173–198.

List of *Lepidoptera* in the Museum Godeffroy from the Fiji and Samoan Islands; *id. l. c.* p. 62.

*Africa.*

M. Korb records the following *Lepidoptera* as observed in the Libyan Desert (S. E. Z. xxxvii. pp. 28–30):—*Vanessa atalanta* and *cardui*, *Danais chrysippus*, *Lycæna*, several species, especially a large tailed one [probably *batica*], *Colias* sp., resembling *edusa*, *Syrichthus* sp. *Pieris glauconome?*, *Agrotis* sp., some small *Geometridæ*, *Crambus* sp., *Plutella* sp., resembling *cruciferarum*, and *Platyptilus* sp.

On a collection of butterflies from the Atbara, Abyssinia, with descriptions of new species; A. G. Butler, Ann. N. H. (4) xviii. pp. 480–490.

H. D. J. Wallengren has published a list of 202 *Lepidoptera*, many new, received from the Transvaal; Œfv. Ak. Förh. xxxii. pp. 83–130.

*North America.*

J. Boll has published an article on dimorphism and variation in North American *Lepidoptera*; Tageblatt Vers. Nat. Hamb. Beilage, xlix. pp. 176–199. The following species, among others, are noticed:—*Colias ariadne* and *keewaydin*, Edw., = *eurytheme*, Boisd., = ? *chrysotheme*, Esp.; *Pieris vernalis*, Edw., = *protodice*, Boisd., winter form; *Nathalis iole*, Boisd., is also dimorphic; *Melitæa marcia*, Edw., = *tharos*, Dru.; *M. phaon*, Edw., is similarly dimorphic; *Vanessa umbrosa*, Lintn., is the summer form of *interrogationis*, Fab.; *Ctenucha venosa*, *Actias luna*, *Neonympha gemma*, and *Terias nicippe*, *lisa*, and *mexicana*, are all more or less dimorphic; *Papilio turnus* and the species of *Catocala* a[illegible] noticed; *Callimorpha fulvicosta*, *lecontii*, and *interrupto-mar*[illegible] pass into each other.

H. Strecker criticises Scudder's papers on the genera of butte[illegible]

Grote's Check-List of N. American *Noctuidæ*, unfavourably; Lepidoptera, pp. 118–120, 123.

H. B. Möschler gives a thorough analysis of some of Grote's recent lists of North American *Sphinges* and *Bombyces*, with occasional criticisms; S. E. Z. xxxvii. pp. 293–315.

Additions to the *Rhopalocera*, *Sphingidæ*, and *Zygænidæ* of Montreal; F. B. Caulfield, Canad. Ent. viii. pp. 38 & 39.

List of *Lepidoptera* collected in the vicinity of Davenport, Iowa; J. D. Putnam, P. Davenp. Ac. i. pp. 174–177.

List of 14 butterflies captured by R. Thaxter on Cape Breton Island; S. H. Scudder, P. Bost. Soc. xviii. pp. 188 & 189.

On the natural history, habits, ravages, enemies, &c., of the various moths of which the caterpillars are known in America as "army-worms"; *cf.* C. V. Riley, Rep. Ins. Mo. viii. pp. 22–26, 182–185, figs. 16–38. The species noticed (not all army-worms) are:—*Anomis xylina*, Say, *Cliziocampa americana*, Harr., *Leucania unipuncta*, Haw., *Gortyna nitela* and *Laphygma frugiperda*, Abb. & Smith.

*South and Central America.*

H. B. Möschler (Verh. z.-b. Wien, xxvi. pp. 293–354, pls. iii. & iv.) has published "Beiträge zur Schmetterlings-Fauna von Surinam," comprising notes on many known species of butterflies and Sphinges, and descriptions of some new.

J. B. Capronnier's paper on Van Volxem's Brazilian *Lepidoptera* is noticed, with comments, by C. Crüger, Verh. Ver. Hamb. ii. pp. 132–135.

H. Druce has published a list of the butterflies of Peru, with descriptions of new species, and notes (chiefly on habits and localities) by E. Bartlett, P. Z. S., 1876, pp. 205–250, pls. xvii. & xviii.

Notes on the butterflies of Costa Rica, with descriptions of new species; W. L. Distant, P. E. Soc., 1876, pp. x.–xiv.

## Papilionidæ.

*Papilio agamemnon*, *polytes*, and *memnon*, Linn. Transformations noticed: M. C. Piepers, Tijdschr. Ent. xix. pp. 155–157. *P. hippocrates*, Feld., var. *oregonia*, from the Columbia River, described; W. H. Edwards, Tr. Am. Ent. Soc. v. p. 208. *P. indra*, Reak., ♀ described; H. Strecker, P. Ac. Philad., 1876, p. 150. *P. machaon*: uncertain duration of pupa state, R. Laddiman, Ent. ix. p. 20; it is double-brooded on the Continent, G. Bentham, Ent. ix. pp. 157 & 158; a variety noticed, Pet. Nouv., 1876, p. 18; larva found feeding on woodbine, De Lafitole, *op. cit.* p. 46; black variety of pupa, Swierstra, Tijdschr. Ent. xix. p. civ.

*Armandia thaidina*, Blanch., noticed and figured by C. Oberthur, Études Ent. ii. p. 18, pl. i. fig. 1.

*Parnassius apollo*, var.; Parent & Rebec, Pet. Nouv. 1876, pp. 66 & 70. *[illegible]pius*, W. H. Miskin, Tr. E. Soc. 1876, p. 451, Queensland; [illegible] Zambesi, p. 56, *auriger*, Gaboon, and *rhodifer*, Andaman [illegible] A. G. Butler, Ent. M. M. xiii.; *P. indicatus*, id. Ann. N. H.

(4) xviii. p. 248, New Guinea; *P. tamerlanus* [= *albion*, Gray, *teste* Hew. in litt.], p. 13, pl. ii. fig. 1, *lama*, p. 15, pl. iii. fig. 1, and *plutonius*, p. 16, pl. iii. fig. 2, all from Mou-pin, C. Oberthur, Études Ent. ii.; spp. nn.

*Eurycus troilus*, sp. n., A. G. Butler, Ann. N. H. (4) xviii. p. 247, New Guinea.

## Pieridæ.

*Leptalis.* F. Müller discusses the question of mimicry in this genus, and concludes that the parent form was not a white, but a black and yellow butterfly. Jen. Z. Nat. x. pp. 1–12.

*Terias candace*, Feld., = *T. zoe*, Hopff., var.; A. G. Butler, Ann. N. H. (4) xviii. p. 486. *T. hecabe*, Linn.: a Javanese variety approaching *T. brenda*, Doubl., noticed; M. C. Piepers, Tijdschr. Ent. xix. p. 155. *T. lisa*: an immense flight arrived in the Bermudas, Oct. 1, 1874. As the nearest land is 600 miles distant, it is suggested that a revolving gale may have carried up a swarm into the higher regions of the atmosphere, and they may have there met with a direct gale blowing them out to sea. J. M. Jones, Psyche, 1875, p. 121; Ent. ix. pp. 54–58. *Cf.* also H. Reeks, Ent. ix. pp. 86 & 87.

*Aporia crataegi.* A pupa, pinned two days after its change, produced the perfect insect; Wurtbein, Pet. Nouv. 1876, p. 56; *cf.* also "M. G.," p. 57.

*Pieris.* Enormous swarms in the Baltic, Aug. 12, 1876; Ent. Nachr. ii. pp. 173 & 174 (copied from the Weser Zeitung). Dates of first appearance in Isle of Man; E. Birchall, Ent. M. M. xiii. p. 10. Notes on parasites; R. Meldola, P. E. Soc. 1876, p. xxxv. *P. brassicæ*: C. A. Dohrn doubts the accuracy of the statement published in a Hamburg periodical that the traffic on the railway between Hamburg and Lübeck was once stopped for several days by hosts of the larvæ crossing the line; S. E. Z. xxxvii. pp. 108 & 109. On cutting the girdle of several larvæ of *P. brassicæ* which were about to change to pupa, some of them succeeded in attaching themselves by the tail after the manner of the *Suspensi*, and in accomplishing their metamorphosis; J. A. Osborne, Nature, xv. p. 7. *P. coronea*, *niseia*, and *teutonia* may be only varieties: the larva of the last lives on *Cucurbitaceæ*; J. D. E. Schmeltz, Verh. Ver. Hamb. ii. pp. 190 & 191. *P. ergane* and *manni* are probably only forms of *P. rapæ*; P. Stefanelli, Bull. Ent. Ital. viii. Addunza, p. 7. *P. napi*, var.; Parent & Rebec, Pet. Nouv. 1876, pp. 66 & 70. *P. rapæ*, var. *aurea*: under this new name, R. A. Rolfe remarks on the new American var. *novangliæ*, Scudd., which he has failed to reproduce by difference of food in England; Ent. ix. pp. 199–201.

*Cathæmia hyparete*, Linn. Transformations noticed; M. C. Piepers, Tijdschr. Ent. xix. p. 154.

*Pinacopteryx syrinx*, Wallengr., = *P. severina*, Cram., var.; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. p. 90.

*Herpænia tritogenia*, Klug, is probably distinct from *H. e*
A. G. Butler, Ann. N. H. (4) xviii. p. 490.

*Callidryas.* These butterflies fertilise a Brazilian spec

*chrum* by their wings; H. & F. Müller, Nature, xiv. pp. 173–175. *C.* (*Aphrissa*) *butleri*, Scudd., = *C. boisduvali*, Feld., which is only a form of *C. statira*, Cram.; A. G. Butler, Ent. M. M. xii. p. 206. *C. rhadia*, Boisd., probably = *C. florella*, Fab., ♀; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. p. 91.

*Goneptery.r rhamni*. Food-plants; O. Wilson, Ent. ix. pp. 70, 202, & 203.

*Colias*. A form from La Creuse, intermediate between *edusa* and *myrmidone*; De Lafitole, Pet. Nouv. 1876, p. 46. *C. hyale* and *edusa* are probably double-brooded; E. A. Fitch, Ent. ix. p. 202, but *cf.* also H. R. Cox, *tom. cit.* pp. 230 & 231. Remarks on the habits, coloration, &c., of these species; J. J. Weir, *tom. cit.* pp. 217–219. *C. hyale*: small specimen noticed; J. Dubus, Pet. Nouv. 1876, p. 91. *C. philodice*: transformations, and a long series of varieties described and figured by W. H. Edwards, Butt. N. Amer. ii. *Col.* pls. ii. & iii. *C.* (*Eurymus*) *philodice*, var. *laurentina*, from Cape Breton Island; S. H. Scudder, P. Bost. Soc. xviii. p. 189.

*Teracolus*, Swains. A. G. Butler has published a revision of this genus (P. Z. S. 1876, pp. 126–165, pls. vi. & vii.), with which he unites *Callosune* and *Idmais*, describing many new species, and raising the number of known species to 129. *T. amata* and *cyprœa*, Fabr., *dynamene*, Klug, and *calais*, Cram., are differentiated, pp. 138 & 139; *T. loandicus*, Butl., is redescribed, p. 153; *T. etrida*, Boisd., ♀ described, p. 160. He also (Ann. N. H. 4, xviii. pp. 487–489) notices the females of *T. amelia* and *isaura*, Luc., and *T. citreus* and *xanthevarne*, Butl. *T. arne*, Klug, is distinct from *T. phisadia*, Godt. *T. anteupompe*, Feld., is redescribed.

*Callosune deidamia*, Wallengr., = *C. evenina*, Wallengr., ♂; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. p. 90.

*Calicharis* [g. n., uncharacterised] *nouna*, Luc., probably = *Anthocharis delphine*, Boisd.; C. Oberthur, Études Ent. i. pp. 18 & 19.

*Anthocharis*. Note on the broods of *belemia* and *ausonia*, and the synonymy of the true *belia*, Linn.; O. Staudinger, Pet. Nouv. 1876, p. 58. *A. belemia* and *glauce*: their specific claims discussed by C. Oberthur, Études Ent. i. p. 16, note. *A. cardamines*: habits of larva, &c.; "P. G.," Pet. Nouv. 1876, p. 16.

*New species*:—

*Leptalis thalia*, F. Müller, Jen. Z. Nat. x. p. 10, fig. 5, South Brazil (mimics *Acræa thalia*).

*Hesperocharis nymphœa*, H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 296, pl. iii. fig. 1, Surinam.

*Elodina andropia*, A. G. Butler, Ann. N. H. (4) xviii. p. 246, New Guinea.

*Terias bisinuata* and *regularis*, A. G. Butler, Ann. N. H. (4) xviii. pp. 485 & 486, Abyssinia.

*Pieris davidis*, fig. 5A, B, and *larraldii*, fig. 2A, B, C. Oberthur, Études Ent. ii. pp. 18 & 19, pl. i., Mou-pin.

*Belenois latilimbata*, A. G. Butler, *l. c.* p. 247, New Guinea.

*Herpænia lacteipennis*, id. *l. c.* p. 489, Abyssinia.

*Colias eriphyle*, W. H. Edwards, Tr. Am. Ent. Soc. v. p. 202, British Columbia.

*Teracolus buxtoni*, p. 130, Natal, *imperator*, p. 132 (= *Anthocharis ione*, Reiche, *nec* Godt.), Senegal, *rosaceus*, fig. 6, Akole, *oriens*, fig. 7, p. 134, pl. vii., *solaris* and *vestalis*, pl. vii. fig. 10, p. 135, *puellaris* and *ochreipennis*, p. 136, all from N.W. India, *protractus*, Punjab, and *modestus*, Ceylon, p. 137, *carnifer*, p. 138, pl. vii. figs. 8 & 9, Punjab, *subfumosus*, p. 139, fig. 3, *lycoris* and *flaminia*, p. 140, figs. 6 & 1, *lycus*, p. 141, fig. 2, *frija*, fig. 5, pl. vi., and *galathinus*, p. 142, all from Natal, *lucullus*, pl. vi. fig. 4, and *gelasinus*, p. 143, Ambriz, *glycera*, p. 144, Africa, *lais*, Orange River, and *halyattes*, fig. 8, p. 145, *ithonus*, fig. 7, pl. vi., *harmonides*, p. 146, and *hippocrene*, Natal, *ignifer*, p. 147, S. Africa, *simplex*, p. 148, D'Urban, *helle*, White Nile, and *hyperides*, Natal, p. 149, *trimeni* (= *Aphrodite achine*, Hübn.) and *hero*, pl. vi. fig. 12, p. 150, *omphaloides* (= *Anth. achine*, Boisd., *nec* Cram.), p. 151, all from S. Africa, *suffusus*, pl. vi. fig. 10, Ambriz, and *hybridus*, S. Africa, p. 152, *pseudocale*, pl. vi. fig. 9, S. Africa, and *angolensis*, Angola and Congo, p. 154, *pseudacaste*, p. 156, pl. vi. fig. 11 (= *Anth. eupompe*, Luc., *nec* Klug), White Nile, *wallengreni* (= *Anthopsyche eupompe*, Wallengr., *nec* Klug), Natal, *dulcis*, fig. 13, N. India, and *dirus*, fig. 11, Scinde, p. 157, *eborcides*, fig. 12, India, pl. vii., and *sanguinalis*, Ceylon, p. 158, *pernotatus*, Punjab, and *farrinus*, Himalayas, p. 159, figs. 1 & 2, *purus*, p. 160, figs. 14 & 15, Punjab, pl. vii., *limbatus*, Ceylon, *casimirus*, fig. 5, Cashmere, and *bimbura* (Moore, MS.), figs. 3 & 4, India, p. 161, pl. vii., *citreus*, p. 162, Hor Tamanib and White Nile, *xanthevarne* (= *evarne*, Luc., *nec* Klug), White Nile and Abyssinia (*cf.* also Butler, Ann. N. H. (4) xviii. p. 489), and *syrtinus*, Senegal, p. 163, and *pseudevanthe*, p. 164, pl. vii. fig. 16, Bombay; A. G. Butler, P. Z. S. 1876. *T. abyssinicus* and *gaudens*, p. 486, *microcale*, p. 487, and *phœnius*, p. 488; *id.* Ann. N. H. (4) xviii.

*Anthocharis bambusarum*, C. Oberthur, *l. c.* ii. p. 20, pl. iii. fig. 4, Chi-Kiang.

## Danaidæ.

*Calliplœa graffiana*, Herr. Schäff., is distinct from *hisme*, Boisd., and *eunice*, Godt.; A. G. Butler, P. Z. S. 1876, p. 251.

*Danais archippus*. A specimen taken in Wales; J. T. D. Llewellyn, Ent. M. M. xiii. pp. 108 & 109. Also in Sussex; T. E. Crallan & J. J. Weir, Ent. ix. pp. 265–268 (with figure of larva). Earlier stages noticed; W. H. Edwards, Canad. Ent. viii. pp. 119, 120, & 148. *D. chrysippus*, Linn., from Java, noticed, and compared with specimens from other localities; P. C. T. Snellen, Tijdschr. Ent. xix. pp. 143 & 144. *D. neptunia*, Feld., = *melittula*, Herr. Schäff., var.; *D. obscurata*, Butl., probably comes from the Solomon Islands, and not from Samoa: J. D. E. Schmeltz, Verh. Ver. Hamb. ii. p. 175.

*Euplœa iphianassa*, Butl., = *macleayi*, Feld., = *nemertes*, Herr. Schäff. (*nec* Hübn.), = *graeffeana*, Heer (E. Graeffe's Reisen in Innern der Insel Viti-Levu, "Neujahrschrift der Züricher Naturf. Gesellsch." 1868); *E. corinna*, Macl., and *helcita*, Boisd., are structurally distinct from *E. montrouzieri*, Feld., and *cleutho*, Quoy; *E. helcita* is the Fijian representa-

tive of the Samoan *E. schmeltzi*, Herr. Schäff.: *id. l. c.* pp. 181 & 182. *E. eleutho*, Quoy: varieties are *eschscholtzi*, Feld., *proserpina*, Butl., *distincta*, Butl. (= *herrichi*, Feld.), and *perryi*, Butl.; *id. l. c.* pp. 62, 178, & 179. *E. batesi*, Feld., = *lapeyrousii*, Boisd.; A. G. Butler, Ann. N. H. (4) xviii. p. 241. *E. guerini*, Feld., new to New Guinea; *id.* P. Z. S. 1876, p. 766. *E. midamus*, Linn.: transformations noticed; M. C. Piepers, Tijdschr. Ent. xix. pp. 142 & 143.

*Conoplea*, g. n. (uncharacterised), mentioned by C. Oberthur, Études Ent. i. p. 36, note xx., appears to be a mere synonym of *Amauris*, Hübn.

*New species:—*

*Danais ferruginea*, A. G. Butler, Ann. N. H. (4) xviii. p. 240, New Guinea.

*Euploea resarta* and *paykulli*, p. 241, *lugens*, p. 242, *id.* l. c.; *E. dolosa*, id. P. Z. S. 1876, p. 766, pl. lxxvii., fig. 1: all from New Guinea.

*Calliploea jamesi* and *infantilis*, id. *l. c.* figs. 2 & 3; *C. violetta*, id. Ann. N. H. (4) xviii. p. 242: all from New Guinea.

## Heliconiidæ.

*Mechanitis nesæa*, Hübn., and *lysimnia*, Fabr., are good species, and not varieties of *polymnia*, L.; H. B. Möschler, Verh. z.-b. Wien, xxvi. pp. 310 & 311.

*Ithomia sylphis*, Guér., and *galata*, ♂, Hew., figured and redescribed by W. C. Hewitson, Ex. Butt. v. *Ith.* pls. xxxiv. fig. 227, and xxxv. fig. 231.

*Heliconius.* Various species are discussed by H. B. Möschler, *l. c.* pp. 312–315. *H. vesta*, Cram., is the true *H. erato*, Linn.

*New species:—*

*Ituna albescens*, W. L. Distant, P. E. Soc. 1876, p. xi., Costa Rica.

*Mechanitis ovata* and *labotas*, id. *l. c.* pp. xi. & xii., Costa Rica.

*Ceratinia alexia*, pl. xvii. fig. 4, and *baana*, Peru, and *tigrina*, pl. xvii. fig. 2, Ucayali, H. Druce, P. Z. S. 1876, p. 207.

*Mechanitis ortygia*, pl. xvii. fig. 5, and *ocona*, id. *l. c.* p. 208, Huiro, Valley of Santana.

*Napeogenes pyrrho*, id. *l. c.* p. 209, Yurimaguas.

*Ithomia zurippa*, *dispœna*, *catilla*, *didymœa*, figs. 223–226, *dolabella* and *cantobrica*, all from Bolivia, *philetæra*, locality unknown, figs. 228–230, *Ith.* pl. xxxiv.; *cleobulina*, *osuna*, *clausina*, *arzalia*, *domiduca*, *mantura*, and *deronda*, *Ith.*, pl. xxxv. figs. 232–238, all from Bolivia; W. C. Hewitson, Ex. Butt. v.

*Melinæa dora*, H. Strecker, Lepidoptera, p. 120, Esmeraldas (figured by G. Weymer as *M. ribbei*, Staud., S. E. Z. 1875, pl. ii. fig. 4); *M. chincha*, H. Druce, P. Z. S. 1876, p. 211, Pozzuzo.

*Heliconius bartletti*, id. *l. c.* p. 219, pl. xviii. fig. 2, Peru; *H. funebris*, pl. iii. fig. 8, Surinam, and *deinia* (Plötz, MS.) Arganza; H. B. Möschler, Verh. z.-b. Wien, xxvi. pp. 314 & 315.

ACRÆIDÆ.

*Acræa andromacha* occurs in Fiji and Samoa, as well as in Australia; J. D. E. Schmeltz, Verh. Ver. Hamb. ii. p. 186.

NYMPHALIDÆ.

Scudder's List of the *Nymphalidæ* of North America (*cf.* Zool. Rec. xii. p. 412) is analysed, with numerous critical notes on the genera and species, by H. B. Möschler, S. E. Z. xxxvii. pp. 32–41.

*Messaras erymanthis*, Dru. Notices of the pupa; M. C. Piepers, Tijdschr. Ent. xix. p. 150.

*Argynnis*. An American species supposed to have established itself at Driburg, Westphalia; Keferstein, S. E. Z. xxxvii. p. 62. *A. inornata*, Edw. (*Arg.* pl. v.), *rupestris*, Behr. (*Arg.* pl. vii. figs. 1–4), and transformations of *diana*, Cram. (pl. vii. figs. A–H), figured by W. H. Edwards, Butt. N. Amer. ii., with notes on the transformations of *A. diana*, *cybele*, and *aphrodite*. *A. adippe*, hermaphrodite (right side ♂, left side ♀); R. J. Stent, Ent. ix. p. 203. Var. *chlorodippe*, Herr. Schäff., recorded as new to France; De Lafitole, Pet. Nouv. 1876, p. 46. *A. dia*, an undoubted British specimen taken in Surrey by W. A. Smith; W. A. Lewis, Ent. M. M. xii. p. 229; Ent. ix. p. 69; P. E. Soc. 1876, p. iii. *A. idalia*, Dru.: the great majority of the females appear about a week or ten days after the males; H. H. Lyman, Canad. Ent. viii. pp. 268–270. *A. myrina*, Cram., transformations; W. H. Edwards, Canad. Ent. viii. pp. 161–163. *A. niobe* doubted as British; G. B. Corbin, Ent. ix. pp. 21–22.

*Melitæa*. Exclusive of *dictynna*, J. N. Rebec (Pet. Nouv. 1876, pp. 82 & 83) admits 3 species of the *athalia* group: *athalia*, Esp., *aurelia*, Nich., and *parthenie*, Borkh. *M. parthenoides*, Kef., = *parthenie*, and *varia*, Meyer-Dür, is an Alpine variety. *M. britomartis*, Assm., *plotina*, Brem., *veronicæ*, Dorfm, &c., are German (?) varieties of *aurelia*, Nick. *M. artemis*: an aberration noticed; De Lafitole, Pet. Nouv. 1876, p. 59. *M. phœbe*, W. V., var *punica*, from Lambèze, pl. i. fig. 3, and *M. didyma*, Esp., var. *deserticola*, from Biskra, pl. iii. fig. 1, described by C. Oberthur, Études Ent. i. p. 25. *M. didyma*, var., G. A. Poujade, Bull. Soc. Ent. Fr. (5) vi. p. clxix.

*Vanessa io*, *urticæ*, and *polychloros*. On varieties caused by starving the larvæ; H. R. Cox, Ent. ix. pp. 58 & 59; *cf.* also G. W. Oldfield, *op. cit.* pp. 87 & 88. *V. io*, ab. *ioides*, Ochs., with notes on the degeneration of *Lepidoptera*; De Lafitole, Pet. Nouv. 1876, p. 59. *V. lintneri*, Fitch [= *antiopa*, ab.], R. Bunker, Canad. Ent. viii. p. 240. *V. polychloros*: on its time of appearance; Rouchy & J. N. Rebec, Pet. Nouv. 1876, pp. 58, 61, & 62. *V. urticæ*: its early hybernation; D. Sharp, Ent. M. M. xiii. p. 94.

*Vanessa levana*, Linn. H. Tetens offers remarks and suggestions with reference to various experiments on its variation; Verh. Ver. Hamb. ii. pp. 167–171. On an aberration, supposed to be *porima*, Ochs.; Hette, Rebec, and Frontin, Pet. Nouv. 1876, pp. 36, 57, 65, 66, & 74.

*Vanessa atalanta*: note on the sexes; "P. G." and others, Pet. Nouv.

1876, pp. 28, 30, & 59. *V. cardui*: its habits, natural history, geographical distribution, &c., are discussed by S. H. Scudder, Am. Nat. x. pp. 392–396, 602–611; P. Bost. Soc. xviii. pp. 201 & 202. He comes to the conclusion that the species originated in N. America. Its migrations, &c., are also discussed by A. Gaschet, Ann. Soc. Ent. Fr. (5) vi. pp. 519–521.

*Pyrameis huntera* has occurred in South Devon; G. C. Bignell & J. T. Carrington, Ent. ix. pp. 255 & 256.

*Junonia orithya*, Cram., has the habits of *Satyrus semele*; M. C. Piepers, Tijdschr. Ent. xix. p. 151.

*Precis iphita* and *ida*, Cram., are probably either distinct species, or seasonal forms; P. C. T. Snellen, *op. cit.* p. 150.

*Doleschallia bisaltide*, Cram.: transformations described; M. C. Piepers, *l. c.* pp. 151 & 152.

*Catagramma*. W. C. Hewitson (Ex. Butt. v. *Cat.* pl. xii.) figures and redescribes his *C. clisithera*, figs. 97 & 98, *cabirnia*, figs. 101 & 102, and *cotyora*, figs. 103 & 104.

*Dynamine tithia*, Hübn.: refigured by N. Erschoff, who doubts if *D. racidula* and *amplias*, Hew., and *salpensa*, Feld., are distinct from *tithia*; Trud. Russk. x. pl. i. figs. 6 & 7.

*Temenis pulchra*, var. from Pozzuzo described; H. Druce, P. Z. S. 1876, p. 225.

*Limenitis sibylla*: black var. noticed; De Lafitole, Pet. Nouv. 1876, p. 46.

*Neptis brebissonni*, var.? from New Guinea, noticed by A. G. Butler, Ann. N. H. (4) xviii. p. 243.

*Diadema*. *D. bolina* does not admit of division into species; *D. octocula*, Butl., is distinct from *formosa*, Herr. Schäff.; *D. lutescens*, Butl., = *D. antilope*, Cram., var. J. D. E. Schmeltz, Verh. Ver. Hamb. ii. pp. 184 & 185; *cf.* also A. G. Butler, P. Z. S. 1876, p. 252.

*Adolias alpheda*, Godt., Moore: transformations described; M. C. Piepers, *l. c.* pp. 149 & 150.

*Apatura clyton*, Boisd., Lec. W. H. Edwards (Butt. N. Amer. ii. *Ap.* pl. ii.) figures and describes var. *ocellata*, Edw., figs. 1–4, var. *proserpina*, Scudd., figs. 5 & 6, and transformations (figs. A–H). He also describes var.? or sp. n.? *flora*, from Florida, and gives woodcuts of *herse* and *lycaon*, Fabr., to show their distinctness. *A. iris*: additional notes on its transformations; W. Buckler, Ent. M. M. xiii. pp. 3–6. C. Crüger records its settling on his dress in numbers, when it was soaked with perspiration, during a very hot day, in Russia; Verh. Ver. Hamb. ii. p. 135.

*Prepona* and *Agrias*. W. C. Hewitson (Ex. Butt. v. *Prepona*, pl. ii. and *Agrias*) figures and describes *P. præneste*, var. *buckleyana*, figs. 9 & 10, and *P. xenagoras*, Hew., figs. 11 & 12, both from Bolivia; also his *Agrias xenodorus* (? = *adon*, var.), *l. c.* fig. 7.

*Symphædra dirtea* can be attracted by sliced pine-apple; W. L. Distant, Ent. M. M. xii. p. 207.

*Adelpha cubæa*, Feld., is apparently distinct from *plesaure*, Hübn.; H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 317.

*Charaxes amelia*, Doum., ♀ figured; W. C. Hewitson, Ex. Butt. v. *Char.* pl. v. figs. 20 & 21. *C. jasius*, rearing; B. Gaiger, Ent. Nachr. ii. pp. 156

& 157. *C. viola*, A. G. Butler: ♀ described by him; Ann. N. H. (4) xviii. p. 481.

*New species* :—

*Cethosia imperialis*, A. G. Butler, Ann. N. H. (4) xviii. p. 124, Cape York.

*Messaras turneri*, id. *l. c.* p. 244, New Guinea.

*Atella cervina*, id. P. Z. S. 1876, p. 767, pl. lxxvii. fig. 5, New Guinea.

*Argynnis carpenteri*, p. 204, New Mexico, *alcestis*, p. 289, N. Illinois, Iowa, and Colorado, W. H. Edwards, Tr. Am. Ent. Soc. v.

*Eresia mundina*, fig. 4, p. 221, Huiro, Valley of Santana, *nassia*, fig. 5, Peru, and *pearcii*, fig. 3, Pozzuzo, p. 222, H. Druce, P. Z. S. 1876, pl. xviii.

*Junonia micromera*, A. G. Butler, Ann. N. H. (4) xviii. p. 482, Abyssinia.

*Rhinopalpa parva*, id. *l. c.* p. 123, Cape York.

*Catagramma camelita*, W. C. Hewitson, Ex. Butt. v. *Cat.* pl. xii. figs. 99 & 100, Bolivia.

*Pyrrhogyra docella* (Herr. Schäff., MS.), H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 316, Surinam.

*Ageronia anomala*, H. Strecker, Lepidoptera, p. 121, Upper Amazon.

*Limenitis antonia*, fig. 3, and *armandia*, fig. 4 A, B, pl. iv. Mou-pin, *arboretorum*, pl. iii. fig. 3, Kiang-si, and *sinensium*, pl. iv. fig. 8, Pekin, C. Oberthur, Études Ent. ii. pp. 22–25.

*Adelpha dominula*, H. B. Möschler, *l. c.* p. 317, pl. iii. fig. 9, Surinam.

*Adolias satropaces*, W. C. Hewitson, Ent. M. M. xiii. p. 150, Moulmein.

*Paphia alberta*, H. Druce, P. Z. S. 1876, p. 234, pl. xviii. fig. 6, Peru.

*Charaxes cedreatis*, W. C. Hewitson, Ex. Butt. v. *Char.* pl. v. figs. 22–24, Angola and Fernando Po.

*Anæa cicla*, H. B. Möschler, *l. c.* p. 319, pl. iii. fig. 10, Surinam.

## Morphidæ.

*Amathusia phidippus*, Linn.: transformations and habits noticed; M. C. Piepers, Tijdschr. Ent. xix. pp. 147 & 148.

*Tenaris jamesi*, A. G. Butler, P. Z. S. 1876, p. 767, pl. lxxvii. fig. 4, New Guinea.

*Morpho achilles*, Linn., and allies discussed by H. B. Möschler: he regards *helenor*, Cram., as distinct; Verh. z.-b. Wien, xxvi. pp. 320 & 321. *M. didius*, Hopff., = *cæruleus*, Perry, and is quite distinct from *menelaus*, Linn.; H. Druce, P. Z. S. 1876, p. 217.

## Brassolidæ.

*Brassolis sophoræ*, Cram. The Surinam form figured by Cramer is very different from the Brazilian; the latter would probably now be regarded as distinct. H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 321.

## SATYRIDÆ.

A fossil larva from Aix in Provence, supposed to belong to this family, is described and figured by Daudet, under the name of *Satyrites incerta*; R. Z. (3) iv. pp. 415–424, pl. xi.

*Cyllo leda*, Linn.; transformations noticed; P. C. T. Snellen, Tijdschr. Ent. xix. p. 145.

*Pseudonympha narycia*, H. D. J. Wallengren, redescribed by him; Œfv. Ak. Förh. xxxii. p. 83.

*Erebia æme*: notes on its varieties; R. C. R. Jordan, Ent. M. M. xiii. pp. 58 & 59.

*Parurge mæra*, Linn., var. *sicula* from Sicily described by O. Staudinger, S. E. Z. xxxvii. p. 138. *P. xiphia*, Fabr.; *cf.* Keferstein, S. E. Z. xxxvii. pp. 62 & 63. He thinks that *xiphia*, Boisd., is probably a fictitious species.

*Satyrus ægeria* and var. *meone*; Bull. Soc. Ent. Fr. (5) vi. pp. clxxix., ccxxxii. & ccxxxiii.

*Melanargia galathea*: varieties described and figured; S. Stevens, Ent. ix. pp. 193 & 194. *Arge galathea*, Linn., var. *mauritanica*, from Lambèze, described; C. Oberthur, Études Ent. i. p. 26.

*Cœnonympha fettigi*, C. Oberthur, noticed and figured by him, *l. c.* p. 28, pl. i. fig. 4 A, B.

*Satyrus semele*, Linn., var. *algirica*, and *S. briseis*, var. *major*, from Algeria, characterized, p. 27; *S. janiroides*, Herr. Schäff., noticed and figured, p. 28, pl. i. fig. 5 A, B, *id. l. c.*

*Œneis semidea*. Left behind on Mount Washington after the Glacial Period; A. R. Grote, P. Am. Ass. xxiv. pp. 222–226, Am. Nat. x. pp. 129–132.

*Percnodaimon*, g. n., A. G. Butler, Ent. M. M. xiii. p. 152. Allied to *Erebia*, pattern of *Leptoneura*, type *E. pluto*, Fered. [cf. *Oreina othello*, infrà].

*New species*:—

*Zophoessa atkinsonia*, W. C. Hewitson, Ent. M. M. xiii. p. 151, Darjeeling.

*Debis serbonis*, id. *l. c.* p. 156, Darjeeling.

*Euptychia nana*, p. 323, and *thalessa*, p. 324, pl. iii. fig. 11, H. B. Möschler, Verh. z.-b. Wien, xxvi., Surinam; *E. henshawi*, W. H. Edwards, Tr. Am. Ent. Soc. v. p. 205, Arizona & New Mexico; *E. butleri*, W. L. Distant, P. E. Soc. 1876, p. xii., Costa Rica.

*Pseudonympha neita*, H. D. J. Wallengren (= *narycia*, Trim., *nec* Wallengr.). Œf. Ak. Förh. xxxii. p. 84, Potchefstroom.

*Erebia saxicola*, pl. iv. fig. 1, Mongolia, and *polyphemus*, pl. ii. fig. 2, Mou-pin; C. Oberthur, Études Ent. ii.

*Oreina othello*, R. W. Fereday, Tr. N. Z. Inst. viii. pp. 302–304, New Zealand (= *merula*, Hew., = *pluto*, Fered. olim, *nec* Esp.]

*Satyrus armandi* [= *bhadra*, Moore, var., *teste* Hew. in litt.] fig. 5, *agrestis* [= *palaka*, Moore, *teste* Hew. in litt.], fig. 3 A, B, *thibetanus*,

fig. 4, pl. ii. *dumicola*, fig. 7, and *arvensis*, fig. 2, pl. iv. pp. 26–30, Moupin, and *dentus* (not described), p. 28, Silhet, C. Oberthur, *l. c.*

*Mycalesis flagrans*, p. 243, New Guinea, *desolata* and *paconis*, pp. 480 & 481, Abyssinia, A. G. Butler, Ann. N. H. (4) xviii.

*Xenica kershawi*, W. H. Miskin, Tr. E. Soc. 1876, p. 452, Queensland.

*Epinephile rawnsleyi*, id. *l. c.* p. 454, Brisbane.

*Heteronympha digglesi*, id. *ibid.*, Brisbane.

*Chionobas mongolica*, C. Oberthur, *l. c.* ii. p. 31, pl. iv. fig. 6, E. Mongolia.

*Hyphthima simplicia*, A. G. Butler, *l. c.* p. 481, Abyssinia.

*Pedaliodes zoippus*, H. Druce, P. Z. S. 1876, p. 214, pl. xviii. fig. 1, Peru.

*Dædalma whitelyi*, id. *l. c.* p. 215, pl. xvii. figs. 6 & 7, Huasampilla.

*Taygetis blanda*, H. B. Möschler, *l. c.* p. 325, pl. iii. fig. 12, Surinam.

## Erycinidæ.

*Cremna actoris*, Cram. ; H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 304.

*Helicopis acis*, Fabr., *endymion*, Cram., and *selene*, Feld. (= *endymion*, pt., Cram.), are varieties of one species ; *id. l. c.* p. 306.

*Nymphidium orestes*, Cram., ♂ described ; *id. l. c.* p. 308.

*Stalachtis eugenia*, Cram., is probably an aberration of *S. calliope*, Linn. ; *S. evelina*, Butl., *zephyritis*, Dalm., and *phædusa*, Hübn., are only doubtfully distinct : *id. l. c.* p. 309.

*Ithomiola celtilla*, var. figured by W. C. Hewitson, Ex. Butt. v. *Erycinidæ*, fig. 3.

*Stiboges*, g. n., A. G. Butler, P. Z. S. 1876, p. 308. Allied to *Abisara* ; type, *S. nymphidia*, sp. n., *l. c.* p. 309, pl. xxii. fig. 1, Penang.

*New species :* —

*Dodona deodata*, W. C. Hewitson, Ent. M. M. xiii. p. 151, Moulmein.

*Mesosemia amona*, id. Ex. Butt. v. *Erycinidæ*, figs. 1 & 2, Bolivia.

*Limnas andania* and *aulonia*, id. *l. c.* figs. 8 & 10, Bolivia.

*Cremna sylva*, H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 304, pl. iii. fig. 6, Surinam.

*Amarynthis bocchoris*, W. C. Hewitson, *l. c.* fig. 6, Minas Geraes.

*Esthemopsis æniacus*, id. *l. c.* fig. 9, Bolivia.

*Mesene nepticula*, pl. iii. fig. 7, and *pactolus*, pl. iv. fig. 12, H. B. Möschler, *l. c.* p. 307, Surinam.

*Symmachia aconia*, W. C. Hewitson, *l. c.* fig. 5, Brazil.

*Aricoris alcmæon*, id. *l. c.* fig. 4, Ecuador.

*Lemonias axenus*, id. *l. c.* fig. 7, locality unknown.

## Lycænidæ.

S. H. Scudder has published a Synonymic List of the Butterflies of N. America, North of Mexico. Part ii. Rurales, Bull. Buff. Soc. iii. pp. 98–129.

The *Rurales* include the subfamilies *Vestales* and *Plebeii* (*Erycinidæ*

and *Lycænidæ* of authors). Scudder admits 112 species, and characterizes several new genera. His corrections of synonymy are too numerous to admit of further notice here.

S. H. Scudder's new genera of *Lycænidæ* are analysed and severely criticised by S. H. Peabody; Canad. Ent. viii. pp. 141–148.

*Lycæna clara*, *eunomia*, and *embla*, and *Chrysophanus nais*, attributed to W. H. Edwards in the Recorder's Cat. Diurnal Lep., are fictitious species; S. H. Scudder, *l. c.* pp. 124 & 129. [Some of these names have just been taken up by W. H. & H. Edwards.]

*Miletus protogenes*, Feld., ? from New Guinea, noticed by A. G. Butler, Ann. N. H. (4) xviii. p. 245.

*Cigaritis massinissa*, Luc.,= *zohra*, Donz.; C. Oberthur, Etudes Ent. i. pp. 20 & 21. He also (p. 21) describes var. *jugurtha*, from Saida.

*Thecla augidena*, Hew., is perhaps not distinct from *battus*, Cram.; H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 300. *T. betulæ*, oviposition and eggs; "P. G." Pet. Nouv. 1876, p. 22. *T. fusca*, Brem., is refigured by Oberthur as *Polyommatus fuscus*; it is allied to *hicre*, Fabr., *gordius*, Esp., and *xanthoides*, Boisd.: C. Oberthur, *l. c.* ii. p. 20, pl. iv. fig. 5.

*Incisalia augustus*, Kirb. The two forms are separated as *irioides*, Boisd., and *crœsioides*, Scudd.; S. H. Scudder, *l. c.* p. 104.

*Nomiades*, Hübn. S. H. Scudder revises the N. American species of this genus, with which he now unites *Glaucopsyche*. He admits the following:—*xerces*, Boisd., *antiacis*, Boisd. (= *mertila*, Edw.), *couperi*, Grote, (= *pembina*, Edw., pt., and *lygdamus*, Doubl., pt.), *lygdamus*, Doubl., *behri*, Edw. (= *polyphemus*, Boisd.), and a new species. Canad. Ent. viii. pp. 21–24.

*Lampides platissa*, Herr. Schäff., is distinct from *L. taitensis*, Boisd.; A. G. Butler, P. Z. S. 1876, p. 252.

*Cupido emolus*, Godt., and *sichela*, Wallengr., are distinct; *C. parsimon*, Fabr., redescribed, p. 88; *C. barberæ*, Trim., = *metophis*, Wallengr., p. 89: H. D. Wallengren, Œfv. Ak. Förh. xxxii. *C. alexis*, Scop. (= *medon*, Hübn.), and *chiron*, Rott., recorded from Upper Torneå by J. Spångberg; he was unable to meet with *icarus*, Rott., so far north, although it is stated to occur there, and thinks that specimens of *alexis* have been mistaken for *icarus* ♀; S. E. Z. xxxvii. pp. 92 & 93.

*Lycæna allardi*, Oberth., noticed and figured, figs. 2 A, B; *L. martinii*, All., redescribed and figured, fig. 1, p. 22, pl. i.; *L. adonis*, Hübn., var. *punctifera*, from Lambèze, described, p. 23: C. Oberthur, *l. c.* i. *L. argentina*, Prittw., = *candrena*, Herr. Schäff.; *L. dyopa*, H. S., = his *platissa*, *L. communis*, Koch, H. S., is distinct from *lysimon*, Hübn.: J. D. E. Schmeltz, Verh. Ver. Hamb. ii. pp. 186–188. *L. lorquini*, Behr, *rhœa*, Boisd., and *dannia*, Edw., = *catalina*, Reak.; *L. rapahoe*, Reak., and *dædalus*, Behr, = *icarioides*, Boisd., *L. pheres* and *evius*, Boisd., are probably varieties; *L. optilete*, Koch, occurs in Alaska; Behr & Strecker, Lepidoptera, p. 120. *L. argiolus*; natural history. W. Buckler, Ent. M. M. xiii. pp. 29–32, 62, 138: the larva will eat blackberry, W. A. Luff. Ent. ix. p. 257. *L. comyntas*, Godt.: transformations described; W. H. Edwards, Canad. Ent. viii. pp. 202–205. *L. ethion*, Doubl. & Hew. figured by W. C. Hewitson, Ex. Butt. v. *Lycæna*, pl. i. fig. 5. *L. gala-*

*thea*, Blanch.: *L. nycula*, Moore, and *L. metallica*, Feld., are probably synonymous with this; R. P. Murray, Ent. M. M. xii. pp. 206 & 207. *L. icarus*, with a protuberance on the head, between the antennæ, supposed to be the theca of a moss; J. Jenner Weir, P. E. Soc. 1876, p. xxvi. Dwarf specimens noticed; De Lafitole, Pet. Nouv. 1876, p. 46. *L. phœbe*, Murray: *L. alsulus*, Herr. Schäff., is probably a brown ♀, in which case the latter name will have priority; A. G. Butler, Ent. M. M. xiii. p. 153.

*Cyaniris pseudargiolus* and allies discussed by S. H. Scudder, *l. c.* pp. 61–66. He suggests the possibility of there being but one species of the group in North America, varying according to season and locality.

*Deudorix varuna*, Horsf. Transformations noticed; M. C. Piepers, Tijdschr. Ent. xix. p. 153.

*New genera and species*:—

*Satyrium*, S. H. Scudder, Bull. Buff. Soc. iii. p. 106. Allied to *Erora*; type, *Lycæna fuliginosa*, Edw.

*Callipsyche*, id. *ibid.* Allied to last; type, *Thecla behri*, Edw.

*Uranotes*, id. *l. c.* p. 107; (new name for *Callipareus*, Scudd., preocc.) type, *Strymon melinus*, Hübn.

*Calycopis*, id. *l. c.* p. 108. Allied to last; type, *Hesperia cecrops*, Fabr.

*Eupsyche*, id. *l. c.* p. 112. Allied to *Thecla*; type, *T. m-album*, Boisd. & Lec.

*Hypaurotis*, id. *ibid.* Allied to *Aurotis*; type, *Thecla chrysalus*, Edw.

*Habrodais*, id. *l. c.* p. 113. Allied to *Aurotis*; type, *Thecla grunus*, Boisd.

*Phædrotes*, id. *l. c.* p. 115. Allied to *Cyaniris*; type, *Lycæna catalina*, Reak.

*Philotes*, id. *l. c.* p. 116. Allied to last; type, *Lycæna regia*, Boisd.

*Brephidium*, id. *l. c.* p. 123. Allied to *Hemiargus*; type, *Lycæna exilis*, Boisd.

*Leptotes*, id. *l. c.* p. 124. Allied to *Lampides*; type, *Lycæna theonus*, Luc.

*Tharsalea*, id. *l. c.* p. 125. Allied to last; type, *Polyommatus arota*, Boisd.

*Chalceria*, id. *ibid.* Allied to *Chrysophanus*; type, *C. rubidus*, Behr.

*Gaides*, id. *l. c.* p. 126. Allied to *Chrysophanus*; type, *C. dione*, Scudd.

*Epidemia*, id. *l. c.* p. 127; type, *Polyommatus epixanthe*, Boisd. & Lec.

*Crudaria*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. p. 86. Allied to *Amblypodia* and *Zeritis*; type, *Arhopala ? leroma*, Wallengr.

*Ialmenus eubulus*, W. H. Miskin, Tr. Ent. Soc. 1876, p. 455, Queensland.

*Myrina symira*, W. C. Hewitson, Ent. M. M. xiii. p. 152, Darjeeling.

*Thecla sponsa*, p. 298, fig. 2, *bimaculata* [= *nobilis*, Herr. Schäff., teste Hew. in litt.], p. 299, fig. 3, *lugubris*, p. 301, fig. 4, and *biston*, p. 302, fig. 5, H. B. Möschler, Verh. z.-b. Wien, xxvi. pl. iii., Surinam. *T. peruviana*, N. Erschoff, Trud. Russk. x. pl. i. fig. 4, Peru.

*Hypochrysops epicurus*, W. H. Miskin, *l. c.* p. 455, Brisbane.

*Danis nemophila*, A. G. Butler, Ann. N. H. (4) xviii. p. 245, New Guinea, Waigiou.

*Lycænesthes princeps*, id. *l. c.* p. 484, Abyssinia.

*Lampides sigillata* and *cyclopteris*, id. *l. c.* p. 483, Abyssinia; *L. goodenovii*, id. P. Z. S. 1876, p. 252, New Hebrides.

*Castalius resplendens* and *cretosus*, id. Ann. N. H. (4) xviii. pp. 484 & 485, Abyssinia.

*Holochila intensa*, id. *l. c.* p. 245, New Guinea.

*Lycæna caleta*, Tondano, Celebes, fig. 1, *cecna*, New Guinea, figs. 2 & 3, *decidia*, Neilgherries, fig. 4, *carana*, Angola, fig. 6, *aryola*, Philippines, fig. 7, *elna*, Java, fig. 8, *cyara*, Angola, figs. 9 & 10, and *heritsia*, Camaroons, figs. 11 & 12, W. C. Hewitson, Ex. Butt. v. *Lycæna*, pl. i. *L. koa*, H. Druce, P. Z. S. 1876, p. 239, Pozzuzo. *L. cæligena*, fig. 3 A, B, and *atro-guttata*, fig. 4 A, B, C. Oberthur, Études Ent. ii. p. 21, pl. i., Moupin. *L. gnoma*, p. 159, fig. 1, *lysizone*, p. 161, figs. 2 & 2 A, and *pygmæa*, p. 163, fig. 3, P. C. T. Snellen, Tijdschr. Ent. xix. pl. vii., Batavia.

*Cupido fylgia*, J. Spängberg, S. E. Z. xxxvii. p. 91, Upper Torneå. (Is an aberration of *chiron*, Hufn.; O. Staudinger, *tom. cit.* p. 235.)

*Nomiades oro*, S. H. Scudder, Canad. Ent. viii. p. 23, Colorado.

*Chrysophanus enysi*, A. G. Butler, Ent. M. M. xiii. p. 153, New Zealand; *C. nais*, W. H. Edwards, Tr. Am. Ent. Soc. v. p. 291, S. California, Arizona.

*Aphnæus chaka*, H. D. J. Wallengen, Œfv. Ak. Förh. xxxii. p. 89, Transvaal.

*Iolaus trimeni*, id. *l. c.* p. 87, Transvaal.

## HESPERIIDÆ.

P. Mabille reviews the various classifications of the *Hesperiidæ*, and accepts Scudder's two main divisions, *Hesperiidæ* and *Astyci*, adding a third, *Frænati* (p. 253) for *Euschemon*. He remarks on the character of the European and adjacent faunæ, and gives a list of the *Hesperiidæ*, arranging the genera as follows:—*Scelothrix*, *Spilothyrus*, *Erynnis*, *Battus*, *Pamphila*, *Thymelicus*, *Cyclopides*, g. n. (for *marloyi*, Boisd.), and *Carterocephalus*. Descriptions of 22 new exotic species, the diagnoses of most of which have previously appeared in the Bulletin, close the paper. Ann. Soc. Ent. Fr. (5) vi. pp. 251–274.

*Thymele cephise*, Herr. Schäff., redescribed in full by H. B. Möschler, from Surinam; Verh. z.-b. Wien, xxvi. p. 326.

*Casyapa thrax*, Linn. Transformations noticed; M. C. Piepers, Tijdschr. Ent. xix. p. 158.

*Ismene bixæ*, Clerck, and *chalybe*, Doubl. & Hew., are quite distinct; W. C. Hewitson, Ann. N. H. (4) xviii. p. 347.

*Syrichthus alveolus*, var. *lavateræ*, reared from an egg laid by a typical ♀; J. Hellins, Ent. M. M. xii. p. 232.

*Thymelicus menius*, Trim., redescribed; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 92.

*Pamphila schelleri*, Kirb., is a *Telegonus*; H. B. Möschler, *l. c.* p. 327. [It probably = *T. pervicax*, Hübn., which has the priority.]

*Hesperia*. W. C. Hewitson (Ex. Butt. v. *Hesp.*, pl. vii.) figures and redescribes *H. artona*, Hew., figs. 67 & 78, *arcas*, Cram. (= *amana*, Hew.), figs. 69 & 70, *rona*, Hew., figs. 71 & 72, *oggia*, Hew., figs. 73 & 74, *bononia*, Hew., figs. 75 & 76, and *homolea*, Hew., figs. 77 & 78. *H. lincola*, Ochs., figured by C. Oberthur, Etudes Ent. i. pl. iii. fig. 3.

*Thracides salius*, Hübn., is probably distinct from *salius*, Cram. The former = *telegonus*, Esp., figured by that author as coming from Hungary; H. B. Möschler, *l. c.* p. 329.

*Megathymus yuccæ*, Boisd. and Lec. Habits, structure and affinities discussed by C. V. Riley, Tr. Ac. St. Louis, iii. pp. 323–344, figs. 25–31, and Rep. Ins. Mo. viii. pp. 169–182, figs. 49–55. He considers that *Ægiale* and *Megathymus* form a distinct tribe of *Hesperiidæ*, which he calls *Castnioides*. He also mentions that A. G. Butler considers *Æ. kollari*, Feld., = *Castnia hesperiaris*, Walk. (p. 34). This article is reprinted by the late E. Newman (Ent. ix. pp. 82–86, 108–115), with a proposal that all the internal feeders (*Xyleutes*, *Castnia*, *Ægeria*, &c.) should be placed in one group [!].

*New genus and species*:—

*Anisochoria*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. cci.; types, *A. polysticta* and *oligosticta*, l. c., Colombia, spp. nn.

*Thymele hydarnis*, id. *l. c.* p. cxcvii., Brazil.

*Telegonus annulicornis* (? = *astylos*, Cram., var.), p. 326, *probus*, p. 327, pl. iii. fig. 13, and *mygdon*, p. 328, pl. iii. fig. 14, H. B. Möschler, Verh. z.-b. Wien, xxvi., Surinam. *T. lacydus*, H. Druce, P. Z. S. 1876, p. 247, pl. xviii. fig. 10, Ucayali and Villa Nova.

*Eudamus astrapæus*, Amazon and Peru, *nicephorus*, Amazon, *phraxanor*, New Granada and Chiriquí, p. 348, *mephitis* and *ridens*, p. 349, and *agiochus*, Chiriqui, *œnander*, Pará, and *meretrix*, Ecuador, p. 350, *lebbæus* and *cephisus*, Chiriqui, and *thaddæus*, New Guinea, p. 351, *hymenæus*, Aru, *migonitis*, Mysol, and *œnesius*, Dorey, p. 352, *calathus*, Sumatra, and *præstes*, Cayenne, p. 353, *litanicus*, Amazon, and *laogonus* and *marpessus*, Brazil, p. 354: W. C. Hewitson, Ann. N. H. (4) xviii.

*Pyrrhopyga agenoria*, id. Ent. M. M. xii. p. 251, Chanchomayo, Peru.

*Erycides orasus*, H. Druce, *l. c.* p. 248, pl. xviii. fig. 9, Valley of Cosnipata; *E. gaudialis*, p. 250, Chiriqui, *tenebricosa*, Peru (Chanchomayo), and *teutas*, Amazon (St. Paulo), p. 251, W. C. Hewitson, l. c. *E. grandimacula*, P. Mabille, *l. c.* p. cxcviii., Brazil.

*Ismene mixta*, pp. ix. & 267, Manilla, *lorquini*, pp. ix. & 266, Manilla, *boisduvali*, pp. ix. & 262, Celebes, *sargon*, pp. ix. & 261, Celebes, *phul*, pp. ix. & 259, Philippines, *belesis*, pp. ix. & 260, Java ?, *assur*, pp. x. & 261, Celebes, *khoda*, pp. xxv. & 262, Pine Island, *mœstissima*, pp. xxv. & 263, Celebes, *perplexa*, pp. xxv. & 263, Moluccas, *simplicissima*, pp. xxv. & 263, Moluccas, *splendida*, p. 264, Philippines, *quadripunctata*, p. 265, Moluccas; *id.* Bull. & Ann. Soc. Ent. Fr. (5) vi. *I. taranis*, W. C. Hewitson, Ann. N. H. (4) xviii. p. 347, Zanzibar.

*Entheus infernalis*, H. B. Möschler, *l. c.* p. 329, pl. iv. fig. 21, Surinam.

*Caristus maroma*, p. 330 (? = *iraca*, Moore), and *butus*, p. 331, pl. iii.

fig. 15; *id. l. c.*, Surinam. *C. simulius*, H. Druce, *l. c.* p. 248, pl. xviii. fig. 8, Valley of Cosnipata.

*Proteides crinoides*, p. 333, fig. 18, *cereus*, ibid. fig. 17, *silaceus*, p. 334, and *maros*, ibid. fig. 16; H. B. Möschler, *l. c.* pl. iii., Surinam.

*Scelothrix* (*Pyrgus*) *albistriga*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. xxvii., Eastern Asia.

*Hesperia cylinda*, p. 449, *ligora* and *maracanda*, Angola, *cyrina*, Darjeeling, p. 450, *sybirita*, Singapore, and *dacela*, Fernando Po, p. 451, *dacia*, habitat ?, *schadia*, Sumatra, *cratea*, Bahia, and *decinea*, Brazil, p. 452, *lacida*, *soritia*, and *dacena*, p. 453, and *corduba*, Gaboon, *sicania*, *cydia*, and *dimassa*, p. 454, and *mammæa*, Brazil, *corissa*, Borneo, and *papœa*, Espiritu Santo, p. 455, *lamponia* and *locutia*, Brazil, and *cynæa*, Venezuela, p. 456, *cormasa*, Borneo, and *malthina*, Calabar, p. 457; W. C. Hewitson, Ann. N. H. (4) xviii. *H. phætusa*, id. Ex. Butt. v. *Hesp.*, pl. vii. figs. 79 & 80, Ega. *H. cephala* and *cerata*, id. Ent. M. M. xiii. p. 152, Darjeeling. *H. comus*, p. 206, Texas, *nereus* and *zampa*, p. 207, South Apache, Arizona, *deva*, p. 292, Arizona; W. H. Edwards, Tr. Am. Ent. Soc. v. *H. hamza*, C. Oberthur, Études Ent. i. p. 28, pl. iii. fig. 2 a–c, Oran. *H. neglecta*, P. Mabille, Ann. Soc. Ent. Fr. (5) vi. p. 268, Manilla. *H.* (*Syrichthus*) *limbata*, N. Erschoff, Trud. Russk. x. pl. i. fig. 5, Peru.

*Pamphila floridæ*, pp. ix. & 269, Florida, *quaternata*, pp. xxvi. & 263, Senegambia, *P.* (?) *musca*, p. xxvi., Philippines, *P. cærulescens* and *catocyanea*, p. lv., *bouddha*, and *P.* (?) *nervulata*, p. lvi., Thibet *rama*, p. cxcviii., Himalaya, P. Mabille, Bull. & Ann. Soc. Ent. Fr. (5) vi., *P. angularis* (Herr. Schäff., MS.), p. 335, *fasciata*, ibid. fig. 19, and *helva*, p. 336, fig. 20, H. B. Möschler, *l. c.* pl. iv., Surinam. *P. brunnea*, P. C. T. Snellen, Tijdschr. Ent. xix. p. 164, pl. vii. fig. 4, Batavia. *Hesperia* (*Pamphila* ?) *umbrata*, N. Erschoff, *l. c.* pl. i. fig. 3, Brazil ?.

*Lerema loammi*, C. P. Whitney, Canad. Ent. viii. p. 76, Florida.

*Hesperilla luteisquama* and *porus*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. cxcix., Himalaya.

*Plesioneura compressa*, (Prittwitz, MS.), H. B. Möschler, *l. c.* p. 336, pl. iv. fig. 22, Surinam.

*Thymelicus nigro-limbatus*, P. C. T. Snellen, *l. c.* p. 165, pl. vii. fig. 5, Batavia.

*Phythonides onega* (Plötz, MS.), pl. iv. fig. 23, and *dilucida* (Herr. Schäff., MS.), H. B. Möschler, *l. c.* p. 338, Surinam.

*Leucochitonea scintillans*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. cc. Guiana, Brazil.

*Cyclopides dalai-lama*, id. *l. c.* p. lvi., Thibet; *C. howa*, id. *l. c.* Ann. p. 270, Madagascar.

*Hesperilla lucasi* and *blanchardi*, id. *l. c.* Bull. p. cliii. Mou-pin.

*Nisoniades plautia*, H. B. Möschler, *l. c.* p. 339, pl. iv. fig. 24, Surinam.

*Thanaos alpheus*, W. H. Edwards, *l. c.* p. 206, New Mexico.

*Pellicia petius*, p. 339, fig. 26, *didia* and *rubescens* (Prittw., MS.) [= *ephora*, Herr. Schäff., *teste* Möschler in litt.], p. 340, figs. 28 & 29, *bessus*, p. 341, fig. 25, and *simplicior* (Herr. Schäff., MS.), p. 342, fig. 27; H. B. Möschler, *l. c.* pl. iv., Surinam.

*Helias pyralina*, id. *l. c.* p. 343, pl. iv. fig. 31, Surinam.

*Achlyodes argyrospila*, P. Mabille, *l. c.* Bull. p. cc., Colombia, Guatemala.

*Tagiades famatus*, Philippines, and *fuligo*, Java, pp. xxvi. & 271, *pulligo*, pp. xxvi. & 272, Java, *insularis*, Madagascar, and *obscurus*, Java, pp. 272 & 274, P. Mabille, Bull. & Ann. Soc. Ent. Fr. (5) ii. *T. binoculus* (Plötz, MS.), H. B. Möschler, *l. c.* p. 344, pl. iv. fig. 30, Surinam.

*Pterygospidea tibetana*, Thibet, and *davidi*, p. liv., and *moori*, p. 152, Mou-pin, P. Mabille, *l. c.*

*Ægiale cofaqui*, H. Strecker, P. Ac. Philad. 1876, p. 148, Georgia.

## Sphingidæ.

*Smerinthus astylus*, Westw., *S. myops*, Harr., *Darapsa versicolor*, Clem., and *D. chærilus*, Walk. Notes on larvæ; G. W. Peck, Canad. Ent. viii. pp. 239 & 240.

*Macroglossa ruficaudis*, Kirb. (= *buffaloensis* and *uniformis*, G. & R.), *æthra* and *famosa*, Streck., and *flaco-fasciata*, Barnst., figured, and the first and last redescribed (pp. 109 & 110); H. Strecker, Lepidoptera, pl. xiii. figs. 1–4.

A. Gaschet records his observations on *Sphinx convolvuli*, *Acherontia atropos*, and *Deilephila celerio* and *nerii*, and concludes that though the two former may migrate into Europe from time to time, yet they are certainly naturalised; and the same is probably the case with the *Deilephilæ*. Ann. Soc. Ent. Fr. (5) vi. pp. 509–519.

*Pterogon clarkiæ*, Boisd., and *inscriptum*, Harr., figured and redescribed by H. Strecker, *l. c.* pp. 111 & 112, pl. xiii. figs. 5 & 8.

*Thyreus abbotti*, Swains. The larvæ captured in New Hampshire all possess the colouration supposed to be peculiar to the ♀. C. P. Whitney, Canad. Ent. viii. pp. 75 & 76; *cf.* also A. R. Grote, *op. cit.* p. 100.

*Euproserpinus phaeton*, Grote & Rob.; A. R. Grote, *l. c.* pp. 28 & 29.

*Madoryx bubastus*, Cram., redescribed in full from Surinam; H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 347.

*Deilephila euphorbiæ*; a larva with two horns recorded by De Lafitole, Pet. Nouv. 1876, p. 62. *D. tithymali*, Boisd.; both sexes and larva figured by C. Oberthur, Études Ent. i. p. 32, pl. ii. fig. 1 A–C. He also (*l. c.* p. 33) notices an undetermined larva, perhaps belonging to an unknown species of the genus.

*Darapsa versicolor*, Harr., figured and redescribed by H. Strecker, *l. c.* p. 113, pl. xiii. fig. 9.

*Gnathostypsis ostracina*, Wallengr., = *Sphinx capensis*, Linn.; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 93.

*Chærocampa nerii*. Rearing; J. Odstreil, Ent. Nachr. ii. p. 160. Found feeding on fig; Coret, Bull. Soc. Ent. Fr. (5) vi. p. clviii. *C. procne*, Clem., figured, and description copied by H. Strecker, *l. c.* p. 114, pl. xiii. fig. 10.

*Tylognathus chloroptera*, Perty ?, and *curinatus* and *iphis*, Walk. (= *scriptor*, Feld.), noticed, and the two former figured; H. B. Möschler, *l. c.* pp. 349 & 350, pl. iv. figs. 33 & 34.

*Philampelus caproniieri*, Boisd.; *id. l. c.* p. 348. *P. vitis*, Linn.: identification; *id.* S. E. Z. xxxvii. pp. 313 & 314.

*Sphinx luscitiosa*, Clem., p. 114, *lugens*, Walk., *plota*, Scudd., *jasminearum*, Boisd., p. 115, *coniferarum*, A. & S., *harrisi*, Clem., p. 116, and *sequoiæ*, Boisd., p. 117, figured, and generally redescribed, by H. Strecker, *l. c.* pl. xiii. figs. 11–17. *S. convolvuli* taken in Orkney in 1875; J. T. Boswell, Scot. Nat. iii. p. 265; Ent. ix. pp. 257 & 258. *S. ligustri*: M. Girard records a case of "flaquerie" in the larva, precisely analogous to that well-known disease in the silkworm; Bull. Soc. Ent. Fr. (5) vi. p. clxxix. *S. strobi*, Boisd., is South African, not Californian; H. Strecker, *l. c.* p. 120.

*Ancerya scyron*, Cram., is quite distinct from *rimosa*, Grote; H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 346.

*Sphinx atropos* is an indigenous European species, and not an immigrant, as asserted by Boisduval; Keferstein, S. E. Z. xxxvii. pp. 236–238.

*Smerinthus tiliæ*. A pupa, in which the colours of the imago were beginning to appear, was laid on a window-sill exposed to bright sunlight. It prematurely produced a ♀, which crept away at once from the disagreeable situation. Its wings were quite wet and pale coloured, but they dried in a few hours, and assumed their usual colours, but did not grow, and the abdomen did not contract nor discharge any fluid. Fully three days afterwards, the wings acquired their proper size, and the abdomen shrunk to its usual form. Other specimens were disengaged from the pupa-skin two or three days before the proper time, but most of them, on being placed under a glass with damp sand, became fully developed, though sometimes not for a whole day. This species is well suited to such experiments, from its robustness, and from the colour of the wings showing through the pupa-skin. J. van Leewen, jun., Tijdschr. Ent. xix. pp. cvi. & cvii.

*Basiana postica*, Walk., redescribed; H. D. J. Wallengren, *l. c.* p. 94.

*Arctonotus lucidus*, Boisd., figured and redescribed by H. Strecker, *l. c.* p. 113, pl. xiii. fig. 7.

*Ceratomia quadricornis*, Harr. Brown variety of larva; W. V. Andrews, Canad. Ent. viii. p. 40; *cf.* R. Bunker, *op. cit.* p. 120.

*New species* :—

*Macroglossa obscuriceps*, A. G. Butler, P. Z. S. 1876, p. 309, pl. xxii. fig. 5, Malacca.

*Lophura minima*, id. *l. c.* p. 310, pl. xxii. fig. 2, Malacca.

*Pterogon juanita*, H. Strecker, Lepidoptera, p. 112, pl. xiii. fig. 6, Mexico or S.W. Texas.

*Deilephila mariæ*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 93, Transvaal.

*Chærocampa plotzi*, H. B. Möschler, Verh. z.-b. Wien, xxvi. p. 350, Surinam; *C. moeschleri*, Columbia, and *mexicana*, Mexico, N. Erschoff, Trud. Russk. x. pl. i. figs. 1 & 2.

*Sphinx saniptri*, H. Strecker, *l. c.* p. 118, pl. xiii., fig. 18, Canada and Pennsylvania.

*Mimas terranea*, A. G. Butler, *l. c.* p. 310, pl. xxii. fig. 3, Malacca.

### ÆGERIIDÆ.

*Sesia chrysidiformis*, var.: Deckermann-Roy, Pet. Nouv. 1876, p. 56 (= *chalcocnemis*, Staud.; P. Mabille, *op. cit.* p. 57). *S. ichneumoniformis*: habits; C. G. Barrett, Ent. M. M. xii. p. 182. *S. oryssiformis*, Herr. Schäff., redescribed; A. Curò, Bull. Ent. Ital. viii. pp. 269 & 270.

*Grotea*, g. n., H. B. Möschler, S. E. Z. xxxvii. p. 314. Allied to *Sciapteron*; type, *G. longipes*, sp. n., p. 313, United States.

*Sura chalybea*, sp. n., A. G. Butler, P. Z. S. 1876, p. 309, pl. xxii. fig. 4, Singapore.

### URANIIDÆ.

*Urania* (*Thaliura*) *crœsus* is not distinct from *U. rhipheus*, as all transitional forms between them occur; H. Lucas, Bull. Soc. Ent. Fr. (5) vi. pp. cxxvii. & cxxvii. He adds notes on its habits and synonymy.

### AGARISTIDÆ.

*Agarista dæmonis*, sp. n., A. G. Butler, Ann. N. H. (4) xviii. p. 249, New Guinea.

### ZYGÆNIDÆ.

(Inclusive of several genera entered under *Lithosiidæ* and *Arctiidæ* in previous Records.)

A. G. Butler has published a series of notes on the *Zygænidæ*, describing a great number of new genera and species; J. L. S. xii. pp. 342–433, pls. xxvii.–xxix. (neuration). He admits the following subfamilies:—*Zygæninæ*, *Syntominæ*, *Thyretinæ*, *Phaudinæ*, *Euchromiinæ*, *Eunomiinæ*, *Antichlorinæ*, and *Charideinæ*, from which the *Ctenuchiinæ* are, perhaps, not sufficiently distinct to form a separate sub-family. The *Charideinæ* are referred by him to the *Arctiidæ*, but as the bulk of the species have hitherto been classed with the *Zygænidæ*, we shall notice the entire paper under the present heading.

*Zygæna*. Hybrid larvæ of this genus have never been found by T. Goossens to survive the second moult; Ann. Soc. Ent. Fr. (5) vi. pp. 429–432. *Z. nubigena*: its reported occurrence in Scotland; W. A. Forbes & E. Newman, Ent. ix. p. 142. *Z. trifolii*: a larva found feeding on oak; De Lafitole, Pet. Nouv. 1876, p. 62.

*Procris*. *P. contraria*, Walk. (= *Zygæna pectinicornis*, Schauf.), is a *Neurosymploca*, and not congeneric with *Zyg. concinna*, Dalm.; *Z. acharon*, Fabr., is a *Procris*; *P. nebulosa* of Klug and Herr. Schäff. are identical; *P. subdolosa*, Walk., is a *Pollanisus*, and *Procris rufiventris*, Walk., probably belongs to a new genus: A. G. Butler, *l. c.* p. 343.

*Aglaope infausta*, Linn. Habits, &c.; A. Fuchs, S. E. Z. xxxvii. pp. 94 & 95; De Lafitole, *l. c.* pp. 89 & 90.

*Syntomis*. *S. schœnerri*, Boisd., and *cuprea*, Prittw. (*nec* Walk.), = *cyssea*, Cram.; *latreillii*, Walk. (*nec* Boisd.), and *passalis*, Fabr., = *creusa*, Linn.; *minceus*, Cram., is type of *Entomis*, Hübn., and has no connection

with *S. khulweini*, Lef.; *huebneri* and *minuta*, Boisd., and *walkeri*, Moore, belong to *Artona*, Walk.; *S. diaphana*, var. ? Walk. (*nec* Koll.), is renamed *S. anone* (p. 244); *simplex* and *nostalis*, Walk., are sexes, and the latter = *monedula*, Wallengr.; *humeralis*, Walk., = *Trypanophora semihyalina*, Moore; *crawfurdi*, Moore, belongs to *Phacusa*; *xanthomela*, Walk., = *contermina*, Walk., and *intermissa*, Walk., probably = *transitiva*, Walk., var.; *fenestrata*, Walk. (*nec* Dru.), is renamed *S. midas* (p. 244); *germana*, Feld., = *thelebus*, Fabr.; *Tipulodes* (?) *apicalis*, Walk., is scarcely distinct from *S. flaviplaga*, Walk.; *S. annulata*, Fabr., *aperta*, *fulvescens*, *confinis*, and *bicittata*, Walk., and probably also *S. vitrea*, *fusiformis*, *teneiformis*, *penangæ*, *guttulosa*, *diversa*, *vacua*, *lineatis*, *octo-maculata*, and *basigera*, Walk., belong to *Hydrusa*, Walk.; *S. myodes*, Walk., and *longipes*, Herr. Schäff., probably belong to *Byblisia*, Walk., and *S. amazona* is an *Epitaxis*. The following species, formerly placed in *Syntomis*, must also be referred to other genera:—*polydamon*, Cram., *atereus*, Cram. (*S. atereus*, Walk., is renamed *S. annetta*, p. 347), *diptera*, Fabr., and *bogotata*, Walk. A. G. Butler, *l. c.* pp. 243–245. *S. phegea*, Esp., ab. *pyleumeri*, described by Wacquant-Geozelles, S. E. Z. xxxvii. p. 370.

*Psichotoe*, Boisd. Neuration figured, pl. xxviii. fig. 7, and *duvauceli*, Boisd., redescribed. *Syntomis incipiens*, Walk., is also referred to this genus. A. G. Butler, *l. c.* p. 354.

*Rhaphidognatha setiæformis*, Feld., probably = *Balataa ægerioides*, Walk.; *id. l. c.* p. 356.

*Salivnca*, Walk. Neuration figured; *id. l. c.* pl. xxviii. fig. 17.

*Phacusa*, Walk. Neuration figured; *id. l. c.* fig. 15.

*Pampa*, Walk., and *Harrisina*, Pack. Neuration figured; *id. l. c.* figs. 13 & 5. Characters of *Harrisina* noticed, p. 360.

*Empyreuma*, Hübn. Neuration figured; *id. l. c.* fig. 19.

*Euchromia*, Hübn. Neuration figured, pl. xxviii. fig. 20. *Sphinx eumolphus*, Cram., and *Glaucopis folleti* and *formosa*, Boisd., = *E. lethe*, Fabr. [?]; *id. l. c.* p. 363.

*Glaucopis sericaria*, Herr. Schäff., *nec* Perty, is renamed *Eurota herrichi*; id. *l. c.* p. 366.

*Amycles*, Herr. Schäff. Neuration figured; *l. c.* fig. 18.

*Myrmecopsis*, Newm., noticed, and details figured; *id. l. c.* p. 380, pl. xxvii. figs. 8 & 9.

*Gymnelia*, Walk. Neuration figured; *id. l. c.* fig. 13.

*Cosmosoma*, Hübn. Neuration figured; *l. c.* fig. 3. *Glaucopis pheres*, var., Walk., *nec* Cram., is renamed *C. chalcosticta*, and *G. telephus*, Walk., is redescribed; *id. l. c.* pp. 387 & 388.

*Pœcilosoma*, Hübn. Neuration figured; *id. l. c.* fig. 5.

*Dycladia*, Feld. *Glaucopis bromus*, var. ? Walk., *nec* Cram., is renamed *D. minor*; id. *l. c.* p. 395.

*Hysia*, Walk. *Glaucopis astyoche*, Walk., *nec* Hübn., is renamed *H. delecta*; id. *l. c.* p. 396.

*Lycorea*, Walk., *nec* Doubl., is renamed *Mallodeta*; id. *l. c.* p. 398.

*Eunomia*, Hübn. *Sphinx andromacha*, Fabr., is the true type. *Glaucopis sanguiflua*, Walk., *nec* Hübn., is renamed *E. carnicauda*; id. *l. c.* p. 401.

*Trichura*, Hübn. *Glaucopis melas*, var. ? Walk., *nec* Cram., is renamed *T. aurifera*; id. *l. c.* p. 405.

*Illipula*, Walk., *Telioneura*, Feld., *Creatonotus*, Herr.-Schäff., *Belemnia*, *Rhipha*, and *Angeles*, Walk. Neuration figured; *id. l. c.* pl. xxix. figs. 2, 12, 23, 24, 21, & 15.

*Angeles*. *Euchromia acharon*, Walk., *nec* Fabr., and var. ? Walk., are renamed *Angeles phœnicotelus* and *rhodura* respectively; *id. l. c.* p. 343 & 425.

*Copidryas gloveri*, Grote & Rob. ♂ described; A. R. Grote, Canad. Ent. viii. pp. 99 & 100.

*Ctenucha*. A. G. Butler forms this genus and its allies (of the species referable to all which he gives a brief summary) into a subfamily called *Ctenuchinæ*, which he refers to the *Arctiidæ*, but is not certain whether it is sufficiently distinct from the *Charideinæ*; id. *l. c.* pp. 429–433.

*Dioptis*, Hübn. A. G. Butler gives a revision of the species referred to this genus by Walker, and describes various new genera and species; Cist. Ent. ii. pp. 107–121. Walker's first section, *Erocha*, belongs to the *Pyralidæ*, being allied to *Erilusa* and *Vitessa*; while many of his other sections are referred to the *Zygænidæ*, *Arctiidæ*, and intermediate groups, which in the present uncertainty as to the classification of the Bombyces, the Recorder thinks it needless to specify. For convenience, the bulk of the paper is included under this section of the Record.

*New genera and species :—*

*Callitomis*, A. G. Butler, J. L. S. xii. p. 351, pl. xxvii. fig. 1 (neuration). Allied to *Syntomis* and *Hydrusa*. To contain *C. syntomoides* (type) and *leucosoma*, Cashmere, spp. nn., *l. c.*

*Trianeura*, id. *l. c.* p. 353, pl. xxviii. fig. 3 (neuration). Allied to *Hydrusa*. To contain *Syntomis subaurata*, Walk. (type), *S. fravata*, Moore, and *T. moorei*, sp. n. *l. c.* p. 354, Bombay.

*Procotes*, id. *l. c.* fig. 1 (neuration). Type, *Syntomis diminuta*, Walk. (This and the two following genera are placed between *Psichotoe*, Boisd., and *Balatæa*, Walk.)

*Notioptera*, id. *l. c.* fig. 2 (neuration). To include *Syntomis dolosa* (type), *strigosa*, ? *glaucopoides*, and ? *expansa*, Walk.

*Tetrassia*, id. *l. c.* fig. 6 (neuration); type, *Syntomis subcordata*, Walk.

*Psoloptera*, id. *l. c.* p. 369. Allied to *Calonotos* and *Angeles*; type, *Euchromia thoracica*, Walk.

*Pseudosphenoptera*, id. *l. c.* p. 370. Allied to *Calonotos* (sect. *Sphenoptera*); type, *Euchromia basalis*, Walk. (neuration), fig. 4.

*Ichoria*, id. *l. c.* fig. 9 (neuration). Allied to *Calonotos*; type, *Euchromia quadrigutta*, Walk.

*Sphecosoma*, id. *l. c.* p. 381. Allied to *Pseudosphex*; type, S. *fasciolatum*, sp. n., *l. c.*, Santa Martha.

*Loxophlebia*, id. *l. c.* pl. xxvii. fig. 14 (neuration). Allied to last; type, *Pœcilosoma vesparia*, Butl.

*Andrenimorpha*, id. *l. c.* p. 382, fig. 10 (neuration). Allied to *Gymnelia*; type, *Glaucopis xanthogastra*, Perty.

*Echoneura*, id. *l. c.* p. 383. Allied to *Læmocharis* and *Pheia*; type, *Euchromia intricata*, Walk.; add *Ech. angusta* and *tenuis*, Espiritu Santo, and *catastibina*, Brazil: spp. nn., *l. c.* p. 384.

*Thrinacia*, id. *l. c.* p. 384. Allied to last; type, *Glaucopis afflicta*, Walk.

*Mochloptera*, id. *l. c.* p. 386, fig. 15 (neuration). Allied to *Gymnelia*; type, *Glaucopis acrocantha*, Perty.

*Leucotmemis*, id. *l. c.* p. 391, fig. 12. Allied to *Ilipa* and *Mochloptera*; type, *Glaucopis latilinea*, Walk.

*Methysia*, id. *l. c.* p. 397. Allied to *Thrinacia* and *Cosmosoma*; type, *Glaucopis notabilis*, Walk.

*Dixophlebia*, id. *l. c.* pl. xxviii. fig. 8 (neuration). Allied to last; type, *Pseudomya quadristrigata*, Walk.

*Corematura*, id. *l. c.* p. 403. Type, *Glaucopis chrysogastra*, Perty. This and the two following genera are placed between *Æthria*, Hübn., and *Eumenogaster*, Herr. Schäff.

*Argyroleides*, id. *l. c.* Type, *Glaucopis ophion*, Walk.

*Pezaptera*, id. *l. c.* p. 404. Type, *Eunomia sordida*, Walk.

*Syntrichura*, id. *l. c.* p. 405. Allied to *Trichura*; type, *S. virens*, sp. n., St. Paulo.

*Mallostethus*, id. *l. c.* p. 408. Type, *Glaucopis metamelas*, Walk.

*Pseudaclytia*, id. *l. c.* p. 409. Type, *Pampa opponens*, Walk. This and the preceding genus are placed at the head of the *Antichlorinæ*, before *Napata*, Walk.

*Chloropsinus*, id. *l. c.* p. 409. pl. xxix. fig. 1 (neuration). Placed between *Napata* and *Illipula*, Walk.; type, *C. lanceolatus*, sp. n., *l. c.*, St. Paulo.

*Ixylasia*, id. *l. c.* p. 410, fig. 8 (neuration). Type, *Aclytia trogonoides*, Walk. This and the four following genera are placed between *Illipula* and *Antichloris*, Hübn.

*Procalypta*, id. *l. c.* p. 411. Type, *Euchromia subcyanea*, Walk.

*Pterygopterus*, id. *l. c.* fig. 10 (neuration). Type, *P. clavipennis*, sp. n., Espiritu Santo.

*Ceramidia*, id. *l. c.* p. 412, fig. 3 (neuration). Type, *Euchromia fumipennis*, Walk.; add *C. cataleuca*, sp. n., *l. c.*, E. Peru.

*Passineura*, id. *l. c.* fig. 4 (neuration). Type, *Pampa fusiformis*, Walk.

*Heliura*, id. *l. c.* p. 417, figs. 13 & 17 (neuration). Allied to *Charidea*; to contain *apicalis*, Herr. Schäff., *capys*, Fabr., *lacteinota*, p. 417 (= *capys*, var. ? Walk.), *thetis*, Linn., *leneus*, Cram., *tetragramma*, Walk., *pyrrhosoma*, sp. n., p. 418, Pará, and *solicauda* (type; = *Euchromia tetragramma*, var. β and ♀, Walk.), p. 418.

*Acridopsis*, id. *l. c.* p. 418. Allied to last; type, *Eucerea latifascia*, Walk.

*Apiconoma*, id. *l. c.* p. 422, fig. 22 (neuration). Allied to *Automolis*; type, *Euchromia opposita*, Walk.

*Galethalea*, id. *l. c.* p. 424. Allied to *Halesidota*, *Eucereon*, and *Charidea*; type, *Hal. pica*, Walk.

*Cercopimorpha*, id. *l. c.* fig. 16 (neuration). Allied to last and to *Acridopsis*; type, *C. homopteridia*, l. c. p. 424, new name for *Euchromia pectinata*, var. ? Walk.

*Metanycles*, id. *l. c.* p. 425, fig. 19 (neuration). This and the two following genera are allied to *Anycles* and *Cercopimorpha*; type, *Aclytia contracta*, Walk.

*Epanycles*, id. *l. c.* fig. 18 (neuration). Type, *Euchromia imperialis*, Walk.

*Sciopsyche*, id. *l. c.* p. 426, fig. 20 (neuration). Type, *Euchromia tropica*, Walk.; add *S. cinerea*, sp. n., *l. c.*, Espiritu Santo.

*Pseuderbessa*, id. Cist. Ent. ii. p. 107. Allied to *Erbessa*; type, *Dioptis umbrifera*, Walk.

*Callagra*, id. *l. c.* p. 111. Allied to *Euagra*; type, *Dioptis azurea*, Walk.; add *C. splendida*, sp. n., *l. c.* p. 112, Brazil.

*Mydromera*, id. *l. c.* p. 112. Allied to *Euagra*; type, *E. isthmia*, Feld.

*Micragyrta*, id. *l. c.* p. 114. Allied to *Empyreuma*; type, *Agyrta gavisa*, Walk.

*Metastatia*, id. *l. c.* p. 115. Allied to *Hyaleucerea*; type, *Hyelosia pyrrhorrhœa*, Hübn.

*Zygæna seriziati*, p. 33, *loyselis*, p. 34, pl. iii. fig. 4, and *felix* (? = *faustina*, Ochs.), p. 36, C. Oberthür, Études Ent. i., Algeria.

*Syntomis georgina*, S. India, Ceylon, *lucina*, Nepal, Calcutta, and *khasiana*, Khasia Hills, p. 345, *cysseoides*, India, *edwardsi* and *formosæ*, Formosa, and *hydatina*, Calcutta, p. 346, *elisa*, Sarawak, *atkinsoni* (Moore, MS.), Moulmein, *artina* and *cupreipennis*, Calcutta, p. 347, *marina*, Congo, *johanna* and *anna*, Kuysna, *alicia*, Abyssinia, and *tomasina*, p. 348, and *francisca*, Sierra Leone, *fantasia*, Cape, *montana*, India, and *mandarinia* (? = *fenestrata*, Herr. Schäff., *nec* Dru.), Shanghai, p. 349, *florina*, Sarawak, *S.* (?) *marella*, hab. ——?, and *emma*, China, p. 350; A. G. Butler, J. L. S. Zool. xii. *S. molanna*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. (1) p. 94, Transvaal.

*Hydrusa cingulata*, *humeralis*, and *nigriceps*, p. 352, and *intensa*, Australia, and *insularis*, Barnard Isles, p. 353; A. G. Butler, *l. c.*

*Artona* (pl. xxviii. fig. 14, neuration) *zebraica*, N. India, *nigrescens*, Punjab, and *fulvida*, Moulmein, p. 356, *hainana*, China, and *confusa*, N. India, p. 357; *id. l. c.*

*Tascia virescens*, Natal, and *pulchra*, Congo; *id. l. c.* pp. 357 & 358.

*Thyretes* (neuration, fig. 11) *monteiroi*; id. *l. c.* p. 359.

*Harrisina fulvinota*, id. *l. c.* p. 361, Espiritu Santo.

*Histiea* (neuration, fig. 21) *meldolæ*, Trinidad, Venezuela, *columbiæ*, New Granada, *amazonica*, Ega to Eastern Peru, and *inferioris*, Lower Amazons; *id. l. c.* p. 362.

*Euchromia leonis*, p. 363, Sierra Leone, *africana* (= *madagascariensis*, Walk., *nec* Boisd.), Natal, Zulu Land, *celebensis*, Celebes, *fraterna*, Moulmein, *orientalis*, N. India, *laura*, E. India, p. 364, *siamensis*, Siam, and *ænone*, Solomon Islands, p. 365; *l. c.*

*Syntomeida* (neuration, fig. 16) *albifasciata*, id. *l. c.* p. 366, Honduras.

*Macrocneme ferrea*, S. America, *esmeralda*, Ega, *interstincta*, Pará, and *splendida*, Santa Marta; *l. c.* p. 371.

*Mastigocera cyanea*, Brazil, and *pusilla* (= *Euchromia æacus*, Walk., *nec* Cram.), Pará, p. 372, *tibialis*, p. 373, Haiti; *id. l. c.*

*Horama grotei*, id. *l. c.* p. 374, Jamaica.

*Isanthrene* (neuration, fig. 4) *maxima*, id. *l. c.* p. 375, Rio Janeiro.

*Homœocera* (neuration, fig. 6) *stretchi*, p. 375, and *beata*, Santa Marta, *salvini*, Panama, p. 376; *id. l. c.*

*Sarosa* (neuration, fig. 11) *pompilina*, id. *l. c.* p. 377, Espiritu Santo.

*Erruca* (neuration, fig. 7) *grenadensis*, N. Granada, and *notipennis*, p. 378, and *vespiformis*, p. 379, Villa Nova, *id. l. c.*

*Lœmocharis fenestrina*, id. *l. c.* p. 383, Brazil.

*Phcia geminata*, id. *l. c.* p. 385, Santa Marta.

*Cosmosoma elegans*, p. 386, and *coccineum*, Espiritu Santo, *pyrrhostethus*, N. Granada, p. 388, *restrictum*, Santarem, *cingulatum*, Veragua, and *erubescens*, Brazil, p. 389; *id. l. c.*

*Ilipa notata*, p. 390, *determinata*, and *stilbo-sticta*, p. 391; *id. l. c.*

*Dycladia hemileuca*, E. Peru, and *margariphera*, Pará, p. 393, *climacina*, Espiritu Santo, and *batesi*, Amazons, p. 394; *id. l. c.*

*Marisa rubripunctata* (= *columbina*, Walk., *nec* Fabr.), Jamaica, and *late-nigra*, Honduras, *id. l. c.* p. 395.

*Eunomia fulvicauda*, St. Paulo, and *sarcosoma*, New Granada, *id. l. c.* p. 401.

*Antichloris* (neuration, pl. xxix. fig. 5) *scudderi*, id. *l. c.* p. 413, Santarem.

*Eriphia* (neuration, fig. 6) *tractipennis*, id. *l. c.* p. 414, Chontales, Nicaragua.

*Aclytia* (neuration, fig. 7) *punctata* (= *Euchromia heber*, Walk., *nec* Cram.), *id. l. c.* p. 414, Honduras.

*Charidea* (neuration, fig. 11) *alonzo*, Venezuela, and *imogena*, Peru, p. 415, and *lurama*, Ecuador, p. 416; *id. l. c.*

*Automolis* (neuration, fig. 25) *fulgurata*, Espiritu Santo, and *packardi* (= *sypilus*, Walk., *nec* Cram.), Amazon, p. 420, and *ameoides*, p. 421, Ecuador: *id. l. c.*

*Androcharta brasiliensis*, Brazil, *stretchi*, Peru and St. Paulo, and *parvipennis*, Ega to Peru, *id. l. c.* p. 427.

*Drymœa unimaculata*, id. Cist. Ent. ii. p. 110, East Peru.

*Euagra angelica*, New Granada, and *intercisa*, Venezuela, *id. l. c.* pp. 110 & 111.

*Agyrta æstiva*, id. *l. c.* p. 113, Honduras.

*Isostola vicina*, id. *l. c.* p. 115, S. America.

*Hyrmina leucothyris*, id. *l. c.* p. 117, Ega.

*Laurona panamensis*, Veragua, and *domingonis* (? = *Ditaxis sora*, Boisd.) Haiti, *id. l. c.* pp. 118 & 120.

*Locha perspicua*, id. *l. c.* p. 120, Chontales.

## Nycteolidæ.

*Nycteola falsalis*, Herr. Schäff., new to France; P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. xlviii.

## Lithosiidæ.

(See also *Zygænidæ*.)

*Gnophria quadra*. Abundance of larvæ in Tuscany in September, 1875. P. Stefanelli, Bull. Ent. Ital. viii., Addunza, p. 7.

*Lithosia*: scarcity of this genus in 1876 as compared with 1875; G. B. Corbin, Ent. ix. pp. 276 & 277. *L. aureola*, Linn.: larva described; G. T. Porritt, Ent. ix. pp. 47 & 48. *L. lutarella*, Linn., and var. *palliforus*, Zell.; A. Fuchs, S. E. Z. xxxvii. pp. 96 & 97. *L. unita*, Hübn.: on the occurrence of this species and its varieties *pallcola* and *aridcola* in Nassau; *id. l. c.* pp. 95 & 96.

*Deiopeia pulchra*. Various observations on its occurrence in the North of France, &c., are scattered through Bull. Soc. Ent. Fr. (5) vi.

*Nola albulalis*. Transformations described by J. P. Barrett and G. T. Porritt, Ent. M. M. xiii. pp. 63 & 94; Ent. ix. pp. 177 & 178.

*Celerena*, Walk., recharacterized by A. G. Butler, P. Z. S. 1876, p. 768. To include *lerne*, Boisd., *divisa*, Walk., (type), *amana*, Feld., *commutata* and *mutata*, Walk., *perithea*, Cram., *proxima*, *spreta*, and *connexa*, Walk., and *cucnemis*, Feld.

*Craspedosis*, g. n., A. G. Butler, P. Z. S. 1876, p. 767, note, not characterized; type, *Celerena sobria*, Walk.

*New species.*

*Celerena vulgaris*, id. *l. c.* p. 768, New Guinea.

*Dysphania chalybeata*, id. Ann. N. H. (4) xviii. p. 127, Cape York.

*Themiscyra varicosa*, id. *l. c.* p. 126, Cape York.

*Nola meridionalis* and *caffra*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, pp. 99 & 100, Transvaal.

*Manulea planissima*, id. *l. c.* p. 100, Transvaal.

## ARCTIIDÆ.

(See also *Zygænidæ*).

Note on a fossil larva probably belonging to the *Arctiidæ*; H. Daudet, Pet. Nouv. 1876, p. 25.

*Euprepia*. On rearing the Alpine species, *E. quenseli*, *flavia*, and *cervini*; H. Frey, MT. schw. ent. Ges. iv. pp. 469 & 470.

*Chelonia caja* may be sometimes triple-brooded; S. Ebrard, Bull. Soc. Ent. Fr. (5) vi. p. ccxxxii.

*Arctia fuliginosa*. Larva highly destructive to linen in the bleaching-fields at Larne; E. Newman & W. Eccles, Ent. ix. pp. 42–48: *cf.* also C. W. Simmons, *op. cit.* pp. 70 & 71.

*Spilosoma lubricipeda*. Aberration; C. Crüger, Verh. Ver. Hamb. ii. pp. 135–139.

*Callimorpha hera* & var. figured by E. Newman, Ent. ix. pp. 25 & 26. On its occurrence in Britain, *cf.* also pp. 210 & 211.

*Munychia callipyga*, Wallengr., and *Aloa delineata*, Walk., = *M. erythronota*, Boisd.; H. D. J. Wallengren, Œfv. Ak. Förk, xxxii. 1, p. 101.

*Eutania*, g. n., *id. l. c.*, p. 102. Allied to *Spilosoma*; type, *E. scapulosa*, sp. n., *l. c.*, Transvaal.

*Epipyrops anomala*, g. and sp. nn.; J. O. Westwood, P. E. Soc. 1876, p. xxiv., and Tr. E. Soc. 1876, p. 522, pl. viii., Hong Kong. Larva parasitic on *Fulgora candelaria*, and supposed to feed upon the wax secreted by that insect; *cf.* Westwood & Bowring, pp. 519–523.

*New species* :—

*Spilosoma scortillum* and *screabile*, H. D. J. Wallengren, *l. c.* pp. 101 & 102, Transvaal.

*Arctia cervinoides*, H. Strecker, P. Ac. Philad. 1876, p. 151, Colorado.

*Areas punctipennis*, A. G. Butler, Ann. N. H. (4) xviii. p. 126, Cape York.

## Liparidæ.

*Orgyia antiqua*, black var.; De Lafitole, Pet. Nouv. 1876, p. 74. *O. pudibunda*: the perfect insects bred from a remarkable brood of black larvæ differed in no respect from the type; A. Guénée, Bull. Soc. Ent. Fr. (5) vi. p. cix. It is double-brooded; J. Peters, Ent. ix. p. 262.

*Liparis dispar*, var. *bardigalensis* or *disparoides*; P. Mabille & A. Gaschet, Bull. & Ann. Soc. Ent. Fr. (5) vi. pp. ix. & 521.

*Apterogynis* g. n., A. Guénée, Stat. Scient. d'Eure-et-Loire, p. 78; for *Orgyia antiqua*, L., and *gonostigma*, W. V.

*Orgyia pan-lacroixi*, C. Oberthur, Études Ent. i. p. 41, pl. iii. fig. 5, Algeria; *O. quadripunctata*, H. D. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 99, Transvaal: spp. nn.

## Notodontidæ.

On the times of appearance of female *Notodontidæ*, &c.; F. K. Robinson, Ent. ix. p. 206.

*Heteromorpha costipuncta*, H. S., and *Phiala xanthosoma*, Wallengr., = *Dasychira atomaria*, Walk.; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 98. *Anthesa*, Walk., belongs to the *Notodontidæ*; id. *l. c.* p. 103.

*Dicranura vinula*, var. *delavolii*, from Corsica and Algeria; A. Gaschet, Ann. Soc. Ent. Fr. (5) vi. p. 532.

*Stauropus fagi*: habits of larva; H. M. Golding Bird, Ent. ix. pp. 269–272.

*Litodonta*, g. n., L. F. Harvey, Canad. Ent. viii. pp. 5, 109 & 110. Allied to *Heterocampa*; type, *L. hydromeli*, sp. n., *ibid.* Texas.

*Ellida gelida*, g. & sp. nn., A. R. Grote, *op. cit.* p. 125, N. America. Allied to *Ptilodontis*.

*Phiala flavipennis*, sp. n., H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 98, Transvaal.

## Psychidæ.

*Psyche*. Some undetermined cases from Algeria noticed; C. Oberthur, Études Ent. i. p. 71.

On coupling in *Psyche*: Lafaurie, Pet. Nouv. 1876, pp. 5 & 6.

## Limacodidæ.

*Lagoa opercularis*, A. & S. On the urticating properties of the larva; M. E. Murtfeldt, Canad. Ent. viii. pp. 201 & 202.

*Limacodes asellus.* Oviposition; F. O. Standish, Ent. ix. pp. 68 & 69.

*Tavla atititis*, H. D. J. Wallengren, ♀ or sp. n., from the Transvaal described by him; Œfv. Ak. Förh. xxxii. 1, p. 96.

*Sisyrosea*, g. n., A. R. Grote, Canad. Ent. viii. p. 112; type, *Limacodes inornatus*, Grote & Rob.; add *S. nasoni*, sp. n., *ibid.*, Virginia.

*Parasa incisa*, sp. n., L. F. Harvey, *tom. cit.* p. 5, Texas.

*Eucrythra phasma*, sp. n., *id. ibid.*, Texas.

## Saturniidæ.

*Breyeria borinensis.* Notes by De Borre and Bar on the relations of this supposed fossil Saturniid; CR. Ent. Belg. xix. pp. iii.–v., liii. & liv. Many Entomologists dispute its being Lepidopterous.

*Attacus cæsar* (?) and *pernyi*: on rearing; Wullschlegel, MT. schw. ent. Ges. iv. pp. 451 & 452.

*Samia cynthia*, four years in cocoon; J. C. Morris, Canad. Ent. viii. p. 198.

*Samia ceanothi*, Behr, has priority over *S. californica*, Grote; H. Strecker, Lepidoptera, p. 120. *S. cecropia*, Linn.: its variation, and on an undetermined parasite; C. E. Worthington, Canad. Ent. viii. pp. 185, 186, & 220.

*Platysamia columbia*, Smith; F. B. Caulfield, Canad. Ent. viii. pp. 77–80, 95–98. He believes the balance of probability is in favour of its being a good species.

*Antheræa yama-mai*: rearing; J. Odstreil, Ent. Nachr. ii. p. 161. An aberration noticed; M. Girard, Bull. Soc. Ent. Fr. (5) vi. p. ccxxxiii. *A. pernyi*: on rearing, &c.; Lelièvre, CR. Ent. Belg. xix. pp. xlv.–xlvii., translated by C. A. Döhrn, S. E. Z. xxxvii. pp. 435–438; *cf.* also G. Jaeger and others, JH. Ver. Württ. xxix. pp. 92–98, xxx. pp. 169–176, 271–274. *A. wahlbergi*, Boisd., redescribed by H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 97.

*Saturnia (Actias) lima*, Linn. A remarkable subspecies evolved in Switzerland from Texan pupæ brought over by J. Boll, and proposed to be called *S. bolli*, M. Wagner; C. Ritsema, Tijdschr. Ent. xix. pp. xcvii. & xcviii.

*Mamillo curtisea*, Weyenb., = *Euclea diagonalis*, Herr. Schäff.; F. M. Van der Wulp, Tijdschr. Ent. xix. p. xlviii.

*New species* :—

*Attacus hercules*, W. H. Miskin, Tr. E. Soc. 1876, p. 7, Cape York.

*Bunæa eblis*, H. Strecker, Lepidoptera, p. 121, Calabar.

*Saturnia (Aglia) mendocino*, J. Behrens, Canad. Ent. viii. p. 149, California.

## Bombycidæ.

*Bombyx processionea.* Cutaneous eruptions produced by the hairs of larva, and remarks on other urticating plants and insects; A. Feroci, Atti Soc. Tosc. ii. pp. 175–188.

*Cnethocampa pityocampa* questioned as British; Ent. ix. pp. 21 & 22.

*Lasiocampa pini.* According to some experiments of T. Goossens, this species can exist ten or twelve generations without interbreeding. An unfertilized ♀ at first deposited green and unfertile eggs, but, being prevented from depositing any more for eight days, at the end of that time she laid four lilac-coloured eggs, which produced larvæ which lived till the second moult. In other species on which he has experimented, interbreeding has generally destroyed the race almost immediately. Ann. Soc. Ent. Fr. (5) vi. pp. 429–433. *L. prompta*, Walk., referred to *Eriogaster*; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 97. *L. rubi*: irritation produced by hairs of larva; J. O. Westwood, P. E. Soc. 1876, p. xxxii. Directions for rearing; E. Newman & E. K. Robinson, Ent. ix. pp. 72, 205 & 206.

*Borocera stali*, Wallengr., = *Gonometa postica*, Walk., and *Concædes carinata*, Wallengr., = *Megasoma cristatum*, Cram.; H. D. J. Wallengren, *l. c.* p. 97.

*Bombyx mori.* Important observations on the development of the germ, and its homology with that of other insects, and the higher animals; A. Dohrn, Z. wiss. Zool. xxvi. pp. 112–122. The hatching of its eggs may be accelerated by exposing them to a weak current of negative electricity; Virson, Œsterreich. Landwirth. Wochenbl. (*cf.* Q. J. Sci. xiii. p. 143). The influence of cold on the hatching of its eggs; Duclaux, C. R. lxxxiii. pp. 1049–1051. Acclimatized silkworms yield a coarser silk than those bred in confinement; G. Semper, Verh. Ver. Hamb. i. pp. 90 & 91.

*Eriogaster levenna*, sp. n., H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 98, Transvaal.

## Zeuzeridæ.

*Cossus ligniperda* at sugar; H. T. Dobson and others, Ent. ix. pp. 183, 207, & 208.

*Endagria ululа*, Borkh.: transformations described; A. Rogenhofer, Verh. z.-b. Wien, xxvi. pp. 86 & 87.

*New species* :—

*Hypopta ? reibelli*, C. Oberthur, Études Ent. i. p. 40, pl. i. fig. 1, Algeria.

*Cossus nanus*, H. Streeker, P. Ac. Philad. 1876, p. 151, Colorado.

*Zeuzera sponda*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 96, Transvaal.

## Hepialidæ.

*Hepialus*: a larva from Queensland, infested with a fungus with four or five different branches, issuing from the back of the neck and the tail; J. O. Westwood, P. E. Soc. 1876, p. xvi. *H. cervinus*, Wallengr. probably = *Gorgopis caffra*, Walk.; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 95. *H. humuli*, ♂: on its pendulum motion; T. A. Chapman, Ent. M. M. xiii. pp. 63 & 64. His observations suggest the probability that the females seek and discover the males upon the wing by their white colour.

*Dalaca ibex*, Wallengr., redescribed; H. D. J. Wallengren, *l. c.* p. 95.

*Hepialus sequioiolus* and *mendocinolus*, p. 174, *baroni* and *lenzi*, p. 175; J. Behrens, Canad. Ent. viii., spp. nn.

## Noctuidæ.

On collecting *Noctuæ* by examining thistles, &c., at night with a lantern; J. van Leeuwen, junr., Tijdschr. Ent. xix. p. cvii.

A. R. Grote has published Part 2 of his Check List of the *Noctuidæ* of America, North of Mexico, containing the *Fasciatæ*, *Deltoides*, and *Noctuo-Phalænidi*. Buffalo: 8vo, pp. 31–50. Two new species are described; and the adoption of Hübner's genera is defended in the preface.

Grote's Check List of N. American *Noctuidæ* is reviewed, with critical notes on some of the species, by A. Speyer, S. E. Z. xxxvii. pp. 198–204.

A. R. Grote publishes remarks on various genera of N. American *Noctuidæ*; op. cit. pp. 134–137.

Captures of N. American *Noctuidæ* in the province of Ontario, Canada; G. Norman, Ent. M. M. xii. pp. 254–256; Canad. Ent. viii. pp. 67–72. In Illinois (with directions for sugaring); O. S. Westcott, Canad. Ent. viii. pp. 12–17. A collection from Colorado, made by A. S. Packard in 1875; A. R. Grote, Bull. U. S. Geol. Surv. ii. pp. 115–120.

On *Noctuidæ* from the Pacific Coast; A. R. Grote, Bull. Buff. Soc. iii. pp. 77–87. Many new species are described and figured, and others are noticed as new to this portion of America.

*Amphipyra effusa* and *Agrotis venigera* found by E. Simon adhering to the walls of caves; P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. ccix.

*Bombycia improvisa*, H. Edwards, noticed; A. R. Grote, *l. c.* p. 78.

*Cymatophora ocularis*. Natural history; W. Buckler, Ent. M. M. xiii. pp. 90–92. *C. ridens*, egg described; J. Hellins, *op. cit.* xii. p. 232.

*Apatela lupini*, A. R. Grote, noticed and figured by him; *l. c.* p. 78, pl. iv. fig. 10.

*Acronycta aceris*. On the damage sometimes caused by this species to horse-chestnut trees; A. Guénée, Bull. Soc. Ent. Fr. (5) vi. pp. cvii. & cviii. The same tree also suffers severely from the larvæ of *Chimatobia brumata* and *Bucculatrix thoracella*; E. L. Ragonot, *tom. cit.* p. cviii.

*Leucania unipuncta*, Haw. Oviposition; C. V. Riley, P. Ac. St. Louis, iii. p. ccxi. *L. zeæ*, Dup., new to Italy: on breeding; Targioni Tozzetti, Bull. Ent. Ital. viii., Addunza, pp. 27 & 28.

*Nonagria lutosa*. A variety, at first supposed to be a new species; W. B. Gill, Ent. M. M. xii. p. 279; xiii. pp. 10 & 11.

*Laphygma frugiperda*, Abb. & Smith (= *Prodenia autumnalis*, Riley). C. V. Riley defines and figures varr. *fulcosa* and *obscura*; Rep. Ins. Mo. viii. pp. 48 & 49, fig. 27.

*Mamestra capensis*, Guén., noticed; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 104.

*Miana fasciuncula*. Transformations described: W. Buckler, Ent. M. M. xiii. pp. 62 & 63.

*Agrotis*. L. F. Harvey (Bull. Buff. Soc. iii. pl. iii.) notices and figures *A. sculptilis*, Harv., *murranula*, Grote & Rob., *scandens*, Riley, p. 73, *feniseca*, Harv., *bostoniensis*, Grote, *A.* (*Ammoconia*) *chortalis*,

Harv., and *A. introferens*, Grote, p. 74, figs. 2–4, 6, 7, 9 & 10. *A. agathina*: food-plants; G. Norman, Ent. M. M. xiii. p. 11. *A. atro-purpurea*, Grote, and allies; A. R. Grote, Bull. U. S. Geol. Surv. ii. p. 118. *A. auxiliaria*, Grote, var. *agrestis* from Colorado described; *id. l. c.* p. 117. *A. cuprea* and *forcipula*, Hübn., recorded from Nassau; A. Fuchs, S. E. Z. xxxvii. pp. 97 & 98. *A. exertistigma*, Morrison ?, or sp. n. ? *morrisonistigma* [!], noticed and figured, pp. 78 & 80, pl. iv. fig. 8, and *A. gravis*, Grote, figured, *l. c.* fig. 2; A. R. Grote, Bull. Buff. Soc. iii. *A. insignata* and *illata*, Walk., are identical, and should be referred to *Hadena*; id. Canad. Ent. viii. p. 29. *A. segetum*, W. V., identical with European specimens, recorded from the Transvaal; H. D. J. Wallengren, *l. c.* p. 104. *A. tritici* and *aquilina* figured, and a comparative description added; J. T. Carrington, Ent. ix. pp. 169–171.

*Segetia filicularia*, Morrison, probably = *Caradrina cubicularis*, W. V.; A. R. Grote, Canad. Ent. viii. pp. 188 & 189.

*Polenta*, Morrison. Generic characters discussed; *id.* Bull. Buff. Soc. iii. pp. 75 & 76.

*Caradrina morpheus*. Oviposition; J. W. Dunning, P. E. Soc. 1876, p. iii.

*Choephora*, Grote & Rob. Characters discussed by A. R. Grote, *l. c.* p. 86, who is now disposed to unite *Pseudorthosia* with it.

*Choephora* and *Pseudorthosia*. A. R. Grote now refers *fungorum*, G. & R., and *pectinata*, Grote, to the former genus, and *variabilis*, Grote, to the latter; Canad. Ent. viii. pp. 17 & 18.

*Taniocampa gracilis*, W. V., *Orrhodia vaccinii*, L., and other species: variation of spring broods in Altona and Schleswig; H. Tetens, Verh. Ver. Hamb. ii. pp. 162–167, 171 & 172. *T. populeti*, var. (?) *tremuleti* from Schleswig described; *id. l. c.* p. 161.

*Orthosia stabilis* and *instabilis*: note on the larvæ; "P. G." Pet. Nouv. 1876, p. 28, *cf.* also pp. 30 & 35. *O. suspecta*: a black var.; J. W. Douglas, Ent. M. M. xiii. p. 109.

*Xanthia togata*, Esp. (*silago*, Hübn.), *gilvago*, Esp., and *Orthosia circellaris*, Hufn. On rearing; F. Böckmann, Verh. Ver. Hamb. ii. pp. 142 & 143.

*Dianthœcia cæsia* is probably double-brooded, like *D. capsophila*; G. T. Porritt, Ent. M. M. xiii. p. 163.

*Telesilla vesca*, Morrison, = *Galgula subpartita*, Guén.; A. R. Grote, *l. c.* p. 26.

*Pachnobia alpina*, Westw., = *hyperborea*, Zett.; O. Staudinger, Ent. M. M. xiii. p. 90, *cf.* also pp. 109 & 110. On the larva and food-plant; E. G. Meek, *op. cit.* pp. 164 & 165. Figured and discussed by J. T. Carrington, Ent. ix. pp. 242–245.

*Polysphænis sericina*, Guén., figured, with remarks by E. Newman: it has occurred in Guernsey. Ent. ix. pp. 74 & 75.

*Epunda lutulenta*; transformations; G. T. Porritt, Ent. M. M. xiii. pp. 163 & 164, var. *luneburgensis*. On its occurrence in Scotland; N. Cooke and F. B. White, Ent. M. M. xiii. pp. 111, 112 & 164.

*Polia flavo-cincta*. Possibility of the imago sometimes hybernating; G. T. Porritt, Ent. M. M. xii. p. 258.

*Hadena amica*, Tr.: larva described; Sintenis, S. E. Z. xxxvii. pp. 368 & 369. *H. cucullitiformis*, A. R. Grote, figured by him; Bull. Buff. Soc. iii. pl. iv. fig. 15. *H. interna*, Grote, = *delicata*, Grote, var.; *id. l. c.* p. 189.

*Oncocnemis*, Led. Synonymy of N. American species (11 admitted, 1 new): A. R. Grote, Bull. U. S. Geol. Surv. ii. pp. 116–118. Distribution; L. F. Harvey, Canad. Ent. viii. p. 110.

*Xylomiges hiemalis*, Grote, = *Drysobota californica*, Streck.; A. R. Grote, Canad. Ent. viii. p. 26.

*Cucullia scrophulariæ*. Its occurrence in Britain; W. H. Harwood, Ent. ix. pp. 233, 259 & 260.

*Lygranthœcia meskeana*, Grote, = *Heliothis fastidiosa*, Streck.; A. R. Grote, *l. c.* p. 26.

*Turache patruelis*, A. R. Grote, redescribed; *id. l. c.* p. 27.

*Phyprosopus callitrichoides*, A. R. Grote. Synonymy discussed by him, *l. c.* p. 205.

*Omia cyclopæa*, Grasl., new to France, taken at Digne; E. Bellier de la Chavignerie, Bull. Soc. Ent. Fr. (5) vi. p. 159.

*Anarta melanopa* and *cordigera*. Transformations described; J. Hellins, Ent. M. M. xiii. pp. 11–13.

*Melipotis fasciolaris*, Hübn., redescribed; A. R. Grote, Check List, p. 40, note 3.

*Microphysa hypoxantha*, H. D. J. Wallengren, noticed by him, *l. c.* p. 114.

*Palindidæ*. C. Bar concludes his paper on this family; Ann. Soc. Ent. Fr. (5) vi. pp. 1–12, 245–250, 433–446, pls. i., v. & vii. He redescribes and figures *P. julianata*, Stoll, p. 1, pl. i. fig. 9, *vincentiata*, Stoll, p. 9, pl. i. fig. 14, *ilyrias*, Guén., p. 246, pl. v. figs. 18–20, and *perlata*, Guén., p. 435, pl. vii. fig. 27, and figures, *P. dominicata*, Guén., pl. i. fig. 12. *Dyomyx*, Guén., is fully characterized, pp. 436–438. At the end of his paper he gives a list of the Cayenne species, as follows:—*Calydia*, Bar (2), *Palindia*, Guén. (29), *Dyamyx*, Guén. (7); total, 38 species.

*Cerocala scapulosa*, Hübn., var. *algiriæ* from Algeria, described and figured by C. Oberthur, Études Ent. i. p. 55, pl. iv. fig. 7.

*Homoptera*. A. R. Grote notices the species: *H. obliqua* and *duplicata* are perhaps synonymous; *calycanthata*, Walker & Bethune (*nec* Guén.), = *Zale horrida*, Hübn.; *H. herminioides*, Walk., = *Epizeuxis æmula*, Hübn.; *H. rosæ*, Behr, is scarcely distinct from *lunata*, Dru.: Canad. Ent. viii. pp. 107 & 108.

*Catocala*. List of species observed in the vicinity of Cincinnati, Ohio, in 1876; C. Dury, Canad. Ent. viii. pp. 187 & 188. Captures near New York in 1876, with note on *C. marmorata*, Edw.; J. Angus, Canad. Ent. viii. pp. 199 & 200. Notes on various N. American species, with descriptions of *C. cerogama*, var. *bunkeri*, and *C. habilis*, var. *basalis* (p. 230); A. R. Grote, *tom. cit.* pp. 229–232. *C. badia*: note on larva; W. V. Andrews, *tom. cit.* p. 198. He thinks this genus must be very close to *Geometra*. *C. belfragiana*, Harv., = *jocaste*, Streck., but the priority is uncertain; L. F. Harvey, *tom. cit.* p. 7. *C. nupta*, var. with red abdomen; De Lafitole, Pet. Nouv. 1876, p. 74. *C. semi-relicta*, Grote, = *briseis*, Edw., var.; H. Strecker, Lepidoptera, p. 121.

*New genera and species :—*

*Chytoryza*, A. R. Grote, Canad. Ent. viii. p. 190. Allied to *Anomis*, &c.; type, *C. tecta*, sp. n., *ibid.*, Texas.

*Pseudolyxa*, id. *l. c.* p. 18. Allied to *Ammoconia*; types, *Choephora blanda*, Grote [sp. n., *infrà*], and *tædata*, sp. n., *ibid.*, Texas.

*Ænigma* [pre-occupied in *Coleoptera*, Newman, 1836], H. Strecker, Lepidoptera, p. 122. Allied to *Hypocala*; type, *Æ. mirificum*, sp. n., *ibid.* Texas.

*Cymatophora magnifica*, id. P. Ac. Philad. 1876, p. 151, Florida.

*Apatela spinea*, A. R. Grote, Bull. Buff. Soc. iii. p. 78, pl. iv. fig. 7, California.

*Simyra capillata*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii 1, p. 101, Transvaal.

*Leucania apparata* and *substituta*, p. 105, and *infima*, p. 106, *id. l. c.*, Transvaal.

*Gortyna obliqua*, p. 53, California, and *appassionata*, pp. 155, Canada, L. F. Harvey, Canad. Ent. viii. *G. necopina*, A. R. Grote, *l. c.* p. 25, United States.

*Perigea niveirena*, L. F. Harvey, *l. c.* p. 53, California, Vancouver's Island.

*Jaspidea viridata*, id. *l. c.* p. 35, California.

*Apamea fallowi*, C. Oberthur, Études Ent. i. p. 45, note 2, pl. iv. fig. 2, Algeria.

*Mamestra nevadæ*, p. 84, California, *comis*, Vancouver, and *albo-guttata*, Oregon, p. 85; A. R. Grote, Bull. Buff. Soc. iii. *M. brachiolum* and *orobia*, L. F. Harvey, *l. c.* pp. 6 & 154, both from Texas.

*Acerra muricana*, A. R. Grote, *l. c.* p. 85, Oregon.

*Caradrina conviva*, p. 6, Texas, and *flavimaculata*, p. 54, Oregon and California; L. F. Harvey, l. c. *C. expolita*, A. G. Butler, Ann. N. H. (4) xvii. p. 407, Rodriguez. *C. flava* (Fallou, MS.), C. Oberthur, *l. c.* p. 45, note 2, pl. iv. fig. 3, Algeria. *C. pervicax* and *murcida*, H. D. J. Wallengren, *l. c.* p. 107, Transvaal.

*Agrotis milleri*, p. 78, fig. 4, and *cinereicollis*, p. 79, fig. 6, California, *costata*, fig. 5, and *brunneigera*, Vancouver, *albipennis*, California and Canada, p. 80, *vapularis*, fig. 3, and *ancipennis* (? = *gravis*, var.), California, *strigilis*, p. 81, and *insularis*, Vancouver, *emarginata* and *facula*, California, *discoidalis*, fig. 9, Nevada, p. 82, *variata*, fig. 12, California, *varix*, Vancouver, *orbis* and *lætula*, fig. 14, California, p. 83; *A.* (*Pachnobia*) *alaskæ* (? = *carnea*, var.), fig. 1, Alaska, p. 84: A. R. Grote, *l. c.* pl. iv. *A. pleuritica*, id. Check List, p. 47, note 14, Canada. *A. æqualis* and *satis*, p. 36, California, *choris*, Nevada, *sierræ*, Sierra Nevada, *recula*, Oregon, and *pyrophiloides*, California, p. 37; L. F. Harvey, l. c. *A. opaca* and *A.* (*Ammoconia*) *aratrix*, id. Bull. Buff. Soc. iii. pp. 72 & 74, pl. iii. figs. 1 & 8, Texas. *A. ignipeta*, C. Oberthur, *l. c.* p. 45, note 2, pl. iv. fig. 4, Algeria.

*Graphiphora pulchella*, L. F. Harvey, Canad. Ent. viii. p. 54, California.

*Hadena dunbari*, Vancouver's Island, and *chlorostigma*, Texas, *id. l. c.*

pp. 52 & 53; *H. quæsita*, A. R. Grote, *op. cit.* p. 26, Wisconsin; *H. diversilineata*, id. Bull. U. S. Geol. Surv. ii. p. 119, Colorado; *H. olorina*, id. Bull. Buff. Soc. iii. p. 84, pl. iv. fig. 13, California.

*Oncocnemis augustus*, L. F. Harvey, *op. cit.* p. 73, pl. iii. fig. 5, Texas; *O. oblita*, A. R. Grote, Bull. U. S. Geol. Surv. ii. p. 117, Nevada; *O. saundersiana*, id. Canad. Ent. viii. p. 29, Grimsby [Canada].

*Cosmia perophoroides*, H. Strecker, P. Ac. Philad. 1876, p. 152, Florida.

*Eustrotia caduca*, A. R. Grote, *l. c.* p. 207, Michigan.

*Homopyralis discalis*, id. *l. c.* p. 206, New York State.

*Phryganis argentistriata*, H. Strecker, *l. c.* p. 152, Florida.

*Choephora blanda*, Washington Territory and Vancouver, and *culepis*, Oregon, A. R. Grote, Bull. Buff. Soc. iii. p. 86.

*Dianthœcia colletti*, J. S. Schneider, in H. Siebke's Enumeratio Insectorum Norvegicorum, fasc. iii. p. 56, Norwegian Alps (Dovre).

*Ipimorpha subvexa*, A. R. Grote, Canad. Ent. viii. p. 189, Texas.

*Diomea bryophiloides*, A. G. Butler, *l. c.* p. 408, Rodriguez.

*Lithophane oregonensis*, Oregon, and *carbonaria*, California; L. F. Harvey, Canad. Ent. viii. p. 55.

*Heliothis regia*, *fastidiosa*, p. 121, *siren*, *inclara*, *nubila*, *rubiginosa*, *imperspicua*, *ultima*, and *spectanda*, p. 122; H. Strecker, Lepidoptera, all from Texas.

*Heliophila pergracilis*, A. R. Grote, Bull. U. S. Geol. Surv. ii. p. 119, Colorado.

*Arsilonche album*, L. F. Harvey, *l. c.* p. 35, Oregon.

*Aletia hestia*, id. *l. c.* p. 6, Texas.

*Cleophana chaberdis* and *varionis*, C. Oberthur, *l. c.* pp. 47 & 48, pl. ii. figs. 2 & 3, Algeria.

*Chariclea darollesi*, id. *l. c.* p. 49, pl. iv. fig. 5, Algeria.

*Calymnia calami*, L. F. Harvey, *l. c.* p. 54, Texas.

*Anthœcia chanzii*, C. Oberthur, *l. c.* p. 51. pl. ii. fig. 4 A, B, Algeria.

*Acontia tinctilis* and *trimeni*, H. D. J. Wallengren, *l. c.* pp. 109 & 110, Transvaal.

*Metioplasta silus*, id. *l. c.* p. 111, Transvaal.

*Leptosia snelleni*, id. *l. c.* p. 112, Transvaal.

*Thalpochares staudingeri*, id. *l. c.* p. 112, Transvaal; *T. elegantula*, L. F. Harvey, *l. c.* p. 55, Nevada.

*Xanthoptera muræna*, H. D. J. Wallengren, *l. c.* p. 113.

*Microphysa perssoni* and *mustelina*, id. *l. c.* pp. 114 & 115, Transvaal.

*Palindia aglaura*, p. 7, figs. 10 & 11, *candida* (? = *rectimargo*, Guén.), p. 8, fig. 13, *ornata*, p. 11, fig. 15, and *albula*, p. 12, fig. 16, pl. i.; *pulchella* (? = *alabastraria*, Hübn.), p. 245, fig. 17, *viridissima*, p. 248, fig. 21, *chloris*, *atalanta*, and *reticulata*, p. 249, figs. 22–24, pl. v.; *micra* and *magdalensis*, pp. 433 & 434, pl. vii. figs. 25 & 26. C. Bar, Ann. Soc. Ent. Fr. (5) vi., Cayenne.

*Dyomix egista*, *egistoides*, *janus*, and *guenæi*, id. *l. c.* pp. 439–442, pl. vii. figs. 28–31, Cayenne.

*Ophiusa boisdeffrii*, C. Oberthur, *l. c.* p. 54, pl. iv. fig. 6, Biskra.

*Euclidia petitjeani*, id. *l. c.* p. 55, pl. ii. fig. 5, Lambèze.

*Bolina revulsa*, H. D. J. Wallengren, *l. c.* p. 116, Transvaal.

*Homoptera turbida*, A. G. Butler, *l. c.* p. 408, Rodriguez; *H. stylobata* and *nana*, L. F. Harvey, *l. c.* p. 155, Texas; *H. unilineata*, A. R. Grote, Canad. Ent. viii. p. 108, Canada.

*Hyypsia umbripennis*, id. *l. c.* p. 109, Canada.

*Anophia illegitima*, H. D. J. Wallengren, *l. c.* p. 109, Transvaal.

*Catocala crataegi*, W. Saunders, Canad. Ent. viii. pp. 72–75, Canada, described in all stages, and contrasted with *polygama*; *C. herodias* and *circe*, H. Strecker, *l. c.* p. 121, Texas; *C. pretiosa*, J. A. Lintner, Canad. Ent. viii. p. 121, New York; *C. angasi* and *mira*, A. R. Grote, *l. c.* pp. 229 & 230, United States; *C. snowiana*, id. Check List, p. 41, note 5, Kansas.

*Patula macfarlanii*, A. G. Butler, *l. c.* p. 127, Cape York.

*Polydesma sagulata*[*-tum*], H. D. J. Wallengren, *l. c.* p. 117, Transvaal.

## Deltoidæ.

*Herminia grisealis*. Transformations; W. Buckler, Ent. M. M. xiii. p. 110.

*Hypenula*, g. n., A. R. Grote, Canad. Ent. viii. p. 27. Allied to *Renia* and *Hypena*; type, *H. opacalis*, sp. n., *l. c.*, Texas.

*Bomolocha annulalis*, id. Check List, p. 45, note 12, Texas.

## Geometridæ.

Packard, Jr., A. S. A Monograph of the Geometrid Moths or *Phalænidæ* of the United States. Washington: 1876, 4to, pp. iv. & 607, 13 pls.

This work forms vol. x. of the Report of the United States Geological Survey of the Territories, under charge of F. V. Hayden. It is probably the most elaborate treatise ever published on any group of *Lepidoptera*. The synonymy, anatomy, natural history, mimicry, geographical distribution, bibliography, and every point connected with the species are very fully discussed. The classification adopted is based upon that of Guénée and Lederer; and the following subfamilies are admitted:—*Larentinæ*, *Operophterinæ* (p. 196, new, to include *Operophtera*, Hübn., = *Chimatobia*, Steph.), *Fidoninæ* (including *Macaridæ*, *Fidonidæ*, and *Zerenidæ*, Guén.); *Caberinæ*, *Goniacidalinæ* (p. 311, new, to include *Goniacidalia*, Pack., *Calledapteryx*, Grote, and a new genus), *Acidalinæ* (including *Ephyridæ*, Guén.), *Geometrinæ*, *Boarminæ*, (including *Amphidasydæ*, *Boarmidæ*, and *Hybernidæ*, Guén.), and *Ennominæ* (including *Urapterygidæ*, Guén.). Pls. i.–vi. are devoted to neuration, pl. vii. and a few figures of pl. vi. to details of structure of various *Lepidoptera*, and pls. viii.–xiii. contain figures of the perfect insects. A few larvæ and pupæ are figured on the upper part of pl. xiii. All the species described are recognisably figured, though without colour, either on the plates, or on woodcuts in the text. Descriptions of most of the undetermined North American species described by previous authors are inserted at the end of each family. The Recorder regrets that his limits compel him to avoid further notice of this work, except as regards the new genera and species described in it.

Short notes on *Geometridæ*, chiefly with reference to Packard's work, and not of sufficient importance to require further notice here; A. R. Grote, Canad. Ent. viii. pp. 152–154.

Notes on oviposition of *A. scutulata*, *S. retulata*, *S. rhamnata*, and *C. picata*; P. H. Jennings, Ent. ix. pp. 12 & 13.

*Eunomos angularia*. No marked difference, except in size, produced by rearing the larvæ on different food-plants; W. Cole, P. E. Soc. 1876, p. xxx. A variety figured; B. W. Neave & E. Newman, Ent. ix. pp. 49 & 50.

*Eugonia dryadaria*, Ramb., and *quercaria*, Hübn. P. Mabille considers these forms to be distinct, and notices a variety of the former; Bull. Soc. Ent. Fr. (5) vi. pp. cix. & cx.

*Angerona prunaria*. Its larva a cannibal; A. Thalenhorst, Verh. Ver. Hamb. ii. pp. 147–149.

*Crocallis elinguaria*. Its hybernation in the egg; E. Holton & T. H. Hedworth, Ent. ix. pp. 88 & 141.

*Metrocampa margaritata*. Buff-coloured var., perhaps only faded; T. H. O. Pearce, E. Newman, & G. T. Porritt, Ent. ix. pp. 161 & 211.

*Eurymene dolabraria*. Larva described; P. H. Jennings, *l. c.* pp. 254 & 255.

*Biston ursaria*, Walk. Habits and transformations; G. J. Bowles, Canad. Ent. viii. pp. 7–9.

*Hemerophila abruptaria*. Larva described; P. H. Jennings, *l. c.* p. 197.

*Ephyra pendularia*, var. figured by F. Bond, Ent. ix. p. 217.

*Geometra papilionaria*. Straw-coloured var. recorded by H. H. Corbett, Ent. ix. p. 205.

*Abraxas hemionata*, Guén., noticed and figured by C. Oberthür, Études Ent. ii. p. 34, pl. ii. fig. 6.

*Hyria auroraria*. Larva described; G. T. Porritt, Ent. ix. pp. 197–199.

*Asthena testaceata*, Don. (= *sylvata*, W. V.). Note on larva; T. Goossens, Bull. Soc. Ent. Fr. (5) vi. pp. cxxxiii. & cxxxiv.

*Acidalia contiguaria*, Hübn. On rearing; A. Fuchs, S. E. Z. xxxvii. pp. 98 & 99. *A. emarginata*: larva described; G. T. Porritt, Ent. M. M. xiii. pp. 13 & 14. *A. lævigaria*, Hübn., is single-brooded at Paris; De Lafitole, Pet. Nouv. 1876, pp. 74 & 75. *A. mediaria*, Hübn.: var. or sp. n. from Algeria; C. Oberthur, *l. c.* i. p. 59, pl. iii. fig. 6.

*Timandra amata*. Rapidity of its transformations; A. Thalenhorst, *l. c.* pp. 150–152.

*Argyris latonaria* and *Osteodes turbulenta*, Guén., noticed; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, pp. 119 & 121.

*Strenia clathrata*. Larva described; G. T. Porritt, *l. c.* pp. 178 & 179.

*Bupalus piniarius*. The dark English form is named *flavescens*; F. B. White, Scot. Nat. iii. p. 367.

*Aspilates duponchelaria*, Luc., = *Heteropsis testaria*, Fabr.; C. Oberthur, *l. c.* i. p. 64.

*Hybernia leucophearia*. Its rarity on some geological formations, and its abundance on others; S. Webb, Ent. ix. pp. 277 & 278.

*Palæocrita* (g. n.) *vernata* and *Anisopteryx pometaria* figured and described, with directions for their destruction; C. V. Riley, Tr. Ac.

St. Louis, iii. pp. 273–280, figs. 14–21; Rep. Ins. Mo. viii. pp. 12–22. *A. pometaria*: varieties in neuration, *id.* Canad. Ent viii. pp. 178 & 179; synonymy, B. P. Mann, *op. cit.* p. 184; specimen with undeveloped wings, *id.* P. Bost. Soc. xviii. p. 201.

*Eupithecia*. C. T. Gregson attempts to classify the British species by their larvæ; he rejects *venosata* and *togata* from the genus, but does not say where he considers them to belong; *helveticata* and *arceuthata* are identical, and *virgaureata* = *pernotata*, var.: Ent. ix. pp. 8–10. *Eupithecia* larvæ in Ireland; H. H. Crewe, Ent. ix. p. 260. *E. callunaria* is only a northern var. of *satyrata*; id. *l. c.* p. 205. *E. tamarisciata*, Freyer, new to Switzerland; Wullschlegel, MT. schw. ent. Ges. iv. p. 450. *E. oxydata* and *subfulvata* are identical; F. B. White, *l. c.* p. 266. *E. pusillata*, var. *laricis*, Spey., pp. 90 & 100; *E. indigata*, Hübn.: natural history, pp. 101–105; A. Fuchs, S. E. Z. xxxvii.

*Cidaria populata*. Larva described; G. T. Porritt, Ent. ix. p. 13.

*New genera and species :—*

*Chloraspilates*, A. S. Packard, Monograph, p. 211. Allied to *Aspilates*; type, *C. bicoloraria*, sp. n., p. 212, pl. xiii. fig. 40, Texas.

*Stenaspilates*, id. *l. c.* p. 212. Allied to last; type, *S. meskaria*, sp. n., p. 213, pl. xiii. fig. 50, Texas.

*Lozofidonia*, id. *l. c.* p. 223, pl. ii. fig. 8 (neuration). Allied to *Fidonia*, &c.; type, *F. acidaliata*, Pack.

*Eufidonia*, id. *l. c.* p. 225, pl. ii. fig. 9 (neuration). Allied to last; type, *Tephrosia notataria*, Walk.

*Dasyfidonia*, id. *l. c.* p. 233, pl. ii. fig. 13 (neuration). Allied to *Ematurga*; type, *Fidonia avunculuria*, Guén.

*Orthofidonia*, id. *l. c.* p. 235, pl. ii. fig. 14 (neuration). Allied to *Fidonia* and *Selidosema*; type, *Larentia ? exornata*, Walk.

*Eufitchia*, id. *l. c.* p. 247, pl. iii. fig. 1 (neuration). Allied to *Thamnonoma*; type, *Abraxas ? ribearia*, Fitch.

*Marmopteryx*, id. *l. c.* p 259. Allied to *Thamnonoma*; type, *M. tessellata*, Pack.

*Caterva*, A. R. Grote, Canad. Ent. viii. p. 205. Allied to *Zerene*; type, *Phalana catenaria*, Dru.

*Eudeilinia*, A. S. Packard, *l. c.* p. 303, pl. iii. fig. 9 (neuration). Allied to *Deilinia*; type, *Corycia herminiata*, Guén.

*Gueneria* [named after Guénée], id. *l. c.* p. 307, pl. iii. fig. 11 (neuration). Allied to *Deilinia*; type, *Ellopia basiaria*, Walk.

*Callizzia*, id. *l. c.* p. 314. Allied to *Calledapteryx*; type, *C. amorata*, sp. n., pl. x. fig. 33, Canada, New York.

*Ceratodalia*, id. *l. c.* p. 322, pl. iv. fig. 1 (neuration). Allied to *Acidalia*; type, *C. gueneata*, sp. n., p. 323, pl. x. fig. 40, Vancouver's Island and California.

*Anaplodes*, id. *l. c.* p. 392. Allied to *Aplodes*; type, *A. pistaciaria*, sp. n., p. 392, pl. xiii. fig. 58, California.

*Paleacrita*, C. V. Riley, Rep. Ins. Mo. viii. p. 17. Allied to *Hybernia*; type, *Anisopteryx vernata*, Peck [see also *suprà*, p. 180].

*Antepione*, A. S. Packard, *l. c.* p. 483, pl. ii. fig. 16 (neuration). Allied

to *Sicya* and *Heterolocha*; types, *Epione depontanata* and *Heterolocha sulphuraria*, Pack.

*Eurymene rosaria*, A. R. Grote, Bull. Buff. Soc. iii. p. 131; Canad. Ent. viii. p. 111, Buffalo.

*Ellopia walkeri*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 120, Transvaal.

*Selenis monotropa*, A. R. Grote, Canad. Ent. viii. p. 207, Bastrop Co.

*Endropia pilosaria* and *apiciaria*, A. S. Packard, *l. c.* pp. 501 & 502, pl. xii. figs. 8 & 9, United States.

*Tetracis grotearia*, id. *l. c.* p. 553, pl. xii. fig. 48, Colorado.

*Eutrapela furcifercata*, id. *l. c.* p. 559, pl. xiii. fig. 64, New York.

*Plagodes kentzingaria* (Grote, MS.), *id. l. c.* p. 468, pl. xi. fig. 44, pl. xiii. fig. 51, United States.

*Cymatophora polygrammaria*, id. *l. c.* p. 439, pl. xi. fig. 19, Massachusetts, New Jersey.

*Gnophos haydenata*, id. *l. c.* p. 445, pl. xi. fig. 27, Colorado.

*Stenotrachelus permagnaria* [-nus], id. *l. c.* p. 450, pl. xi. fig. 31, Missouri.

*Cleora nigro-venaria*, id. *l. c.* p. 454, pl. xi. fig. 34, Vancouver's Island.

*Tephrina acrobelia*, H. D. J. Wallengren, *l. c.* p. 122, Transvaal; *T. gastonaria*, C. Oberthur, Études Ent. i. p. 60, pl. iii. fig. 7, Algeria.

*Eucrostis zelleraria*, A. S. Packard, *l. c.* p. 370, pl. x. fig. 76, Texas.

*Nemoria gratata* (Walk., MS.), *id. l. c.* p. 373, pl. x. fig. 79, Northern States and Canada.

*Chlorosea bistriaria*, pl. xiii. fig. 55, Nevada, and *pereviridaria*, pl. x. fig. 82, California; *id. l. c.* pp. 378 & 379.

*Aplodes brunneraria*, pl. x. fig. 88, Southern States, and *rubro-marginaria*, pl. xiii. fig. 44, Canada; *id. l. c.* pp. 388 & 389.

*Semiothisa dislocaria*, id. *l. c.* p. 282, pl. ix. fig. 48, Texas.

*Macaria kirbyi*, H. D. J. Wallengren, *l. c.* p. 120, Transvaal.

*Thamnonoma guencaria*, p. 252, pl. ix. fig. 70, California, and *flavicaria*, p. 266, pl. xiii. fig. 49, Colorado, Utah; A. S. Packard, *l. c.*

*Fidonia martiniaria*, C. Oberthur, *l. c.* p. 61, pl. iv. fig. 8, Algeria.

*Lythria rilevaria* [sic], Missouri, Texas, and *snoviaria* [sic], Kansas, A. S. Packard, *l. c.* pp. 221 & 222, pl. ix. figs. 43 & 42.

*Selidosema olivierata*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. cix., Portugal.

*Phasiane nubiculata*, p. 267, pl. xiii. fig. 45, Colorado, Wyoming, and *irrorata*, p. 273, pl. x. fig. 7, California; A. S. Packard, *l. c.*

*Deilinia pacificaria*, id. *l. c.* p. 307, pl. x., fig. 28, Vancouver's Island.

*Evacidalia floridata*, id. *l. c.* p. 319, pl. x., fig. 36, Texas.

*Eois gemmata*, fig. 37, Texas, and *ferrugata*, fig. 39, United States; *id. l. c.* pp. 320 & 321, pl. x.

*Asthena brunneifasciata*, id. *l. c.* p. 325, pl. x. fig. 42, Vancouver's Island.

*Acidalia producta*, p. 334, fig. 51, Philadelphia, *albo-costaliata*, p. 336, fig. 53, Alabama, *rotundo-pennata*, p. 337, fig. 55, Maine, and *quadrilineata*, p. 345, fig. 64, Northern States, *id. l. c.* pl. x.; *A. mutilata, determinata*, and *luteo-strigata*, O. Staudinger, S. E. Z. xxxvii. pp. 140–142, Sicily; *A. reynaldiata*, G. Ronast, Pet. Nouv. 1876, p. 1, Lyons (= *asellaria*, Herr.

to *Sicya* and *Heterolocha*; types, *Epione depontanata* and *Heterolocha sulphuraria*, Pack.

*Eurymene rosaria*, A. R. Grote, Bull. Buff. Soc. iii. p. 131; Canad. Ent. viii. p. 111, Buffalo.

*Ellopia walkeri*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 120, Transvaal.

*Selenis monotropa*, A. R. Grote, Canad. Ent. viii. p. 207, Bastrop Co.

*Endropia pilosaria* and *apiciaria*, A. S. Packard, *l. c.* pp. 501 & 502, pl. xii. figs. 8 & 9, United States.

*Tetracis grotearia*, id. *l. c.* p. 553, pl. xii. fig. 48, Colorado.

*Eutrapela furciferata*, id. *l. c.* p. 559, pl. xiii. fig. 64, New York.

*Plagodes kentzingaria* (Grote, MS.), *id. l. c.* p. 468, pl. xi. fig. 44, pl. xiii. fig. 51, United States.

*Cymatophora polygrammaria*, id. *l. c.* p. 439, pl. xi. fig. 19, Massachusetts, New Jersey.

*Gnophos haydenata*, id. *l. c.* p. 445, pl. xi. fig. 27, Colorado.

*Stenotrachelus permagnaria* [*-nus*], id. *l. c.* p. 450, pl. xi. fig. 31, Missouri.

*Cleora nigro-venaria*, id. *l. c.* p. 454, pl. xi. fig. 34, Vancouver's Island.

*Tephrina acrobelia*, H. D. J. Wallengren, *l. c.* p. 122, Transvaal; *T. gastonaria*, C. Oberthur, Études Ent. i. p. 60, pl. iii. fig. 7, Algeria.

*Eucrostis zelleraria*, A. S. Packard, *l. c.* p. 370, pl. x. fig. 76, Texas.

*Nemoria gratata* (Walk., MS.), *id. l. c.* p. 373, pl. x. fig. 79, Northern States and Canada.

*Chlorosea bisteiaria*, pl. xiii. fig. 55, Nevada, and *perviridaria*, pl. x. fig. 82, California; *id. l. c.* pp. 378 & 379.

*Aplodes brunneraria*, pl. x. fig. 88, Southern States, and *rubro-marginaria*, pl. xiii. fig. 44, Canada; *id. l. c.* pp. 388 & 389.

*Semiothisa dislocaria*, id. *l. c.* p. 282, pl. ix. fig. 48, Texas.

*Macaria kirbyi*, H. D. J. Wallengren, *l. c.* p. 120, Transvaal.

*Thamnonoma guencaria*, p. 252, pl. ix. fig. 70, California, and *flavicaria*, p. 266, pl. xiii. fig. 49, Colorado, Utah; A. S. Packard, *l. c.*

*Fidonia martiniaria*, C. Oberthur, *l. c.* p. 61, pl. iv. fig. 8, Algeria.

*Lythria vilevaria* [sic], Missouri, Texas, and *snoviaria* [sic], Kansas, A. S. Packard, *l. c.* pp. 221 & 222, pl. ix. figs. 43 & 42.

*Selidosema olivierata*, P. Mabille, Bull. Soc. Ent. Fr. (5) vi. p. cix., Portugal.

*Phasiane nubiculata*, p. 267, pl. xiii. fig. 45, Colorado, Wyoming, and *irrorata*, p. 273, pl. x. fig. 7, California; A. S. Packard, *l. c.*

*Deilinia pacificaria*, id. *l. c.* p. 307, pl. x., fig. 28, Vancouver's Island.

*Evacidalia floridata*, id. *l. c.* p. 319, pl. x., fig. 36, Texas.

*Eois gemmata*, fig. 37, Texas, and *ferrugata*, fig. 39, United States; *id. l. c.* pp. 320 & 321, pl. x.

*Asthena brunneifasciata*, id. *l. c.* p. 325, pl. x. fig. 42, Vancouver's Island.

*Acidalia productata*, p. 334, fig. 51, Philadelphia, *albo-costaliata*, p. 336, fig. 53, Alabama, *rotundo-pennata*, p. 337, fig. 55, Maine, and *quadrilineata*, p. 345, fig. 64, Northern States, *id. l. c.* pl. x.; *A. mutilata*, *determinata*, and *luteo-strigata*, O. Staudinger, S. E. Z. xxxvii. pp. 140–142, Sicily; *A. reynaldiata*, G. Rouast, Pet. Nouv. 1876, p. 1, Lyons (= *asellaria*, Herr.

Schäff., of which *abyssamata*, Staud., is probably only a local race; O. Staudinger, *op. cit.* p. 13).

*Lomaspilis batesi*, H. D. J. Wallengren, *l. c.* p. 119, Transvaal.

*Eupithecia albicapitata*, p. 48, pl. viii. fig. 1, Canada, Maine, *zygadeniata*, p. 51, pl. ix. fig. 7, Texas, *longipalpata*, p. 56, pl. ix. fig. 6, and *behrensata*, p. 59, pl. ix., fig. 5, California, *ravocostaliata*, p. 60, pl. viii. fig. 9, Maine, A. S. Packard, *l. c.*; *E. faltunaria*, C. Oberthur, *l. c.* p. 63, pl. iv. fig. 9, Algeria; *E. quercifoliata*, A. B. Haas, Nat. Tids. (3) ix. p. 514, Denmark.

*Ochyria gueneeata*, p. 141, pl. viii. fig. 60, and *lacteata*, p. 143, pl. ix. fig. 2; A. S. Packard, *l. c.*, California.

*Lobophora inequaliata*, id. *l. c.* p. 180, pl. ix. fig. 20, Long Island.

*Heterophelps harveiata* [? *harveyi*], id. *l. c.* p. 193, pl. ix. fig. 27, United States.

*Tornos approximaria*, id. *l. c.* p. 215, pl. ix. fig. 40, Kentucky.

## Pyralidæ.

P. C. T. Snellen enumerates the *Pyralidæ* (85 species) taken by Von Nolcken in New Granada, St. Thomas, and Jamaica, and describes and figures the new species; Tijdschr. Ent. xix. pp. 187–264, pls. xi.–xix.

Notes on 20 S. American *Pyralidæ*, with descriptions of some new species; C. Berg, S. E. Z. xxxvii. pp. 342–355.

*Salbia*, Guén., recharacterised; P. C. T. Snellen, *l. c.* pp. 212 & 213.

*Spilomela*, Guén. Characters revised: *id. l. c.* pp. 255 & 256.

*Melanomma auricinctaria*, Grote, belongs to the *Pyralidæ*, and is perhaps allied to *Cryptocosma*, Led.; A. R. Grote, Canad. Ent. viii. p. 28.

*Rhodaria pudicalis*, Dup., figured by C. Oberthur, Etudes Ent. i. pl. iii. fig. 8.

*Agrotera nemoralis*. Transformations described; J. Hellins, Ent. M. M. xii. pp. 232 & 233; also W. H. Tugwell, Ent. ix. pp. 179 & 180, and C. Lafaury, Ann. Soc Ent. Fr. (5) vi. p. 423.

*Ebulea stachydalis* and *sambucalis*. Their larvæ described and compared; W. Buckler, Ent. M. M. xiii. pp. 133–136.

*Oligostigma*, Guén., is discussed by P. C. T. Snellen, *l. c.* pp. 186–209, pl. 8 & 9. Guénée's species, *O. colonialis*, pp. 191 & 198, pl. viii. fig. 3A–D, *crassicornalis* (♀ = *javanalis*, Guén.), pp. 194 & 203, pl. ix. fig. 8A–C, and *gibbosalis*, pp. 196 & 207, pl. ix. fig. 12A–D, are redescribed and figured, and 9 new species characterised.

*Hydrocampa nymphæalis*. On the larva and its habits, with additional notes taken from Réaumur; W. Buckler, *l. c.* xii. pp. 210–215.

*Acentropus niveus*, Oliv. Habits, bibliography, &c.; C. Ritsema, Tijdschr. Ent. xix. pp. xcviii.–c., 1–22; transl. J. W. May, Ent. M. M. xii. pp. 257 & 258. J. W. Dunning still maintains that there is only one species; P. E. Soc. 1876, pp. xxxii.–xxxiv.

*Eurycreon sticticalis*, Linn., taken in Illinois, does not differ from European specimens; A. R. Grote, *l. c.*, p. 157.

*Phacellura*, Guild. P. C. T. Snellen (*l. c.* pp. 224–230) gives a table of the known species. *P. capensis*, Zell., perhaps = *P. indica*, Saund. *P. fumosalis*, Guén., is figured; pl. xiii. fig. 9.

*Pilocrocis amissalis*, Guén. (= *ramentalis*, Led.), discussed by C. Berg, *l. c.* p. 351.

*Botys ferrugalis*, Hübn. Larva described by C. Lafaury, *l. c.* p. 424. *B. lancealis*: transformations described; W. Buckler, *l. c.* xii. pp. 277–279. *B. terrealis*: larva described; G. T. Porritt, Ent. M. M. xii. pp. 209 & 210. *B. pharopteralis*, Guén. (= *plebcialis*, Led.), redescribed by C. Berg, *l. c.* p. 347. *B. trinalis*, W. V., var. *bornicensis* from Nassau characterised; A. Fuchs, S. E. Z. xxxvii. pp. 105 & 106. *B. syphaxalis*, Walk., perhaps = *B. taculolalis*, Guén., p. 194; *B. laticalis*, Led., ♀ noticed and figured, p. 202, pl. xi. fig. 12; P. C. T. Snellen, *l. c.*

*Acrospila gastralis*, Guén. & Led., = *Eulepte concordalis*, Hübn.; *id. l. c.* p. 222.

*Ebulea crocealis*. Larva described; G. T. Porritt, Ent ix. p. 88.

*Spilodes palealis*, var. *algiralis*, All., is probably a distinct species; C. Oberthur, Etudes Ent. i. p. 68.

*Scopula decrepitalis* is perhaps double-brooded; W. Hambrough, Ent. ix. p. 265.

*Nomophila noctuella*. Specimens from Bogota are generally larger than those from Europe or N. America; P. C. T. Snellen, *l. c.* p. 211.

*New genera and species*:—

*Salbiomorpha*, Snellen, Tijdschr. Ent. xix. p. 216. Allied to *Salbia*; type, *S.* [illegible] n., *l. c.* p. 217, pl. xii. figs. 11 & 12, Anolaima ?.

*Hileithia*, [illegible] Allied to the last; type, *H. appialis*, sp. n., *l. c.* p. 219, pl. [illegible] & 14, Anolaima ?.

*Prenesta*, id. *l. c.* p. 219. Allied to *Botiides*; types, *P. fabialis*, figs. 15 & 16, and *suniasis*, figs. 17 & 18, pp. 220 & 221, pl. xii., Rio Magdalena, spp. nn.

*Nolckenia*, id *l. c.* p. 222. Allied to *Margarodes* and *Phakellura*; type, *N. margaritalis*, sp. n., *l. c.* p. 224, pl. xiii. figs. 2 & 3, Pandi.

*Sestia*, id. *l. c.* p. 235. Allied to *Phacellura*; type, *S. deosalis*, sp. n., p. 236, pl. xiii. figs. 10 & 11, locality unknown (*Phacellura marianalis*, H. S., from Cuba, belongs to this genus).

*Psara*, id. *l. c.* p. 239. Affinities not stated; type, *P. pallicaudalis*, sp. n., p. 240, pl. xiii. figs. 13 & 14, locality unknown.

*Steniodes*, id. *l. c.* p. 244. Allied to *Ceratoclasis*; type, *S. lutealis*, sp. n., *l. c.* p. 245, pl. xiii. figs. 17 & 18, Ubaque.

*Ledereria*, id *l. c.* p. 256 [preoccupied in *Noctuidæ* by Grote, 1874]. Allied to *Spilomela*; to include *perspicalis*, Led., *diphtheralis*, Hübn., *hebræalis* and *striginalis*, Guén., *argentalis*, Cram., *ovulalis*, Guén., *phenice*, Cram., and *platinalis*, Guén.; also *L. stolckenialis*, Rio Magdalena, and *seppalis*, Anolaima ?, pp. 257 & 258, pl. xiv. figs. 11 & 12, spp. nn.

*Mochlocera* (Zell., MS.), A. R. Grote, Canad. Ent. viii. p. 157. Allied to *Tetralopha*, Zell.; type, *M. zelleri*, sp. n., *l. c.*, Texas, Missouri.

*Odontia exoticalis*, P. C. T. Snellen, *l. c.* p. 191, pl. xi. fig. 3, Anolaima ?

*Pyralis secretalis*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 122, Transvaal.

*Cindaphia impuralis*, P. C. T. Snellen, *l. c.* p. 254, pl. xiv. fig. 10, Cundai and Anolaima ?.

*Lepyrodes piabilis*, H. D. J. Wallengren, *l. c.* p. 124, Transvaal.

*Asopia graafialis*, P. C. T. Snellen, *l. c.* p. 189, pl. xi. fig. 1, Cucqueta.

*Aporodes arbutalis*, id. *l. c.* p. 190, pl. xi. fig. 2, Pandi.

*Oligostigma bilinealis*, p. 196, fig. 1 A–C, Punjaub, *unilinealis*, p. 197, fig. 2 A, B, Java, *hamalis*, p. 199, fig. 4 A–C, Punjaub, *aureolalis*, p. 200, fig. 5 A–C, and *simplicialis*, p. 201, fig. 6, Java, *latifascialis*, p. 202, fig. 7 A, B, Celebes, pl. viii., *tripunctalis* and *nectalis*, Java, and *sejunctalis*, Punjaub, pp. 205–207, pl. ix. figs. 9 A, B, 10, 11 A–C : *id. l. c.*

*Hydrocampa ekthlipsis* [*ecth-*], A. R. Grote, *l. c.* p. 111, Albany, N. Y., and Canada.

*Paraponyx guenealis*, Anolaima ?, *distinctalis*, Rio Magdalena, and *hydrothionalis*, Cundai and Anolaima ? P. C. T. Snellen, *l. c.* pp. 260–262, pl. xiv. figs. 13–15 ; *P. indomitalis*, p. 352, Uruguay, and *effrenatalis*, p. 354, Cordova, C. Berg, S. E. Z. xxxvii.

*Botis amiculatalis*, p. 343, Buenos Ayres, and *suavidalis*, p. 345, Rio Janeiro, *id.* l. c. ; *B. vicarialis*, p. 194, fig. 4, *polygamalis*, p. 195, figs. 5 and *communalis*, p. 196, fig. 7, Bogota, Ubaque, *grisealis*, fig. 8, ma ?, *graphitalis*, fig. 9, Barranquilla, *acutalis*, fig. 10, Rio Magda- utangulalis, fig. 11, Anolaima ?, *incalis*, fig. 13, Rio Magdalena, 198–202, pl. xi., *claudialis*, p. 204, pl. xi. fig. 14, *samealis*, p. 205, pl. xi. fig. 15, and *variegalis*, p. 207, pl. xii. figs. 1 & 2, Anolaima, P. C. T. Snellen, l. c. *B. sexmaculalis* (= *Orobena octonalis*, Zell., *cf.* p. 156), and *penitalis*, p. 98, Kansas, *erectalis*, Albany, and *communis*, United States, p. 99, and *submedialis*, p. 111, Canada ; A. R. Grote, *l. c.*

*Zophodia dentata*, id. *l. c.* p. 158, Colorado.

*Emprepes novalis*, id. *l. c.* p. 156, Texas.

*Eurycreon asopialis*, p. 209, pl. xii. fig. 3, Rio Magdalena, and *fuscocilialis*, p. 210, pl. xiii. fig. 1, Anolaima ?, Chiriqui ; P. C. T. Snellen, *l. c.*

*Salbia deformalis*, p. 214, figs. 4–6, Rio Magdalena, *abnormalis*, figs. 7 & 8, and *cognatalis*, figs. 9 & 10, Anolaima ?, p. 215, *id. l. c.* pl. xii.

*Margarodes spurcalis*, id. *l. c.* p. 224, pl. xiii. fig. 4, Rio Magdalena.

*Phacellura fuscicollis*, p. 226, South America, *auricollis*, p. 226 & 231, fig. 5, locality unknown, *satanalis*, p. 231, fig. 6, and *guenealis*, p. 233, Rio Magdalena, *gigantalis*, p. 234, figs. 7 & 8, Cundai, *id. l. c.* pl. xiii.

*Syllepis latifascialis*, id. *l. c.* p. 238, pl. xiii. fig. 12, locality unknown.

*Megastes pusialis*, id. *l. c.* p. 241, pl. xiii. fig. 15, Rio Magdalena.

*Metasia deltoidalis*, id. *l. c.* p. 243, pl. xiii. fig. 16, Bogota.

*Blepharomastix vestalialis*, id. *l. c.* p. 245, pl. xiv. fig. 1, Barro Blanco.

*Ceratoclassis tenebralis*, figs. 2 & 3, Rio Magdalena, and *rooalis*, fig. 4, Anolaima ?, *id. l. c.* p. 246 & 247, pl. xiv.

*Scopula concoloralis*, C. Oberthur, Études Ent. i. p. 68, pl. ii. fig. 6, Algeria.

## Crambidæ.

*naturiella*, W. V., recorded from Colorado ; A. R. Grote, Surv. ii. p. 120.

*Galleria mellonella*: its ravages in beehives; H. Putze & E. Winter, Verh. Ver. Hamb. ii. pp. 241–243.

*Crambus tristellus*: natural history. It may be destructive to grass lands when it abounds. W. Buckler, Ent. M. M. xiii. pp. 14 & 15.

*New species* :—

*Scoparia seriziatalis*, C. Oberthur, Etudes Ent. i. p. 69, pl. iv. fig. 10, Algeria.

*Melissoblaptes murinus*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 127, Transvaal.

*Hypenodes kalchbergi*, O. Staudinger, S. E. Z. xxxvii. p. 139, Sicily.

*Nephopteryx maculata*, id. *l. c.* p. 143, Sicily.

*Acrobasis* (?) *singularis*, id. *l. c.* p. 144, Sicily.

*Pempelia spartiella*, p. 19, fig. 1, and *palumbiella* (? = *gallicola*, Staud., var.), p. 20, fig. 2: C. Rondani, Bull. Ent. Ital. viii. pl. i., Italy.

*Ancylolomia mirabilis*, H. D. J. Wallengren, *l. c.* p. 125, Transvaal.

*Crambus palustrellus*, E. L. Ragonot, Bull. Soc. Ent. Fr. (5) vi. p. lxxviii., Landes; *C. heliocaustus*, H. D. J. Wallengren, *l. c.* p. 126, Transvaal.

*Chilo recalcus*, id. *ibid.*, Transvaal.

## Tortricidæ.

The external structure of the *Tortrices* is discussed with great detail by H. de Peyerimhoff, Ann. Soc. Ent. Fr. (5) vi. pp. 523–590, pls. x.–xii. The paper includes general observations on their classification, habits, transformations, &c.

E. L. Ragonot figures and redescribes his *Teras pyrivorana* (vel *malivorana*), p. 401, *Tortrix lafauryana*, p. 403, *Lophoderus* (*Tort.*) *mabilliana* and ab. *pistaciana*, p. 405, and *Grapholitha adenocarpi*, p. 406, *tom. cit.* pls. vi. figs. 1–4.

C. Lafaury describes the larvæ of *Tortrix lafauryana*, Rag., p. 404, *Grapholitha adenocarpi*, Rag., p. 407, *Teras mixtana*, Hübn., p. 424, *Aphelia venosana*, Zell., p. 425, *Graph. aspidiscana*, Hübn., p. 426, and *micaceana*, Const., and *Phoxopteryx curvana*, Herr. Schäff., p. 427, *op. cit.*

On the *Tortrices* of Pembrokeshire; C. G. Barrett, Ent. M. M. xii. pp. 230–232.

G. Brischke (S. E. Z. xxxvii. pp. 68 & 69) notices the larvæ of *Lobesia permixtana*, *Sciaphila virgaureana*, and *Grapholitha servillana*.

*Eupœcilia hybridella*, Hübn.: note on larva; C. G. Barrett, *l. c.* xiii. p. 159.

*Stigmonota dorsana*, Fabr., and *orobana*, Tr., discussed, *id. l. c.* pp. 158 & 159.

*Carpocapsa grossana*, Haw., figured in all stages and transformations described; "D. G.," Tijdschr. Ent. xix. pp. 54 & 55, pl. ii. figs. A–F.

*Carpocapsa pomonella* found feeding on oak-galls [?]; E. L. R[illegible], Bull. Soc. Ent. Fr. (5) vi. p. lxxxv.

*Phthoroblastis juliana*, Curt., noticed, and De Roo Va[illegible] description of the larva copied; "D. G.," *l. c.* pp. 56 & 5[illegible]

*Grapholitha bicinctana* Dup. (= *lugdunana*, Guén.) is distinct from *artemisiana*, Zell.; E. L. Ragonot, *l. c.* pp. lxxxiii.–lxxxv. *G. opulentana*, H. S., feeds, near Cannes, on *Juniperus oxycedrus*; Millière & Peyerimhoff, *tom. cit.*, pp. cviii. & cix.

*Grapholitha obscurana*, sp. n., E. L. Ragonot, *l. c.* p. lxv., Fontainebleau.

*Conchylis argentifurcatana* and *hipeana*, A. R. Grote, Canad. Ent. viii. pp. 206 & 207, Ontario, spp. nn.

## Tineidæ.

The concluding volume of H. von Heinemann's work on German *Lepidoptera* (Die Schmetterlinge Deutschlands und der Schweiz systematisch bearbeitet, nebst analytischen Tabellen zum Bestimmen der Schmetterlinge. 2te Abth. Kleinschmetterlinge. Band ii. Die Motten und Federmotten. Heft ii. von H. v. Heinemann und M. F. Wocke. Braunschweig: 1877, 8vo, pp. vi., 389–825, 1–102), though bearing date 1877, was published not later than November, 1876. It has been completed with the assistance of the late author's MSS., by M. F. Wocke. As the first part of the work was published in 1859, and the preceding part of the present volume in 1870, a large number of additions and corrections have accumulated, which Wocke proposes to issue as a supplementary volume. The present volume contains the *Tineina* from *Endrosis* to *Nepticula*, the smaller groups which conclude the *Lepidoptera*, and analytical tables of the *Choreutina*, *Atychina*, *Tineina*, *Micropterygina*, *Pterophorina*, and *Alucitina*.

E. L. Ragonot figures, and in most cases redescribes, *Nothris declaratella*, Staud., p. 408, and his own *Symmoca nigro-maculella*, p. 410, *Œcophora fourdheuillella*, p. 412, *Lithocolletis geniculella*, *pseudo-plataniella*, *alnivorella*, p. 414, *caudiferella*, p. 415, and *parvifoliella*, p. 417: Ann. Soc. Ent. Fr. (5) vi. pl. vi. figs. 5–12. The larvæ of several of these species are described either by Ragonot or Lafaury.

Short notes on various *Tineina*: id. *tom. cit.* Bull., pp. cliii.–clv. Notes on *Tineina* observed in 1876; J. E. Fletcher. Ent. M. M. xiii. p. 165.

G. Brischke (S. E. Z. xxxvii. pp. 69 & 70), notices the larvæ of *Cleodora tanacetella*, *Schreckensteinia festaliella*, *Gelechia conligenella*, *rhombella* (?), and *mulinella* (?).

V. T. Chambers corrects various misprints in his papers on American *Tineina*; Canad. Ent. viii. p. 19.

31 Texan *Tineina*, mostly new, noticed by H. Frey & J. Boll, S. E. Z. xxxvii. pp. 209–228.

*Œnophila v-flava*, Haw., *Dysmasia nigripunctella*, Haw., *D. parietariella*, Bruand, and *Cryptilum klugi*, Zell., noticed, with figures of heads; P. C. T. Snellen, Tijdschr. Ent. xix. pp. 51–53. pl. ii. figs. 1–6.

*Anesychia bipunctella*, Fabr. (= *echiella*, Hübn.), a reputed British species, has occurred in Kent; C. G. Barrett, Ent. M. M. xiii. p. 165.

*Xysmatodoma melanella* and *Solenobia pomonæ*: on their supposed identity; G. Harding, *op. cit.* xii. pp. 208 & 209.

*Solenobia triquetrella*, F. v. R.; Snellen von Vollenhoven, Tijdschr. Ent. xix. p. xli.

*Cryptoblabes bistriga*, transformations; W. Buckler, Ent. M. M. xiii. p. 111.

*Tinea angustipennis*, Herr. Schäff., new to Britain, has occurred in England; H. T. Stainton, Ent. M. M. xiii. pp. 143 & 144; *cf.* also T. Sorrell, Ent. ix. p. 159. *T. lucidella*, Walk., = *gigantella*, Stainton; H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 128.

*Semele*. V. T. Chambers (*l. c.* p. 105) refers his *Tinea argentistrigella* to this genus.

*Pronuba yuccasella*, Riley. J. Boll gives his observations on the habits of this species, but doubts if *Yucca* or any other plant is fertilised exclusively by insect agency; S. E. Z. xxxvii. pp. 401–405. C. V. Riley replies to Zeller's remarks on this species; Tr. Ac. St. Louis, iii. pp. 325 & 326.

*Hemerosia rhediella*, habits of larva; H. T. Stainton, *op. cit.* xii. p. 253.

*Zelleria insignipennella* and *hepariella* are only doubtfully distinct: *id. op. cit.* xiii. p. 1.

*Gelechia humeralis*, id. *l. c.* pp. 38 & 39; *G.* (*Doryphora*) *morosa*, Mühl., has occurred in England, *id. l. c.* p. 144.

[*Embryonopsis halticella*, Eaton.] Habits; H. N. Mosely, J. L. S. xii. p. 578.

*Diplodoma marginepunctella*, Steph., new to Holland; P. C. T. Snellen, *l. c.* p. li.

*Depressaria purpurea*, Haw.: larva described; C. Lafaury, Ann. Soc. Ent. Fr. (5) vi. p. 428.

*Hyponomeuta*: short notes on various French species; *tom. cit.* Bull. pp. cxxxii., cxxxiii., & cliii.

*Anaphora agrotipennella*, Grote: transformations; M. E. Murtfeldt, Canad. Ent. viii. pp. 185 & 186.

*Chrysocorys erythriella*, Clem. (?), or sp. n. (?) described by Frey & Boll, *l. c.* p. 214.

*Coleophora nutantella*, Mühl.: habits and transformations described by A. Guénée, Ann. Soc. Ent. Fr. (5) vi. pp. 505–508. The larvæ commences life by feeding within the capsules of *Silene nutans*, like that of a *Dianthœcia*, and subsequently becomes a case-bearer.

*Elachista pollutella*, H. S., new to Switzerland; R. C. R. Jordan, Ent. M. M. xiii. p. 61.

*Lithocolletis abrosiæella*, Chamb., and *desmodiella*, Clem., redescribed by Frey & Boll, *l. c.* pp. 221 & 227. *L. acaciella*, H. S., *nec* Zell., is renamed *L. dubiosella*; M. F. Wocke, *l. c.* p. 677.

*New families, genera, and species*:—

*Chauliodidæ*, H. v. Heinemann, Schmett. Deutschl. (2) ii. p. 401. Placed between the *Glyphipterygidæ* and *Lacernidæ*, to include the genera *Heydenia*, *Æchmia*, *Chauliodus*, *Ochromolopis*, and *Schreckensteinia*.

*Butalidæ*, id. *l. c.* p. 436. Placed between the *Lacernidæ* and *Elachistidæ*; to include *Amphisbatis* and *Butalis*.

*Douglasi*[*i*]*dæ*, id. *l. c.* p. 510. To include *Tinagma* and *Douglasia*. This and the five following small families are placed between the *Elachistidæ* and *Coleophoridæ*.

*Heliozelidæ*, id. *l. c.* p. 514. To include *Antispila* and *Heliozela*.

*Heliodinidæ*, id. *l. c.* p. 518. To include *Heliodines*.

*Cosmopterygidæ*, id. *l. c.* p. 520. To include *Cosmopteryx*.

*Batrachedr[id]æ*, id. *l. c.* p. 524. To include *Batrachedra*.

*Augasm[at]idæ*, id. *l. c.* p. 526. To include *Augasma*.

*Ascalenia*, M. F. Wocke, in V. Heinemann's Schmett. Deutschl. (2) ii. p. 421. Between *Limnœcia* and *Mompha*; type, *Laverna vanella*, Frey.

*Heinemannia*, id. *l. c.* p. 427; types, *Tinea laspeyrella*, Hübn., and *T. festivella*, W. V.

*Blastodacna*, id. *l. c.* p. 429; types, *Laverna hellerella*, Dup., and *L. vinulentella*, Herr. Schäff. This genus and the preceding are placed between *Stathmopoda* and *Tebenna*.

*Ripismia*, id. *l. c.* p. 399. Allied to *Glyphipteryx*, but externally resembling *Grapholitha*; type, *Choreutes dolosana*, Herr. Schäff.

*Lithariapteryx*, V. T. Chambers, Canad. Ent. viii. p. 217. Allied to *Glyphipteryx*, &c.; type, *L. abroniæella*, sp. n., *l. c.*, Colorado.

*Atachia*, M. F. Wocke, *l. c.* p. 464; type, *Symmoca pigerella*, Herr. Schäff., placed at the head of the *Elachistidæ*, before *Perittia*.

*Scirtopoda*, id. *l. c.* p. 465; types, *Tinagma herrichiella*, Herr. Schäff., and *T. saltatricella*, F. v. Rössl.; between *Perittia* and *Elachista*.

*Hofmannia*, H. v. Heinemann & M. F. Wocke, *l. c.* p. 644. Between *Zelleria* and *Cedestis*, to contain *Z. saxifragæ* and *fasciapennella*, Staint.

*Palumbina*, g. n., C. Rondani, Bull. Ent. Ital. viii. p. 22; affinities not stated; type, *P. terebintella*, sp. n., *l. c.* p. 23, pl. i. figs. 12–14, Italy.

*Dactylota kinkerella*, g. and sp. nn., P. C. T. Snellen, Tijdschr. Ent. xix. pp. 23–27, pl. i., Holland. (*Gelechiidæ*, allied to *Doryphora*).

*Euplocamus stupens*, H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. 1, p. 127, Transvaal.

*Blabophanes pellucida*, id. *l. c.* p. 128, Transvaal.

*Cryptolechia hæresiella*, id. *ibid.*, Transvaal.

*Lecithocera anthologella*, id. *l. c.* p. 129, Transvaal.

*Tinea imitatorella*, p. 105, *croceo-verticella* and *thorace-strigella*, p. 106, V. T. Chambers, *l. c.*, Kentucky.

*Semele argentinotella*, id. *l. c.* p. 104, Kentucky.

*Adela* (*Nematois*?) *trifasciella*, and *A. fasciella*, p. 103, and *flammensella*, p. 104, *id. l. c.*

*Nemophora annulatella*, E. L. Ragonot, Bull. Soc. Ent. Fr. (5) vi. p. lxvi., Paris.

*Polyhymno fusco-strigella*, V. T. Chambers, *l. c.* p. 30, Texas.

*Gelechia clemensella*, Pennsylvania, and *saundersella*, Kentucky, *id. l. c.* p. 173; *G. cicerella*, C. Rondani, *l. c.* p. 20, pl. i. figs. 3–5, Italy.

*Lita singula* and *L.* (?) *punctata*, O. Staudinger, S. E. Z. xxxvii. pp. 145 & 146, Sicily.

*Teleia femoralis*, id. *l. c.* p. 146, Sicily.

*Anacampsis* (?) *basalis*, id. *l. c.* p. 147, Sicily.

*Mesopleps* (?) *acuminatalis*, id. *l. c.* p. 148, Sicily.

*Symmoca* (?) *pallida*, id. *l. c.* p. 149, Sicily.

*Macroceras acophila*, id. *l. c.* p. 150, Sicily.

*Glyphipteryx albimaculella* (? = *forsterella*, Fabr., var.), Brunswick,

and *majorella* (Mann., MS., = *equitella*, var., Herr. Schäff. & Frey), Switzerland; H. v. Heinemann, *l. c.* p. 397.

*Blastobasis gigantella*, V. T. Chambers, *l. c.* p. 219, Colorado.

*Butalis subseliniella*, p. 439, Œdenberg, *ericetella*, p. 444, Hanover, *speyeri*, p. 445, Gornergrat, *gracilella*, p. 452, Saxony, H. v. Heinemann, *l. c.*

*Gracilaria negundella*, V. T. Chambers, *l. c.* p. 18, Colorado, *rhoifoliella* and *inornatella*, p. 31, Kentucky, *sauzalitæella* [*sauz-*] and *behrensella*, p. 32, California, *basquella*, Texas, and *sassafrasella*, Kentucky, p. 33; *G. obscuripennella*, p. 209, *consimilella*, p. 210, *auriferella* and *interpositella*, p. 211; Frey & Boll, *l. c.* Texas. *G. pistaciella*, C. Rondani, *l. c.* p. 21, pl. i. figs. 6–10, Italy. *G. fribergensis*, Fritsche, Isis, 1871, p. 229, Freiburg.

*Coriscium remotellum*, M. F. Wocke, *l. c.* p. 632, Vienna (? *roscipennella*, Tr. & Herr. Schäff.); *C. rhombiferellum*, Frey & Boll, *l. c.* p. 213, Texas.

*Zelleria fusca*, H. T. Stainton, Ent. M. M. xiii. p. 1, Scotland.

*Argyresthia helvetica*, H. v. Heinemann, *l. c.* p. 652, Bernena.

*Coleophora nigricornis* (Wocke), p. 534, Valais, *cornuta* (Frey, MS.), p. 539, Frankfort-on-Main, *ahenella*, p. 546, Germany, *aureipennis* (Wocke), and *æthiops* (Wocke), p. 547, Macugnaga, *salicorniæ* (Zell., MS.), p. 553, Merseburg, *niveistrigella* (Wocke), p. 564, Valais, *medicaginis* (Schmidt, MS.), p. 571, Frankfort-on-Main, *roessleri* (Wocke, = *tanaceti*, Roessl., *nec* Mühl.), *tristrigella*, p. 590, Csepregh, *betulella*, p. 583 (? = *ibipennella*, Staint.), Brunswick, *brevipalpella* (Wocke), p. 586, Breslau, *inulæ* (Wocke), p. 593, Rhenish Palatinate, *alpicola* (Wocke), p. 594, Switzerland, *graminicolella*, p. 599, Germany, *absinthii* (Wocke), p. 602, Island of Wollin, *muehligiella* (Wocke), = *gypsophilella*, Mühl., MS.), Frankfort-on-Main; H. v. Heinemann, *l. c.* *C. ocymoidella*, C. Rondani, *l. c.* p. 23, pl. i. fig. 15, Italy (? = *saponariella*, Heeg., var.). *C. nigra-lineella*, V. T. Chambers, *l. c.* p. 172, Kentucky.

*Laverna* ? (*Anybia* ?) *gleditschiæella*, id. *l. c.* p. 135, Kentucky; *L. anotheræsemenella*, p. 138, St. Louis, *bifasciella*, p. 158, California, *unifasciella*, p. 159, San Francisco; *L. plumipes*, A. G. Butler, Ann. N. H. (4) xvii. p. 409, Rodriguez.

*Elachista roesslerella* (= *nigrella*, Herr. Schäff., *nec* Haw.), p. 489, Wiesbaden, *decolorella* (Wocke), p. 491, Valais, *oppositella*, p. 492, Hanover, *monticola* (Wocke) (? = *helvetica*, Frey), p. 495, Upper Harz; H. v. Heinemann, l. c. *E. pusilla* and *texanica*, Frey & Boll, S. E. Z. xxxvii. pp. 215 & 216, Texas.

*Elachista* (?) *tristatella*, V. T. Chambers, *l. c.* p. 172, Kentucky.

*Opostega accessoriella*, Frey & Boll (? = *albo-galeriella*, Clem.), *l. c.* p. 216, Texas.

*Phyllocnistis insignis*, iid. *l. c.* p. 217, Texas.

*Lithocolletis celtidella*, C. Rondani, *l. c.* p. 22, pl. i. fig. 11 (= *millierella*, Staud.), Italy; *L. affinis*, p. 222, *solidaginis*, p. 223, *modesta* and *occitanica*, p. 224, *tenuistrigata*, p. 225, and *pusillifoliella*, p. 226, Frey & Boll, *l. c.*, Texas.

*Asychna* (?) *pulvella*, V. T. Chambers, *l. c.* p. 171, Kentucky.

*Tischeria decidua* and *heinemanni*, M. F. Wocke, *l. c.* p. 699, Germany *T. nolckeni*, Frey & Boll, *l. c.* p. 220, Texas.

*Lyonetia gracilella*, V. T. Chambers, *l. c.* p. 34, Kentucky.

*Bucculatrix angustata* and *rileyi*, iid. *l. c.* pp. 218 & 219, Texas; *B. atagina*, p. 716, Meran, and *jugicola*, p. 721, Trafoi, M. F. Wocke, *l. c.*

*Nepticula bolli*, p. 739, Switzerland, *pennicillata*, p. 744, Versfelde, *albicomella* (Wocke), p. 748, Germany, *nobilella* (Wocke), p. 755, Vienna, *angustella*, p. 756, Hanover, *carpinella*, p. 762, Germany; H. v. Heinemann, l. c. *N. dallasiana*, Frey & Boll, *l. c.* p. 228, Texas. *N. diffinis*, M. F. Wocke, Bresl. ent. Zeit. 1874, p. 100, Breslau. *N. badio-capitella*, V. T. Chambers, *l. c.* p. 160, Kentucky.

### Pterophoridæ.

*Agdistis tamariscis*, Zell., new to Switzerland; Wullschlegel, MT. schw. ent. Ges. iv. p. 451.

*Pterophorus dichrodactylus* and *microdactylus*. Transformations described; W. Buckler, Ent. M. M. xii. pp. 233–236.

*Œdematophorus constanti*, E. L. Ragonot, redescribed and figured by him; Ann. Soc. Ent. Fr. (5) vi. pp. 419–421, pl. vi. fig. 13.

### Alucitidæ.

*Alucita butleri*, sp. n., H. D. J. Wallengren, Œfv. Ak. Förh. xxxii. p. 130, Transvaal.

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# DIPTERA.

BY

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### The General Subject.

Allen, F. J., & Underhill, H. M. J. Notes on the Diptera. Sci. Goss. 1876, pp. 60–62, 103–106, 155–159, 171–175, figs. 25–31, 53–57, 85–101.

Desultory notes on British *Muscidæ*, *Asilidæ*, and *Conopidæ*, very well illustrated by drawings of microscopic structure of different parts. These are in continuation of former notes on *Tabanidæ* and *Bombyliidæ*. [See Zool. Rec. xii. pp. 471 & 472.]

Westwood, J. O. Notæ Dipterologicæ. Tr. E. Soc. 1876. No. 1, *Bombylii* at Pompeii, pp. 497–499; No. 2, Descriptions of some new

exotic species of *Tipulidæ*, pp. 501–506, pl. iii. (2 new genera also); No. 3, Descriptions of new genera and species of the family *Acroceridæ*, pp. 507–518, pls. v. & vi.; No. 4, Monograph of the genus *Systropus*, with notes on the economy of a new species of that genus, pp. 571–579, pl. x.

See *Bombyliidæ*, *Tipulidæ*, *Acroceridæ*, *Asilidæ*, and *Conopidæ* [infrà].

Wulp, F. M. Van der. Opmerkingen betreffende eenige exotische Diptera. Tijdschr. Ent. xix. pp. 170–176.

Observations on localities and affinities, &c., of *Midas concinnus*, Macq., *Leptogaster nitidus*, Macq., *Laparus princeps*, Macq., *Dysmachus suillus*, F., *Mochtherus gnavus*, V. d. W., *Eccoptopus erythrogastrus*, Löw, and *Gigamyia gigantea*, Wied.

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Luminous *Diptera*. Löw remarks that Pallas long ago observed light in *Culex*; Ent. MB. i. p. 41. [See Hagen, Biblioth. ent. ii. p. 26; also Zool. Rec. xii. p. 468.]

On dipterous gall-makers and their galls; F. G. Binnie, Tr. Glasg. Soc. F. Nat. i. pp. 154–164.

On mimetic resemblances between *Diptera* and *Hymenoptera*; C. R. Osten-Sacken, Psyche, i. p. 96.

On a supposed case of seasonable dimorphism (*Syrphidæ*); id. *l. c.* p. 113.

Larvæ in company with ants, under stones; A. Laboulbène, Bull. Soc. Ent. Fr. (5) vi. p. cxliii.

On collecting, &c.; Gobert, Feuil. Nat. vi. p. 71.

St. Petersburg. A list of species in this government not quoted by Osten-Sacken in his Catalogue; J. Portschinsky, Troudy Ent. Ross. vii. (1874). See Hor. Ent. Ross. xi. Rev. Bibliogr. p. vii.

Guadaloupe. 12 species, including 4 probably locally characteristic, recorded by C. R. Osten-Sacken, P. Bost. Soc. xviii. pp. 133 & 134.

## Cecidomyiidæ.

Bergenstamm, J. E. von, & Löw, P. Synopsis Cecidomyidarum. Verh. z.-b. Wien, xxvi. pp. 1–104.

A most conscientious and valuable contribution to the literature of economic Entomology. After some introductory observations, (1) a Catalogue is given of former publications on the subject, with full bibliographical references, and distinction of papers containing mention of the larval anatomy and metamorphosis; followed by (2) a full scientific Catalogue of the genera and described species (arranged alphabetically), also with bibliographical references, and accompanied by synonymical and other notes, especially as to the habits of the larvæ, where known. Of these, 463 are recognized, including 5 described but not named. (3) These species, 143 in number, of which the economy and larva are known, but not the perfect insects, are in like manner discussed; and the work concludes with (4) a botanical alphabetical index of the plants attacked.

*Cecidomyia brassicæ*, Winn.: a *Platygaster* bred from its larvæ; Doebner, Ent. MB. i. p. 58.

### Mycetophilidæ.

*Sciara* sp. parasitic on *Nematus* larva; P. Cameron (quoting Verrall), P. N. H. Soc. Glasg. ii. p. 298.

*Stægeria*, g. n., for *Sciophila halterata*, Stæg.; F. M. Van der Wulp, Tijdschr. Ent. xix. Verslag, p. xlix., wing figured, with postical vein not furcate.

### Bibionidæ.

*Penthetria holosericea*, Meig., new to the French Fauna, with remarks on the neuration of the genus and on fossil *Bibionidæ*; A. Giard, Bull. Soc. Nord, viii. pp. 172–178.

### Blepharoceridæ.

*Hapalothrix*, g. n., H. Löw, Deutsche E. Z. 1876, p. 210. Allied to the S. American *Paltostoma*, and forming with that genus a special group, characterized by the want of spurs to the hinder tibiæ. Only the ♂ known, of which the genitalia resemble those of *Liponeura*. Differs from *Paltostoma* in being clothed with long hairs, &c. For *H. lugubris*, sp. n., *id. l. c.* p. 212, Monte Rosa.

### Culicidæ.

*Culex*. Large numbers, of the ♀ only, appearing in a house early in spring; J. O. Westwood, P. E. Soc. 1876, p. vii.

### Tipulidæ.

*Tipula oleracea*. "A comparison of the metamorphosis of the crane-fly and the blow-fly," by A. Hammond, J. Quek. Club, 1876, pp. 139–148, pls. x. & xi. Especially refers to the pupa, and to the "imaginal discs" of Weismann, which the author does not find to represent anything essentially exceptional in the mode of development of the segments to which they belong. The tendency of the observations is to disprove the distinctive character of the development of the cephalic and thoracic segments.

*Semnotes*, g. n., J. O. Westwood, Tr. E. Soc. 1876, p. 501. No differential characters mentioned; *S. imperatoria*, pl. iii. fig. 1, Melbourne, *ducalis*, figs. 2 A, 2 B, N. Australia, spp. nn., *id. l. c.* p. 502.

*Libnotes*, g. n., *id. l. c.* p. 505. Venation entirely anomalous, no veins being furcate at apex, where they are parallel. For *L. thwaitesiana*, sp. n., *id. ibid.* pl. iii. figs. 6 A, & 6 B, Ceylon.

*Ozodicera longipedalis*, sp. n., *id. l. c.* p. 503, pl. iii. fig. 4, Australia.

*Tipula brobdignagia* [!], pl. iii. fig. 3, North China, *mikado*, Japan, spp. nn., *id. l. c.* p. 504.

*Limnobia satsuma*, sp. n., *id. l. c.* p. 504, pl. iii. figs. 5 A, 5 B, Japan.

### Xylophagidæ.

*Xylophagus cinctus*. Larva and pupa described from dead fir bark in Scotland. The larva feeds on larvæ of other insects. The larva of *X. ater* also reared from birch bark, in company with the larva of *Pyrochroa*. F. B. White; Ent. M. M. xiii. pp. 160–162.

### Tabanidæ.

C. R. Osten-Sacken, Mem. Bost. Soc. ii. (Pt. 4, No. iv.) pp. 421–479, has completed his "Prodrome of a Monograph of the Tabanidæ of the United States" [Zool. Rec. xii. p. 471] by a 2nd part, referring to the genus *Tabanus*, with appendix and index to both parts. 102 species of *Tabanus* have been described from N. America, North of Mexico, of which 34 are identified, 26 are sunk as synonyms, and 42 remain unknown. The author describes 20 species as new, and refers to others known to him but not described, from insufficient material. The importance of a knowledge of the marked sexual differences is pointed out, the coloration of the eyes discussed as a valuable diagnostic character, and the presence of a more or less distinct ocelligerous tubercle on the vertex discovered to be highly useful in definition of natural relationship. The subgenus *Therioplectes*, proposed by Zeller for the species with pubescent eyes, is limited, so far as regards N. American species, to those also possessing this tubercle more or less distinctly, the European *T. rusticus* and *fulvus* being also eliminated, and with others, forming a new subgenus, *Atylotus* (infrà). Some synonymy is suggested as to Wiedemann's, Walker's, and Macquart's species. *T. ater*, Wied., *nec* Pal. Beauv., is renamed *wiedemanni*, p. 455.

In additions to part 1 of the "Prodrome" (pp. 474 & 475), some varieties of *Chrysops pudicus*, *morosus* (? = *lugens*, Wied.), and *frigidus* are discussed. A list is also given of the 73 described *Tabanidæ* from Mexico, Central America, and the W. Indies, pp. 475–477, viz., *Pangonia*, 14 spp., *Lepidoselæga*, 2 spp., *Dichelacera*, 3 spp., *Chrysops*, 15 spp., and *Tabanus*, 39 spp.

The following new genus, subgenus, and species are characterized :—

*Diachlorus*, p. 475, = *Diabasis*, O.-S., *nec* Hoffmanns.

*Atylotus*, subg. of *Tabanus*, p. 426. Eyes pubescent, no vestige of an ocellar tubercle; frontal callosity wanting, or small and rudimentary; difference in size between the large and small facets of the eyes in the ♂ considerable, with line of division very distinct; upper branch of 3rd longitudinal vein knee-shaped at the base (emitting a stump of a vein in European species). For the European *T. fulvus* and *rusticus*, also *T. bicolor* and *reinwardti*, Wied., *T. fulvescens*, Walk., and *T. cerastes*, p. 462, Kentucky, Wisconsin.

*Tabanus fronto*, p. 431, Georgia, *tectus*, p. 436, Pennsylvania, Texas, &c., *tener*, p. 440, Georgia, Florida, *orion*, p. 442, Canada, Massachusetts, &c., *actæon*, p. 443, Canada, Minnesota, &c., *cymatophorus*, Kentucky, *venustus*, Texas and Missouri, p. 444, *psammophilus*, Florida, *nivosus*, New Jersey, p. 445, *vicax*, p. 446, Maine, &c., *longus*, p. 447, Middle States,

*sagax*, p. 452, Illinois, Minnesota, *punctifer*, p. 453, Utah, California, Colorado, *T.* (*Therioplectes*) *socius*, p. 467, Hudson's Bay Territory ("remarkably like the common European *T. tropicus*"), *illotus*, p. 469, British N. America, Minnesota, &c., *microcephalus*, p. 470, and *astutus*, p. 471, Northern States, *rhombicus*, p. 472, Colorado and British N. America.

## Acrocerid.æ.

J. O. Westwood, Tr. E. Soc. 1876, describes the following new genera and species :—

*Apsona*, p. 510. Near *Panops* and *Lasia*, but with a long bristle at the apex of the antennæ, the proboscis of moderate length, and the 2 posterior cellules pedicellated. *A. muscaria*, ibid., pl. v. fig. 2, New Zealand.

*Leucopsina*, ibid. Near *Panops*, but with prominent thoracic shoulders and pedunculate abdomen. *L. odyneroides*, ibid., pl. v. fig. 3, Australia.

*Megalybus*, p. 511. Next *Philopota*, with subquadrate thorax, which is dorsally more gibbous, and constricted abdominal segments. Also approaches *Systropus*. *M. pictus*, p. 511, pl. v. fig. 4, *tristis*, *gracilis*, fig. 5, and *subcylindricus*, p. 512, Chili.

*Pialeoidea*, p. 514. Next *Pialea*, but with the antennæ inserted near each other on a tubercle before and near the eyes, and the median longitudinal vein reaching the posterior margin. For *Cyrtus magnus*, Walker, pl. vi. fig. 3.

*Nothra*, ibid. Neuration as in *Pterodontia*, but the costa not spurred, and outer discoidal cell with a short appendage. *N. bicolor*, p. 515, pl. vi. fig. 4, Australia.

*Panops lamarckianus*, p. 508, pl. v. fig. 1, Moreton Bay, Australia.

*Lasia ænea*, *æneiventris*, *nigripes*, and *bicolor*, p. 509, Chili.

*Pterodontia dimidiata*, p. 513, pl. vi. fig. 1, Columbia.

*Pialea ? lutescens*, ibid., fig. 2, Brazil.

*Astomella apiformis*, fig. 5, *bombiformis*, fig. 6, p. 515, pl. vi., S. Europe.

*Oncodes darwini* and *fortnumi*, Adelaide, *tasmannica*, Tasmania, and *ignava*, Australia, p. 516.

## Bombyliid.æ.

*Bombylius medius* observed in large numbers at Pompeii, evidently parasitic upon a large species of *Andrena* ; with notes on former account of the economy of the genus. J. O. Westwood, Tr. E. Soc. 1876, pp. 497–499.

*Bombylius* parasitic on *Colletes fodiens*; Schmidt-Goebel, S. E. Z. xxxvii. p. 392 [recorded among "Coleopterologische Kleinigkeiten"].

*Paranthrax*, g. n., J. M. F. Bigot, Bull. Soc. Ent. Fr. (5) vi. p. lxvi. Near *Anthrax* and *Argyromœba*. For *An. rufiventris*, Blanch.

*Eclimus* (generic characters amended, and the rendering *Eclimmus* by Agassiz repudiated) *hirtus*, sp. n., H. Loew, Deutsche E. Z. 1876, pp. 209 & 210, Acarnania.

### Asilidæ.

*Leptynoma*, g. n., J. O. Westwood, Tr. E. Soc. 1876, p. 517. Near *Gonypes* and *Thlipsomyza*, but agreeing with some of the *Acroceridæ* in its neuration and elongate proboscis. *L. sericea*, sp. n., *id. l. c.* p. 518, pl. vi. fig. 7, Damara Land, S. Africa.

*Ommatius orenoquensis*, Guyana, and *vittiger*us, Australia, spp. nn., J. M. F. Bigot, Bull. Soc. Ent. Fr. (5) vi. p. lxxxv.

*Emphysomera nigrifemorata*, Amoy, and *hyacinthina*, Natal, spp. nn., *id. l. c.* p. lxxxvi.

### Dolichopodidæ.

Notes on various British species; S. H. Verrall, Ent. M. M. xii. pp. 195 245, 268, *et seqq.*

*Chrysotus*. Revision of 10 British species; *id. l. c.* pp. 245–248.

*Porphyrops simplex*, p. 195, S. England, *tenuis*, p. 197, Scotland, spp. nn.; *id. l. c.*

*Diaphorus* (doubtfully distinct from *Chrysotus*) *dorsalis*, sp. n.; *id. l. c.* p. 198, S. England.

*Chrysotus palustris*, sp. n., *id. l. c.* p. 247, S. England.

### Phoridæ.

*Phora rufipes*, Meig. Transformations described and figured; J. Schnabl, Deutsche E. Z. 1876, pp. 216–220, pl. i. figs. 1–7.

### Syrphidæ.

Osten-Sacken, C. R. A list of the North American *Syrphidæ*. Bull. Buff. Soc. iii. pp. 38–71.

A second instalment of a proposed new Catalogue of N. American *Diptera*. The number of described species of *Syrphidæ* north of Mexico and exclusive of California, is about 160; from California only 11 are known. With a few exceptions (all small genera), all the European genera occur in N. America, and most of these common genera are much richer in species in Europe. 11 genera are peculiar to N. America, and 25 species are common to Europe and N. America.

The Catalogue contains bibliographical references and localities, with synonymical and other incidental observations. Other notes are given, p. 63, and a new genus and 8 new species characterized. Corrections are made in the author's former papers [Zool. Rec. xi. pp. 445 & 446].

*Syrphus*. The 11 known N. American species of this (restricted) genus are described and tabulated: *S. umbellatarum*, L., *abbreviatus* and *lapponicus*, Zett., occur also in Europe; *S. diversipes*, Macq., ? = *cinctellus*, Zett., *S. topiarius*, Zett., *nec* Meig., renamed *torvus*, p. 139, and a new species, *rectus*, ? = *ribesii*, L., seem also European, and *S. lesueuri*, Macq. (*Epistrophe conjungens*, Walk., ♂), is recorded from Silesia. C. R. Osten-Sacken, P. Bost. Soc. xviii. pp. 135–153.

*Syrphus torvus* and *rectus* queried respectively as the early and late representatives of one species; but no intermediate form was found in 300 specimens equivalent to *S. vitripennis* between *topiarius* and *ribesii* in Europe. C. R. Osten-Sacken, Psyche, i. pp. 113–115. On habits of *S. torvus*, *cf.* p. 183.

*Volucella zonaria*, *inanis*, and *pellucens*. Their larvæ found living in nests of *Vespa germanica*; that of the first species described. They do not touch either larvæ or pupæ of the wasp. Erné, MT. schw. ent. Ges. iv. pp. 561 & 562.

*Allograpta*, g. n., C. R. Osten-Sacken, Bull. Buff. Soc. iii. pp. 49 & 63, Differs from other *Syrphidæ* in the peculiar markings of its abdomen and in the eyes of the male being divided into two parts by a well-defined line, above which the facets are larger than below. For *Scæva obliqua*, Say, and ? *S. emarginata*, Say.

*Didea laxa*, sp. n., *id. l. c.* p. 66, N. America.

*Syrphus rectus* (? = *ribesii*, L.), p. 140, N. York, &c., *contumax*, p. 147, *amalopis*, p. 148, New Hampshire, spp. nn., *id.* P. Bost. S. c. i.

*Xanthogramma felix*, sp. n., *id.* Bull. Buff. Soc. iii. p. 67, [illegible] erica.

*Brachyopa vacua* [script. *racua*], p. 67, *notata*, p. 6[illegible], [illegible]., *l. c.*, Canada and United States.

*Criorrhina armillata*, sp. n., *id. l. c.* p. 58, Quebec.

*Arctophila flagrans*, sp. n., *id. l. c.* p. 59, Colorado.

*Xylota cerea*, sp. n., *id. l. c.* p. 60, New Hampshire.

*Mixtecayia ephippium*, sp. n. *id. l. c.* p. [illegible], Mexico.

### Platypezidæ.

*Platypeza holosericea* and *sulfurea* etc.; larvæ described by É. Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 231 & 232.

### Conopidæ.

*Ptychoproctus complexus*, Bigot (1859), ? = *Stylomyia leonum*, Westw. (1850), ♂; J. M. Bigot, Bull. Soc. Ent. Fr. (5) vi. p. cx.; at all events, the genera are identical.

*Systropus* monographed; 11 species recognized, from Africa, Asia, and America. 3 are described as new, whereof one (*crudelis*) was bred from cocoons of a moth, ? *Limacodes* or *Doratifera*, found on a *Mimosa* tree at Natal. J. O. Westwood, Tr. E. Soc. 1876, pp. 571–579, pl. ix. *S. eumenoides*, Westw., figured, *l. c.* figs. 13–15.

*Systropus crudelis*, p. 574, pl. x. figs. 1–12, Natal, and var. from Damara Land, *polistoides*, p. 575, Chantibon, Siam, *tipuloides*, p. 576, Sulu Island, spp. nn., *id. l. c.*

### Muscidæ.

*Phasides*. J. M. F. Bigot, Ann. Soc. Ent. Fr. (5) vi. pp. 389–400, discusses the genera of this group, which he ranks as a "*Carie*" *Phasidæ*, combining the "Phasiennes" and "Gymnosomées" united, and forming a connection between the "Tachinaires" or "Dexiaires" and the "Ocyp-

terées" or "Muscidées." *Gymnosoma nitens*, Wied., and ? *G. costata*, Pz., are referred to *Wahlbergia*, Zett. All the genera, such as *Clytra* and *Tryphera*, that have long abdominal setæ, are eliminated from the group.

*Sarcophaga*. 20 British species recognized and described, with general characters, generic and sexual, an analytical table, and magnified lateral outlines of *S. carnaria*, *melanura*, and *nurus*. R. H. Meade, Ent. M. M. xii. pp. 216–220, 260–268.

*Musca domestica* identical in the Old and New Worlds; an abstract of its life history, with figs. of its early stages. A. S. Packard, Am. Nat. x. pp. 476–480, fig. 28.

*Anthomyia (Homalomyia) scalaris*; 50 larvæ discharged from the lower intestine of a boy in Kentucky, and the flies afterwards reared from them; G. S. Judd, Am. Nat. x. p. 374.

*Anthomyia muscaria*, F.; larva described, from willow catkins; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 189. *A.* sp. near *pluvialis*: larvæ and pupæ extracted from the ear of a patient, suffering from severe inflammation; A. Laboulbène, quoting Danthon, Bull. Soc. Ent. Fr. (5) vi. p. xxii.

C. Rondani, Bull. Ent. Ital. viii. p. 187 *et seq.*, continues his treatment of the "Species Italicæ ordinis Dipterorum (Muscaria, Rndn.)" by discussing his "Stirps xxiv. *Chylizinæ*," wherein he includes *Pachylomera*, R., *Psila*, Mgn., *Loxocera*, Fall., *Platbystila*, Mcq., *Megachetum*, R., and *Chyliza*, Fall.

*Orellia schineri*, Lw., reared from seed-pods of *Rosa canina*; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 238.

*Sphecolyma*, g. n., Perris, *l. c.* p. 242. *Anthomyiides*, near *Drymia*; remarkable for its long legs; bred from nest of *Vespa germanica*. For *S. flava*, sp. n., *ibid.*, Landes.

*Trichopoda nigricauda*, p. 394, Mexico, *bicolor*, p. 395, *nigripennis*, p. 396, and *obscura*, p. 399, Buenos Ayres, *arcuata*, p. 397, Chili, *pictipennis*, p. 398, S. America, spp. nn., Bigot, *l. c.*

*Bogosia rufiventris*, sp. n., *id. l. c.* p. 399, Natal.

*Sarcophaga similis*, R. H. Meade, *l. c.* p. 261, Britain (? = *carnaria*, var.; *id. l. c.* p. 268); *S. mutata*, F. Smith, Ann. N. H. (4) xvii. p. 450, Rodriguez Island: spp. nn.

*Lucilia bufonivora*, sp. n., R. Moniez, Bull. Sc. Nord, viii. p. 25, Dept. du Nord. The eggs are laid in the eyes of frogs, and the larvæ eat into the living Batrachian. Taken abundantly at Valenciennes by A. Lelièvre, who refers it to *regalis* or *illustris*, Meig.; but this opinion contradicted by A. Girard, *tom. cit.* pp. 171 & 172. Larvæ supposed to be those of this species discovered in the head of a toad found near Maurenne; P. de Borre, CR. Ent. Belg. xix. p. lxiv. Evidence of its occurrence near Paris; M. Girard, Bull. Soc. Ent. Fr. (5) vi. pp. ccii. & ccxix.

*Pollenia basalis*, sp. n., F. Smith, Ann. N. H. (4) xvii. p. 449, Rodriguez Island.

*Milichia argyrogastra*, sp. n. ?, Perris, *l. c.* p. 208, reared from lime-trees, Mt. de Marsan.

*Psila bertolini*[*i*], p. 190, Italy, *sardoa*, p. 192, Sardinia, spp. nn., C. Rondani, *l. c.*

*Loxocera maculata*, p. 193, N. and Middle Italy, *marginata*, p. 194, Parmese Apennines, spp. nn., *id. l. c.*

*Chyliza permixta*, sp. n., *id. l. c.* p. 197, Italy.

*Tephritis oxyacanthæ*, sp. n. ?, Perris, *l. c.* p. 211, reared from hawthorn, Mt. de Marsan.

*Sapromyza obsoletoides*, J. Schnabl, Deutsche E. Z. 1876, p. 215, Poland; *S. squalida*, F. Smith, *l. c.* p. 450, Rodriguez Island: spp. nn.

*Elachyptera furcata*, sp. n., Perris, *l. c.* p. 194, Landes.

*Drosophila uvarum*, sp. n., C. Rondani, Bullettino del Comizio agrario Parmense, 1875, and Bull. Ent. Ital. viii. p. 86, Italy.

### ŒSTRIDÆ.

*Rogenhofera grandis*, Guér., bred from *Mus flavescens*, Waterh., near Buenos Ayres, and its economy described; C. Berg, S. E. Z. xxxviii. pp. 268–272.

*Cephalemyia ovis*. Observations on the larva; H. Lucas, Bull. Soc. Ent. Fr. (5) vi. p. xcv.

### (APHANIPTERA.)

*Sarcopsyllus gallinaceus*, Westw., = *Hectopsylla psitacii*, Frauenf.; C. Ritsema, Tijdschr. Ent. xix. Verslag, p. xlvi.

Observations on the flea found on moles (not *Pulex talpæ*), and in which no trace of eyes can be found under a high power; E. Newman, Ent. ix. pp. 89 & 90.

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# NEUROPTERA.

BY

ROBERT MCLACHLAN, F.R.S., F.L.S., &c.

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### THE GENERAL SUBJECT.

BRAUER, F. Die Neuropteren Europas, und insbesondere Oesterreichs. Festschr. z.-b. Wien, pp. 265–300.

Consists of introduction with faunistic notes, bibliography, a revision of the Austrian species, and general list of the *Neuroptera* (in the Linnean sense) of the Palæarctic region. About 1000 species catalogued, with localities. (Reviewed, Ent. M. M. xiv. p. 44.)

GIRARD, MAURICE. Les Insectes. ii. [Vide *Orthoptera*.]

Pp. 260–565 are occupied by *Neuroptera*; as are also pls. lxiv.–lxviii. The latter (lxviii.) did not appear in Guérin's 'Iconographie,' and some of the figures on it are original.

HAGEN, H. A. Report upon the collections of *Neuroptera* and *Pseudo-Neuroptera* made in portions of Colorado, New Mexico, and Arizona, during the years 1872–1874. In Wheeler's Rep. Geogr. Explor. W. of 100th Mer. (Washington: 1875, 4to), v. Zoology, chapt. xiv. pp. 911–922.

PROVANCHER, L. Petite Faune entomologique du Canada. Les Nevroptères. Nat. Canad. viii. pp. 177–191, 209–218, 264–268, 309–315, 323–327.

Comprises a portion of the *Pseudo-Neuroptera*. The descriptions are little else than translations from Hagen's North American Synopsis. At p. 310, a rough figure of *Plathemis trimaculata* (♂) is given as a 'model' of the form of the *Odonata*, but is said to represent a *Gomphus*!

## TRICHOPTERA.

MCLACHLAN, R. A Monographic Revision and Synopsis of the *Trichoptera* of the European fauna. Part iv., pp. 145–220, pls. xvi.–xxiii. (April, 1876), part v. pp. 221–280 (and Supplement, part i. pp. i.–xii.), pls. xxiv.–xxxi. (Nov. 1876). London & Berlin: 8vo.

These parts bring the work down to the end of the family *Sericostomatidæ*, and the Supplement extends to the end of the *Limnophilidæ*, embodying the new information received as to localities, new species, &c., to date. The changes in nomenclature, synonymy, &c. (chiefly from personal examination of types) are numerous, and often so intricate in details that a condensed abstract of them is scarcely possible. Figures illustrating the more essential structural characters of almost each species are, as heretofore, given. Only the absolutely new genera and species are recorded *infrà*.

F. G. Binnie, "Fauna and Flora of West of Scotland," pp. 19–21, catalogues 55 species from the Glasgow district, with localities.

General notes, &c., on habits of larvæ; Provancher, Nat. Canad. viii. pp. 81–87.

### *Phryganeidæ*.

MCLACHLAN, *l. c.* Supplement, pp. i.–iii., notes additional localities for European species, varieties, &c., and describes a new genus:—

*Agrypnetes*, p. ii. Facies of *Agrypnia* (*Pagetana*), but with only 1.2.2 spurs; anterior tarsi very short, intermediate tarsi flattened, and with a dense comb-like fringe of hairs; antennæ extremely stout. Type, *A. crassicornis*, sp. n., pl. xxiv., Finland.

### *Limnophilidæ*.

Descriptions of the species of the European fauna are concluded in McLachlan's "Revision and Synopsis," pt. iv., and additional information

given in the Supplement, pt. i. A new genus and the following new species are described :—

*Chilostigma*, g. n., p. 187. Spurs 1.2.2 ♂ ♀. Anterior wings tuberculate, with short semi-erect hairs; pterostigma very sharply defined. Type, *C. sieboldi* (Hag.), sp. n., p. 188, pl. xx., Lapland and Finland.

*New species :—*

*Halesus antennatus*, p. 153, Switzerland, *hilaris*, p. 154, pl. xvi., Switzerland, *ligonifer*, p. 155, pl. xvi., South of France, *mendax*, p. 156, pl. xvii., Switzerland, *melampus*, p. 158, pl. xvi., Switzerland, *mœstus*, p. 159, pl. xvi., Noric Alps.

*Drusus monticola*, p. 174, pl. xix., Switzerland, Tyrol, Noric Alps, *melanchætes*, p. 177, pl. xix., Switzerland and Tyrol.

*Psilopteryx zimmeri*, p. 189, pl. xxi., Switzerland and Saxony.

*Chætopteryx sahlbergi*, p. 195, pl. xxi., Lapland, *obscurata*, p. 196, pl. xxii., Switzerland, *clara*, p. 197, pl. xxi., Carniola, *gessneri*, p. 198, pl. xxii., Switzerland.

*Enœcyla costæ*, p. 208, pl. xxiii., Naples.

*Grammataulius signatipennis* (*interrogationis*, Kol., pt.), Suppl., p. iv. pl. xxxi., Finland and Lapland.

*Limnophilus exulans*, Suppl., p. vi., pl. xxxi., Iceland.

*Anabolia sororcula* (*soror*, McLach., pt.), Suppl., p. viii. pl. xxx., N. Europe.

*Stenophylax ucenorum*, Suppl., p. ix., pl. xxx., Alps of Dauphiné.

*Drusus annulatus* and *Peltostomis sudetica*. McLachlan, *l. c.* Suppl., p. xi., indicates the possibility of these being only conditions of one species, differing locally in the spur-formula ; and remarks on the artificial nature of the latter character as a means of generic differentiation in this family.

*Sericostomatidæ.*

An examination of the species of the European fauna is completed in McLachlan's "Revision and Synopsis," pt. v., in which the family is divided into four sections. The following new genera and species are described :—

*New genera :—*

*Cerasma*, p. 234. Allied to *Sericostoma* ; discoidal cell of hind-wings closed ; inferior appendages of ♂ notched ; head of ♂ produced posteriorly into horns. Type, *C. cornuta*, sp. n., p. 235, pl. xxvi., Caucasus.

*Schizopelex*, p. 235. Allied to *Sericostoma* and *Cerasma* ; head of ♂ with broad raised lobes, but not produced into horns. Type, *Sericost. festivum*, Rambur.

*Œcismus*, p. 236. Allied to *Sericostoma* and *Notidobia* ; inferior appendages of ♂ entire ; anterior wings elongate. Type, *Œ. mucidus*, sp. n., p. 237, pl. xxv., Greece.

*Lithax*, p. 242. Allied to *Silo* ; no grooves in the wings of the ♂. Type, *Silo niger*, Hag.

*Selis*, p. 251. Allied to *Silo* ; anterior wings of the ♂ with a long groove, posterior without a groove. Type, *Silo auratus*, Hag.

*Micrasema*, p. 259. Allied to *Oligoplectrum*, but unicolorous, and with different neuration and palpi. Type, *O. morosum*, McLach.

*Thremma*, p. 265. Allied to *Micrasema*; spurs, 1.3.4; possessing ocelli, differing in neuration. Type, *T. anomalum*, sp. n., p. 266, pl. xxix., Greece.

*Crunœcia*, p. 271. Allied to *Lepidostoma*, but without scales, and differing in neuration, palpi, &c. Type, *Mormonia irrorata*, Curtis.

*New species :—*

*Sericostoma pedemontanum*, p. 229, pl. xxv., Turin, *memorabile*, ibid., Alps of Dauphiné, *turbatum*, p. 231, Belgium, *siculum*, p. 232, Sicily, *hamiferum*, ibid., North Italy ?.

*Micrasema tristellum*, p. 261, pl. xxviii., Savoy, *longulum*, p. 263, pl. xxix., Saxony, *gelidum*, ibid. pl. xxviii., Finland, *minimum*, p. 264, pl. xxviii., Tyrol, Styria, Saxony, *M.* (?) *exiguum*, p. 265, pl. xxviii., Saxony.

*Helicopsyche* (?) *sperata*, p. 269, pl. xxix., Naples.

*Helicopsyche*. A summary of observations given by McLachlan, "Revision and Synopsis," pt. v. pp. 266–269. A detailed account of the records of its appearance in Europe, with new observations, by Von Siebold, appears in Bull. Ent. Ital. viii. pp. 73–82; also (with especial reference to Switzerland) by the same author in MT. schw. ent. Ges. iv. pp. 246–252.

*Leptoceridæ.*

Binnie, P. N. H. Soc. Glasg. iii. p. 57, notices the species found in the neighbourhood of Glasgow.

## Neuroptera-Planipennia.

*Panorpidæ.*

*Boreus*. H. L. Moody, Psyche, i. pp. 161 & 162, suggests that the use of the aborted wings is to support the female in the act of copulation.

*Sialidæ.*

*Chauliodes sinensis*, Walker, figured in Girard's 'Traité élémentaire,' ii pl. lxviii. fig. 4.

*Ascalaphidæ.*

*Ascalaphus kolyvanensis*, Laxm., var. n. *ponticus*, McLach., Ent. M. M. xiii. p. 35, described.

*Nymphidæ.*

*Nymphes myrmeleonoides*, Leach, figured in Girard's 'Traité élémentaire,' ii. pl. lxviii. fig. 1.

## Pseudo-Neuroptera.

### Thysanura.

Reuter, O. M. Catalogus præcursorius Poduridarum Fenniæ. Medd. Soc. Fenn. i. pp. 78–86.

Forty-three species are enumerated, of which some are given as new.

Tullberg, Tycho. *Collembola borealia* (Nordiska *Collembola*). Œfv. Ak. Förh. xxxiii. No. 5, pp. 23–42, pls. viii.–xi.

A valuable treatise on boreal *Collembola*, with introductory remarks criticizing Lubbock's arrangement, &c., of the group. A table at the end shows the distribution of the species. Greenland is credited with 8 species, Spitzbergen with 4, Beeren Island with 3, Nova Zembla with 13, and Siberia with 21. Of these, 13 occur in Sweden. The plates are mostly occupied by details.

Parona's list of species found in the district of Pavia (*cf.* Zool. Rec. xii. p. 484) is reprinted in Bull. Ent. Ital. viii. pp. 298–300.

*Japyx*. A species from Calcutta noticed by Wood-Mason, P. A. S. B. 1876, p. 174.

*New genus and species :—*

*Corynothrix*, Tullberg, *l. c.* p. 33. Mesonotum not prominent; fourth segment of abdomen somewhat longer than the third; antennæ twice as long as the head, 4-jointed; mucros of the forks very small, with two teeth; back densely clothed with clavate hairs; no scales. Type, *C. borealis*, sp. n., p. 34, pl. x. figs. 13–16, Nova Zembla.

*Sminthurus variegatus*, Tullberg, *l. c.* p. 29, pl. viii. figs. 1–4, Siberia, *malmgreni*, id. *ibid.*, Nova Zembla; *S. insignis*, Reuter, *l. c.* p. 83, *pilosicauda* and *lineatus*, p. 84, *tullbergi*, p. 86, Finland.

*Papirius chloropus*, Tullberg, *l. c.* p. 31, Siberia; *P. dorsalis*, Reuter, *l. c.* p. 85, Finland.

*Tomocerus minutus*, Tullberg, *l. c.* p. 32, Siberia and Nova Zembla, *lividus*, ibid., Siberia.

*Degeeria* (?) *superba*, Reuter, *l. c.* p. 85, Finland.

*Isotoma bidenticulata*, Tullberg, *l. c.* p. 35, Nova Zembla and Greenland, *stuxbergi*, ibid., Nova Zembla and Siberia, *violacea*, p. 36, Siberia, *sensibilis*, ibid., Nova Zembla; *I. balteata*, Reuter, *l. c.* p. 86, Finland.

*Achorutes longispinus*, Tullberg, p. 37, *thuli* and *dubius*, p. 38, Nova Zembla, the latter also from Siberia.

*Lipura arctica*, Tullberg, p. 39, Spitzbergen, Nova Zembla, and Siberia, *octo-punctata* and *sibirica*, p. 40, Siberia, *grœnlandica*, p. 41, Greenland and Spitzbergen.

*Anura gigantea*, Tullberg, p. 41, Siberia.

## Mallophaga.

Giebel, C. Diagnoses of some species of *Mallophaga* collected by the Rev. A. E. Eaton during the late Transit of Venus Expedition to Kerguelen's Island. Ann. N. H. (4) xvii. pp. 388 & 389.

*New species :—*

*Docophorus dentatus*, on *Diomedea exulans*, l. c. p. 388.

*Nirmus angulicollis*, on *Diomedea exulans*, and *N. setosus*, on *Pelicanoides urinatrix*, ibid.

*Goniodes brevipes*, on *Apterodytes longirostris*, p. 389.

*Nirmus sulphureus*, Giebel, Z. ges. Naturw. (2) xiii. p. 528, on *Trogon*, S. America.

*Menopon caudatum*, id. *l. c.* p. 529, on *Galbula ruficauda*, Bogotá.

### Thysanoptera.

Scudder, S. H. The tertiary *Physopoda* of Colorado. Bull. Geol. Surv. (2) No. 4, pp. 221–223, 1875.

Redescribes *Palæothrips fossilis*, and adds the following:—

*Lithadothrips vetusta* (g. & sp. nn.), p. 222.

*Melanothrips extincta*, sp. n., *ibid.*

### Termitidæ.

Hagen, H. A. The probable danger from White Ants. Am. Nat. x. pp. 401–410.

A popular article on these insects in general, and on *Termes flavipes* in particular. The author especially recommends that all rotten and decaying wood be removed from places frequented by the insects, and that this should be done in winter.

*Termes lucifugus.* Perris, Ann. Soc. Ent. Fr. (5) vi. pp. 201 & 202, has observed the habits of this species in the Landes, and is of opinion that Lespès's observations are correct; he was able to watch the deposition of eggs by the "little queens" (*petites reines*). In May, or the beginning of June, innumerable swarms of "little kings" and "little queens" left the nest and took to flight, as he considers, to form new colonies, pairs seeking suitable places where eggs are laid to be hereafter developed into "kings" and a "queen," thus forming the foundation of a true Termitarium. In the "Bulletin" attached to the same volume, p. ccxvii., he records analogous observations on *Eutermes flavicollis.*

### Embidæ.

Larva of a species found in an orchid-house near London on the roots of an East Indian species of orchid, and asserted to be injurious to the plant, with figures; W. H. Michael (with note by J. O. Westwood), Gard. Chron. (n.s.) vi. p. 845.

### Psocidæ.

Rostock, M. Psocidenjagd im Hause. Ent. Nachr. ii. pp. 190–192.

An interesting notice on species found in the writer's house in Saxony, chiefly introduced with fire-wood, and also bred in the thatch; includes a large proportion of the European species, one is noticed as new.

*Rhyopsocus*, g. n., Hagen, Bull. U. S. Mus. No. 3, p. 52. Ocelli absent; antennæ 26-jointed; maxillary palpi with the apical joint large, truncate; tarsi 3-jointed, the terminal two joints equal; wings four. Type, *R. ellipticus*, Hag., *l. c.*, Kerguelen's Island (introduced?).

*Elipsocus cyanops*, sp. n., Rostock, *l. c.* p. 192, Saxony.

*Psocus canadensis* and *trifasciatus*, spp. nn., Provancher, Nat. Canad. viii. p. 186, Quebec.

## Perlidæ.

*Capnia pygmæa* appearing in enormous numbers on the Rivière du Loup, Canada, in March, falling on the snow. Provancher, Nat. Canad. viii. p. 125.

*New species* :—

*Pteronarcys rectus*, id. *l. c.* p. 189, *bicarinatus*, p. 190, *flavicornis*, p. 191, Quebec.

*Perla quebecensis* and *hieroglyphica*, id. *l. c.* p. 211, *marginipes* and *nacalis*, p. 212, *riparia* and *sulcata*, p. 213, *naica*, p. 214, Quebec.

*Nemura nigrita*, id. *l. c.* p. 217, Quebec.

## Ephemeridæ.

Joly, E. Sur une nouvelle espèce du genre d'Éphémérines *Oligoneuria* (*O. rhenana*), par feu le Dr. L. Imhoff ; traduit de l'Allemand et annoté. Bull. Soc. Angers, 4me et 5me années, pp. 37–46.

A translation of Imhoff's paper published in Verh. Ges. Bas. in 1852, with copious notes.

——. Études sur l'appareil reproducteur des Éphémérines. C. R. lxxxiii. pp. 809–813.

Scarcely more than an extract from the paper by N. & E. Joly noticed below.

——, N. Les Éphémères, leur organization, leurs métamorphoses, leurs mœurs, et leur industrie. La Nature, v. pp. 10–15, 43–47.

A well-written, semi-popular article, illustrated by numerous woodcuts, for the most part original. It is more especially elaborated from a study of *Palingenia virgo*, the details concerning the embryology and the condition of the very young larvæ of which are valuable. As in all works by this author (and by his son, E. Joly), there is evidence that he had not seen Lubbock's memoir on the development of *Chloeon*.

——. Études sur l'embryogénie des Éphémères, notamment chez la *Palingenia virgo*. Mém. Ac. Toulouse (sep. copy), pp. 1–12, pls. i. & ii. ; *cf.* CR. lxxxii. pp. 1030–1034, and Ann. N. H. (4) xvii. pp. 481–484.

—— & E. Contributions à l'histoire Naturelle et à l'Anatomie des Éphémérines. Rev. Sci. Nat. v. (Dec., 1876) ; separate, pp. 1–26, with four plates.

A concise summary. Two points may be specially mentioned. The authors assert that in *Palingenia virgo* the young larva is entirely deprived of branchiæ and respires solely through the skin ; the double intromittent organ of the ♂ has an opening at the extremity of each branch ; and there are probably two oviducts in the ♀.

Eaton, P. E. Soc. 1876, p. vii. announces a supplement to his mono-

graph in preparation, and remarks on certain genera. The deficiency of legs in *Campsurus* and allies is probably due to their being shed with the pupa-skin; in some all the legs appear to be cast by the ♀, in others the anterior pair is retained. The separation takes place between the femur and trochanter. Indications of new forms are given.

*Cloe quebecensis*, sp. n., Provancher, Nat. Canad. viii. p. 267, Quebec.

## Odonata.

A fossil from the Carboniferous of Cape Breton and considered to represent the abdomen of a dragon-fly, is named *Libellula carbonaria*; Scudder, Canad. Nat. viii. p. 88, fig. 2.

### *Agrionina.*

Selys-Longchamps, E. de. Synopsis des Agrionines, 5me Légion, *Agrion* (suite), pp. 1–282. Bruxelles: 1877, 8vo. (Published also in Bull. Ac. Belg. (2) xli. pp. 247–322, 496–539, 1233–1309, xlii. pp. 490–531, 952–991; but as the separate form of this Synopsis is always referred to, the pagination therein given is retained.)

The last part of this Synopsis appeared in 1865, comprising the genus *Argia* in its broad sense; the present includes all the remaining *Agrionina*, excepting the genera *Telebasis*, *Argiocnemis*, and *Hemiphlebia*. An analysis of the arrangement is also given in CR. Ent. Belg. xix. pp. xxxv.–xxxvii., xlviii.–l. *Agrion* (in its broad sense) is divided into two great divisions, and as almost all the sub-generic terms used are new, the tables are here reproduced.

I.—A spine or acute point at the apex of the 8th segment of the ♀, beneath.

Section 1.—The 10th segment of the ♂ somewhat elevated.

A. Inferior sector of the triangle originating before the basal post-costal nervule.

a. With pale post-ocular spots. Females dimorphic.

*a*. Arculus placed beyond the second antecubital nervule. Pterostigma similar in all the wings . . . . . *Ceratura* (subg. n.), p. 7.

*b*. Arculus normal. Pterostigma of the anterior wings of the ♂ differing from that of the posterior.

*aa*. Pterostigma of the ♂ not touching the costa in the anterior wings . . . . . *Anomalagrion*.

*bb*. Pterostigma of the ♂ normal . *Ischnura*.

b. No pale post-ocular spots. Pterostigma similar in the four wings . . . . . *Amphiagrion* (subg. n.), p. 40.

B. Inferior sector of the triangle originating at the basal post-costal nervule, or somewhat before in the anterior. Pterostigma similar in the four wings.

a. No post-ocular spots . . . . . *Oxyagrion* (subg. n.), p. 46.

b. With post-ocular spots . . . . . *Acanthagrion* (subg. n.), p. 60.

Section 2.—The 10th segment of the ♂ not elevated.

A. Inferior sector of the triangle originating at the basal post-costal nervule. No post-ocular spots . . *Xiphiagrion* (subg. n.), p. 77.

B. Inferior sector of the triangle originating before the basal post-costal nervule. With post-ocular spots . *Enallagma* (subg. n.), p. 79.

II.—No spine at the apex of the 8th segment of the ♀, beneath.

Section 1.—Inferior sector of the triangle originating before the basal post-costal nervule. (Sub-genera inhabiting especially the boreal hemisphere.)

A. With pale post-ocular spots.

a. Abdomen extremely slender, its markings nearly similar in both sexes; coloration metallic green. . . . . *Nehalennia.*

b. Abdomen less slender, its markings differing in the sexes; coloration less metallic. . . *Agrion.*

B. No post-ocular spots.

a. Coloration red . . . . . *Pyrrhosoma.*

b. Coloration bronzy on a blue or yellowish ground *Erythromma.*

Section 2.—Inferior sector of the triangle originating at the basal post-costal nervule, or scarcely before.

§ *Sub-genera of the Old World.*

A. With pale post-ocular spots. Abdomen slender or moderate, the markings differing in the sexes.

a. Prothorax of the ♀ furnished with two processes directed backward . . . . *Pseudagrion* (subg. n.), p. 200.

b. Prothorax of the ♀ simple . . . . *Xanthagrion* (subg. n.), p. 230.

B. No post-ocular spots. Abdomen moderate, the markings nearly similar in the sexes.

a. Coloration yellow or reddish; spines of the tibiæ moderate . . . . . *Ceriagrion* (subg. n.), p. 235.

b. Coloration green and black; spines of the tibiæ long, widely divergent (♂ unknown) . *Argiagrion* (subg. n.), p. 240.

§§ *Sub-genera of the New World.*

A. With pale post-ocular spots.

*a*. The median nervure in the posterior wings of the ♂ diverging suddenly from the costa, at the pterostigma; the 10th segment ending in an elevated fork; abdomen moderate . . *Anisagrion* (subg. n.), p. 240.

*b*. The median nervure normal in the sexes; abdomen excessively long and slender; 10th segment of the ♂ not forked. . . . *Telagrion* (subg. n.), p. 256.

B. No pale post-ocular spots.

*a*. Abdomen long or very long; coloration greenish or yellowish; claws with the lower tooth very strong . . . . . *Leptagrion* (subg. n.), p. 264.

*b*. Abdomen moderate; coloration red; claws with the lower tooth smaller . . . *Erythragrion* (subg. n.), p. 245.

The already described species are placed in their proper sub-genera on the scheme detailed in the foregoing tables. The following are described as new (including named varieties):—

*Ischnura cervula*, p. 18, California, *perparva* (McLachlan, MS.), p. 19, California ("Texas" erroneously), *fluviatilis* (Bates, MS.), p. 25, Amazons, Buenos Ayres, Chili, &c., race *bizonata*, p. 26, Brazil, *taitensis*, p. 35, Taiti, *orientalis*, p. 36, Japan, China, *rufo-stigma*, p. 39, India.

*Amphiagrion amphion*, p. 43, N. America.

*Oxyagrion dissidens*, p. 48, Quito, *terminale*, p. 51, Brazil, *brevistigma*, p. 53, Brazil, *micro-stigma*, p. 54, Brazil, *miniopsis*, p. 55, Bogotá, *hæmatinum*, p. 56, Minas Geraes, *basale*, p. 59, Brazil.

*Acanthagrion apicale* (Bates, MS.), p. 62, Amazons, *gracile*, Ramb., varr. *cuneatum* and *quadratum*, p. 65, Brazil and Mexico, race *minarum*, ibid., Brazil, race *lancea*, p. 66, Brazil, race *vidua*, p. 67, Merida, *truncatum*, p 67, Brazil, *temporale*, p. 68, Minas Geraes *trimaculatum*, p. 69, Brazil, *interruptum*, p. 70, Chili, *nigrinuchale*, p. 72, Brazil, *laterale*, p. 73, New Granada, (?) *cheliferum*, p. 75, Brazil.

*Xiphiagrion cyano-melas*, p. 77, Moluccas.

*Enallagma cyathigerum*, Charp., race ? *robustum*, p. 92, California, (?) *brevispina*, p. 94, Japan, *civile*, Hag., race ? *simile*, p. 98, Columbia and Bogotá, *semicirculare*, p. 100, Mexico, *traviatum*, p. 102, Massachusetts, *divagans*, p. 104, Massachusetts, *cultellatum* (Hag., MS.), p. 107, Cuba *cæcum*, Hag., race ? *cardenium* (Hag., MS.), Cuba, (?) *nigridorsum*, p. 114, Zanzibar, (?) *obliteratum*, p. 116, Cape, *gabonense*, ibid. Gaboon, (?) *subfurcatum*, p. 117, Abyssinia, *malayanum*, p. 119, Java, (?) *parvum*, p. 120, India, (?) *melanotum*, p. 121, China.

*Nehalennia atrinuchalis*, p. 127, Shanghai, *sophia*, p. 131, Brazil.

*Agrion* (?) *nepos* (Bates, MS.), p. 139, Amazons, *minutissimum* (Bates, MS.), p. 140, Amazons, (?) *exclamationis*, p. 141, California, *concinnum*,

Johans., race ? *interrogatum*, p. 144, Saskatschewan, *resolutum* (Hag., MS.), p. 153, Saskatschewan, *sieboldi*, p. 171, Japan, (?) *lineolatum*, p. 172 (= *hieroglyphicum*, Brauer, p. 282), Japan and China, (?) *xanthomelas*, p. 174, Sandwich Isles, (?) *waltheri*, p. 176, Brazil, (?) *melanoproctum*, p. 177, Polynesia.

*Pyrrhosoma abbreviatum*, p. 189, California.

*Erythromma* (?) *conditum* (Hag., MS.), p. 195, Maryland and Washington, (?) *gayi*, p. 197, Chili, (?) *blanchardi*, p. 199, Chili.

*Pseudagrion melanicterum*, p. 202, Sierre Leone and Lagos, *angolense*, p. 203, Angola, *protextatum*, p. 204, Zanzibar and Gaboon, *glaucescens*, p. 208, Sierra Leone, *torridum*, p. 210, Senegal, *nubicum*, p. 211, Nubia, *microcephalum*, Ramb., race ? *australasiæ*, p. 216, Queensland, race ? *migratum*, p. 217, Japan, race ? *approximans*, ibid., locality unknown, *cyane*, p. 218, New Holland, (?) *hisopa*, p. 219, Pulo Besoar, *rubriceps*, p. 220, Java and India ?, *crocops*, p. 222, Menado, *coriaceum*, p. 223, Amboyna, *ustum*, p. 225, Sulu, *magnanimum*, p. 226, Aru, *hypermelas*, p. 229, India.

*Xanthagrion erythroneurum*, p. 231, Melbourne, *zelandicum*, McLach., race ? *antipodum*, p. 234, New Zealand.

*Ceriagrion melanurum*, p. 239, Japan.

*Argiagrion leoninum*, p. 240, Sierra Leone.

*Anisagrion allopterum*, p. 243, Guatemala and Putla, race ? *rubricundum*, p. 244, Putla.

*Erythragrion corallinum*, p. 254, Brazil, *coccineum*, p. 255, Minas Geraes.

*Telagrion fulvellum* (Bates, MS.), p. 258, Amazons, *inversum*, p. 259 Amazons, *longum*, p. 260, Brazil, *mecistogastrum*, p. 262, Brazil.

*Leptagrion porrectum* (Hag.), p. 265, Brazil, *andromache* (Hag.), p. 268, Brazil, *elongatum*, p. 269, Brazil, race ? *dispar*, p. 271, Brazil, *inca*, p. 272, Peru, (?) *inornatum*, p. 273, S. America ?, (?) *obsoletum*, p. 275, Amazons, *fluminum* (Bates, MS.), p. 276, Amazons, (?) *rufum*, p. 277, S. America ?.

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*Agrion canadense*, sp. n., Provancher, Nat. Canad. viii. p. 325, Quebec.

Johans., race ? *interrogatum*, p. 144, Saskatschewan, *resolutum* (Hag., MS.), p. 153, Saskatschewan, *sieboldi*, p. 171, Japan, (?) *lineolatum*, p. 172 (= *hieroglyphicum*, Brauer, p. 282), Japan and China, (?) *xanthomelas*, p. 174, Sandwich Isles, (?) *waltheri*, p. 176, Brazil, (?) *melanoproctum*, p. 177, Polynesia.

*Pyrrhosoma abbreviatum*, p. 189, California.

*Erythromma* (?) *conditum* (Hag., MS.), p. 195, Maryland and Washington, (?) *gayi*, p. 197, Chili, (?) *blanchardi*, p. 199, Chili.

*Pseudagrion melanicterum*, p. 202, Sierra Leone and Lagos, *angolense*, p. 203, Angola, *pretextatum*, p. 204, Zanzibar and Gaboon, *glaucescens*, p. 208, Sierra Leone, *torridum*, p. 210, Senegal, *nubicum*, p. 211, Nubia, *microcephalum*, Ramb., race ? *australasiæ*, p. 216, Queensland, race ? *migratum*, p. 217, Japan, race ? *approximans*, ibid., locality unknown, *cyane*, p. 218, New Holland, (?) *hisopa*, p. 219, Pulo Besoar, *rubriceps*, p. 220, Java and India ?, *crocops*, p. 222, Menado, *coriaceum*, p. 223, Amboyna, *ustum*, p. 225, Sulu, *magnanimum*, p. 226, Aru, *hypermelas*, p. 229, India.

*Xanthagrion erythroneurum*, p. 231, Melbourne, *zelandicum*, McLach., race ? *antipodum*, p. 234, New Zealand.

*Ceriagrion melanurum*, p. 239, Japan.

*Argiagrion leoninum*, p. 240, Sierra Leone.

*Anisagrion allopterum*, p. 243, Guatemala and Putla, race ? *rubricundum*, p. 244, Putla.

*Erythragrion corallinum*, p. 254, Brazil, *coccineum*, p. 255, Minas Geraes.

*Telagrion fulvellum* (Bates, MS.), p. 258, Amazons, *inversum*, p. 259 Amazons, *longum*, p. 260, Brazil, *mecistogastrum*, p. 262, Brazil.

*Leptagrion porrectum* (Hag.), p. 265, Brazil, *andromache* (Hag.), p. 268, Brazil, *elongatum*, p. 269, Brazil, race ? *dispar*, p. 271, Brazil, *inca*, p. 272, Peru, (?) *inornatum*, p. 273, S. America ?, (?) *obsoletum*, p. 275, Amazons, *fluminum* (Bates, MS.), p. 276, Amazons, (?) *rufum*, p. 277, S. America ?.

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*Agrion canadense*, sp. n., Provancher, Nat. Canad. viii. p. 325, Quebec.

# ORTHOPTERA.

BY

ROBERT MCLACHLAN, F.R.S., F.L.S., &c.

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## THE GENERAL SUBJECT.

BEUTHIN, H. Zweiter Beitrag zur Kenntniss der Orthopteren der Umgegend von Hamburg. Verh. Ver. Hamb. ii. pp. 219–221.

Enumerates additional species, with localities.

BOLIVAR, IGNACIO. Sinópsis de los Ortópteros de España y Portugal. An. Soc. Esp. v. pp. 79–130, 259–372, pls. vi., xi. & xii.

An admirable work, worthy of being styled a Monograph rather than a Synopsis, for all the species are tabulated and described at length, and with an introductory chapter explaining the terminology, &c. The outline plates are chiefly explanatory of genera and critical species. The first part comprises the *Forficulidæ* and *Blattidæ*; the second, the *Mantidæ*, *Phasmidæ*, and *Acrydiidæ*. The Spanish fauna is evidently very rich in these insects.

BRUNNER VON WATTENWYL, C. Die morphologische Bedeutung der Segmente, speciell des Hinterleibes, bei den Orthopteren. Festschr. z.-b. Wien, pp. 1–18, pls. i.–iii.

A useful paper on the comparative morphology of the terminal segments of the abdomens of the various groups of the true *Orthoptera*; the plates present the instructive feature of the homologising parts in the groups being coloured alike in all the figures.

GIRARD, MAURICE. Les Insectes. Traité élémentaire d'Entomologie (*cf.* Zool. Rec. x. p. 216), ii. fasc. i. Orthoptères, Névroptères, with atlas of 8 plates. Paris: 1876, 8vo, pp. 1–576. (Pp. 571–576 are occupied by the commencement of the Hymenoptères.)

The *Orthoptera* are comprised in pp. 1–259, pls. lxi.–lxiii. (the plates are re-impressions of those in Guérin's "Iconographie"). This work is one of the most valuable compilations that have of late appeared, and the compiler shows a great amount of knowledge of general entomological literature. Obvious errors occasionally occur, but they are often those committed by the original writers. Reviewed by Plateau, in CR. Ent. Belg. xix. pp. xv. & xvi., and in Pet. Nouv. ii. pp. 31 & 32.

GRABER, VITUS. Die tympanalen Sinnesapparate der Orthopteren Denk. Ak. Wien, xxxvi. pt. ii. pp. 1–136, pls. i.–x.

This very important memoir is divided into three consecutive parts: (1) the form of the apparatus in the *Gryllidæ* and *Locustidæ*; (2) its form in the *Acrydiidæ*; (3) the physiology and comparative morphology of the apparatus in the *Orthoptera*, and of certain so-called analogous organs in insects in general; each of these is again sub-divided into many sections, the whole forming an exhaustive essay, illustrated by crowded anatomical figures.

——. Die abdominalen Tympanalorgane der Cikaden und Gryllodeen. *Tom. cit.* pp. 273–296, pls. i. & ii.

PROVANCHER, L. Petite Faune entomologique du Canada. Les Orthoptères. Nat. Canad. viii. pp. 13–26, 52–62, 72–81, 106–116, 134–143.

SCHOCH, GUSTAV. Die schweizerischen Orthopteren. Analytische Tafeln zur Bestimmung geradflügliger Insekten. Zürich: 1876, 8vo, pp. 48 (*cf.* Ent. Nachr. ii. p. 128).

SCUDDER, S. H. Report on the *Orthoptera* collected by the U. S. Geographical Surveys west of the 100th Meridian, under the direction of Lieut. G. M. Wheeler, during the season of 1875. In Wheeler's Rep. U. S. Geogr. Surv. W. of 100th Mer. 1876, pp. 278–295.

The N. American species of *Pezotettix* and the *Œdipodidæ* are tabulated in this Report.

——. Fossil *Orthoptera* from the Rocky Mountain Tertiaries. Bull. U. S. Geol. Surv. i. (1875) pp. 447–449.

——. New and interesting insects from the Carboniferous of Cape Breton. Canad. Nat. viii. pp. 88–90.

Relates to fossils referred to the *Odonata* and *Blattidæ*.

——. List of the *Orthoptera* collected by Dr. A. S. Packard in Colorado and the neighboring Territories, during the summer of 1875. Bull. U. S. Geol. Surv. ii. pp. 261–267.

——. Synoptical Tables for determining N. American Insects. Psyche, i. pp. 169–171, 177 & 178.

Two tables: the first concerns the families of *Orthoptera*, with notes on the principal bibliography; the second concerns the *Forficulariæ*.

——. A Century of *Orthoptera*. Decade V.—*Forficulariæ* (exotic). P. Bost. Soc. xviii. pp. 251–257. Decade VI.—*Forficulariæ* (N. American), pp. 257–264.

——. *Orthoptera* from the Island of Guadalupe. *Tom. cit.* pp. 268–271.

——. The Mode in which Cockroaches and Earwigs fold their Wings. Am. Nat. x. pp. 521–529.

A capital article treated in a popular manner, with good illustrative woodcuts, amplifying the studies of Saussure on the same subject.

Stål, C. Bidrag till södra Afrikas Orthopter-fauna. Œfv. Ak. Förh. xxxiii. No 3, pp. 29–76.

A list of species from Damara Land and Ovambo, with a few from Cape Colony. New genera and many new species are described.

——. Observations Orthoptérologiques. Sv. Ak. Handl. Bihang, iii. No. 14, pp. 1–43. In three parts:—(1) Sur une systématisation nouvelle des Phasmides; (2) Sur le système des Acridiides; (3) Diagnoses d'Orthoptères nouveaux.

——. Sur les caractères distinctifs des Locustiens et des Grylliens. CR. Ent. Belg. xix. pp. ix.–xii.

The main distinction between these families is that in the *Locustidæ* the anterior coxæ are very short and transverse, whereas in the *Gryllidæ* these parts are much longer, or longer than broad. Other characters are entered into in detail, and the position of some anomalous genera discussed.

Thomas, Cyrus. Report upon the collections of *Orthoptera* made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871–1874. In Wheeler's Rep. Geogr. Expl. W. of 100th Mer. (Washington: 1875, 4to), v. Zoology, chapt. xiii. pp. 845–908, pls. xliii.–xlv.

——. A List of *Orthoptera* collected by J. D. Putnam during the summers of 1872–1875, chiefly in Colorado, Utah, and Wyoming Territories. P. Davenp. Ac. i. pp. 249–264, pl. xxxvi.; followed (pp. 265 & 266) by notes by Putnam.

Woodward, Henry. On a remarkable fossil Orthopterous Insect from the Coal Measures of Scotland. J. G. Soc. xxxii. pp. 60–64, pl. ix.

Describes a singular fossil referred to the *Mantidæ*; concluding with a list of the known insects and *Arachnida* from the Palæozoic rocks. Additions, &c., to this list are given by Scudder, Geol. Mag. (2) iii. p. 519, and Heer, *l. c.* p. 520.

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*Pachytylopsis perseairii*. A critique on the position of this fossil, by Weyers and Van Volxem (posthumously), appears in CR. Ent. Belg. xix. pp. xxviii.–xxxiv. The conclusions arrived at are:—(1) It is doubtful if the impression be that of the wing of an Orthopteron; (2) it is absolutely certain that it is not that of an Acrydien.

Notes on capture and preservation; A. Durieu, Pet. Nouv. 1876, pp. 13 & 14.

## Forficulariæ.

Scudder, S. H. Brief Synopsis of North American Earwigs, with an appendix on the fossil species. Bull. U. S. Geol. Surv. ii. pp. 249–260.

A tabular synopsis of genera and species; the latter about 38 in number.

——. Critical and Historical Notes on *Forficulariæ*; including descriptions of new generic forms, and an alphabetical synonymic list of the described species. P. Bost. Soc. xviii. pp. 287–332.

The aim of this useful memoir is sufficiently indicated in the title. It

commences with brief historical notes; after which is an alphabetical list of the genera with annotations, including new generic divisions; then follows the synonymic list of species, which appear to number about 225, according to the author's views.

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*New genera and species* :—

*Anechura*, Scudder, *l. c.* p. 289, for *Forficula bipunctata*, F.

*Catamophora*, p. 291, for *Chelidura robusta*, Scudd.

*Chelisoches*, p. 295, for *Lobophora*, Serv., 1839, *nec* Curtis, 1825.

*Typhlolabia*, p. 300, for *Forficula* (?) *larva*, Philippi.

Scudder, Bull. U. S. Geol. Surv. ii., describes :—

*Cylindrogaster nigra*, p. 251, Pará (♀, ? apterous.)

*Labidura auditor*, p. 252, Natal.

*Chelisoches comprimens*, ibid., Africa.

*Ancistrogaster arthritica*, p. 253, Brazil, *gulosa*, p. 259, Mexico.

*Forficula variana*, p. 253, Liberia, *vellicans*, p. 254, Brazil, *luteipes* and *variicornis*, p. 255, Brazil, *hirsuta*, p. 256, Brazil, *vara*, p. 260, *tolteca*, p. 261, *exilis*, p. 262, Texas, *aculeata*, ibid. Illinois and Michigan.

*Labia arcuata*, p. 257, Brazil, *rotundata*, p. 263, Mexico, *brunnea*, p. 264, Cuba, *guttata*, p. 265, Texas, *burgessi*, p. 266, Florida, *melancholica*, p. 267, Texas.

*Neolobophora volsella*, p. 257, Mexico.

*Thermastris chontalia*, p. 258, Nicaragua.

*Spongophora forfex*, p. 259, ? Tropical America.

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*Forficula* (*Brachylabis*) *varicornis*, F. Smith, Ann. N. H. (4) xvii. p. 450, Rodriguez.

*Labidura tertiaria*, Scudder, Bull. U. S. Geol. Surv. i. p. 447, *lithophila*, id. *op. cit.* ii. p. 259, fossil, in tertiaries of Colorado.

## Blattidæ.

Plateau, Félix. Note sur les phénomènes de la digestion chez la Blatte Américaine (*Periplaneta americana*, L.). Bull. Ac. Belg. xli.

The author considers the digestive apparatus to be composed of (1) a buccal intestine, very large, divided successively into three portions, viz.: an œsophagus relatively short and narrow, an ample crop occupying a large portion of the abdomen, and a valvular apparatus (or gizzard); (2) a middle intestine of moderate length, having eight glandular cœca at its origin; (3) a terminal intestine. The food accumulates in the crop, and undergoes the action of the salivary glands; the feculent substances are transformed into glucose, and this first product of digestion is absorbed on the spot, and is not found afterwards; the valvular apparatus serves only as a triturator; the middle intestine receives the juice secreted by the glandular cœca, which is ordinarily alkaline, never acid, neutralising the acidity acquired by the food in the crop, transforming the albuminoids into soluble bodies capable of assimilation; the terminal intestine receives the residue of the food, and the urinary secretion of the Malpighian vessels.

*Homalodemas* and *Pollusca*, Stål, are respectively ♂ & ♀ of one genus, for which the former name is retained; Stål, Œfv. Ak. Förh. xxxiii. No. 3, p. 74.

*New genus and species*:—

*Cirphis*, Stål, *l. c.* Allied to *Oxyaloa*; type, *C. pallipes*, id. Damara Land.

*Ischnoptera bivittata*, Thomas, P. Davenp. Ac. i. p. 250, pl. xxx. [illegible] & 2, San Francisco.

*Ectobia heckeli*, Bolivar, An. Soc. Esp. v. p. 118. Ferrol.

*Panesthia nitidissima*, Wood-Mason, J. A. S. B. xlv. pt. 2, p. 189, S. India, *wallacii*, ibid., near Singapore, *flavipenn's*, p. 190, Nágá Hills, Brahmaputra Valley, &c.

*Homœogamia centriosus* [*-sa*], Scudder, Bull. U. S. Geol. Surv. i. p. 448, fossil in tertiaries of Colorado.

*Blattina sepulta*, id., Canad. Nat. viii. p. 89, fig. 1, fossil, in the Carboniferous of Cape Breton.

MANTIDÆ.

WOOD-MASON, J. On the femoral brushes of the *Mantidæ*, and their function. P. A. S. B. 1876, p. 123.

An abstract of a paper concerning a species of *Hierodula* from the Nicobars, in which attention is called to a brush of stiff hairs near the distal end of each fore femur, existing in it and in many other members of the family. He considers these brushes are used for cleaning the parts of the mouth after feeding; at p. 176, it is stated that the brushes are used for cleaning the eyes.

——. On the geographical distribution of *Schizocephala*, a genus of *Mantidæ*: id. *ibid.*

Contrary to the opinion of Saussure, to the effect that this genus is peculiarly African, it is one of the most widely distributed in India.

——. On the development of the antennæ in the pectinicorn *Mantidæ*: id. *l. c.* p. 228.

In *Gongylus gongylodes*, no difference in the antennæ of the sexes is observable down to the penultimate moult, when the pectinations in the male begin to develop.

——. Description of a new species of *Mantidæ*, with pointed eyes; Ann. N. H. (4) xviii. pp. 441–443.

Sexual differences in various species noticed by Wood-Mason, P. A. S. B. 1876, p. 175.

*Mantis religiosa* found abundantly near Fontainebleau; M. Girard, Bull. Soc. Ent. Fr. 1876, p. clxxix. Near Havre; A. Pérard, Feuil. Nat. vi. p. 155. At Mesnil (Marne); A. Béthune, *op. cit.* vii. p. 22.

*New genera*:—

*Antostia* (subg. n. of *Ameles*), Stål, Œfv. Ak. Förh. xxxiii. No. 3, p. 69. Type, *A.* (*A.*) *maculipennis*, sp. n., *ibid.*, Damara Land.

*Carvilia* (subg.-n. of *Fischeria*), id. *l. c.* p. 70; type, *F.* (*C.*) *saussurii*, sp. n., *ibid.*, Damara Land.

*Cilnia*, id. *l. c.* p. 71. Allied to *Hierodula*; type, *Mantis latipes*, Stål.

*Bisanthe*, id. *l. c.* p. 72. Allied to *Miomantis*; type, *Mantis pulchripennis*, Stål.

*Ceratomantis*, Wood-Mason, P. A. S. B. 1876, p. 75. Type, *C. saussurii*, Pegu (indicated but scarcely described).

*Lithomantis*. Woodward (J. G. Soc. xxxiii. p. 63) proposes this name for a singular fossil from the Coal Measures of Scotland, having some resemblance to the recent genus *Blepharis*, and described as *L. carbonarius*. On pl. ix. it is figured, with *Blepharis domina* for comparison.

*New species*:—

*Mantis latipes* and *pulchripennis*, Stål, Sv. Ak. Handl. Bihang, iii. No. 14, p. 43, S. Africa. *M. wheeleri*, Thomas, Wheeler's Report, v., Zoology, p. 849, ? Colorado.

*Phyllocrania westwoodi*, Wood-Mason, P. A. S. B. 1876, p. 176, Nágá Hills and Bhutan.

*Heterochæta tricolor*, id. Ann. N. H. (4) xviii. p. 441, Calcutta.

*Fischeria laticeps*, id. *l. c.* p. 337, Kolapur State.

## Phasmatidæ.

Scudder, S. H. Odoriferous glands in *Phasmidæ*. Psyche, i. pp. 137–140.

Two pores, situated one on each side of the prothorax in its upper anterior part (mistaken by Stål, according to the author, for stigmata), emit in many species an odoriferous fluid, secreted in sacs termed "glandulæ odoriferæ." These pores occur in both sexes, and the secretion is probably a means of defence, the insects being sluggish in their habits as compared with most other families of the order, and not furnished with raptorial members.

Stål, Sv. Ak. Handl. Bihang, iii. No. 3, pp. 3–21, enters into general remarks on the system adopted by him in Part iii. of his "Recensio Orthopterorum" (*cf.* Zool. Rec. xii. p. 490), and gives an analytical table of genera in a form that he considers more abridged, and in which the characters are more readily seizable. He thinks some of the numerous genera introduced in his 'Recensio' may be considered either as such or as sub-genera, according to the amount of knowledge possessed by the student, or his aptitude to understand the system in its fullest details. He himself thinks it better to consider them only as sub genera in some cases. The abridged table extends to 16 pages.

*Bacillus gallicus*, Charp. Anonymous notes on habits and transformations appear in Pet. Nouv. ii. pp. 77 & 78.

*New species*:—

*Bactrododema brevitarsis*, Stål, Œfv. Ak. Förh. xxxiii. No. 3, p. 67, Damara Land.

*Lonchodes verrucifer*, Wood-Mason, J. A. S. B. xlv. pt. 2, p. 47, pl. xi., South Andaman (*cf.* P. A. S. B. 1876, p. 95).

## Gryllidæ.

*Gryllotalpa borealis*, Burm. On its chirping: S. H. Scudder, Psyche, i. pp. 105 & 106; Am. Nat. x. pp. 97 & 98.

*New genera and species*:—

*Maxentius*, Stål, Œfv. Ak. Förh. xxxiii. No. 3, p. 63. Allied to *Stenopelmatus*; for *M. repens*, p. 64, Damara Land, and *fusco-fasciatus*, p. 76, Cape.

*Clearidas*, id. *l. c.* p. 64. Allied to *Gryllus*; type, *C. nigriceps*, p. 65, Damara Land.

*Rupilius*, id. *l. c.* p. 65. Type, *R. nigro-signatus*, p. 66, Damara Land.

*Gryllodes lineatus*, Scudder, in Wheeler's Rep. U. S. Surv. 1876, p. 279, Arizona.

*Gryllus insularis*, id. P. Bost. Soc. xviii. p. 268, Guadalupe Island.

## Locustidæ.

*Phaneroptera lilifolia*, F. Bellier de la Chavignerie, Pet. Nouv. 1876, p. 69, notes his observations on this insect in the environs of Voltaggio; he considers the var. *albicornis* as the most abundant form, and is sure that *P. margine-guttata* is also a variety of it.

*New genera*: —

*Enyalius*, Stål, Œfv. Ak. Förh. xxxiii. No. 3, p. 58, = *Eugastes*, div. a, Stål. Type, *Eugaster diadematus*, Stål.

*Melidia*, p. 60. Allied to *Phaneroptera*; type, *M. brunneri*, sp. n., *ibid.*, Damara Land.

*Diophanes*, id. Sv. Ak. Handl. Bihang, iii. No. 14, p. 38. Facies of *Platyphyllum* and *Meroncidius*; type, *D. rosaceus*, sp. n., p. 39, Chiriqui.

*Digllus*, p. 40. Allied to *Meroncidius*; type, *D. discophorus*, sp. n., p. 41, Chiriqui.

*Eppia*, p. 42. Allied to *Subria*; type, *E. truncatipennis*, sp. n., *ibid.*, Chiriqui.

*Plagiostira*, Scudder, in Wheeler's Rep. U. S. Surv. 1876, p. 281. With a shallow flat quadrate pronotum, carinate only laterally, the anterior portion projecting beyond the head; femora slender; supra-anal plate sharply angulate. Type, *P. albo-notata*, sp. n., *ibid.*, Northern New Mexico.

*New species*:—

*Scopiorus nigridens*, Stål, Sv. Ak. Handl. Bihang, iii., No. 14, p. 37, Chiriqui.

*Brisilis curvidens*, id. *l. c.* p. 39, Chiriqui.

*Meroncidius incurvus*, id. *l. c.* p. 41, Chiriqui.

*Callimenus dilatatus*, id. *l. c.* p. 42, Asia Minor.

*Tylopsis longipennis*, id. Œfv. Ak. Förh. xxxiii. No. 3, p. 58, Damara Land.

*Terpnistria lobulata*, id. *l. c.* p. 61, Ovambo and Caffraria.

*Eurycorypha brevicollis*, id. *ibid.*, Ovambo.

*Conocephalus ambiguus*, id. *l. c.* p. 62, Damara Land.

*Ceuthophilus utahensis*, Thomas, P. Davenp. Ac. i. p. 264, pl. xxxvi. fig. 8, Utah. *C. denticulatus*, Scudder, in Wheeler's Rep. U. S. Survey, 1876, p. 279, S. Colorado.

*Stiroxys melanopleura*, Scudder, *l. c.* p. 280, Los Angelos; *S. hermanni*, p. 904, pl. xliv. fig. 4, Arizona ?, *bilineata*, p. 905, pl. xlv. fig. 7, San Carlos, C. Thomas, in Wheeler's Report, v. Zoology.

*Stenopelmatus oculatus*, Scudder, Bull. U. S. Geol. Surv. ii. p. 261, Utah.

## ACRYDIIDÆ.

DODGE, G. M. Notes on variation in colour of *Œdipoda corallipes* and *Œ. cincta*. Canad. Ent. viii. pp. 101 & 102.

GERSTÄCKER, A. Die Wanderheuschrecke (*Œdipoda migratoria*, L.) gemeinverständliche Darstellung ihrer Naturgeschichte, Lebensweise, Schädlichkeit, und der Mittel zu ihrer Vertilgung. Berlin: 1876, 8vo.

A popular work; not seen by the Recorder.

KATTER, F. Die Vertilgung der Wanderheuschrecke. Ent. Nachr. ii. pp. 119 & 121.

MÜLLER, ALBERT. Ueber das Auftreten der Wanderheuschrecke. Verh. Ges. Andermatt, 1875, pp. 188–190; *cf.* Gard. Chron. (n. s.) v. p. 471.

Observations on a swarm of locusts in Switzerland, in August, 1875.

STÅL, Sv. Ak. Handl. Bihang, iii. No. 14, pp. 21–24, criticises his system as propounded in Part i. of his "Recensio Orthopterorum," and points out that, *inter alia*, his divisions founded on the length of the antennæ must be abandoned. He places more reliance upon the presence or absence of an apical spine on each margin of the upper side of the posterior tibiæ, and gives lists of genera that present these conditions.

*Caloptenus spretus*. In Riley's Rep. Ins. Mo. vii., more than half the volume (pp. 57–156) is occupied by the "Rocky Mountain Locust," principally consisting of detailed accounts of the great ravages caused by it in 1875; many new points in its natural history are cleared up, and suggestions thrown out for combating the pest in the future. In addition to figures of the species in various stages, and of its enemies, other allied insects are also figured, viz.:—*Acridium americanum*, *Œdipoda phœnicoptera*, *Brachypeplus magnus*, *Tragocephala viridifasciata*, and *Tettix granulosa*, as species sometimes mistaken for it. One lengthy chapter, "Locusts as food for man," is sufficiently explained by the title. As this Report embodies everything of importance published on the insect, it is not necessary to refer to the numberless notices published in (chiefly American) journals and newspapers. A good summary of its ravages in Manitoba and the North-west Territories in 1874, is given by G. M. Dawson, Canad. Nat. viii. pp. 120–134. See also J. C. Wise, Warren Smith, and Allen Whitman, "The Grasshopper, or Rocky Mountain Locust, and its ravages in Minnesota," a special report to the Governor. St. Paul: 1876, 8vo, pp. 50; also J. S. Pilsbury, C. V. Riley, and P. Pusey, on the Proceedings of a conference of the governors of several

Western States and Territories, held at Omaha, Nebraska, in Oct. 1876. St. Louis, 1876, 8vo, pp. 58. These have not been seen by the Recorder (*cf.* Psyche, ii. pp. 45 & 46).

Thomas, Wheeler's Report, v. Zoology, pp. 851–864, enters into a somewhat elaborate examination of the various arrangements proposed, and especially of the recent changes effected by Stål and Scudder, and gives a list of species affected, together with a catalogue of additions to the fauna of the United States since the publication of his Synopsis. He figures the following already known species :—*Pediosceretes nevadensis*, Thomas, pl. xiii. fig. 4; *Gomphocerus carpenteri*, Thomas, pl. xliv. fig. 5; *Tomonotus tenebrosus*, Scudder, pl. xliii. fig. 3; *Œdipoda neglecta*, Thomas, pl. xliv. fig. 3; *Acridium shoshone*, Geoff. pl. xliii. fig. 2.

*New genera and species :—*

Stål, Sv. Ak. Handl. Bihang, iii. No. 14, describes :—

*Rubellia*, p. 24. Allied to *Monistria* and *Paxilocerus*; type, *R. nigrosignata*, p. 25, Madagascar.

*Gyrtone*, p. 25. Perhaps allied to *Systella*; type, *G. compressa*, ibid., Malacca.

*Charilaus*, p. 26. Allied to *Atractomorpha*; type, *C. carinatus*, ibid., Transvaal.

*Munatia*, p. 28. Allied to *Procolpia*; type, *M. punctata*, ibid., Chiriqui.

*Euthymia*, p. 29. Type, *E. melanocerca*, ibid., Madagascar.

*Gergis*, ibid. Type, *G. pallidinervis*, ibid., Madagascar.

*Hysia*, p. 30. Allied to *Oxya*; type, *H. nigricornis*, ibid., Madagascar.

*Cratippus*, p. 31. Types, *C. bufo* and *rana*, ibid., Australia.

*Lilæa*, p. 33. Allied to *Eremobia*; type, *L. depressa*, ibid., habitat unknown.

*Methone*, p. 34. Allied to *Eremobia*; type, *M. andersoni*, ibid., Damara Land.

*Thericles*, p. 35. Allied to *Mastax*; types, *T. obtusifrons* and *compressifrons*, p. 36, South-west Africa.

*Erucius*, p. 36. Type, *Mastax agrionoides*, Haan.

*Erianthus*, ibid. Allied to *Choratypus*; type, *Mastax guttata*, Westw.

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*Parmilis* (= ? *Acricera*, Serv.), subg. of *Xiphocera*, id. Œfv. Ak. Förh. xxxiii. No. 3, p. 35.

*Hoplophola*, subg. of *Xiphocera*, id. *l. c.* p. 36. Type, *X.* (*H.*) *serrata*, ibid., Damara Land.

*Trachytettix*, id. *l. c.* p. 57. Allied to *Tettix*; type, *T. scaberrimus*, ibid., Damara Land.

*Hesperotettix*, Scudder, Bull. U. S. Geol. Surv. ii. p. 262. Allied to *Pezotettix* and *Caloptenus*; type, *Ommatolampis viridis*, Thomas.

*Mestobregma*, id. *l. c.* p. 264. Allied to *Psinidia*; type, *Œdipoda plattii*, Thomas.

*Circotettix*, id. *ibid.* Allied to *Ctyphippus*; type, *Œdipoda undulata*, Thomas.

*Aulocara*, id. *l. c.* p. 266. Allied to *Acrotylus*; types, *A. cæruleipes*, ibid., and *decens*, p. 267, Colorado.

*Brachystola*, Scudder, *l. c.* p. 267, proposed in lieu of *Brachypeplus*, Girard, pre-occupied in *Coleoptera*.

*Œdocara*, id., in Wheeler's Rep. U. S. Surv. 1876, p. 289. Allied to *Œdaleus*; type, *Œ. strangulatum*, ibid., S. Colorado.

*Stirapleura*, id. *l. c.* p. 290. Allied to *Œdocara*; type, *S. decussata*, ibid., S. Colorado.

*Dissosteira*, id. *l. c.* p. 291. Types, *Gryllus carolinus*, L., and *Œdipoda longipennis*, Thomas.

*Hadrotettix*, id. *ibid.* Type, *Gryllus trifasciatus*, Say.

*Trachyr*[*r*]*hachys*, id. *ibid.* Allied to *Trilophidia*; types, *T. aspersa* and *coronata*, p. 292, Northern New Mexico.

*Derotmema*, id. *l. c.* p. 293. Closely allied to *Psinidia*; type, *D. cupidineum*, ibid., Northern New Mexico.

*Anconia*, id. *l. c.* p. 294. Aspect of *Trimerotropis*, but differing in nearly all its structural characters; type, *A. integra*, p. 295, S. California.

*Monistria conspersa*, Stål, Sv. Ak. Handl. Bihang, iii. No. 14, p. 25, Australia.

*Pyrgomorpha granulata*, id. *l. c.* p. 26, South Africa.

*Porthetis sabulosus*, id. *ibid.*, and *serratus*, id. *l. c.* p. 27, South Africa.

*Dericoris acutispina*, id. *l. c.* p. 27, Egypt.

*Tropinotus granulatus*, id. *ibid.*, Monte Video.

*Colpolopha burmeisteri*, id. *ibid.*, Venezuela.

*Elaochlora granulosa*, id. *l. c.* p. 28, Bogotá.

*Traulia specularia*, id. *l. c.* p. 31, Malacca.

*Platyphyma vittipennis*, id. *ibid.*, Cape.

*Oxya polychroa*, id. *ibid.*, Malacca, *punctatissimus*, id. *l. c.* p. 33, West Africa.

*Eremobia biloba, cinerascens*, and *subsulcata*, id. *l. c.* p. 35, Persia; *E. magna*, Thomas, Wheeler's Report, v. p. 886, pl. xlv. fig. 1, Lower Arizona.

*Cycloptera incisa*, Stål, *l. c.* p. 37, Chiriqui.

*Ochrophlebia violacea*, id. Œfv. Ak. Förh. xxxiii. No. 3, p. 32, Ovambo.

*Phymateus baccatus*, id. *l. c.* p. 33, Damara Land.

*Xiphocera* (*X.*) *sparmani* and *arenosa*, p. 37, and *X.* (*Porthetis*) *punticornis*, p. 39, Damara Land, *id. l. c.*

*Euryphymus curvipes*, p. 41, and *vylderi*, p. 42, Damara Land, *id. l. c.*

*Calliptenus pallidicornis*, id. *l. c.* p. 43, Damara and Ovambo.

*Euprepocnemis prasinata* and *ambigua*, id. *l. c.* p. 44, Damara Land.

*Tristria nigro-taniata*, id. *l. c.* p. 45, Damara Land.

*Ochrilidia brevipes*, id. *l. c.* p. 47, Damara Land and Ovambo.

*Pnorisa tricarinata*, id. *l. c.* p. 48, Ovambo.

*Phlæoba chloronota*, id. *ibid.*, Damara Land.

*Epacromia temporalis*, id. *l. c.* p. 49, Ovambo and Sierra Leone.

*Pachytylus sulcicollis* and *P.* (*Œdaleus*) *punctifrons*, p. 50, Damara Land, *id. l. c.*

*Spinetonotus scabriculus*, id. *l. c.* p. 51, Damara Land.

*Acrotylus angulatus*, id. *l. c.* p. 52, Ovambo.

*Thericles puberulus*, id. *l. c.* p. 56, Damara Land.

*Tettix latipes*, id. *ibid.*, Damara Land; *T. tuerki*, Krauss, Ent. MB. i. p. 103, Vienna.

*Pezotettix tellustris*, p. 282, N. New Mexico and S. Colorado, *plagosus* and *vivax*, p. 284, N. New Mexico, *marginatus*, ibid., and *jucundus*, p. 285, California, *enigma*, p. 285, Santa Barbara and Los Angelos, Scudder. Wheeler's Rep U. S. Survey, 1876. *P. oregonensis*, p. 888, pl. xlv. figs. 2 & 3, Oregon, *marshalli*, p. 889, pl. xlv. fig. 4, S. Colorado, *humphreysi*, p. 890, S. Arizona, Thomas, Wheeler's Report, v. *P. gracilis* and *occidentalis*, Bruner, Canad. Ent. viii. p. 124, Nebraska. *P. junius*, p. 9, *autumnalis* and *alba*, p. 10, Nebraska, Dodge, Canad. Ent. viii. *P. nigrovittatus*, Stål, Sv. Ak. Handl. Bihang, iii. No. 14, p. 32, Mexico.

*Dociostomus ornatus*, Scudder, Wheeler's Rep. U. S. Survey, 1876, p. 287, N. New Mexico.

*Arphia teporata*, p. 288, S. Colorado, N. New Mexico, and Texas, *id. l. c.* *Phlibostroma parvum*, id. *l. c.* p. 290, N. New Mexico.

*Psinidia sulcifrons*, id. *l. c.* p. 293, S. California.

*Trimerotropis vinculata*, p. 270, Guadalupe Island, California, and New Mexico; *lauta*, p. 271, Guadalupe Island, *id.* P. Bost. Soc. xviii. *T. obscura* and *pseudo-fasciata*, Santa Cruz Island and S. California, *id.* Wheeler's Rep. U. S. Survey, p. 294, N. New Mexico. *T. citrina*, Colorado and Texas, *suffusa*, Utah, California, and Vancouver's Island, *id.* Bull. U. S. Geol. Surv. ii. p. 265. *T. fontana*, Thomas, P. Davenp. Ac. i. p. 255, pl. xxxvi. fig. 5, Utah.

*Syrbula fusco-vittata*, Thomas, in Wheeler's Report, v. p. 870, pl. xliii. fig. 5, Lower Arizona.

*Chrysochraon decorum*, Scudder, Bull. U. S. Geol. Surv. ii. p. 262, Colorado.

*Scyllina delicatula*, id. *l. c.* p. 263, Colorado.

*Arphia arcta*, id. *ibid.*, Colorado.

*Psoloessa* (?) *coloradensis*, Thomas, P. Davenp. Ac. i. p. 252, pl. xxxvi. figs. 3 & 4, Colorado.

*Cratypedes putnami*, id. *l. c.* p. 257, fig. 6, Colorado.

*Œlipoda hoffmani*, p. 876, Arizona, *wheeleri*, p. 879, pl. xliv. fig. 1, Arizona ?, *utahensis*, pl. xliv. fig. 2, Utah, and *sparsa*, New Mexico, p. 883, *id.* Wheeler's Report, v. *Œ. nebrascensis*, Bruner, Canad, Ent. viii. p. 123, Nebraska.

*Acridium vagum*, Scudder, P. Bost. Soc. xviii. p. 269, Guadalupe Island and California. *A. rugosum*, Provancher, Nat. Canad. viii. p. 135, Quebec. *A. albo-lineatum*, Thomas, in Wheeler's Report, v., p. 897, pl. xliii. fig. 1, ? Arizona.

*Chloealtis canadensis*, Provancher, Nat. Canad. viii. p. 135, Quebec.

*Caloptenus sanguinolentus*, p. 109, *parvus*, p. 116, Quebec, *id.* l. c. *C. yarrowi*, Thomas, in Wheeler's Report, v. p. 894, pl. xlv. fig. 6, ? Arizona. *C. lurida* and *regalis*, Dodge, Canad. Ent. viii. p. 11, Nebraska.

*Acrocera brunneri*, Bolivar, An. Soc. Esp. iv. p. 118, pl. xi. fig. 7, Spain.

*Gomphocerus* (*Stenobothrus*) *uhagoni*, p. 324, pl. xii. fig. 12, *bolivari* (Brunner), p. 327, pl. xii. fig. 10, Spain, *id.* l. c. *G. navicula*, Scudder, in Wheeler's Rep. U. S. Survey, 1876, p. 286, S. Colorado and N. New Mexico.

# RHYNCHOTA.

BY

E. C. Rye, F.Z.S., M.E.S.

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Lethierry, L., & Puton, A. Faunule des Hémiptères de Biskra. Ann. Soc. Ent. Fr. (5) vi. pp. 13–56, pl. ii. [i. in error].

114 species are recorded, of which those new have been for the most part diagnosed in Pet. Nouv. The fauna is not well defined. Some of the species have a marked analogy with those from Sarepta.

Puton, A. Notes pour servir à l'étude des Hémiptères. *Tom. cit.* pp. 275–290.

Descriptions of new or little known species (including some already diagnosed in Pet. Nouv. by the author), with notes on distribution and synonymy.

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Captures in Gt. Britain: J. W. Douglas, Ent. M. M. xiii. p. 112. In France: Lucante, Pet. Nouv. ii. p. 15.

## HEMIPTERA–HETEROPTERA.

Jakowleff [Yakovleff, Jacovleff, or Jacovlev], B. "Matériaux pour servir à une faune Entomologique de la Russie d'Europe," Art. iv. Troudy Ent. Ross. viii. (1876) pl.

In the Revue Bibliographique of Hor. Ent. Ross. xi. pp. vii. & viii., S. Solsky gives the above title, with an analysis of the publication, which contains many notices on the geographical distribution of 219 species. The following new genera and species are stated to be therein characterized and well figured:—

*Pachycnemis*, (*Cydnides*) for *P. henkei*, Steppes at the mouth of the Volga.

*Stirogaster*, (*Reduviides*) near *Oncocephalus*, for *S. fausti*, Krasnovodsk.

*Centroscelis* [? *-scelis*], (*Reduviides*), for *C. spinosus*, Astracan and Derbent.

[*H*] *Oplistopus*, (*Reduviides*) for *O. cristophi*, Krasnovodsk.

*Leprosoma tuberculatum* and *Mormidea varicornis*, Mt. Bogdo, *Megalonotus villosus*, Daghestan Alps, *Macropterna minuta*, Astracan *Dic-*

*tyonota sareptana*, Sarepta, *Tingis inermis*, Astracan, *Holotrichius tristis*, Mangyschlak.

——. Nobuia Polujestkokrilia (Hemiptera-Heteroptera) Russkoi Faunui. Bull. Mosc. 1876, pt. 2, pp. 85–124.

Latin names, German diagnoses, and Russian descriptions of various new genera, species, and varieties, nearly all from the Ussuri, a river of Eastern Siberia.

Reiber, F., & Puton, A. Catalogue des Hemiptères-hétéroptères de l'Alsace et de la Lorraine. Colmar: 1876, pp. 40.

This Catalogue, originally published in Bull. Soc. Colm. 1875 & 1876, contains 494 species, with observations on localities, &c. For notice, *cf.* Pet. Nouv. ii. p. 64.

Saunders, E. Synopsis of British Hemiptera-Heteroptera. Tr. E. Soc. 1876, pt. iii. pp. 613–655, pl. xii.

*Microphysidæ* to end, with addenda. The plate contains figures of species of *Salda*.

Stål, C. Enumeratio Hemipterorum. Bidrag till en Förteckning öfver alla hittills kända Hemiptera, jemte systematiska Meddelanden. Sv. Ak. Handl. (n.f.) xiv. [for 1875; published in 1876], No. 4, pp 1–162.

This, the 5th of the author's papers on this subject, consists of "Enumeratio Plataspinorum," pp. 1–16; "Enumeratio Cydninorum Extra-europæorum," pp. 17–27; "Enumeratio Pentatomidarum Africæ, Asiæ, et Australiæ," pp. 28–130; "Enumeratio Phymatidarum," pp. 131–136; "Enumeratio Galgulidarum," pp. 137–140; "Enumeratio Naucoridarum," pp. 141–147; and general index to this part. Many new genera and species are characterized, and much synonymy is given.

Uhler, P. R. Report upon the Collections of *Hemiptera* made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1873, and 1874. In Wheeler's Rep. Geogr. Explor. W. of 100th Mer. (Washington: 1875, 4to), v. Zoology, chap. xii. pp. 827–842, pl. xlii.

Forty-one species of *Heteroptera* are recorded, whereof 6 are new, and one represents a new genus. One Homopterous species only is noticed.

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Captures in Scotland: E. C. Champion, Ent. M. M. xiii. p. 112. In S. England: E. Saunders, *tom. cit.* p. 113.

Additions to the Finland fauna (6 spp.); J. Sahlberg, Medd. Soc. Fenn. i. pp. 87–90. O. M. Reuter (3 spp.), *tom. cit.* pp. 137 & 138 (*cf.* also p. 146).

No Hemipterous insect is known to suck the juices of diseased or dead in preference to sound or living plants or animals; J. Lichtenstein, Ann. Ent. Belg. xix. p. 165.

Mimicry in *Hemiptera*; O. M. Reuter, *l. c.* pp. 136 & 137.

## Pachycoridæ.

*Cryptacrus pinguis*, Germ., from the Cape of Good Hope, found living in London; J. Scott, Ent. M. M. xii. p. 236.

## Eurygastridæ.

*Dybowskyia*, g. n., B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 85. Near *Ancyrosoma* and *Psacasta*. For *B. ussuriensis*, sp. n., *id. l. c.* p. 87, R. Ussuri.

## Odontoscelidæ.

*Corimelæna extensa*, Uhler, figured; Wheeler's Rep. *l. c.* v. pl. xlii. fig. 6.

## Plataspididæ.

C. Stål, Sv. Ak. Hndl. (n.f.) xiv. No. 4, pp. 1–16, enumerates the known species, characterizing as new genera and species:—

*Scleropelta*, p. 4 in table, between *Brachyplatys* and *Osca*; for *S. lateralis*, p. 9, Borneo.

*Tropidotylus*, p. 4 in table, between *Coptosoma* and *Probænops*; for *T. fasciolatus*, p. 15, Ceylon.

*Brachyplatys nigripes*, p. 8, Philippine Isles.

*Coptosoma elegans*, p. 11, Borneo, *australica* [*-cum*] and *lyncea* [*-ceum*], p. 12, *podagrica* [*-cum*], p. 13, North Australia, *pardalina* [*-num*], E. India, *tigrina* [*-num*], Cochin China, *punctiventris* [*-re*], Malacca, p. 13.

## Cydnidæ.

Stål, *l. c.* pp. 17–27, enumerates the known extra-European species, characterizing as new:—

*Cephalocteus punctipennis*, p. 21, Cape of Good Hope.

## Pentatomidæ.

Stål, *l. c.* pp. 28–130, enumerates the known African, Asian, and Australian species, characterizing as new genera and species:—

*Aglaophon*, p. 36 in table, between *Pœcilometis* and *Bathrus*; for *A. varius*, p. 42, Brisbane.

*Aleria*, p. 37 in table, between *Peltasticus* and *Mustha*; for *A. asopoides*, p. 47, Madagascar.

*Anaxarchus*, p. 56 in table, between *Dictyotus* and *Macromolus*; for *A. pardalinus*, p. 72, Australia (Moreton Bay).

*Æsula*, p. 57 in table, after *Theloris*; for *Pentatoma viridissima*, Sign.

*Æthemenes*, p. 57 in table, after *Æsula*; for *P. nigro-punctata*, Sign, and *P. unicolor*, St.

*Agatharcus*, p. 57 in table, between *Palomena* and *Carpocoris*; for *Cimex linea*, Klug, and *A. jalloides*, p. 76, Persia.

*Hegelochus*, p. 57 in table, following *Dolycoris*; for *Pentatoma tristicula*, St.

*Audocides*, p. 57 in table, next before *Veterna*; for *Pentatoma vittaticeps*, St.

*Adria*, p. 58 in table, between *Ilerda* and *Diploxys*; for *Pentatoma parvula*, Dall.

*Commius*, p. 62 in table, between *Chalcocoris* and *Coquerelia*; for *Cimex elegans*, Don.

*Anaxilaus*, p. 63 in table, following *Coquerelia*; for *Pentatoma camatula*, Dall., with which *Cimex vesiculosus*, H. S., is queried as identical.

*Hyrmine*, p. 63 in table, following *Anaxilaus*; for *Cimex 6-punctatus*, L. (of which *Rhaphidogaster nigrifascia*, Walk., and *Vulsirea hemichloris*, Voll., are varr.), and *Pentatoma chlorina*, St.

*Acesines*, p. 65 in table, between *Critheus* and *Flaminia*; for *A. breviceps*, p. 96, E. India.

*Ægaleus*, p. 66 in table, between *Menida* and *Amphimachus*; for *Cimex lineatus*, Thunb., &c.

*Anchesmus*, p. 66 in table, following *Piezodorus*; for *A. ruficornis*, p. 100, Egypt.

*Ambiorix*, p. 66 in table, following *Anchesmus*; for *A. æneseens*, p. 100, N. Hindostan.

*Anaximenes*, p. 66 in table, following *Ambiorix*; for *Nezara confluenta*, Montr. & Sign.

*Alciphron*, p. 67 in table, following *Anaximenes*; for *Cimex glaucus*, F.

*Abeona*, p. 67 in table, between *Jurtina* and *Ocirrhoe*; for *A. gladiatoria*, p. 102, E. India.

*Agathocles*, p. 69 in table, between *Tropidocoris* and *Amyntor*; for *A. limbatus*, p. 106, Silhet.

*Æsepus*, p. 108 in table; *Acanthosomina*, next *Sangarius*, for *A. signoreti*, p. 110, Australia.

*Agamedes*, p. 109 in table, following *Æsepus*; for *A. pilicornis*, p. 111, Cape Colony, Graham's Town.

*Abulites*, p. 109 in table, before *Anubis*; for *Cimex sparsus*, Germ.

*Andriscus*, p. 109 in table, following *Duadicus*; for *D. recurvus*, Walk.

*Anaxandra*, p. 110 in table, following *Sastragala*; for *Acanthosoma refuscens* and *cornutum*, Dall., and *An. nigro-lineata*, Darjeeling, and *sigillata*, E. India, p. 114.

*Brachycerocoris afer*, p. 31, Damara Land.

*Deroploa curvicornis*, p. 32, Rockhampton, Australia.

*Testrica emarginata* and *bubula*, N. Australia, and *T. hadulea*, W. Australia, *ibid.*

*Niarius venosus*, p. 38, Rockhampton.

*Eumecopus calidus*, p. 40, *vitticentris*, *punctiventris*, *acanthopygius*, and *fuscescens*, Australia.

*Dalpada pilicornis*, p. 44, Nilgerry Hills.

*Mustha incana*, p. 48, Persia.

*Dolycoris indicus*, p. 76, Deccan, Darjeeling.

*Ilerda pugnax*, p. 77, Zanzibar.

*Stollia fasciolata*, p. 81, N. and E. Australia.

*Alcimus coronatus*, p. 88, Deccan.
*Catacanthus violarius*, p. 89, Waigiou.
*Zangis virginea*, p. 93, Ceylon.
*Antestia trivialis*, p. 96, Zanzibar.
*Menida signoreti*, p. 98, E. India (? Africa).
*Jurtina bipunctula*, p. 101, Island of Réunion.
*Cuspicona laminata*, p. 102, New Caledonia.
*Tropidocoris læviventris*, p. 105, *punctipes*, p. 106, E. Indies.
*Placosternum alces* and *urus*, p. 107, Ceylon.
*Microdeuterus insulanus*, p. 113, Philippine Isles.
*Urochela guttulata*, p. 115, *pilosa*, p. 116, Darjeeling.
*Urolabida uniloba*, p. 117, Darjeeling.
*Phyllocephala volxemi*, p. 121, Lagos.
*Diplorrhinus quadricornis*, p. 122, N. Hindostan.
*Gellia punctulata*, p. 123, Old Calabar.

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*Strachia festiva*, L., var. n. *albiventris*; B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 105.

*Homalogonia*, g. n., *id. l. c.* p. 89. Near *Carpocoris*, Kti.; for *H. maculata*, sp. n., *id. l. c.* p. 90, R. Ussuri.

*Stromatocoris*, g. n., *id. l. c.* p. 92. Near *Piezodorus*; for "*Stamocnus*" [= *S. amœnus*], p. 93, and *musivus*, p. 96, spp. nn., *id. l. c.*, R. Ussuri.

*Renardia*, g. n., *id. l. c.* p. 99. Near *Rhaphidogaster*; for *R. decempunctata*, Mots.

*Acrocoris*, g. n., *id. l. c.* p. 102. Apparently referred to the *Rhaphidogastrini*; for *A. serraticollis*, sp. n., *id. l. c.* p. 104, R. Ussuri.

*Dino[r]rhynchus*, g. n., *id. l. c.* p. 107. *Asopini*, near *Podisus*. For *D. dybowskii*, sp. n., *id. l. c.* p. 109, Island Askold.

*Neottiglossa metallica*, sp. n., *id. l. c.* p. 88, R. Ussuri.

*Elasmostethus dorsalis*, sp. n., *id. l. c.* p. 106, R. Ussuri.

*Lioderma viridicata* [*-tum*], sp. n., Uhler, in Wheeler's Rep. *l. c.* v. p. 830, pl. xlii. fig. 11, Colorado.

## Coreidæ.

*Alydus calcaratus*. "Nympha" described, simulating leaf of *Trifolium*; O. M. Reuter, Medd. Soc. Fenn. i. pp. 136 & 137.

"*Gonocerus*" *annulipes*, H. Luc., additionally characterized; it is between *Ceraleptus* and *Bothrostethus*, and is referred in preference to the latter genus. A. Puton, Bull. Soc. Ent. Fr. (5) vi. p. xxxiv.

*Metapodius thomasi*, Uhler, = *granulosus*, Dall., var.; P. R. Uhler, in Wheeler's Rep. *l. c.* v. p. 831.

*Dasycoris humilis*, Uhl., figured, *l. c.* pl. xlii. fig. 8, hemi-elytrous form.

*Scolopocerus*, g. n., P. R. Uhler, *l. c.* p. 832. General features of *Dasycoris*: no differential characters given. For *S. secundarius*, sp. n., *id. l. c.* p. 833, pl. xlii. fig. 5, Arizona.

*Leptocerea*, g. n., B. Jakowleff, Troudy Ent. Ross. vii. (1874) p. 39.

For *L. viridis*, sp. n. [See Zool. Rec. xi. p. 467. The genus is referred to as new by S. Solsky, in his analysis of this inaccessible and unintelligible publication, in the Revue Bibliographique of Hor. Ent. Ross. xi. p. vi. Solsky spells it *Leptocerwa*; it = *Agraphopus*, Stål, *teste* Puton, Cat. Hém. ed. 2, p. 18.]

### Berytidæ.

*Berytus setipennis*, E. Saunders, Ent. M. M. xiii. p. 102, Malta; *B. pilipes*, A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 275, no locality given: spp. nn.

### Lygæidæ.

Some Belgian species enumerated; G. v. Horváth, CR. Ent. Belg. xix. pp. xc.–xcii. Further species by A. De Borre, *l. c.* p. xcii.

*Lygæus venustus*, Böb., var. n. *marginatus*, from R. Ussuri; B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 110.

*Lygæus affinis*, Jakow., = *tristrami* [script. *tristami*], D. & S.; A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 290.

*Nysius angustatus*, Uhl, figured; Uhler, *l. c.* pl. xlii. fig. 1.

*Plinthisus* monographed; G. v. Horváth, Verh. z.-b. Wien, xxvi. pp. 721–736. *P. minutissimus*, *pusillus*, *major*, *flavipes*, and *brevipennis* are dimorphous. *P. latus*, Reut., and *mellæ*, Ferrari, are respectively macropterous and brachypterous forms of *P. pusillus*, Scholtz; *P. hungaricus*, Horv., = *longicollis*, Ferr., = *convexus*, Fieb.; *P. flavipes* and *pubescens*, Ferr., = *longicollis*, Fieb.: *P. longipennis*, Ferr., = *bidentulus*, H.-S., = *brevipennis*, Latr.; *P. flavipes*, Fieb., var. n. *coracinus*, from Corfu and Cephalonia, p. 733.

*Trapezonotus dispar*, Stål, new to Britain; J. W. Douglas, Ent. M. M. xii. p. 222.

*Isioscytus*, subg. n. of *Plinthisus*; Horváth, Verh. z.-b. Wien, xxvi. p. 727. Unites *Plinthisomus* and *Plinthisus*; for *P. ptilioides*, Puton.

*Melanocoryphus erythropterus*, sp. n., A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 276, Syra.

*Lygæosoma lowii*, sp. n., E. Saunders, Ent. M. M. xiii. p. 103, Galilee.

*Ischnodemus championi*, sp. n., *id. ibid.*, Cephalonia.

*Macropterna lethierrii*, sp. n., *id. op. cit.* xii. p. 221, Attica.

*Plociomerus douglasi*, sp. n., F. B. White, Ent. M. M. xiii. p. 105, New Zealand.

*Megalonotus sodalicius* [sic], sp. n., Uhler, *l. c.* p. 835, pl. xlii. fig. 2, California, Oregon, Nevada, Texas.

*Plinthisus* (*Plinthisomus*) *megacephalus*, Spain, *P. pilosellus*, Tangiers, *putoni*, Béziers and Algeria, and var. *coarctatus*, Algeria and Portugal, *angulatus*, Persia, and *major*, Algeria, spp. nn., G. v. Horváth, Pet. Nouv. ii. p. 81; also in Verh. z.-b. Wien, xxvi. pp. 725, 728, 729, 731, & 732.

*Calyptonotus putoni*, Algeria, *walkeri*, Malta, spp. nn., E. Saunders, Ent. M. M. xii. p. 221.

*Scolopostethus brevis*, sp. n., *id. ibid.*, Malta.

## ANTHOCORIDÆ.

*Myrmedobia tenella*, Zett., and *Acompocoris alpinus*, Reut., new to Britain; E. Saunders, *l. c.* p. 249.

*Microphysa bipunctata*, Perr., ♂ described; É. Perris, Ann. Soc. Ent. Fr. (5) vi. p. 198, Mt. de Marsan. It attacks *Acari*; l. c. p. 212.

*Xylocor[io] idea*, g. n., O. M. Reuter, Pet. Nouv. ii. p. 54. Differs from *Xylocoris* in proportions of antennal joints, distance of eyes from apex of pronotum, narrower pronotum, and abbreviate hemi-elytra; and from *Scoloposcelis* in its slender femora and shorter rostrum. *X. brevipennis*, sp. n., *id. l. c.* p. 55, Lyons.

*Scoloposcelis angustus*, sp. n., *id. l. c.*, p. 55, Greece.

## CAPSIDÆ.

S. C. Snellen van Vollenhoven, Tijdschr. Ent. xix. pp. 65–132, pls. iii.–v., in the 6th part of his "Inlandsche Hemipteren," continues his descriptive account of the Netherlands' species (one new species), figuring various species of *Lygus* and *Dicyphus*.

*Lopus sulcatus*, Fieb., from S. England; E. Saunders, Ent. M. M. xii. p. 186.

*Lopus satyriscus*, Scott, is an *Orthocephalus*, very near *flavo-marginatus*, Costa; A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 282.

*Hadrodema militare*, Uhl., fig. 12, *Calocoris palmeri*, Uhl., fig. 4, and *Lygus annexus*, fig. 10; Uhler, *l. c.* pl. xlii.

*Orthocephalus tenuicornis*, Muls. & R., is distinct from *O. saltator*, Hahn; O. M. Reuter, Pet. Nouv. ii. p. 33.

*Plesiodema pinetellum*, Zett., and *Psallus diminutus*, Krschb., from Scotland; *id.* Ent. M. M. xiii. pp. 85 & 86. *Agalliastes wilkinsoni*, D. & S., forma macroptera, and protective variation in *Megalocerœa ruficornis*, Fall., also in Scotland; *id. l. c.* p. 87.

*New genera and species*:—

*Bothrocranum*, O. M. Reuter, Pet. Nouv. ii. p. 54. *Cyllocoraria*: near *Loxops*. For *B. freyi*, ibid., Engadine.

*Phœnicocapsus*, id. *ibid.* Near *Macrocoleus*: for *P. regina*, ibid., Spain.

*Omphalonotus*, id. *l. c.* p. 26. Between *Systellonotus* and *Eroticoris*: for *Capsus 4-guttatus*, Krschb., from Hungary and Alsace.

*Allo[r]rhinocoris*, id. *l. c.* p. 33. *Miraria*: allied to *Pantilius*. For *Conometopus prasinus* (Fieb. ?), S. Russia.

*Saundersia*, id. ibid. *Capsaria*: for *S. morens*, ibid., Greece.

*Ethelastia*, id. *l. c.* p. 34. Near *Cremnocephalus*: for *E. inconspicua*, ibid, Sarepta.

*Hyoidea*, id. *ibid.* Near *Orthotylus*: for *H. notaticeps*, ibid., Sarepta and Hungary.

*Miris instabilis*, Uhler, *l. c.* p. 836, pl. xlii. fig. 9, Colorado (= *M. lævigatus*, L., forma occidentalis).

*Lopus affinis*, B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 115, Kurusch (Caucasus); *L.* (? g. n.) *vittatus*, G. von Horváth, Pet. Nouv. ii. p. 15, N. Hungary.

*Phytocoris jakovleffi*, Sarepta, *insignis*, Caucasus, O. M. Reuter, Pet. Nouv. ii. p. 33.

*Calocoris superbus*, Uhler, *l. c.* p. 838, pl. xlii. fig. 3, California; *C. rubripes*, Jakowleff, *l. c.* p. 115, R. Ussuri; *C. vicinus*, G. von Horváth, Pet. Nouv. ii. p. 15, S. Hungary.

*Derwocoris* (*Calocoris*) *zelleri*, J. Scott. Ent. M. M. xiii. p. 104, Palermo.

*Pycnopterna persica*, O. M. Reuter, Pet. Nouv. ii. p. 5, Astrabad.

*Lygus aurantiacus*, S. C. Snellen van Vollenhoven, Tijdschr. Ent. xix. p. 103, "Holland;" *L. adustus*, Jakowleff, *l. c.* p. 117, R. Ussuri.

*Globiceps sordidus*, O. M. Reuter, Pet. Nouv. ii. p. 21, Pesth.

*Orthotylus schoberiæ*, id. *l. c.* p. 34, Hungary.

*Heterotoma diversipes*, A. Puton, Bull. Soc. Ent. Fr. (5) vi. p. xxxix., Corsica.

*Oncotylus nigricornis*, E. Saunders, Ent. M. M. xii. p. 222, La Rochelle.

*Macrocoleus dissimilis*, p. 21, Buda, *mellæ*, p. 54, Italy, O. M. Reuter, Pet. Nouv. ii.

*Macrotylus melanocerus*, A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 282, Algeria.

*Amblytylus horvathi*, O. M. Reuter, Pet. Nouv. ii. p. 21, Buda.

*Harpocera hellenica*, id. *ibid.*, Greece.

*Atractotomus albipennis*, Sarepta, *validicornis*, Avignon, *id. ibid.*

*Psallus wollastoni*, id. Ent. M. M. xiii. p. 154, Madeira; *P. rubronotatus*, Jakowleff, *l. c.* p. 119, Sarepta.

*Apocremnus anticus*, O. M. Reuter, Pet. Nouv. ii. p. 22, S. Russia.

*Auchenocrepis reuteri*, Jakowleff, *l. c.* p. 120, Krasnovodsk (connects *A. foreli*, Muls., and *A. albo-scutellata*, Put., all three being varr. of one species; Lethierry & Puton, Ann. Soc. Ent. Fr. 5, vi. p. 38, note.)

*Plagiognathus punctiveps*, p. 22, Sarepta, *plagiathus*, p. 54, Italy, O. M. Reuter, Pet. Nouv. ii.

*Criocoris mœstus*, id. *l. c.* p. 22, Buda.

*Agalliastes pumilus*, Jakowleff, *l. c.* p. 121, Astracan.

## Tingididæ.

*Serenthia minuta*, Horv., = *depressa*, Jakow.; A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 290.

*Monanthia humuli*, F.; pupa described and figured. Ritsema, Tijdschr. Ent. xix. Verslag, p. xliii. See also Groll, *l. c.* p. cvii.

*Kalama*, subg. n. of *Campylostira*, for *Dictyonota putoni*, Stål.; A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 34. A new species, *K. coquereli*, id. *ibid.* note, from Oran, causes the author to refer this subgenus to *Dictyonota*: in it, the three prothoracic keels are detached from the disc in front, forming three sharp spines.

*Galeatus scrophicus*, sp. n., E. Saunders, Ent. M. M. xiii. p. 103, Pt. Scropha.

*Monanthia capitata*, sp. n., B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 110, R. Ussuri.

*M.* (*Platychila*) *helvina*, sp. n., *id. l. c.* p. 111, R. Ussuri.

### Phymatidæ.

Stål, Sv. Ak. Handl. (n. f.) xiv. No. 4, pp. 131–136, enumerates the known species, describing as new genus and species:—

*Anthylla*, p. 131 in table. *Phymatini*: between *Phymata* and *Oxythyreus*; for *P. nervoso-punctata* and *elongata*, Signoret.

*Phymata wolffi*, N. America (= *erosa*, Wolff, *nec* H. S.), *breviceps*, Bogotá, p. 133.

*Macrocephalus asper*, p. 135, La Guayra.

### Aradidæ.

*Stenopterus*, Sign. (*nec* Illig.), renamed *Leptopterus*. A. Puton, Cat. Hémipt. d'Eur. (2) 1875, p. 32; Ann. Soc. Ent. Fr. (5) vi. p. 280, note.

*Aradus ussurensis*, sp. n., B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 113, R. Ussuri.

*Aneurus brouni*, sp. n., F. B. White, Ent. M. M. xiii. p. 106, New Zealand.

### Reduviidæ.

A Reduviid from Cordova, known as "Bichuque," inflicts a very painful bite; A. Laboulbène, Bull. Soc. Ent. Fr. (5) vi. p. xxii. It was in the larval state, and after seven months of complete starvation, seemed as well as ever; *id. l. c.* p. cxlii.

*Hoplistopus christophi*, Jakowl., = *Reduvius tabidus*, Klug; A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 290.

*Lethierrya*, g. n., A. Puton, Ann. Soc. Ent. Fr. (5) vi. p. 38. *Emesina* (div. *Leistarcharia*, St.): distinguished from *Orthunga* and *Tinna* by its unarmed head, and want of a long spine at the base of anterior femora, and from *Ceratoscopus* (*Emesodema*) by its head not being transversely furrowed, the want of a spur to the front trochanters, &c. *L. biskrensis*, sp. n., *id. l. c.* p. 39, Biskra.

*Nabis poweri*, sp. n., E. Saunders, Ent. M. M. xii. p. 250, S. England.

*Harpactor dybowskii*, sp. n., B. Jakowleff, Bull. Mosc. 1876, pt. 2, p. 123, R. Ussuri.

*Reduvius laniger*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 411, Rodriguez Island.

### Saldidæ.

*Salda littoralis*, L., fig. 1, *c-album*, Fieb., fig. 2, *orthochila*, Fieb., fig. 3, *morio*, Zett., fig. 4, *arenicola*, Sch., fig. 5, *marginalis*, Fall., fig. 6, *saltatoria*, L., fig. 7, *scotica*, Curt., fig. 8, *cincta*, H. S., fig. 9, *cocksi*, Curt., figs. 10 & 15, *pilosa*, Fall., fig. 11, *pilosella*, Thoms., fig. 12, *opacula*, Zett., fig. 13, *elegantula*, Fall., antenna, fig. 14; E. Saunders, Tr. E. Soc. 1876, pl. xii.

*Salda australis*, sp. n., F. B. White, Ent. M. M. xiii. p. 106, New Zealand.

### Hydrometridæ.

*Gerris* (*Hydrometra*) *aspera*, Fieb., new to Britain; J. W. Douglas, Ent. M. M. xii. p. 223.

*Velia infernalis*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 411, Rodriguez Island.

### Naucoridæ.

Stål, Sv. Ak. Hand. (n. f.) xiv. No. 4, pp. 141–147, enumerates the known species, describing as new genera and species:—

*Pelocoris*, p. 142 in table, next after *Ilyocoris*: for *Naucoris bipunctulus*, H. S., &c., and *P. impicticollis*, p. 144, North Brazil.

*Heleocoris*, p. 142 in table, between *Laccocoris* and *Aphelochirus*: for *Naucoris obliquata*, Spin., *N. humeralis*, Say, and *H. tabidulus*, p. 146, Syria.

*Ambrysus guttatipennis*, Mexico, *puncticollis*, Texas, p. 143.

*Naucoris conspersus*, p. 144, Sicily, Algeria, *australicus* and *congrex*, p. 145, Australia.

### Corixidæ.

*Corixa prominula*, Thoms., new to Britain; J. W. Douglas, Ent. M. M. xii. p. 224. *C. douglasi*, Fieb., = *vernicosa*, Wall., *ex. typ.*; id. *op. cit.* xiii. p. 137.

*Corisa dispersa*, sp. n., P. R. Uhler, in Wheeler's Rep. *l. c.* v. p. 841, pl. xlii. fig. 7, California, Nevada, Texas.

*Sigara felix*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 412, Rodriguez Island.

## HEMIPTERA-HOMOPTERA.

Fieber, Franz Xavier. Les Cicadines d'Europe d'après les originaux et les publications les plus récentes. Deuxième partie: Descriptions des espèces. Traduit de l'Allemand par Ferd. Rieber. R. Z. (3) iv. pp. 11–268, pls. iii.–xiii.

Contains descriptions of genera (including those referred to in Zool. Rec. xii. p. 508 as uncharacterized), species and varieties, *Membracidæ*, *Cicadidæ*, and *Fulgoridæ* (pt.). The plates consist of well executed outlines of characteristic portions of the external anatomy of various genera, and are not referred to in the text.

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Finland: 4 species new for the fauna; J. Sahlberg, Medd. Soc. Fenn. i. p. 138.

## CICADIDÆ.

CARLET, G. Sur l'Anatomie de l'appareil musical de la Cigale. C. R. lxxxii. pp. 1207 & 1208.

In the species of *Cicada* observed, there are 3 pairs of thoracic, and 7 pairs of abdominal stigmata. The outer wall of the sonorous cavity belongs to the second abdominal segment.

GRABER, VITUS. Die abdominalen Tympanalorgane der Cikaden und Gryllodeen. Denk. Ak. Wien, xxxvi. 2, pp. 273–296, pls. i. & ii.

Pages 274–284, and pl. i., refer to *Cicada*. The tympanal membrane is a modification of the margin or lateral part of the first dorsal segment, and there is no trace in the ♀ (of *C. plebeia*, at least, upon which the author's observations were made) of any structure corresponding to the male organs of sound. The muscular and other anatomical systems are discussed, with the result that entirely heterogeneous matters appear to be developed from one and the same place, and that there is not the least analogy between the homology of the tympanum muscle of the *Cicada* with that of the *Acrydiidæ*.

*Triglena*, Fieb., characterized, with type *T. virescens*, sp. n., Smyrna; Fieber, R. Z. (3) iv. pp. 23–25.

*Tibicina hæmatodes*, Scop., var. n. *viridinervis*, Broussa, *id. l. c.* p. 36.

*Cicadatra atra*, Ol., varr. nn., *aquila*, p. 55, Greece, *tau*, p. 54, Turkey in Asia, *pallipes*, p. 55, Asia Minor, *id. l. c.*

*Cicadetta montana*, Scop., varr. nn. *longipennis*, p. 90, and *brevipennis*, p. 91, *id. l. c.*

*Tibicina nigro-nervosa*, p. 32, Corsica, *intermedia*, p. 34, Karabagh, spp. nn., *id. l. c.*

*Cicadatra platyptera*, p. 43, *tenebrosa*, p. 50, spp. nn., *id. l. c.*, Turkey.

*Cicadetta euphorbiæ*, p. 67, Malaga, *kollari*, p. 77, Elizabethopol, *megerlii*, p. 79, Austria (= *dimidiata*, Meg., *nec* Ol.), *tran[s]sylvanica*, p. 94, Transsylvania, *hageni*, p. 96, Cyprus (= *annulata*, Hag.), *parvula*, p. 97, Amasia, *brullæi*, p. 99, S. France, &c., *hæmatophleps*, p. 101, Georgia, *lobulata*, p. 103, Tauria, *sareptana*, p. 105, Sarepta, *mediterranea*, p. 107, Italy, *albipennis*, p. 119, Greece, spp. nn., *id. l. c.*

## CERCOPIDÆ.

*Ptyelus lugubris*, sp. n., L. Lethierry, CR. Ent. Belg. xix. p. lxxviii., River Ussuri, E. Siberia.

*Philænus nebulosus*, sp. n., *id. l. c.* p. lxxix., Krasnovodsk.

## MEMBRACIDÆ.

*Centrotus cornutus*, varr. nn. *depressus*, p. 15, Italy, *obtusus*, p. 19, S. Europe, Fieber, R. Z. (3) iv.

*Gargara sibirica* and *paradoxa*, spp. nn., L. Lethierry, CR. Ent. Belg. xix. p. lxxx., E. Siberia.

IASSIDÆ.

*Athysanus stactogalus*, Amyot, No. 2, *pallasi*, Leth., No. 4, *jucundus*, Leth., No. 5, *scutellaris*, Leth., No. 6, and *Typhlocyba* (*chlorita*) *fasciolata*, Leth., No. 7; Ann. Soc. Ent. Fr. (5) vi. pl. ii.

*Deltocephalides*. Revision of the British species, with addition of 8 species (2 new) of *Deltocephalus*; J. Scott, Ent. M. M. xii. pp. 239–244, 271–276.

*Eupteryx tenellus*, Fall., new to Britain; J. W. Douglas, Ent. M. M. xii. p. 204.

*Allygus* (Fieb. Cat., ined.), g. n., J. Scott, Ent. M. M. xii. p. 169. Allied to *Athysanus*, but with narrower head, and of somewhat more boat-shaped outline; elytra with the ordinary ante-apical areas broken up irregularly by transverse areas. For (amongst others un-named) *A. mixtus*, Germ., *atomarius*, Kirschb. (*nec* Germ.), = *commutatus*, Fieb., and *modestus*, sp. n. (Fieb., ined.), p. 172, = *atomarius*, Marshall, *nec* Germ., *nec* Kirschb., from Britain.

*Aconura*, g. n., L. Lethierry, CR. Ent. Belg. xix. p. lxxxv. Seems to connect *Cicadula* and *Thamnotettix* with *Deltocephalus*: remarkable for the very developed triangular vertex, the large, oblong, obliquely placed eyes, and the ♀ genital organs, which are longer than the rest of the abdomen. For *A. jakowleffi*, ibid., and *volgensis*, p. lxxxvi., spp. nn., Astracan.

*Pediopsis bipunctata*, sp. n., *id. l. c.* p. lxxxi., Toulouse.

*Agallia dorsalis*, sp. n., *id. ibid.*, Algeria.

*Tettigonia semiglauca*, sp. n., *id. l. c.* p. lxxxii., E. Siberia.

*Penthimia nitida*, sp. n., *id. ibid.*, E. Siberia.

*Acocephalus elongatus*, sp. n., *id. l. c.* p. lxxxiii., Sarepta.

*Selenocephalus corsicus*, sp. n., *id. ibid.*, Corsica.

*Gnathodus roseus*, sp. n., J. Scott, Ent. M. M. xiii. p. 83, Corsica.

*Cicadula opacipennis*, p. lxxxiii., Astracan, *diminuta*, Hazebrouck, Dep. du Nord, and *vittiventris*, S. France and Astracan, p. lxxxiv. Lethierry, l. c.; *C. nicolasi*, id. Pet. Nouv. ii. p. 26, S. France: spp. nn.

*Doratura ivankofi*, sp. n., Lethierry, Pet. Nouv. ii. p. 26, Karkow.

*Phlepsius filigranus*, sp. n., J. Scott, Ent. M. M. xiii. p. 84, Nimes.

*Thamnotettix rubrivenosa*, sp. n., *id. l. c.* p. 83, Corsica.

*Athysanus tigripes*, Lethierry, CR. Ent. Belg. xix. p. lxxxvii., Astracan; *A. heydeni*, id. Ann. Soc. Ent. Fr. (5) vi. p. 51, note, pl. ii. No. 3, Germany, S. France, Corsica: spp. nn.

*Deltocephalus longicaput*, p. 240, *flavipennis*, p. 242, spp. nn., J. Scott, Ent. M. M. xii., England.

*Notus juniperi*, Batna, *ignicollis*, locality unknown, p. lxxxvii., *albicans*, p. lxxxviii., S. France, spp. nn., Lethierry, CR. Ent. Belg. xix.

*Dicranoneura pygmæa*, sp. n., J. W. Douglas, Ent. M. M. xii. p. 203, S. England.

*Eupteryx corsica*, Corsica, and *putoni*, Balaruc, Hérault, spp. nn., Lethierry, *l. c.* p. lxxxviii.

*Typhlocyba cratægi*, p. 203, *debilis*, p. 204, spp. nn., J. W. Douglas, *l. c.*, S. England.

## FULGORIDÆ.

*Fulgora candelaria.* Notes on a Lepidopterous parasite (*Epipyrops anomala*, g. & sp. nn.) from Hong Kong; J. O. Westwood, Tr. E. Soc. 1876, pp. 519–524, pl. vii.

*Liburnia paludosa* and *flavcola*, Flor, new to Britain; J. Scott, Ent. M. M. xii. p. 205, xiii. p. 130.

*Haplacha seticulosa*, Leth.; Ann. Soc. Ent. Fr. (5) vi. pl. ii. No. 1.

*Tettigometra virescens*, Pz., varr. nn. *hispanica* and *concolor*, p. 135, *fuscipes*, p. 136, *T. helferi*, Fieb., var. n. *ferruginea*, p. 147, *T. macrocephala*, Fieb., varr. nn. *concolor* and *trifasciata*, Crefeld, p. 150, *T. obliqua*, Pz., varr. nn. *panzeri* and *bimaculata*, p. 153, *griseola*, Fieb., varr. nn. *opaca*, p. 154, S. Russia, *T. costulata*, Fieb., varr. nn. *albofasciata*, p. 158, Grenada, Syracuse, *unifasciata*, Sarepta, and *abrupta*, Euphrates, p. 159; Fieber, R. Z. (3) iv.

*Cixius pilosus*, Ol., var. n. *infumata*, p. 179, *C. nervosus*, L., var. n *fasciatus*, p. 185, *C. cunicularius*, L., varr. nn. *vulgaris*, p. 189, and *fuscus*, p. 170, *id. l. c.*

*Dictyophara pannonica*, Creutz., varr. nn. *viridis* and *rosea*; id. *l. c.* p. 222.

*Haplacha*, g. n., Fieber, *l. c.* p. 166. Between *Hemitropis* and *Myndus*: for *H. seticulosa*, sp. n., p. 167, Algeria.

*Trigonocranus*, Fieb., characterized: for *T. emmeæ*, sp. n., Switzerland; Fieber, *l. c.* p. 168.

*Ommatissus*, Fieb., characterized: for *O. binotatus*, sp. n., Andalusia; *id. l. c.* pp. 174 & 175.

*Trir* [*r*] *hacus*, g. n., *id. l. c.* p. 175. Between *Ommatissus* and *Cixius*: for *T. setulosus*, sp. n., p. 176, Parnassus.

*Cixius discrepans*, p. 178, Italy, *pyrenaicus*, p. 184, Pyrenees, *pallipes*, p. 191, Italy, &c., spp. nn., *id. l. c.*

*Hyalesthes luteipes*, sp. n., *id. l. c.* p. 197, Italy.

*Oliarus melanochatus* and *adustus*, p. 198, S. Russia, *tristis*, p. 199, Montenegro, *limbatus*, p. 200, Andalusia, *roridus*, p. 202, Corfu, S. Russia, &c. (and varr. *maculatus*, p. 201, and *opalinus*, p. 202), *splendidulus*, p. 203, *concolor*, p. 209, Parnassus, *hyalinus*, p. 204, Dalmatia, *sordidus*, p. 208, Naxos, *signatus*, p. 210, and *lugubris*, p. 211, Sarepta, *lutescens*, p. 212, Malaga, *cuspidatus*, p. 215, Europe, *apiculatus*, p. 216, S. Europe, spp. nn., *id. l. c.*

*Dictyophara krueperi*, p. 220, Greece, *iberica*, p. 224, Portugal, spp. nn., *id. l. c.*

*Caloscelis affinis*, sp. n., *id. l. c.* p. 233, Dobrudscha.

*Orgerius productus*, sp. n., *id. l. c.* p. 239, Parnassus.

*Mycterodus sulcatus*, sp. n., *id. l. c.* p. 251, Sicily.

*Conosimus corsicus*, sp. n., L. Lethierry, CR. Ent. Belg. xix. p. lxxvi., Corsica.

*Issus acuminatus*, id. *ibid.*, Oran; *I. fissala*, p. 259, *climacus*, p. 266, Portugal, *luteus*, p. 260, Italy, *frontalis*, p. 264, Italy, Tyrol, *truncatus*, p. 265, S. France, Fieber, *l. c.*: spp. nn.

*Tettigometra atrata*, p. 123, Belgrade, *lepida*, p. 138, Transsylvania,

Fieber, *l. c.*; *T. sanguinea*, p. lxxvii., *damrii*, p. lxxviii., Lethierry, *l. c.*, Corsica : spp. nn.

## Psyllidæ.

Löw, F. Zur Biologie und Charakteristik der Psylloden, nebst Beschreibung zweier neuer Species der Gattung *Psylla*. Verh. z.-b. Wien, xxvi. pp. 187–216, pls. i. & ii.

Besides the 2 new species, the author, after a discussion of the general external anatomy of the group, describes and figures various portions of *P. salicicola*, Frst., *forsteri*, Flor, *terminalis*, M.-Dür, = *brevi-antennata*, Flor, *pruni*, Scop., *oxyacanthæ*, M.-Dür., = *pityophila*, Flor, = *crataegi*, Frst., *Trioza walkeri*, Frst., *argyrea*, M.-Dür, = *abieticola*, Frst., = *rhamni*, Schrank, and *forsteri*, M.-Dür, = *flavipennis*, Frst.

Reuter, O. M. Catalogus Psyllodearum in Fennia hactenus lectarum. Meddelanden af Societas pro Fauna et Flora Fennica, i. pp. 69–77. [This new publication, issued at Helsingfors, represents, with the Acta Societatis pro Fauna et Flora Fennica, the extinct Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar].

The author enumerates 17 species of *Psylla*, 9 of *Trioza*, 2 of *Rhinocola*, 7 of *Aphalara*, and 1 of *Livia*, with indications of locality and habits, bibliographical references, and full descriptions of 2 new species and of *Psylla sylvicola*, Leth., *P. nigrita*, Zett., and *Aphalara nebulosa*, Zett.

Scott, J. Monograph of the British species belonging to the *Hemiptera-Homoptera*, family *Psyllidæ*; together with the description of a genus which may be expected to occur in Britain [*Spanioneura*]. Tr. E. Soc. 1876, pp. 525–569, pls. viii. & ix.

Discusses *Livilla* 1 sp., *Arytæna* 1, *Psylla* 24 (3 new), *Trioza* 10 (1 new; and *T. walkeri*, Först., var. n. *albipennis*, p. 553), *Aphalara* 4 (1 new), *Rhinocola* 2, *Livia* 1. *Artyæna spartii*, Htg., = *ulicis*, Curtis, figured, pl. viii. fig. 1, and elytra, &c., of various species.

Notes on recorded and probable British species, and their habits; J. W. Douglas, Ent. M. M. xiii. pp. 40 & 67. J. Scott, *tom. cit.* pp. 66 & 137.

Table of genera; A. Puton, Ann. Soc. Ent. Fr. (5) vi. pp. 287 & 288.

*Homotoma ficus*, L., near Paris; M. Girard, Bull. Soc. Ent. Fr. (5) vi. p. cxxxii.

*Bactericera*, g. n., A. Puton, Pet. Nouv. ii. p. 15 (also, as new, in Ann. Soc. Ent. Fr. 5, vi. p. 286). Very near *Trioza* in form, facies, and neuration, but differing in the absence of frontal conical appendages and in the structure of the antennæ. *B. perrisi*, sp. n., *id. ibid.*, Landes.

*Psylla pyrastri* and *stenolabis*, F. Löw, Pet. Nouv. ii. p. 65, Vienna; *P. viburni*, p 194, figs. 1–3, Austria, Switzerland, *iteophila*, p. 196, figs. 4 & 5, Austria, *id.* Verh. z.-b. Wien, xxvi. pl. i.; *P. spartilisuga*, p. 283, Algeria, *cytisi*, p. 284, and *myrthi*, p. 285, Guelma and Hyères, A. Puton, Ann. Soc. Ent. Fr. (5) vi.; *P. lauci*, p. 541, *viridissima*, p. 543, *rhamni-*

*cola*, p. 548, pl. viii. fig. 5, J. Scott, Tr. E. Soc. 1876, S. England: spp. nn.

*Trioza salicivora*, J. Scott, *l. c.* p. 558, pl. ix. fig. 7, Scotland; *T. salicivora*, p. 75, Abo and Russian Carelia, *chenopodii*, p. 76, Runsal island, near Abo, O. M. Reuter, Medd. Soc. Fenn. i.: spp. nn.

*Aphalara radiata*, J. Scott, *l. c.* p. 562, pl. ix. fig. 12, England; *A. halimocnemis*, L. Lethierry, Ann. Soc. Ent. Fr. (5) vi. p. 55, note, Sarepta: spp. nn.

## APHIDIDÆ.

BUCKTON, G. B. Monograph of the British *Aphides*. I. London (printed for the Ray Society, being the volume for 1875): 1876, 8vo, pp. 1–193, pls. A–C (anatomical) and i.–xxxviii.

After general, anatomical, bibliographical, and biological introductions, the author divides the family *Aphididæ* into 4 tribes, *Aphidinæ*, *Schizoneurinæ*, *Pemphiginæ*, and *Chermesinæ*, and describes and figures the British species of *Siphonophora* (37, 10 new), *Phorodon* (2), *Myzus* (4, 1 new), *Drepanosiphum* [*-phon*, vel *-pho*] (2), and 2 new genera. Full particulars are given as to economy, parasites, &c., where known. The plates, drawn by the author, seem lifelike; but there are various *omissa*, &c., in the treatment of the work, which detract somewhat from its value to entomologists. *Siphonophora rosæ*, var. n. *glauca*, p. 109, pl. iii.

*Amphorophora*, g. n., Buckton, *l. c.* p. 187. Differs from *Drepanosiphon* in its long limbs and large tail, and from *Rhopalosiphon* in its very long antennæ. For *A. ampullata*, sp. n. (? = *R. staphyleæ*, Koch), *ibid.* pl. xxxvii. fig. 4, apt. vivip. ♀ only, from ferns in conservatory.

*Megoura* [*-gura*], g. n., *id. l. c.* Possesses the mixed characters of *Siphonophora* and *Rhopalosiphon*. For *M. viciæ*, sp. n., *ibid.* pl. xxxviii., ♀ only, E. England, on *Vicia sepium*.

*Siphonophora lutea*, p. 119, pl. viii., on *Orchidaceæ*; *S. menthæ*, p. 120, pl. ix. figs. 1 & 2, on *Mentha* and *Sarothamnus*; *S. polygoni*, p. 123, pl. x. figs. 1–3, on *Polygonum*; *S. circumflexa*, p. 130, pl. xiii., on *Cineraria*, &c.; *S. scrophulariæ*, p. 137, pl. xvi. figs. 1 & 2, on *Scrophularia scorodonia*; *S. carnosa*, p. 144, pl. xx., on *Urtica urens* (? = *urticæ*, Pass., var.); *S. longipennis*, p. 146, pl. xx. bis, on *Corylus avellana*; *S. muralis*, p. 157, pl. xxvi., on *Lactuca muralis*; *S. sisymbrii*, p. 160, pl. xxvii. figs. 4 & 5, on *Sisymbrium officinale*; and *S. olivata* (? = *Aphis carduina*, Walk.), p. 164, pl. xxix. figs. 3 & 4, on *Carduus lanceolatus*: spp. nn., *id. l. c.*, various localities in the South of England.

*Myzus gracilis*, sp. n., *id. l. c.* p. 176, pl. xxxiv. fig. 5, on sycamore, S. of England.

### *Phylloxera*.

BALBIANI, E. G. Sur l'éclosion prochaine des œufs d'hiver du Phylloxera. C. R. lxxxii. pp. 666–669.

Hypothetical observations, with no result, as to the product of the "winter-egg."

[Balbiani, E. G.] Sur l'éclosion de l'œuf d'hiver du Phylloxera de la Vigne. *Tom. cit.* pp. 833 & 834.

The author has observed the hatching of a perfect *Phylloxera* from the "winter-egg." This insect partakes at the same time of the characters of the maternal form from which it has issued by binary generation, and of those of the long line of descendants which it will itself produce by parthenogenesis. *Cf.* M. Girard, Pet. Nouv. ii. p. 34.

——. Sur la parthénogénèse du Phylloxera, comparée à celle des autres Pucerons. *Op. cit.* lxxxiii. pp. 205–209.

Chiefly in opposition to Lichtenstein's opinions.

——. Nouvelles observations sur le Phylloxera du chêne, comparé au Phylloxera de la vigne. *Tom. cit.* pp. 699–702.

Both species lay their eggs only on the plants on which they are respectively parasitical; and their evolution is much less influenced by difference in latitude than by climatic occurrences.

——. Recherches sur la structure et sur la vitalité des œufs du Phylloxera. *Tom. cit.* pp. 954–959, 1020–1026, 1160–1166.

Boiteau, P. Sur l'œuf d'hiver du Phylloxera. C. R. lxxxii. pp. 155–157.

——. Éclosion de l'œuf d'hiver du Phylloxera de la vigne dans la Gironde; caractères de l'insecte. *Tom. cit.* pp. 984–986.

This hatching occurs in the middle of April.

——. Sur le Phylloxera issu de l'œuf d'hiver. *Tom. cit.* pp. 1043 & 1044, 1143–1145.

——. Sur les galles des feuilles de vignes françaises; ponte de l'insecte issu de l'œuf d'hiver; éclosion des œufs formant la deuxième génération; migration de ces nouveau-nés. *Tom. cit.* pp. 1316–1318.

——. Sur le Phylloxera aérien. *Op. cit.* lxxxiii. pp. 131–134.

On the economy of the leaf-gall form.

——. Observations sur le développement et les migrations du Phylloxera. *Tom. cit.* pp. 430–432.

——. Lettre à M. Dumas sur les produits de l'œuf d'hiver du Phylloxera vastatrix. *Tom. cit.* pp. 848–851.

Endorsing Balbiani's views.

Lichtenstein, J. Notes pour servir à l'histoire des insectes du groupe des Phylloxériens, Homoptères formant la transition des Aphidiens aux Coccidiens. Ann. Ent. Belg. xix. pp. 164–177 (also separately, Paris: 1876, 8vo, pp. 14). Abstract by R. Hickel; Feuil. Nat. vi. p. 120.

After some general and historical observations, the names "Homoptères Anthogénésiques" are proposed for *Acanthochermes*, Kollar, in which the pupiferous form is apterous, *Phylloxera*, Boyer (of which only *P. coccinea*, Heyd., a species named *P. punctata*, pp. 171 & 173, from France and Switzerland, *P. quercûs*, Boyer, *P. florentina*, Targ., and *P. corticalis*, Kalt., are recognized), and *Rhizaphis*, Planchon

(adopted for *P. vastatrix*), in which two latter genera the pupiferous form is winged.

Lichtenstein, J. Notes pour servir à l'histoire des Insectes du genre Phylloxera. Paris: 1876, 8vo, pp. 14, 1 pl. [Extr. from Annales Agronomiques, ii. No. 1, 1876].

Reviewed in Ent. Nachr. ii. pp. 129, 136–138, 153, & 154.

——. Beobachtungen über die Naturgeschichte der Phylloxera. MT. schw. ent. Ges. iv. pp. 510–533, pl.

A translation by E. Frey-Gessner of the last-mentioned paper. The plate gives an excellent idea of the whole circle of existence of the insect.

Lichtenstein's opinion (in Annales Agronomiques, ii. p. 128), that *Phylloxera* is nearer the *Coccidæ* than the *Aphididæ*, was anticipated by Leuckart in 1859, referring to *P. quercûs*; Balbiani, C. R. lxxxiii. p. 206, note.

——. Zur Systematik von *Phylloxera*. S. E. Z. xxxvii. p. 64.

The author reiterates his opinion that *Phylloxera* should be placed in the *Coccidæ*, considering the economy and metamorphosis more important than wing-structure. He divides this section of the *Homoptera* into two families, viz.:—with one or more generations viviparous, "Aphidida," always oviparous, "Coccidida." *Phylloxera*, *Aleurodes*, and *Chermes*, having four wings, form a transition to the *Coccidæ*.

——. Weitere Beoträge zur Geschichte der *Phylloxera*. Tom. cit. pp. 231 & 232.

——. Weitere Beobachtungen über *Phylloxera*. Tom. cit. pp. 386–388.

See also Bull. Soc. Ent. Fr. (5) vi. pp. xxxviii. & xxxix., for a comparison by this author of the propagation of *Phylloxera* with the growth of plants; also pp. lxiii. & lxiv., as to distinction of this genus from *Rhizaphis* (see Girard & Signoret, *l. c.* pp. lxxvi.–lxxviii.; and Lichtenstein in reply, pp. xciii.–xcv.). On migration to different plants, p. cli.

——. Sur les œufs des Phylloxeras. C. R. lxxxii. pp. 610–612.

——. Sur le Phylloxera issu de l'œuf d'hiver. *Tom. cit.* pp. 1145 & 1146.

——. Notes pour servir à l'histoire des Phylloxériens et plus particulièrement de l'espèce *Phylloxera Acanthokermes*, Kollar (s. *Acanth. quercûs*). Tom. cit. pp. 1318–1321.

——. Confirmation nouvelle des migrations phylloxériennes. *Op. cit.* lxxxiii. pp. 325–327.

A repetition of the author's experiences as to the changing from one plant to another by the same species in different stages, and reference to Targioni-Tozzetti's similar results, *P. signoreti* being only the 2nd winged form of *P. florentina*.

——. Note sur les Phylloxeras. *Tom. cit.* pp. 656 & 657.

*P. quercûs* found on the vine.

[Lichtenstein, J.] Réponse à M. Balbiani, au sujet des migrations et des pontes des Phylloxeras. *Tom. cit.* pp. 846–848.

Reiterates the migration theory.

Riley, C. V. Notes on the Natural History of the Grape *Phylloxera*. Tr. Ac. St. Louis, iii. pp. 281–287, fig. 22.

The following conclusions are deduced:—There is no practical use in knowing the nidus chosen by the female; downy or tomentose leaves are apparently chosen in preference; the impregnated egg of *P. vastatrix* will by inference hatch in the season in which it is laid; there is no "winter egg" as in *P. quercûs*, except possibly in some exceptional cases; and the term "pupa" applied by Lichtenstein to sexed eggs is unwarranted.

The entire metamorphoses can, under certain circumstances, take place underground, without the intervention of the perfect winged form; a winter egg ready to hatch found on the root in May; the identity of the adult gall-living female with that found in the root-swellings corroborated; the gall-living form produces the root-livers with wide, bevelled antennæ. V. Fatio, Arch. Sci. Nat. (2) lvi. pp. 163–166 (extr. from 2nd Rep. to Dept. of Interior, Canton Geneva); also C. R. lxxxii. pp. 1378–1380, and lxxxiii. p. 41.

Observations on the extraordinary spreading of *Phylloxera* in Burgundy in 1876; J. Lichtenstein & H. Millot, Messager du Midi, No. 219, Aug. 11th, 1876. A small red *Trombidium* observed to attack it.

On the isolated district of Mancey (Saône-et-Loire) affected by *Phylloxera*: A. Rommier, C. R. lxxxiii. pp. 386–388; also J. Lichtenstein, Bull. Soc. Ent. Fr. (5) vi. p. clx.

Report on experiences in S. France; Marion, C. R. lxxxiii. p. 38.

At Orleans; M. Girard, Pet. Nouv. ii. p. 82. *Cf.* also Signoret, Bull. Soc. Ent. Fr. (5) vi. p. liii.

On its presence and origin at Orleans; Mouillefert, C. R. lxxxiii. pp. 728–735, with map. These observations are entirely opposed to Lichtenstein's ideas as to migration of species.

On its progress in the departments of the two Charentes; Bouillaud, *tom. cit.* pp. 873–875.

On its advance to Hungary; E. de Kvassey, *tom. cit.* p. 1282.

It did comparatively little injury in N. America in 1875; insecticides applied to the roots during May and June, in the interval between the hatching of the impregnated winter egg and the appearance of the winged females, are most likely to be of use. It certainly occurs in California. C. V. Riley, Rep. Ins. Mo. viii. pp. 157–168.

Destructive agents. Mouillefert, p. 317; Allies, pp. 612, 1044, 1380; Crolas & F. Jobart, p. 615; Demaille, p. 617; De la Vergne, p. 725; Marion, p. 1381; Delachanal, p. 1428 (C. R. lxxxii.). Mervoyer, p. 92; Rosseau, p. 134; P. Mouillefert, pp. 209–214, 959–961, 1224–1227 (sulphocarbonate of barium strongly recommended); Dumas, p. 328; Marès, pp. 427 & 1142; Gueyraud, p. 432; J. Roussellier, pp. 434 & 1219; Sabaté, p. 437; Allibert, p. 479; T. Pignède, p. 601; Gachez, p. 632; Allies, pp. 702 & 1222; Boutin, p. 788; E. Blanchard, p. 843; Dela-

chanal, p. 962; Aubergier, p. 964; Boiteau, p. 1026; Marion, p. 1087; De la Vergne, p. 1221; Laureau, p. 1280 (C. R. lxxxiii.).

Planting *Eucalyptus globulus* near vineyards recommended, &c.; G. Stierlin, MT. schw. ent. Ges. iv. pp. 494.

General observations, &c. H. de la Blanchère, in "Les Ravageurs des Vergers et des Vignes" (Paris: 1876, 12mo), pp. 204–258, figs. Delorme, "Études sur la Maladie des Vignes," Ann. Soc. Agric. Lyon (4) viii. pp. 73–75. F. Lajeunie, Rapport et procès-verbaux; Conseil générale de la Charente: Commission nommée pour l'étude du Phylloxera (Angoulême: 1876, 8vo). Schnetzler & Brunner, Bull. Soc. Vaud. xiv. p. 180. The Bulletin des travaux de l'Association Viticole de l'arrondisement de Libourne pour l'étude du Phylloxera, 1876, contains various articles by Boiteau, Baillon, Falières, &c. Rapport sur la séance de la Commission supérieure du Phylloxera au Ministère de l'Agriculture et du Commerce; 14 Fév. 1876.

L. Laliman, CR. lxxxiii. p. 324, considers there is a great confusion with regard to *Phylloxera*; he has found large numbers of a *Pemphigus* on his vines, and believes these insects are beneficial, not destructive.

*Phylloxera florentina*, Targ.; notes on its biology by A. T. Tozzetti, Bull. Ent. Ital. viii. p. 185.

## Coccidæ.

Mark, E. L. Beiträge zur Anatomie und Histologie der Pflanzenläuse insbesondere der Cocciden. Bonn: 1876, 8vo, pp. 1–58, pls. iv.–vi.

An inaugural dissertation, read before the philosophical faculty of the Leipzig University. Abstract in Psyche, i. pp. 193 & 194.

V. Signoret, Ann. Soc. Ent. Fr. (5) vi. pp. 591–676 (pt. xviii.), after concluding the text of his "Essai sur les Cochenilles ou Gallinsectes (Homoptères-Coccides)" [Zool. Rec. xii. pp. 516 & 517], translates and discusses Schrader's Australian "Brachyscélides"; and gives additions and rectifications to his own treatise (including references to *Aspidiotus lentisci*, p. 601, S. France and Algeria, and *Eriopeltis lichtensteini*, p. 607, Montpellier, as new species; *Diaspis harrisi*, Walsh, = *ostreiformis*, Curt.; *Pollinia costæ*, Targ., is referred to the Coccites; *Coccus stellifer*, Westw., = *Vinsonia pulchella*, Sign.), a review of undetermined species, explanations of plates, a systematic catalogue of all known species, with indications of food-plants and countries, and tables of genera and species.

"Cochenille." Article by Laboulbène in the Dictionnaire Encyclopédique des Sciences médicales, pt. 1, vol. xviii. pp. 179–198 (abstract in Bull. Soc. Ent. Fr. 5, vi. pp. xx. & xxi.)

*Dactylopius adonidum*, rearing its young after 62 days without food; J. Lichtenstein, Bull. Soc. Ent. Fr. (5) vi. p. lxiv.

*Dactylopius adonidum*, *Lecanium hemisphæricum*, and *Boisduvalia lataniæ*. These species are fostered by *Brachymyrmex heeri*, a Central

American ant living among tropical orchids in the botanical garden at Zurich, and anatomical and physiological observations are made upon the relationship of the insects. A. Forel, Bull. Soc. Vaud. xiv. pp. 38–48.

*Asterodiaspis*, g. n., V. Signoret, Bull. Soc. Ent. Fr. (5) vi. p. ccix., and Ann. *tom. cit.* p. 606, for *Asterolecanium quercicola*, Bouché.

*Coccus ceratiformis*, sp. n., A. G. Butler, Ann. N. H. (4) xvii. p. 412, Rodriguez Island.

*Aspidiotus vitis*, sp. n., Signoret, *ll. cc.* pp. lii. & 601, Nice.

*Mytilaspis flavescens*, sp. n., A. Targioni-Tozzetti, Ann. del Ministr. Agric. Ind. e Commerc., Roma, 1876, p. 36, pl. 1 A, figs. 1 A–H, on orange and citron, Italy (? = *M. anguinus*, Boisd.).

# VERMES.

BY

C. F. Lütken, Ph.D., F.R.D.A., &c.

## I. ROTATORIA.

1. Claus, C. Ueber die Organisation und die systematische Stellung der Gattung *Scison*. (Festschrift, z.-b. Ges. Wien) 14 pp., 2 pls.
2. Davis, H. On the Rotifer *Conochilus volvox*. M. Micr. J. xvi. pp. 1–5, pl. cxliii.
3. Kramer, —. Eine Bemerkung über ein Räderthier aus der Familie der Asplanchneen. Arch. f. Nat. xlii. pp. 179–182, pl. viii. figs. 1–4.
4. Smith, F. H. On Animal Life in Water containing free acids. Mem. Soc. Manch. (3) v. pp. 185–191.

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According to Stein (Tagebl. d. Leipz. Nat. Vers. 1872, p. 140), who is acquainted with the asplanchnous males of 13 highly different genera of *Rotatoria*, the sexual dimorphism is a general phenomenon in all true *Rotatoria*. The intestine, though unable to perform its normal functions, is generally present in the shape of a shrivelled string, serving as attachment to the testis. The "lime sac" of the *Rotatoria* is probably a poison-gland. The segmentation of the egg of *Lacinularia* is described by Fleming (SB. Ak. Wien, lxxi. pp. 101–104) in a manner reminding much of analogous observations in *Nematoda*, *Medusæ*, &c.

Poggenpol's description (in N. Mém. Mosc. x. pp. 9–13) of a social Rotatorian allied to *Conochilus*: *Strophosphæra ismailoviensis* (g. & sp. nn.), is only known to the Recorder from R. Leuckart's "Jahresbericht," 1872–1875 (Arch. f. Nat. xxxix. pp. 475 & 476).

In the abnormal genus, *Scison*, Gr. (*Saccobdella*, V. Ben. & Hesse), parasitic on *Nebalia*, the body is divided into 4 portions, 2 dilated (head and abdomen) and 2 narrow (head and tail, the latter corresponding to the "foot" in *Rotatoria*, and terminating in an adhesive organ); in the "neck" and "tail" (in *S. annulatus*, also in the abdominal portion) the thin chiti-

nous covering is subdivided in annulations. Structurally, *Seison* agrees best with the *Rotatoria*: a rudimentary rotatory organ, œsophagus, stomach (intestine indistinct, vent probably at the base of the tail), a masticatory apparatus (though placed in a peculiar pouch-like diverticle of the mouth), unicellular glands, muscles, no heart, and no blood-vessels, &c.; but the contractile bladder and lateral canals are obsolete, the ejaculatory organ of the males very complicated, and the males themselves not inferior in size and structure to the females. If placed with the *Rotatoria*, *Seison* therefore must occupy a separate position in the class. Two species are distinguished, *S. grubii* and *S. annulatus* (1).

## II. CHÆTOPODA.


1. Giard, A. Note sur l'embryogénie de la *Salmacina dysteri*, Huxley. Note sur le developpement, &c. C. R. lxxxii. pp. 233–235 & 285–288.

2. Greef, R. Ueber das Auge der Alciopiden. Ein Beitrag zur Kenntniss des Baues der Retina. SB. Ges. Marb. 1875, pp. 1–24, pls. i. & ii. (Abstr., Z. ges. Naturw. [2] xiii. pp. 301–303.)

3. Grube, E. Mittheilungen über die Familie der *Chlorhæminen*. Ber. schl. Ges. 1876, pp. 37–49.

4. Horst, R. Aantekeningen op de anatomie van *Lumbricus terrestris*. (Tidschr. Nederl. Dierk. Ver. iii. pp. 37–68, pl. vi. [Separately, as Dissertation, 96 pp., 1 pl., Utretcht]; Abstract, Niederl. Arch. Zool. iii. pp. 282 & 283.)

5. McIntosh, W. C. On the Structure of the Body-wall in the *Spionidæ*. P. R. Soc. Edinb. 1875 & 1876, pp. 123–128.

6. ——. Descriptions of some new Species of *Annelida* from Kerguelen Island. Ann. N. H. (4) xvii. pp. 318–323.

7. ——. On British *Annelida*. Pt. i. Tr. Z. S. ix. pp. 371–394, pls. lxvii.–lxx.

8. ——. On the *Annelida* of the Porcupine Expeditions of 1869 & 1870. *L. c.* pp. 395–416, pls. lxxi.–lxxiii.

9. Semper, C. Die Verwandtschaftsbeziehungen der gegliederten Thiere. Arb. Inst. Würzb. ii. pp. 25–76, pls. iii.–v., and iii. pp. 115–404, pls. v.–xxv. Preliminary account, "Die Identität im Typus der Gliederwürmer und Wirbelthiere," Verh. Ges. Würzb. (2) ix. pp. 102–112; Ann. N. H. (4) xvii. pp. 462–473.

10. Vejdowsky, F. Beiträge zur Oligochætenfauna Böhmens. SB. böhm. Ges. 1875, pp. 191–201.

11. ——. Ueber *Psammoryctes umbellifer* (*Tubifex umb.*, E. R. Lank.) und ihre verwandte Gattungen. Z. wiss. Zool. xxvii. pp. 137–154, pl. viii.

12. ——. Anatomische Studien an *Rhynchelmis limosella*, Hoffm. (*Euaxes filirostris*, Grube). *Tom. cit.* pp. 332–361, pls. xxi.–xxiv.

13. ——. Ueber *Phreatothrix*, eine neue Gattung der Limicolen (ein Beitrag zur Brunnenfauna von Prag). *Tom. cit.* pp. 541–554, pls. xxxix.

## Distribution, &c.

A paper by A. F. Marion, "Dragnages profonds au large de Marseille" (Rev. Montp. iv.) is only known to the Recorder from a note in J. Zool. v. p. 279. Another paper by the same author, "Sur les Annélides de Marseille," Montpellier (12 pp., 1 pl.), also remained unknown to the Recorder. The "Bulletin of the United States National Museum," No. 3, contains "Contributions to the Natural History of Kerguelen Island," by J. H. Kidder (*Annelida*, Echinoderms, and *Anthozoa*, by A. E. Verrill). "Report on the dredgings in the region of St. George's Bank [in America] in 1872," by S. J. Smith & O. Harger (Tr. Conn. Ac. iii. 1, pp. 1–57) (*Annelida*, *Turbellaria*, *Radiata*; the names of the species described or figured are given below).

McIntosh has reported (P. R. Soc. xxv. pp. 215–222) upon the *Annulata* dredged by the "Valorous" expedition in Davis Strait and the North Atlantic, to a depth of 1785 fathoms; a few new genera and species are recorded. Some remarks on the deep sea *Annulata* captured during the first part of the cruise of the "Challenger," are contained in R. v. Willemoës-Suhm's "Report," P. R. Soc. xxiv. The "Erster Jahresbericht der Zoologischen Station in Neapel" (Leipzig, 1876) contains observations on the season of appearance and of propagation of the *Vermes*, Echinoderms, and *Cœlenterata* observed at the zoological station at Naples.

Vejdowsky (10) enumerates 17 *Oligochæta limicola* and 10 *O. terricola* from Bohemia.

## Anatomy, Physiology, &c.

In Semper's elaborate treatise (9) on the homologies and phylogenetic relations of *Vertebrata* and *Annulata*, in the rich details whereof (critical, investigatory, and speculative) it lies beyond the scope of this record to indulge, the chapter on gemmation in Naids (*N. proboscidea*, *barbata*, *Chætogaster*) (l. c. ii. pp. 161–260) may be noticed as having a direct bearing upon the ontogeny of *Chætopoda*. The author's views of the "unity of organic composition," at least of the *Vertebrata*, *Arthropoda*, and *Vermes*, find their expression in his regarding the "*Trochosphæra*" (i.e., the typical larva of the marine chætopodous *Annulata*) as the starting-point of the evolution of these great divisions of the animal kingdom, just as the "Gastræa" is regarded as the starting-point of development of all "*Metazoa*" by Häckel. Semper's argument, that the proboscis-orifice of the *Nemertea* and the "mouth" of the other *Turbellaria* should be homologized with the mouth of *Vertebrata*, and the true mouth of *Nemertea* on the other hand with the mouth of the *Annulata*, ought also to be pointed out as deserving more than a passing

notice; likewise the discussion of "segmentation" and "strobilization," &c.

On the primordial phenomena of evolution in the egg of *Nephelis*, *Cucullanus*, and other Nematoids, several *Rotatoria*, &c., *vide* BÜTSCHLI, Abh. senck. Ges. x. pp. 215–238, pp. 246–248, and 441 & 442.

Contributions to the anatomy of the aquatic *Oligochæta* by VEJDOWSKY (11–13); Observations on the formation of the remarkable spermatophor of *Psammoryctes* (11). Special attention is given to the modifications of the sexual organs in this genus, in *Rhynchelmis* (12), and *Phreatothrix* (13). *Rhynchelmis limosella* becomes sexually mature in the middle of the winter. HORST (4) reviews the anatomy of *Lumbricus* from original researches; the skin and muscular system, and the circulatory organs, take a prominent place in these investigations.

A remarkably high development of the organs of vision in *Alciopidæ* is described by GREEF (2); a peculiar stress is laid upon the retina being probably formed of a single layer of "optic cells," whose different portions are differentiated as the bacillar, pigmentous, columnar and fibrillar layers of the retina.

In the concluding remarks of his note on the embryology and evolution of *Salmacina*, GIARD (1), points out the analogies and embryological relations between the *Annulata* (and *Rotatoria*) and the *Mollusca*. A [Russian] paper by REJEWSKY on *Polygordius* and the "Lovenian" larva (N. Mém. Mosc. x. 1873, 11 pp., pl. xiii.) is only known to the Recorder from LEUCKART'S "Jahresbericht" (Arch. f. Nat. [illegible] 504–506.

## GENERA AND SPECIES.

McINTOSH (7) reviews the British *Euphrosynidæ*, *Amphinomidæ*, *Aphroditidæ*, *Polynoidæ*, *Acoetidæ*, and *Sigalionidæ*; also (8) the species of the same families dredged during the "Porcupine" expeditions of 1869 & 1870. Descriptive notes, illustrations of characters of bristles, &c., remarks on synonymy, &c., are given for the greater number of recorded species; the following are designated as new (some of them, however, having been named or shortly discussed in the author's previous publications):—

*Euphrosyne lanceolata* (8), p. 395, pl. lxxi. fig. 1 (off Ireland, 173 fathoms).

*Malmgrenia castanea* (7), p. 376, pls. lxvii. figs. 15–19, lxviii. fig. 15 (Shetland, Channel Islands, off S.W. Ireland, &c., 80–110 fathoms); *andreapolis*, l. c. p. 327, pl. lxxvii. figs. 20–23 (St. Andrews, &c.).

*Harmothoe sibbaldi*, id. l. c. p. 378, pl. lxviii. figs 1–3 (Shetland to Cornwall); *zetlandica*, id. l. c. p. 379, pls. lxix. fig. 1, lxviii. figs. 4 & 5 (Bressay Sound, 5 fathoms); *macleodi*, id. l. c. p. 382, pl. lxix. figs. 2 & 3 (Shetland, St. Andrews); *antilopes*, id. l. c. p. 383, pl. lxix. figs. 4–6 (Shetland, Hebrides); *halicti*, id. l. c. p. 384, pl. lxix. figs. 7–10 (Minch); *morphysæ*, ibid. pls. lxix. figs. 11–15, lxx. fig. 18 (Guernsey, Polperro).

*Hermadion assimile*, id. l. c. p. 387, pl. lxx. figs. 4–6 (British, and off Spain).

*Eupolynoe mollis*, sp. n., McIntosh (6), p. 319 (Kerguelen Island).

*Polynoe* (*Lepidonotus*) *helotypus*, sp. n., Grube, Ber. schl. Ges. 1876, p. 26; *phæophyllus*, id. ibid.; *P.* (*Halosydna*) *nebulosa*, id. *ibid.* (all from Chefoo).

*Læmilla* (?) *mollis*, Sars, Tr. Conn. Ac. iii. 1, p. 35.

*Antinoe angusta*, sp. n., Verrill, *l. c.* p. 36.

*Eucranta villosa*, Mgr., *l. c.* p. 37.

*Eunoa hispanica*, McIntosh (8), p. 396, pl. lxxi. figs. 5–7 (Channel slope, 539 fathoms).

*Lagisca jeffreysi*, id. l. c. p. 397, pls. lxxi. figs. 8–12, lxxiii. figs. 17 & 18 (off Ireland and on the Channel slope, 163–690 fathoms).

*Polynoe* (*Evarne*) *mazeli*, Marion, *l. c.* (Gulf of Marseille).

*Evarne johnstoni*, McIntosh (8), p. 398, pl. lxxi, figs. 13–18 (Atlantic, 690 fathoms).

*Phyllantinoe mollis*, id. l. c. p. 401, pl. lxxii. figs. 5 & 6 (Atlantic, 539 fathoms).

*Eupanthalis kinbergi*, id. l. c. p. 404, pl. lxxii. figs. 12–15 (Adventure Bank, 92 fathoms).

*Sthenelais atlantica*, id. l. c. p. 405, pl. lxxii. figs. 15 & 16 (305 fathoms); *jeffreysi*, id. l. c. p. 406, pl. lxxii. figs. 18 & 19, lxxiii. figs. 1–3 (off Ireland, 165 fathoms); ? *zetlandica*, id. (7), p. 390, pl. lxx. figs. 15–17 (Shetland).

*Eusthenelais hibernica*, id. (8), p. 407, pl. lxxiii. figs. 4 & 5 (off Ireland and Cape Sagres, 106–145 fathoms).

*Sigalion buski*, id. (7), p. 391, pl. lxx. fig. 14.

*Nereis eatoni*, sp. n., *id.* (6), p. 320 (Kerguelen); ? = *antarctica*, sp. n., Verrill, Bull. U. S. Mus. 3, p. 64 (Kerguelen).

*Lycastis pontica*, sp. n., Bobretzky (Tr. Nat. Soc. Kiew [1872] ii. 3, pp. 1–3, pl. xiv.) (Black Sea).

The *Alciopidæ* are arranged (2) in 7 genera: *Alciopa*, *Asterope*, *Vanadis*, *Rhynchonerella*, and the following proposed as new by GREEF:—

*Halodora* (for *H. reynaudii*, A. E.), differing from *Alciopa* through the composite bristles; *Nauphanta*, differing from *Vanadis*, Cl., through the presence of two cirriform appendages at the extremity of the rudders; *Callizona*, through the cephalic lobe strongly protruding above the eyes. Several new species of *Alciopidæ* are announced, and their names given, but without descriptions.

*Nephthys circinnata*, sp. n., Verrill, Tr. Conn. Ac. iii. p. 38 (St. George's Bank, 85–430 fathoms); *ciliata*, Rthk., *ibid.* pl. v. fig. 1.

*Phyllodoce catenula*, Verrill, *l. c.* p. 39, pl. iv. fig. 3.

*Eusyllis phosphorea*, sp. n., *id. l. c.* p. 39, pl. vii. fig. 2 (St. George's Bank, Fundy Bay, 45–52 fathoms).

*Ninoe nigripes*, id. *ibid.* pl. v. fig. 3.

*Leodice vivida*, St., *ibid.* pl. v. fig. 5.

*Nothria conchilega*, Sars, *ibid.* pl. vii. fig. 3; *opalina*, Verr., *ibid.* p. 41, pl. vii. fig. 4.

*Lumbriconereis lucida*, sp. n., Grube, Ber. schl. Ges. 1876, p. 27 (Cheefoo, China); *fragilis*, Oerstd., Tr. Conn. Ac. iii. pl. v. fig. 2.

*Aracoda reticri*, sp. n., Grube, *l. c.* (Chefoo).

*Glycera macintoshi*, Grube, *l. c.* (Chefoo).

*Trachytrypane* (g. n.) *jeffreysi* and *arctica*, spp. nn., McIntosh (P. R. Soc. xxv. pp. 217 & 218), allied to *Ophelia* and *Linotrypane* (North Atlantic, 1705–1760 fathoms). Body elongate, smooth, rounded in front, but marked throughout the rest of its extent with the usual ventral ridges. Anterior segments short, those in the middle long; head forming a short cone, with a minute filiform process at the tip in *T. jeffreysi*; no cirri; bristles minute (prominent and curved backward in *T. arctica*); tail separated by a furrow from the body, terminated in a recurved process, or funnel-shaped, with a smooth rim.

*Cirratulus chefooensis*, Grube, *l. c.* (Chefoo).

*Aricia kupferi*, Ehl., described by McIntosh, P. R. Soc. xxv. p. 217.

*Notomastus sinuosus*, Grube, *l. c.* p. 28 (Chefoo).

*Samythella elongata*, Verrill, Tr. Conn. Ac. iii. p. 73.

*Neottis spectabilis*, sp. n., *id.* Bull. U. S. M., *l. c.* (Kerguelen Island); ? = *antarctica*, sp. n., McIntosh (6) p. 421 (same loc.).

*Grymæa spiralis*, Verrill, Tr. Conn. Ac. iii. p. 44, pl. iv. fig. 1.

*Pista cristata*, Mgr., *l. c.* pl. iv. fig. 2.

*Amphitrite kerguelensis*, sp. n., McIntosh (6), *l. c.* Kerguelen Island.

*Ammochares assimilis*, Sars, Tr. Conn. Ac. *l. c.* pl. v. fig. 4.

Grube (3) enumerates the species of *Chlorhæmineæ*, which are distributed into 6 genera: *Siphonostomum*, *Flabelligera*, *Stylarioides*, *Trophonia*, *Piromis*, and *Brada*; *Stylarioides parmata* (Philippines), *l. c.* p. 48, and *Brada mamillata* (Kerguelen Island), *l. c.* p. 46, spp. nn.

*Psygmobranchus intermedius* (on the cirri of *Antedon*), and *Heterophenacia renouardi*, spp. nn., Marion, *l. c.* (Gulf of Marseilles).

*Spirorbis valida*, sp. n., Verrill, Tr. Conn. Ac. iii. p. 44 (Le Hare Bank, 45–60 fathoms), ? *nautiloides*, Lmk., *l. c.* p. 45, pl. iv. fig. 4.

*Protula media*, St. *ibid.*, pl. vi.; *P. meilhaci*, sp. n., Marion, *l. c.* (Gulf of Marseilles).

*Serpula chrysogyrus*, sp. n., Grube, Ber. schl. Ges. 1873, p. 28 (Philippines).

*Ditrupa groulandica*, sp. n., McIntosh, P. R. Soc., *l. c.* p. 219 (North Atlantic, 1450 fathoms).

*Psammoryctes*, g. n., Vejdowsky (11), differs from the other *Tubificidæ* (*Tubifex* and *Limnodrilus*) through the possession of 4 types of bristles—comb-shaped, hair-shaped, and two kinds of bifurcate—and through several anatomical characters (no cutaneous vessels, segmental organs without ampullæ, seminal duct opening in a seminal vesicle, and continued as cœmental duct to the atrium of the penis; spermatophores *Opalina*-like, with a hooked trunk, reminding of an *Echinorrhynchus*, &c.). Type, *P. umbellifer*, Kessl.

*Phreatothrix*, g. n., *id.* (13). Agrees with *Trichodrilus*, Clap., through the position of the receptacula seminis behind the seminal ducts; it differs through the presence of a single pair only of these receptacula, but of two pairs of seminal funnels, and two pair of testes (6th to 15th segments); lateral contractile vascular loops terminating in two blind appendages; bristles simple, delicate, in two double rows on each side of the body, as in *Trichodrilus*. *T. pragensis*, sp. n., id. (*Tri-*

*chodrilus pragensis*, id., *antei* (10, p. 196) (in springs, among *Algæ*, Prague).

Of the genus *Rhynchelmis*, a new diagnosis is given (12) based upon anatomical investigation; it belongs, with *Lumbriculus*, *Stylodrilus*, and *Trichodrilus*, to the family of the *Lumbriculidæ*: bristles in four double rows, undivided or rarely indistinctly bifurcate; vessels numerous in every segment, simple or ramified; no contractile heart; two pairs of seminal ducts, uniting in two glandular atria, and opening outwards at the 11th segment; oviducts funnel-shaped.

*Tubifex coccineus*, sp. n., Vejdowsky (10), p. 193 (Bohemia).

*Lumbricus submontanus*, sp. n., *id. l.c.* p. 199 (Riesengebirge); *aquatilis*, sp. n., *ibid.* (Bohemia).

## III. DISCOPHORA.

Olsson, P. Bidrag till Skandinaviens Helminthfauna, I. Sv. Ak. Handl. xiv. (n. f.) 1, pp. 1–6, pl. i.

Contributions to the knowledge of Swedish *Hirudinea*. One new species is described: *Piscicola picta*, Olss., on the branchial arch of *Gadus morrhua*.

On the species of *Clepsine* of Tunis and Algeria; Robin, pp. 314–336.

Robin, C. Mémoire sur le développement embryogénique des Hirudinées. Mém. Ac. Sc. xl. (Abstr. J. Zool. v. pp. 89–102.)

## IV. TURBELLARIA.

1. Barrois, J. De l'embryologie des Nemertiens. C. R. lxxxii. pp. 859–862; Ann. N. H. (4) xviii. pp. 73–75.

2. Collingwood, —. On 31 species of marine Planarians, collected partly by the late Dr. Keelart, at Trincomalee, and partly by Dr. Collingwood, in the Eastern Seas. Tr. L. S. (2) i. pp. 83–98, pls. xvii.–xix.

3. Hoffman, C. K. On de entwickelingsgeschiedenis van *Tetrastemma varicolor*, Oerstd., Eene bijdrage tot de kenniss der Nemertinen. (Beiträge zur Kenntniss der Nemertinen. i. Zur Entwickelungs-geschichte von *Tetrastemma varicolor*). Versl. Ak. Amst. x. pp 392–404, 1 pl.; Niederl. Arch. Zool. iii. pp. 205–215, pl. xiii.

4. McIntosh, W. C. On the central nervous system, the cephalic sacs, and other points in the anatomy of the *Lineidæ*. J. Anat. Phys. x. pp. 231–252, pls. x.–xiii.

5. Man, J. G. de. [A] Oversicht der tot dusverre in de zoete wateren van Europa waargenomen *Turbellaria*, 23 pp. (Tijdschr. Nederl. dierk. Ver. i.). [B] Eerste bijdrage tot de kennis der Nederlandsche zoetwater Turbellarien. 13 pp. 3 pls. *ibid.*, only known to the Recorder

from Leuckart's "Jahresbericht." [C] *Geocentrophora sphyrocephala*, n. g. & sp., eene landbewohnende Rhabdocoele, *op. cit.* ii. pp. 62–67, pl. ii. [D] De gewone europeesche Land-planarie *Geodesmus terrestris*, O. F. M., *l. c.* ii. pp. 238–242, pl. xiv. (Abstr. Niederl. Arch. Zool. iii. pp. 278–280.

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MOSELEY'S paper on a young *Pelagonemertes* is translated or abstracted in J. Zool. vi. pp. 10–16, pl. i., and Arch. Z. expér. v. p. li. SALENSKY'S (Russian) paper on the evolution of an *Enterostomum* from Sebastopol Bay, and on a species of *Nadina*, Oul. (Protocols of the Naturalists' Society of Kasan, 1872–73) are only known to the Recorder from Leuckart's "Jahresbericht," 1872–1875.

HOFFMANN (3) has studied the evolution of one of the *Nemertinea enopla*; it is direct, without metamorphosis, the segmentation complete and regular, &c. There is no invagination, and no *Gastrula* is formed. In the embryo, the external cell-layer of the "morula" stage first differentiates into the ectoderm, followed successively by the next cell-layers, which furnish the mesoderm and the endoderm, while the innermost cell portion undergoes a fatty degeneration, and constitutes the first contents of the embryonal intestine. About the time when the anterior and posterior flagella disappear, the mouth and afterwards the vent are formed through perforation, and 4 eye-spots become visible. The sense-system is developed from the ectoderm, the subcutaneous muscular layers and the muscles of the trunk (proboscis) from the mesoderm, while the glandular part of the trunk is formed from the endoderm.

## GENERA AND SPECIES.

*Lineus corrugatus*, sp. n., McIntosh, Ann. N. H. (4) xvii. p. 422, Kerguelen Island.

The following species of Eastern *Turbellaria dendrocœla digonopora* are described and figured in COLLINGWOOD'S paper (2) :—

*Thyzanozoon alderi*, sp. n., p. 88, pl. xvii. fig. 1, Labuan; *allmanni*, sp. n., p. 89, pl. xvii. fig. 2, Singapore; *auropunctatum*, Keel., p. 94, pl. xviii. fig. 13 (Aripo).

*Acanthozoon*, g. n. "Caput subdiscretum, tentaculis parvis approximatis, corpus supra spinulis brevibus nigris ubique instructum." *A. armatum*, Keel., p. 95, pl. xviii. fig. 14, and *papilio*, K., *ibid.* fig. 15, Ceylon.

*Sphyngiceps*, g. n. "Corpus lœve, caput discretum, tentaculis magnis subdistantibus; ocelli occipitales et capitales." *S. lacteus*, sp. n., p. 90, pl. xvii. fig. 3, Singapore.

*Proceros concinnus*, sp. n., p. 90, pl. xvii. fig. 4, Labuan; *hancockanus*, sp. n., p. 91, pl. xvii. fig. 5, and *buski*, sp. n., p. 91, pl. xvii. fig. 6, Singapore.

*Eurylepta fusca*, Keel., p. 95, pl. xviii. fig. 16; *atraviridis*, K., p. 95, pl. xviii. fig. 17; *undulata*, K., p. 95, pl. xviii. fig. 18; *violacea*, K., p. 96, pl. xviii. fig. 19; *dulcis*, K., p. 96, pl. xviii. fig. 20; *purpurea*, K., p. 96, pl. xviii. fig. 21; *viridis*, K., p. 96, pl. xix. fig. 22; *affinis*, K., p. 96, pl. xix. fig. 23; *cerebralis*, K., p. 96, pl. xix. fig. 24; *striata*, K., p. 97,

pl. xix. fig. 25; *zeylanica*, K., p. 97, pl. xix. fig. 26, all from Ceylon; *keelarti*, sp. n., p. 92, pl. xvii. fig. 7, Singapore.

*Typhlolepta byerleyana*, sp. n., p. 92, pl. xvii. fig. 8, Borneo.

*Centrostomum ocellatum*, Keel., p. 97, pl. xix. fig. 27; *punctatum*, Keel., p. 97, pl. xix. fig. 28, Ceylon.

*Elasmodes obtusus*, sp. n., p. 93, pl. xviii. fig. 9, Singapore.

*Leptoplana patellensis*, sp. n., p. 93, pl. xviii. fig. 10, Simon's Bay; *aurantiaca*, sp. n., p. 94, pl. xix. fig. 11, Singapore.

*Stylochoplana elegans*, Keel., p. 98, pl. xix. fig. 29, Ceylon; *meleagrina*, K., p. 98, pl. xix. fig. 30, *ibid.*

*Stylochopsis malayensis*, sp. n., p. 94, pl. xix. fig. 12, Borneo.

*Planocera thesea*, Keel., p. 98, pl. xix. fig. 31, Ceylon.

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The diagnoses of Keelart's Ceylonese species were published previously in "Prodromus Faunæ Zeylanicæ."

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*Mesostomum lugdunense* and *herklotsianum*, spp. nn., De Man (5, B).

*Bdellocephala*, g. n., De Man (5, B); type, *Fasciola punctata*, Pallas (*Planaria bicornis*, Gmel). The median portion of the margin of the head between its ear-shaped projections constitutes a real sucking apparatus; the posterior limit of the head is marked by a neck-shaped stricture.

*Geocentrophora*, g. n., De Man (5, C), a terricolar Rhabdocœle; body elongate, flat, pharynx barrel-shaped; mouth in the middle of the semilunar margin of the head; the male apparatus, consisting of a cylindrical sac, enclosing a chitinous hook, and a strongly muscular bladder, opening behind the mouth; a single ovarian sac in the middle portion of the body, &c. *G. sphyrocephala*, sp. n., *ibid.*, Holland.

## Helminthology generally.

1A. Beneden, J. P. van. Animal parasites and messmates. London (International Scientific Series, xx.). Criticised by T. S. C., in Veterinarian, xlix. pp. 326–328, 398–400, 481–484.

1B. ——. Die Schmarotzer des Thierreichs. Leipzig. Criticised by Zürn, in Arch. f. wiss. und prakt. Thierheilk. ii. pp. 318–320, by Graf, D. Zeitschr. Thiermed. ii. pp. 268–272.

2. Cobbold, T. S. Notes on *Entozoa*, iii. & iv. Pr. Z. S. 1876, pp. 200–204, 294–298, pls. xvi. & xxi.

3. Leuckart, R. Die menschlichen Parasiten und die von ihnen herrührenden Krankheiten, ein Hand-und Lehrbuch für Naturforscher und Aerzte. iii. (Schlusslieferung), Leipzig und Heidelberg. Abstract by H. Krabbe in Ugesk. f. Læger (3) xxi. 10 pp.; Rev. Vetérin. xlix. pp. 96–98.

4. Linstow, — Von. Helminthologische Beobachtungen. Arch. f. Nat. xlii. pp. 1–18, pls. i. & ii.

5. Perroncito, E. Sulla tenacitá di vita del Cisticerco della cellulosa e di

altri elminti. Ann. Agric. Tor. xix.; Moleschotts Untersuchungen xi., Vierteljahrschr. f. wiss. Veterinärk. xlvi. pp. 150–153; Zeitschr. f. prakt. Vet. wiss. iv. pp. 309–317, 503–511, & 536–555, with pl.

None of the *Entozoa* subjected to Perroncito's experiments (*Cysticercus cellulosæ*, *pisiformis*, *tenuicollis*, scolices of *Cœnurus* and *Echinococcus*, *Tænia cucumerina*, *serrata*, *perfoliata*, embryos of *Filaria megastoma* and *microstoma*, *Strongylus filaria*) survived a raising of the temperature (during the course of about ten minutes) to 50° centigr. The death was ascertained not only by their immobility under otherwise favourable circumstances, but also by their imbibing carmine or hæmatoxiline, in the case of *Cyst. cellulosæ* also through feeding experiments with negative results. In many experiments, a temperature of 45–48° cent. was sufficient to ensure the death of the parasite.

Heller, —. Echinocockken, Cysticerken, Trichinen, with 3 pl. (Leipzig). Reprint from Ziemssen's Handbuch der speciellen Pathologie und Therapie, iii.

Compare also the reviews on "Animal Parasites" in R. Virchow and A. Hirsch, JB. Leist. Forts. Medecin, xi. pp. 394–397 & 552–555.

## V. TREMATODA.

6. Cobbold, T. S. [A] Trematode parasites from the dolphins of the Ganges (*Platanista gangetica* and *Orcella brevirostris*); J. L. S. xii. pp. 35–46, pl. x. [B] On the supposed rarity, nomenclature, structure, affinities, and source of the large human fluke (*Distoma crassum*, Busk), *l. c.* pp. 285 & 286. [C] Observations on the large human fluke (*Distoma crassum*, Busk), with notes on two cases in which a missionary and his wife were the victims; Veterinarian, xlix. pp. 296–305. [D] Remarks on the human fluke-fauna, with special reference to recent additions from India and the East; *l. c.* pp. 209–212.

7. McConnell, J. E. P. On the *Distoma conjunctum* as a human fluke, Veterinarian, xlix. pp. 242–246; Lancet, March 4, 1876.

8. Olsson, P. Bidrag till Skandinaviens Helminthfauna. i. Sv. Ak. Handl. (n. f.) xiv. i. pp. 6–35, pls. i.–iv.

Anatomical descriptions, with illustrations of many Swedish flukes as additions to the author's former papers on Scandinavian *Helmintha*. The new species are named below.

9. Sonsino, P. [A] Richerche intorno alla *Bilharzia hæmatobia* in relazione colla ematuria endemico dell' Egitto (Rend. Acc. Nap. 1874). [B] Della *Bilharzia hæmatobia* e della alterazione anatomico-patologiche che induce nell' organismo umano, etc. "Imparziale," 1876: Firenze, 42 pp. 1 pl.; abstr. Veterin. *l. c.* pp. 233–235.

A paper by the same author on a new parasite of the ox, *Bilharzia bovis* (Rend. Acc. Nap. 1876), is only known to the Recorder from short notes in J. Zool. v. p. 288, and Ann. Méd. Vetér. xxv. pp. 529–595.

10. Villot, A. Sur l'appareil vasculaire des Trematodes [on the excretory or vascular system of *Distoma insigne*] C. R. lxxxii. pp. 1344–1346.

11. Zeller, E. Weiterer Beitrag zur Kenntniss der Polystomen. Z. wiss. Zool. xxvii. pp. 238–274, pls. xvii. & xviii.

A note on *Distoma gigas*, by G. Nardo, Atti Inst. Ven. (5) i. pp. 265 & 266. A paper by R. H. Fetz on the anatomy of the elephant's fluke (*D. jacksoni*), in the "New York Medical Journal," is cited, Veterinarian, *l. c.* p. 854.

## Anatomy, Evolution, &c.

Zeller's continued studies (11) of *Polystomum integerrimum* have led to remarkable results. From the testis, two seminal ducts take their origin; the longer goes to the copulatory organ, by the means of which the sperma is introduced into the body of the fellow-fluke during copulation; the other, and shorter duct communicates with the canal leading from the ovary and from the yelk-producing organ. To this communication, the possibility is due of an internal self-fecundation in such individuals as live a solitary life in the bladder of the frog, if self-copulation should prove ineffectual. The mutual copulation between two individuals is easily observed; the cirrus of each is introduced into one of the small orifices of one of the two "lateral pads" of the other individual, and the spermatozoa thus conducted through a special canal to the common canal, leading from the ovary and from the organ which produces the cells of the "nutritive yelk." They are therefore mixed with this substance before they come in contact with the "ovula;" these three elements are then carried together to the uterus, by the peristaltic movements of which the egg gets its definite constitution and external covering, the material of the shell being furnished with peculiar glands, opening in the duct immediately behind the uterus. The fully-formed eggs accumulate (sometimes in great numbers) in the oviduct, and are expelled through the genital opening common to both sexual systems, the flukes protruding themselves half way into the cloaca of the frog during this operation. Under ordinary conditions, the eggs are laid in spring, when the frogs awake from hibernation and resume the work of reproduction, and the larvæ are hatched at a period when the tadpoles are in a somewhat advanced state of evolution. They migrate into the branchial cavity, where they take their abode for about two months; when the gills of the frog begin to disappear, they migrate through the œsophagus and intestine to the bladder; their whole cycle of development until sexual maturity takes three years. On the other hand, when the formation of the eggs and the evolution of the larvæ of *Polystomum* are artificially accelerated, *e.g.*, by keeping the frogs in heated rooms, the larval *Polystoma* are hatched at a period when the tadpoles are still quite young, their gills delicate and soft, etc. Their evolution is then very rapid, they become mature and produce eggs within five weeks; their life is at end before the gills of their hosts are obliterated, and they never migrate into its internal organs. But these "gill-cavity *Polystoma*" constitute

a peculiar, though in most instances artificial variety, distinguished not only by biological, but also by external and internal characters; small size, imperfect development of the terminal hooks, want of the lateral pads (vulvæ) (internal self-fecundation therefore here is alone possible), modifications of testis, ovaria of the coronet of the "cirrus," suppression of oviduct, more backward position, therefore, of the genital opening (in several of these modifications there are striking analogies with *P. ocellatum*), a different shape of the spermatozoa [!]; the eggs, however (which are expelled singly, no oviduct being present for their retention), their mode of evolution, the larvæ, &c., are identical; when hatched they will be in company with more advanced tadpoles only, and therefore in their turn go through the normal slow cycle of development, and thus return to the ordinary type of the species. The evolution of the egg is also very remarkable, as described by the author, but cannot be recorded here; it may be noted that the embryo is developed from the "ovulum" or "egg-cell" only, and literally *eats* the nutritive yelk; and that the four eyes and the hooklets of the adhesive disc are *not* transitory organs, but preserved during life.

R. Leuckart (Jahresbericht, *l. c.* p. 723) cites an observation of Weinland (Weichthierf. d. schwäb. Alp, Stuttg. 1875, p. 101) intimating that the *Cercariæ* of *Limnæa* might possibly be the larvæ of *Distomum hepaticum*; they showed a decided propensity to creep about on foreign objects, and might perhaps be encysted upon stems of grass (?) in the vicinity of water, and thus be swallowed by sheep.

## Genera and Species.

*Distoma crassum*, Busk, the large human fluke, allied to *D. lanceolatum*, is redescribed by Cobbold (6, b, c.) from specimens derived from persons formerly residing in China (its larval form might possibly reside in Ningpo oysters). *D. sinense* [Zool. Rec. xii. p. 536] is named *D. spatulatum*, by Leuckart (3, p. 871), and *macconelli*, by Cobbold (Veterin., *l. c.* p. 98). *D. conjunctum*, Cobb., hitherto known from the American fox and Indian pariah-dogs, is re-discovered by McConnell (7) in man in India. On *D. hepaticum* in the horse, Veterin. *l. c.* pp. 764 & 765; on the contemporaneous frequency of liver-flukes in sheep and hares in certain localities in Sweden, Tidsk. f. Veterin. (Stockholm) 1876, pp. 169. *D. magnum*, sp. n., Bassi (in the liver of stags), Medico-Veterin. 1875. *D. lancea*, Dies. (6a, pl. x. fig. 1), from the duodenum of *Orcella brevirostris*; *campula*, Cobb. (*C. oblonga*, olim), *l. c.* pl. x., fig. 2, from the liver-ducts of *Platanista gangetica*; *andersoni*, sp. n., Cobb., *l. c.* fig. 3, from the intestine of the same; *tursionis*, sp. n., Marchi, Atti Soc. Ital. xv. 4, from the intestine of *Delphinus tursio*; *ichthyophorbæ*, sp. n., Grebnitzky [Materials for a fauna of Southern Russia] (cited after Leuckart).

*Bilharzia bovis*, sp. n., Sonsino (Rend. Acc. Nap. 1876), perhaps identical with *B. hæmatobia* of men and apes. The occurrence of a similar species in the blood of sheep is also announced; also that of a new fluke (*Diplostoma* or *Hemistoma ægyptiaca*, Cobb., not described) from the intestine of the horse in Egypt; Vetérin. *l. c.* p. 757.

*Distoma* (*Dicrocœlium*) *vitellilobum*, sp. n., Ollsson (8), p. 14 (*Rana temporaria*, stomach); *rastellus*, sp. n., *id. l. c.* p. 16, pl. iii. figs. 31–35 (*Rana temporaria*, *Bufo vulgaris*, intestine and œsophagus). *D.* (*Brachylœmus*) *conostomum*, sp. n., *id. l. c.* p. 17, pl. iii. fig. 37 (*Corregonus marœna*, in the œsophagus and on the gills); *leptostomum*, sp. n. *id. l. c.* p. 18, pl. iii. figs. 38–40 (the badger and hedgehog, in the intestine); *nigrescens*, sp. n., *id. l. c.* pl. iii. fig. 41 (*Lophius piscatorius*, stomach, *Molva vulgaris*, on the branchial arches). *D.* (*Apoblema*) *labri-rupestris*, sp. n., *id. l. c.* p. 19 (*Labrus rupestris*, in the intestine, immature, encysted). *D.* (*Echinostoma*) *pseudo-echinatum*, sp. n., *id. l. c.* p. 20, pl. iv. figs. 45–49 (*Larus marinus*, rectum). *D.* (*Dicrocœlium* or *Brachylœmus* ?) *crassum*, sp. n. *id. l. c.* p. 25, pl. iv. figs. 57 & 58 (*Hirundo urbica*, large intestine); *medians*, sp. n., *id. l. c.* pl. iv. figs. 59–63 (*Bufo vulgaris*, intestine).

*Tetracotyle fœtorii*, sp. n., Linstow (4), p. 1, pl. i. fig. 2 (*Fœtorius putorius*, encysted below the skin of the neck); perhaps the larval state of *Holostomum*.

*Octobothrium minus*, sp. n., Olsson (8), p. 10 (*Gadus melanostomus*, on the gills); *denticulatum*, sp. n., *id. l. c.* pl. i. figs. 13–17 (*Gadus virens*, on the gills).

*Onchocotyle emarginata*, sp. n., *id. l. c.* p. 11, pl. ii. figs. 23–26 (*Raja clavata*, on the gills); *abbreviata*, sp. n., *id. l. c.* p. 12, pl. ii. figs. 27 & 28 (*Acanthias vulgaris*, on the gills).

*Monostoma semifuscum*, sp. n., *id. l. c.* p. 28, pl. iv. figs. 65 & 66 (*Sula bassana*, intestine).

## VI. CESTOIDA.

12. Chapman, H. C. Description of a new *Tænia* from *Rhea americana*. P. Ac. Philad. 1876, p. 14.

13. Cobbold, T. S. Tapeworms (human *Entozoa*); their source, &c. 3rd edn., London.

[Not seen by the Recorder.]

14. ——. [A] On hydatide disease of man and animals, as illustrated by specimens contained in the pathological museums of the Metropolis, and in others elsewhere. Veterin. xlix. pp. 65–74, 136–143; Brit. Med. Jour. 1875 & 1876. [B] On measly meat and measles in man. Veterin. xlix. pp. 833–836.

15. Crinon, —. Les vers cestoides de l'homme. Paris: 20 pp.

[Not seen by the Recorder.]

16. Donnadieu, A. Étude sur les Ligules. Lyon Médical. Arch. Z. expér. v. pp. lxiii. & lxiv.

17. Duchamp, G. Recherches anatomiques et physiologiques sur les Ligules (*L. simplicissima*, Rud., *L. monogramma*, Cr.). Appendix: Bertholus. Mémoire sur le développement du *Dibothrium latum* (Rud.), Bothriocephale de l'homme. Paris: 65 pp. 2 pls. Abstr. Z. Zool. v. pp. 372–378, Ann. Sci. Nat. (6), N. 4, 3 pp.

18. Giacomini, C. Sul *Cysticercus cellulosæ* e sulla *Tænia mediocanellata*. Giorn. di. med. veter. (4) iv. pp. 193–195.

19. Masse, — & Pourquier, —. [A] Note sur la ladrerie du bœuf par le ténia inerme de l'homme (*Tænia mediocannellata*); C. R. lxxxiii. pp. 236–238; Ann. Méd. Vétér. xxv. pp. 652 & 653; Rec. Méd. Vétér. (3) vi. pp. 892–895; Rev. Vétér. 1876, pp. 539–542. [B] Le Ténia inerme et la ladrerie du bœuf, nouvelles expériences faites à l'école d'agriculture de Montpellier (Montpellier Médical., p. 220).

20. Megnin, —. La ladrerie du porc et ses rapports avec le *Tænia solium* de l'homme. Rec. Méd. Vétér. (3) vi. pp. 1255–1264.

21. Perroncito, E. Sopra un case di *Cœnurus* risconstrato nella cavita abdominale di un coniglio. Giorn. Med. Veter. (4) iv. pp. 52–55, 1 pl.

22. Welsh, F. H. The anatomy of two parasitic forms of the *Tetrarhynchidæ*. J. L. S. xii. pp. 329–392, pls. xxiv.–xxvi.

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Other papers of a more or less practical bearing:—Broca, Cysticerques multiples chez l'homme (Gaz. d. hospit. No. 24); Nouveau cas de ladrerie chez l'homme (Union Médicale, 1876; Z. Zool. v. pp. 280 & 281; Rec. Méd. Vétér. 3, vi. pp. 638 & 639; Giorn. med. Vet. 4, v. pp. 376 & 377). A case of infection with numerous subcutaneous, intramuscular, &c., tumors, in a person infested with *Tænia solium*. Chouffard, Discussion sur le Ténia (Gaz. d. hospit. No. 7). Colin, Le Ténia dans l'armée (*Op. cit.* No. 1). Henne, Étude critique sur le *Tænia mediocannellata* (Rec. de mém. de méd. milit.). Vidal, Fréquence du Ténia inerme (*mediocannellata*) (L'Union Médicale). H. Krabbe, Notice explicative sur les mésures préventives prises en Islande pour combattre le developpement de la maladie causée par les Echinocoques: Copenhagen, 4 pp. (Congrès d'hygiène de Bruxelles). E. Sommer, Der *Cysticercus* im Muskel- und Unterhaut- Zellgewebe: Jena, 38 pp. O. Bollinger, *Echinococcus multilocularis* in der Leber des Rindes (D. Zeitschr. f. Thiermedicin. ii. pp. 109–111). Id., *Cysticercus pisiformus* in der Leber von Feldhasen und Kaninchen. *Echinococcus* bein Rinde (Aerztlich. Intelligenzbl.). Pütz, *Cœnurus cerebralis* bei einer Kuh (Zeitschr. f. prakt. Veterinärw., iv. p. 172). A. Hartmann, Fälle von *Echinococcus*-Blasen bei Schafen (Oesterr. Vierteljahrschr. f. wiss. Veterinärk. xlvi. p. 138).

In the "additions and corrections" to Leuckart's great work on the human parasites (3) pp. 847–868, the recent contributions to the history of human tapeworms, published after the appearance of pt. i. of the work, are resumed. Observations on the frequency of *Tænia mediocannellata* in man, and of its *Cysticercus* in the ox in Abyssinia, and on the social conditions and popular habits explaining the frequency of both stages, are contributed from manuscript notes of Schimper (*l. c.* pp. 854–857); their frequency in India is also dwelt upon. *T. cucumerina* (of the dog) is probably identical with *T. elliptica* of the cat: its

occurrence in children is explained through their companionship with dogs infested with lice (*Trichodectes*), the bearers of its larval stage.

A species of *Cysticercus* was found below the peritoneal investment of the intestine of a lizard (*Ascalabotes mauritanicus*) by MARCHI, Atti Soc. Ital. xv. (4); another, resembling *T. litterata* of the fox, in the abdominal cavity of *Lacerta crocea* (Leuckart, Jahresbericht, *l. c.*, p. 437). On *Echinococci* in the liver of Paro, and *Cysticercus tenuicollis* in the abdominal cavity of the Saïga antelope and Ethiopian wart-hog (in Zoological Gardens), Pagenstecher, Verh. Ver. Heidelb. (2) i. pp. 74–76.

On *Tænia lævis* (Bl.) *vide* LINSTOW (4) p. 1, pl. i. fig. 1; *T. tauricollis*, sp. n., Chapman (12), from *Rhea americana*.

BERTOLUS (17) describes the operculated eggs and ciliated embryos of *Bothriocephalus latus*, the latter being provided with six hooks like the embryos of *Tænia*. With other naturalists, he suggests that the scolex migrates into fishes of the salmon tribe; the *Ligula nodosa*, which he found copiously encysted upon the external surface of the stomach and pyloric appendages of a large trout, might be the intermediary stage. [According to DONNADIEU, *L. nodosa* is not specifically different from the common *Ligula*.] LEUCKART (*l. c.* p. 868) tried vainly, however, to infest a trout river with embryos of *B. latus*; he suggests that Naids might perhaps be their intermediate bearers.

A note by LORTET on the migrations of *Ligula* (Revue scientifique; Rev. Soc. sav. 6, iii. p. 362) is unknown to the Recorder. According to DUCHAMP (17), *L. simplicissima* has been extremely abundant for several years in ponds of La Bresse frequented by aquatic birds, producing in *Tinca vulgaris* a peritonitis, terminating with death, after the exit of the parasite through an aperture formed in the vicinity of the vent. The *Ligula* lives only a short time in pure water, but for weeks in the putrescent body of the dead host. In this state, the reproductive organs are still rudimentary, the bothridia present, but not fully developed. When placed in water of 40° cent., the hitherto almost torpid worm becomes very lively, and executes most vigorous movements. Duchamp's experiments with the introduction of the piscine *Ligula* into the digestive system of the common duck, confirm its transformation into the avian *L. monogramma* (Cr.). In the course of a few days, it becomes sexually mature, but disappears shortly after, only its eggs being found in the fæces. The eggs are operculate, the embryos provided with a ciliated covering, six hooks, etc. The male organs disappear before the perfect development of the ova, which are probably set free through the decomposition or digestion of the *Ligula*. DONNADIEU (16), however, has found living *Ligulæ* crowded with eggs nine times of ten in the fæces of the birds; he also ascertained experimentally the migration of the embryos into fishes.

The 2 species of *Tetrarrhynchus*, from the stomach of a shark (*Carcharias*), studied by WELSH (22), are named provisionally *Tetrarrhynchus carcharias* and *Abothros carcharias*.

## VII. NEMATODA (and Nematorrhyncha).

23. Bavay, —. Sur l'Anguillule stercorale. C. R. lxxxiii. pp. 694–696; J. Zool. v. pp. 343–346; Ann. N. H. (4) xviii. pp. 507–509. Normand: Entozoaire accompagnant la maladie dite diarrhée de Cochinchine. C. R. *l. c.* pp. 316–318; J. Zool. v. pp. 347 & 348.

24. Bugnion, E. Sur la pneumonie vermineuse des animaux domestiques. Arch. Sci. Nat. liv. (1875), pp. 324–327; Ann. N. H. (4) xvii. pp. 170 & 171; Zeitschr. f. Thiermedicin, ii. pp. 250 & 251.

25. Bütschli, O. Untersuchungen über freilebende Nematoden und die Gattung *Chatonotus*. Z. wiss. Zool. xxvi. pp. 363–413, pls. xxiii.–xxvi.; Abstr. Z. ges. Naturw. (2) xiii. pp. 399–404.

26. Casali, T. Nuova varieta di *Spiroptera* del pollo domestico. An. Soc. Mod. (2) viii. pp. 1–12, pl. i.

27. Cobbold, T. S. [A] Remarks on recent contributions to our knowledge of the parasitic Nematoids, especially in reference to the wasting diseases they produce in man and animals; Veterin. xlix. pp. 1–7. [B] Remarks on the study of parasites, with suggestions in reference to the management of sheep suffering from Nematoid worms; *op. cit.* pp. 673–676.

28. Man, J. G. de. Onderzoekingen over vrij in de aarde levende Nematoden. Tijdschr. Nederl. Dierk. Ver. ii. pp. 78–196, pls. iii.–xiii. (Abstr. Niederl. Arch. Zool. iii. pp. 281 & 282.)

29. ——. Contributions à la connaissance des Nematoides marins du golfe de Naples. *Op. cit.* iii. 31 pp. pls. vii.–ix.

30. Panceri, P. Osservazioni intorno a nuove forma di Vermi Nematoidi marini. Rend. Acc. Nap. 1876, p. 225 *et seq.*; Atti Acc. Nap. 1876.

[Not seen by the Recorder.]

Of Ercolani's paper on "Dimorphobiosis" in *Nematoda* [Zool. Rec. xii. p. 538] an abstract is given in Repert. f. Thierheilk., xxxvi. pp. 413–416. (Compare on this matter the critical remarks of R. Leuckart, Jahresbericht, Arch. f. Nat. xxxix. pp. 531–533.) Kühn, on Nematoids (*Heterodera schachti*) on roots of beet, oat, and wheat; Landwirthschaftl. Jahrb. iii. pp. 47–50. A. Braun, on galls caused by Anguilluline worms; SB. nat. Fr. 1875. L. Kuntz, Trichinenkunde, ein Leitfaden für Fachleute; Stuttgart, 64 pp. R. Bassi, Di alcuni fibromi d'origine parasittaria degli stinchi dei solipedi, &c. [*Spiroptera cincinnati*, Ercol.], Giorn. di med. Veterin. (4) iv. pp. 448–450; with a letter on the same subject from A. Gotti, *l. c.* pp. 451–457. J. Drechsler and L. Graff, Ueber einen neuen Parasiten in der Schleimhaut des Rinderdarms; Zeitschr. f. Thiermedicin, ii. pp. 355–358. H. Krabbe, *Strongylus* (*Syngamus*) *trachealis*, Tidskr. Vet. 1876, pp. 26–29. *Id.* "Ormeaneurismernes Forhold til Koljk hos Hesten" (after Bollinger), *ibid.* (2), vi. pp. 89–103. Hischl, Fall von *Anchylostomum duodenale* beobachtet im

pathol. anat. Inst. in Wien (Wien. Medicin. Presse, No. 27, pp. 925). FAYRER, on *Filaria sanguinis-hominis ægyptiaca* (Lancet, Aug. 26, 1876). COBBOLD, Notification of recent hæmatozoal discoveries in Australia and Egypt (Brit. Med. J., June 24, 1876, p. 780). WINCKEL, Chylöser Ascites benirkt durch Parasiten (Hæmatozoen); Arch. f. klin. Med. xvii. p. 303. KNOCH, Die Trichinen-Endemie und Epidemie in Moskau; Arch. Anat. Phys. lxvi. p. 393. MÜLLER, Trichinose in Westphalen; Zeitschr. f. prakt. Med. Nos. 14 & 15. A. KOCH, Ueber Parasiten des Schweines mit besonderer Berücksichtigung der Trichinose; Oesterr. Monatschr. f. Thierheilk. i. p. 5. DAMMAN, Zur Frage des Lebendauers und der Verkapselung der Trichinen bei dem Schweine; Zeitschr. f. Thiermedicin, iii. p. 92. KRYLOW, Ueber die Trichinose in Russland; *op. cit.* ii. pp. 320–331. Several Russian papers on Nematoids (unknown to the Recorder) are cited by LEUCKART (*l. c.*), e.g.: MELNIKOFF, on *Cytoopsis acipenseris*; Tr. Nat. Soc. Kasan, 1871–72. RADKEWITCH, on the evolution of *Nematoda*; Tr. Nat Soc. Charkow, 1871 (JB. Leist. Fort. Anat. i.). FEDSCHENKO on *Filaria medinensis*, *tricuspis*, and *quadrispina*, spp. nn., *Mermis longissimus* and *explicans*, spp. nn.; Nachr. Ges. Mosc. x. pp. 51–69, pl. xiv.

BUGNION (24) has studied the different forms of pneumonia produced by adult *Strongyli micruri* coiled up in the bronchi of calves and heifers, or by eggs and young of other species in the pulmonary tissue of goats, sheep, pigs, and cats. According to O'NEILL (Lancet, 1875), a microscopical *Filaria* causes in the negroes of West Africa a cuticular disease resembling scabies; R. LEUCKART (JB. Leist. Fort. Anat. i. p. 551) observed a similar phenomenon in the fox. *Rhabditis stercoralis*, Bavay (23), is found in the stomach, intestine, hepatic and biliary ducts of persons suffering from the "diarrhœa of Cochin China."

One of the most important chapters in the concluding volume of LEUCKART'S "Menschlichen Parasiten" (3) is that (pp. 642–725) devoted to "dracontiasis" and to *Dracunculus medinensis*. The male is unknown. In the adult female, the vent is obliterated, and all other organs reduced in bulk through the excessive development of the uterus. The young ones are not expelled through a sexual orifice (wanting in the adult worm), but set free through the bursting of the maternal body. Leuckart's hypothesis that small *Crustacea* of the *Cyclops* tribe might be the interimistic hosts of the young guinea-worms, was confirmed by Fedschenko in Turkestan; they penetrate in the *Cyclops* through the skin between the abdominal segments, and assume an interimistic larval form, equally unlike the preceding and the final one. The anatomy of the adult worm is treated in full. The other species described in this volume are: (2) *Trichina spiralis* (pp. 513–609); rats are the true hosts of this parasite, and hogs chiefly infected from them; (3) *Filaria labialis*, Pane (p. 616), once found in a pustule at the lip; (4) *F. bronchialis*, Rud. (p. 618), found once in the bronchial glands and adjoining lymphatic vessels of a phthisical patient; (5) *F. lou*, Guyot (p. 619), below the conjunctiva in negroes in Western Africa and the Antilles; (6) *T. lentis*, Dies. (p. 622), found thrice in the lens (young specimens, perhaps, of different species); (7) *T. sanguinis-hominis*, Lewis (p. 628), only known in the embryonic

condition (tropical zone) [Compare a paper by SONSINO, Rend. Acc. Nap. 1874]; (8) *Ascaris maritima*, sp. n., Leuckart (p. 877), vomited by a child in Greenland, probably only accidental in man.

## NEW GENERA AND SPECIES.

*Strongylus serratus*, Linstow (4), p. 3, pl. i. figs. 4 & 5 (*Anser domesticus*, cœcum); *S. hemicolor*, Cobbold (2), p. 294, pl. xxi. figs. 5–10 [*Pithecia leucocephala*].

*Ascaris cornelyi*, Cobbold, *l. c.* figs. 1–4 [*Numida vulturina*, intestine], *andersoni*, id. *l. c.* p. 296, pl. xxi. figs. 14 & 15 [Indian squirrel, intestine]; *A. maritima*, Leuckart, *vide suprà*.

*Spiroptera muricí*, Cobbold, *l. c.* figs. 11–13 [*Pithecia leucocephala*, stomach, œsophagus].

*Acanthophorus*, g.n., Linstow (4). Polymyarian; two spicula of unequal size; no papillæ; spines from head to tail in the ventral, lateral, and dorsal lines; hooks in pairs anteriorly in the submedian lines. *A. tenuis*, id. *l. c.* p. 5, pl. i. figs. 7–9 [*Mergus merganser*, œsophagus], *horridus*, p. 6, pl. i. figs. 10–12.

*Dorylæmus flavo-maculatus*, id. *ibid.* pl. i. fig. 13 (Lake Ratzeburg); *macrurus*, id. *l. c.* p. 7, pl. i. fig. 14 (Ratzeburg, beneath moss); *pachysoma*, id. *l. c.* p. 8, pl. i. figs. 15 & 16 (Stade, beneath moss).

*Aphelenchus erraticus*, id. *l. c.* p. 10, pl. ii. figs. 2–4 (pseudo-parasitical in the intestine of *Lacerta vivipara*).

*Trilobus octies-papillata*, id. *l. c.* p. 11, pl. ii. fig. 28 (Lake Ratzeburg); *longicauda*, id. *l. c.* p. 12, pl. ii. figs. 29 & 30 (Ratzeburg).

*Monhystera ocellata*, id. *ibid.* pl. ii. fig. 31 (Ratzeburg).

*Chromadora ratzeburgensis*, id. *l. c.* p. 13, pl. ii. figs. 32 & 33, and *viridis*, p. 14 (Ratzeburg).

*Rhabditis agilis*, id. *ibid.* figs. 36 & 37 (Ratzeburg).

*Diplolaimus* [*-læmus*], g. n., Linstow. Distinguished by certain peculiarities of the mouth and œsophagus. *D. gracilis*, id. *l. c.* p. 16, pl. ii. fig. 38 (Ratzeburg).

The same author has also published observations (*l. c.*) on *Ascaris depressa*, *Filaria aculeata*, Cr. (pl. i. fig. 6) (from the œsophagus of *Charadrius hiaticula*), *Strongylus nodularis* (between the stomachal membranes of *Fulica atra*), *Dorylæmus stagnalis*, D. (pl. i. figs. 17–22), *Tylenchus filiformis*, Btl. (pl. ii. fig. 23), *Trilobus gracilis*, Bst. (pl. ii. figs. 26 & 27). *Calyptonema*, Mar., is probably founded upon specimens changing the skin, during which process the interior chitinous covering of the œsophagus and the supplemental spine are also thrown off. To Cobbold (2), are due observations on *Ascaris simplex* (*delphini*) Rud. [intestine of *Platanista gangetica*], *A. leptura*, R. (intestine and cloaca of *Testudo elongata*), *Oxyuris obesa*, Dies. (pl. xxi. figs. 16–19, from the Capybara ?), *Strongylus tubiformis*, Zed. (pl. xxi. fig. 20, the cat), and *Filaria terebra*, Dies. (abdominal cavity of *Cervus columbianus*).

DE MAN (28) has described 50 species of free terrestrial species and (29) 18 maritime from Naples. Of the Dutch, several are from brackish soil, suggesting a descent of the terrestrial from marine species. Figures

are given of parts of almost all the species. The following record embraces only the new genera and species; first, the terrestrial (28):—

1. *Ironidæ*. *Ironus tenuicaudatus*, M , p. 7.*

2. *Dorylæmidæ*. *Dorylæmus regius*, p. 15, pl. iii. fig. 2; *robustus*, p. 17, pl. iii. fig. 3; *elongatus*, p. 19, pl. iii. fig. 4; *rhopalocercus*, p. 22, pl. iv. fig. 6; *borborophilus*, p. 25, pls. iv. & v. fig. 8; *gracilis*, p. 29, pl. v. fig. 9; *similis*, p. 30, pl. v. fig. 10; *brigdammensis*, p. 35, pl. vi. figs. 13 & 14.

3. *Tylolæmidæ*. *Tylopharynx*, g. n. Pharynx with three more or less curved chitinous rods, each with a knob posteriorly; œsophagus as in *Tylenchus*, two bulbs; skin annulate; genital organs bipartite; no bursa in the males. *T. striata*, p. 40, pl. vi. fig. 15.

*Tylencholaimus* [*-læmus*], g. n. Agrees with *Dorylæmus* in the structure of the œsophagus and ovarium, and with *Tylenchus* in having a (not very solid) oral spine, and in the shape of the genital organs. Œsophagus without bulbs, but with a thickened chitinous tube in its posterior portion (male unknown). *T. minimus*, p. 43, pl. vi. fig. 16; *zelandicus*, p. 45, pl. vi. fig. 17.

*Tylenchus robustus*, p. 47, pl. vi. fig. 18; *exiguus*, p. 54, pl. vii. fig. 21; *elegans*, p. 56, pl. vii. fig. 23.

*Aphelenchus molestus*, p. 59, pl. vii. fig. 24.

4. *Odontosphæridæ*. *Teratocephalus*, g. n. Body slender, especially behind, skin distinctly ringed, without bristles or papillæ; head of a peculiar shape, due to an excessive evolution of papillæ; mouth-cavity small; œsophagus with a bulb containing a dental apparatus; genital organs single, asymmetrical; spicula much curved, without any accessory part; no caudal papillæ and no caudal gland. *T. terrestris* (Btsl.).

*Cephalobus oxyuroides*, p. 63, pl. vii. fig. 26; *bursifer*, p. 65, pl. viii. fig. 28.

*Rhabditis butschlii*, p. 77, pl. ix. fig. 36; *gracilicauda*, p. 79, pl. ix. fig. 37.

*Diplogaster coprophages*, p. 82, pl. x. fig. 38. *Anguillula* and *Plectus* also belong to this group.

5. *Ptychopharyngidæ*. *Spilophora geophila*, p. 85, pl. x. fig. 40.

*Chromadora leuckarti*, p. 88, pl. x. fig. 41. *Cyatholæmus* is also to be placed here.

6. *Tripylidæ*. *Spira*, *Tripyla*, *Leptolaimus* [*-læmus*], g. n. Skin ringed, with a few bristles and a lateral membrane; pharynx an elongate narrow channel, without any chitinous investment; two circular lateral organs; head without lips or papillæ; œsophagus swelling slightly behind; a caudal gland with a narrow duct; two spicula with a single curved accessory piece; a row of pre-anal papillæ, the hindmost tubiform; uterus bipartite; vulva in the middle of body. *L. papilliger*, p. 92, pls. x. & xi. fig. 42.

7. *Monhysteridæ*. *Bastiania*, g. n. Body very slender, skin trans- ose; bristles on the head; lateral circles and caudal gland al organs single. Differs from *Monhystera* through the

tion is that of the separately printed copies.—C. F. L.

absence of accessory pieces and the presence of a median row of preanal papillæ. *B. gracilis*, p. 95, pl. xi. fig. 43.

*Monhystera* ? *tenax*, p. 99, pl. xi. fig. 45; ? *dolichura*, p. 100, pls. xi. & xii. fig. 46.

*Sphærolæmus gracilis*, p. 102, pl. xii. fig. 47.

8. *Odontopharyngidæ*. *Oncholæmus thalassophygas*, p. 109, pls. xii. & xiii. fig. 48.

*Mononchus bastiani*, p. 107, pl. xiii. fig. 49; *tridentatus*, p. 109, pl. xiii. fig. 50.

The new marine species from Naples are:—*Oncholæmus dujardini* (29), p. 7, pl. vii. fig. 4, *assimilis*, p. 8, pl. vii. fig. 5, *campylocercus*, p. 8, pl. vii. fig. 3; *Enchelidium eberthi*, p. 10, pl. vii. fig. 6; *Anticoma tyrrhenica*, p. 12, pl. vii. fig. 7; *Phanoderma gracile*, p. 14, pl. viii. fig. 8; *Thoracostoma echinodon*, p. 17, pl. viii. fig. 10; *Monhystera gracilis*, p. 18, pl. viii. fig. 11, *cephalophora*, p. 19, pl. viii. fig. 12; *Spira bioculata*, p. 20, pl. viii. fig. 13, *mediterranea*, p. 21, pl. ix. fig. 14; *Cyatholæmus spirophorus*, p. 23, pl. ix. fig. 15, *longicaudatus*, p. 24, pl. ix. fig. 16; *Chromadora neapolitana*, p. 26, pl. ix. fig. 17, *chlorophthalma*, p. 27, pl. ix. fig. 18, *lata*, p. 28, pl. ix. fig. 19.

Bütschli (25) has published various corrections and additions to his former papers; the following species are given as new:—*Tylenchus imperfectus*, p. 362, pl. xxiv. fig. 7 (in rotten fungi); *Rhabditis fluviatilis*, p. 365, pl. xxiv. fig. 8 (in floating putrid matter, Main River); *Diplogaster similis*, p. 370, pl. xxiii. fig. 2 (in dung), *striatus*, p. 372, pl. xxiii. fig. 4 (in floating putrid matter, Main River), *gracilis*, p. 373, pl. xxiii. fig. 3.

*Nematorrhyncha*. After a renewed examination of *Chætonotus* [one of the *Gastrotricha*, Zool. Rec. xii. p. 520: the hemaphroditism is denied, and a nervous system shown to exist], Bütschli (25) discusses the systematical position of this ambiguous tribe, which, uniting it with the sub-order *Atricha* (viz., *Echinoderes*), he elevates into a distinct order, *Nematorrhyncha*, the relations of which to other segmented or unsegmented worms and to the *Arthropoda* are treated in detail. In the genealogical tree appended, they are placed between the *Nematoda* and the *Arthropoda*, the latter forming with the *Rotatoria* one principal branch, the *Annulata* and *Plathelmintha* constituting the other.

## VIII. ACANTHOCEPHALA.

Of Leuckart's "Menschlichen Parasiten" (3) a large portion (pp. 725–871), illustrated with woodcuts, is devoted to the anatomy, evolution, metamorphoses, and migrations of *Echinorrhynchus proteus* and *angustatus* (Zool. Rec. x. pp. 492 & 493), though the only instance of the (probably accidental) occurrence of an Echinorrhynch in man is the *E. hominis* of Lambl; it has only been found once, and can [illegible] be referred to *E. gigas* nor to any other known species.

New species: *Echinorrhynchus lanceolatus*, sp. n., Li[illegible] pl. i. fig. 3 (intestine of *Charadrius hiaticula*).

Notes on other species: Cobbold (2) pp. 202–204; *E. transversus*, Rud. [*Turdus iliacus*], *echinodiscus*, Dies. [*Myrmecophaga tamandua*] and *elegans*, Dies (pl. xvi. figs. 1–9) [*Hapale œdipus*].

## IX. GEPHYREA.

1. Kowalewski, A. Du male planariforme de la Bonélie, traduit du Russe par J. D. Catta. Montpellier: 8 pp., 1 pl.

2. Salensky, W. Ueber die Metamorphose des *Echiurus*. Morphol. JB. ii. pp. 319–327, pl. xxii.

3. Schenk, S. L. Der grüne Farbstoff von *Bonellia viridis*. SB. Ak. Wien, 1875, 5 pp.

4. Théel, H. Recherches sur le *Phascolion strombi*. Sv. Ak. Handl. (n. f.) xiv. 2, 32 pp., 2 pls.

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Species: *Phascolosoma japonicum*, sp. n., Grube, JB. schles. Ges. 1876, p. 50 (Z. ges. Naturw. 2, xiii. p. 96), from Japan; *P. tabicola*, Verr., and *boreale*, Kef. ?, S. J. Smith & O. Harger, Tr. Conn. Ac. iii. p. 46.

*Chætoderma nitidulum*, Lov., *iid. l. c.* pl. viii. fig. 3.

*Aspidosiphon* sp., near *A. steenstrupi*, from St. Vincent; Grube, *l. c.*

### Evolution, Anatomy, &c.

Evolution. The *Echiurus* larva is shaped according to the "Lovénian" type of larval *Annulata*; during growth, the anterior portion of the body is transformed into a trunk (proboscis), whilst the posterior is elongated, and develops the anterior paired hooks and the posterior circle of hooklets, the respiratory sacs, the ganglionated ventral nerve-strings, &c. Salensky (2).

Anatomy. Théel (4) describes the anatomy of *Phascolion strombi* (Zool. Rec. xii. p. 542), the spines, tubercles, and papillæ of the skin, its cuticle, epithelium, and "follicles." As to the interpretation of the latter as glands (*l. c.* p. 541), or sense-organs, he does not pronounce any decided opinion, rejecting, however, the nervous nature of the filaments connecting them with the subjacent muscular stratum in some species. The muscular sac is undivided, composed of external circular and internal longitudinal fibres, to which are added, between the two layers, separate delicate oblique bands. There are two retractors of the intestine, a large dorsal and a ventral, both inserted in the hindmost portion of the body cavity. The nervous cord is single, without ganglia, ending posteriorly in two ramifying branches, giving off lateral branches in its course, and continued anteriorly in the ring and brain, encircling the parts immediately behind the base of the twenty tentacles. The body-[illegible] filled with the nutritive fluid, which circulates in a definite [illegible] observed in young specimens, from before backward along [illegible]tion of the body, and from behind forward in the dorsal; [illegible]d corpuscles of different types, also, at times, ova and

# ECHINODERMATA.

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## ANATOMY, PHYSIOLOGY, AND BIOLOGY GENERALLY.

*Biology.* It is evident from the observations (2, 18, 19, 22) of different naturalists who have had the opportunity of studying the southern and antarctic *Echinodermata* during recent expeditions, or materials collected on those occasions, that very often, at least, there is no metamorphosis, no "*Pluteus*"-like pelagic larval state, or "locomotive bilateral pseudo-embryo" in these species; in place of that—as in several northern species—a direct development exists, and a commensal relation takes place between the parent and the brood, a passive maternal care at least being bestowed on the eggs and young, which are developed in or upon the maternal body until they have attained their definite shape and organization. Observations of this kind are, *e.g.*, made in *Amphiura magellanica*, *Ophiacantha vivipara* and *marsupialis*, and *Ophiomyxa vivipara*. In these *Ophiuridæ*, the ova are developed in bags in the body-cavity, corresponding in number with the genital slits, through which they communicate with the exterior; two or three young may be found in each bag, which receives the eggs from the ovaria. In *Ophiacantha*, the young ones cling to the back of the mother until attaining a relatively considerable size. In the Holothurian *Cladodactyla crocea*, the young may be found on the back of the mother, clinging in rows to the ambulacral feet of the 'bivium,' which in the females are less developed than those of the 'trivium,' or belly; the dorsal ambulacral feet are also, in the young, developed after the ventral. In *Psolus ephippifer*, the eggs are deposited and the young reared on the back, protected by the large polygonal scales of this portion of the body, which are in the females raised on stalks, and form in this manner a sort of 'marsupium.' In *Cidaris nutrix*, the young are reared on the peristome, protected by the spathulate spines of the peristomial part of the shell, while in *Goniocidaris canaliculata*, *membranipora*, and *vivipara*, the nursery is established at the abactinal portion, protected by the large uppermost primary spines. In *Hemiaster* (*Abatus cordatus* and *excavatus*), the widened and deepened paired ambulacra of the mature females (in the young and in the males they are not so dilated nor so deeply sunken) perform the same functions. In *Asterias perrieri*, a cluster of some hundreds of young ones may be found clinging to the ventral disk of larger specimens. In *Archaster excavatus*, the eggs pass from the ovarian openings into the interspaces between the shafts of the "paxilli;" when six ambulacral suckers at least are formed on each arm, the young star-fishes push their way out between the "paxilli," and remain for a time loosely attached to the parent by the centre of the dorsal surface, clustering especially in the angles between the arms of the mother. In *Hymenaster nobilis*, a marsupial tent is formed over the vent by five specially developed dermal valves, supported on spines, like the rest of the superficial covering of the starfish. During the southern cruise of the "Challenger," between the Cape of Good Hope and Australia, only one form of Echinodermal "pseud-embryo" (a *Chiridota*,

? larva) occurred, while "*Plutei*" and "*Bipinnariæ*" were constantly taken in the towing-net in the warm and temperate seas.

According to STUDER (19), the arms of *Labidiaster* are thrown off successively, swollen with mature ova, for the purpose of propagation (*Cf.* SARS's similar suggestion on *Brisinga*; Zool. Rec. xii. p. 553). GIARD describes *Echinocardium cordatum* as living buried in the sand at the depth of 15–20 centimètres, in a cavity lined with a glutinous secretion; two tubes of the thickness of a quill communicate with the surface, one of them terminating at the central point of the ambulacral star, the other at the anal aperture; the water penetrates by the first-named tube, which contains the long suckers of the anterior ambulacrum, the movements of which convey the alimentary particles to the mouth; the anal tube serves for the escape of the sand which has traversed the digestive system (C. R. lxxxii. pp. 76 & 77; Ann. N. H. 4, xvii. pp. 261 & 262).

According to SELENKA's observations (16), each of the eight large tentacula of *Cucumaria* (*doliolum*) are successively withdrawn and reflected into the mouth, to be cleared of the adherent or captured animalcules, and the two small ventral tentacles are employed during the subsequent protrusion of the large one as a sort of comb for stripping them completely of their whole catch. The fecundation of the ova probably takes place in the atrium of the mouth, as the females begin to agitate their tentacles violently each time the males eject their clouds of spermatozoa into the water. CARPENTER (4) has ascertained that the food of Crinoids consists of minute *Entomostraca*, Diatoms, spores of *Algæ*, *Peridinium*, &c.

*Evolution.*—Some data as to the evolution of the species, which in their young state are nursed by their parents, as stated above, are given in the papers of C. W. THOMSON (22B) and AGASSIZ (2). The approximation of the young *Hemiaster* to the type of the regular *Echini*—mouth nearly central, bivium and trivium completely separated abactinally, vent subcentral inside the fasciole—is especially remarkable.

The embryonal evolution of *Holothuria* and *Cucumaria* have been studied by SELENKA (16). Of the fourteen heads under which the author embodies the results of his beautiful investigations, the following may here be cited:—The eccentric position of the new nucleus, formed in the egg after fecundation, determines the position of the actinal and abactinal pole; the "blastula" is composed of a single layer of ciliated cells; it is transformed into a "gastrula" through the invagination of the vent at the abactinal pole, at a place where internally some of the blastodermal (endodermal) cells are freed from their connections, and build up a "mesodermal germ," from which the amœboid migrating cells are developed, which successively constitute the subcutaneous muscular system, the muscular investment of the intestine, and probably also many other internal organs. Before the invaginated primitive intestine is made confluent with the actinally invaginated oral atrium, it has given off a diverticulum, which afterwards subdivides in two cavities; from one of which the aquiferous system takes its origin, with the vesicles for the tentacula, the ambulacral vessels, organ of Poli, the stone-canal with its dorsal pore, etc.; the other is the first beginning of the large peritoneal cavity, which subsequently pushes aside the primitive body cavity or

cavity of segmentation. The gastro-vascular cavity of the *Cœlenterata*, therefore, is homologous only with the primitive intestinal cavity of Echinoderms, of which the later body-cavity and the water-vascular system, &c., are only evaginations. The calcareous corpuscles of the skin are formed in the ectoderm.

The investigations of GÖTTE (8) have cleared up some highly important and hitherto obscure points in the developmental history of *Crinoidea* (*Antedon*), thus making it possible to institute a closer comparison between the structure of the larvæ of this and of the other sub-classes of Echinoderms. Apart from much that is different, there are some striking analogies with the facts just settled for the *Holothuriidæ* by Selenka. The primitive intestine is introduced in the "gastrula" through an invagination of the blastoderm, but the intestinal cavity thus formed is very soon completely closed up. Through evagination from it, three secondary cavities are formed, two (lateral) forming the left (inferior, or actinal) and the right (superior, or abactinal) peritoneal cavity, the third (ventral) giving origin to the aquiferous system and the tentacula. It is only after the first elements of the stem, its calcareous articles and terminal plate, are deposited in the posterior portion of the larval body, and after the appearance of the centro-dorsal plate, the basalia, and oralia in the anterior portion, that the whole visceral portion so far changes its position in the body as eventually to fill up the portion diametrically opposed to the base of the stem; then also the coverlet over the tentacles breaks down, and the mouth and vent are formed, the last-named orifice at a place nearly answering to the former position of the gastrular invagination. According to CARPENTER (4), who describes and figures some later stages of the development of the young (pentacrinoid) *Antedon*, and illustrates their anatomy, the vent is, however, formed at a somewhat later stage. The second portion of Götte's paper is devoted to a sagacious and profound analysis of the homologies of the larvæ of the five sub-classes of Echinoderms, which it is impossible here to reproduce; still it may be noted that the oral (actinal) portion of the body of a starfish, brittle-star, or sea-urchin, with the arms in the stars, is formed from and corresponds to the *left* antimere of the larva, the dorsal (abactinal) to the *right*; that the Crinoids may be considered as the most primitive type among the *Echinodermata*; that the primitive coverlet over the pre-oral cavity gives a clue towards understanding the apparently mouthless palæozoic Crinoids,—abnormal stemless forms of larval *Antedon* in like manner suggesting *Holopus*; that the centro-dorsal portion of the starfish, or brittle-star, corresponds with the whole dorsal (abactinal) portion of the sea-urchin, and not, inversely, the apex of the *Echini* to the whole dorsal portion of disc and arms in *Asteriæ* and *Ophiuræ*; that the "radii" of Holothurians are truly the "interradii"; and that the structural disharmony between the larvæ of Echinoderms and of worms (including those of *Gephyrea*), excludes the possibility of *any* theory connecting these types genealogically being conformable with truth. GREEFF (7) also illustrates the structure of an embryonal *Antedon* before the protrusion of the first tentacles.

The observations of HERTWIG (9) on the processes going on in the egg

before and after fecundation were made on ova of *Toxopneustes lividus*, but have, probably, as shown in the critical chapters of his essay, a general bearing on the subject. Before fecundation, the "germinal vesicle" migrates towards the periphery of the egg, and vanishes, leaving behind only the "germinal spot" as the future nucleus of the egg. After fecundation, a small nucleolar body (probably the head of a spermatozoon) makes its appearance in the interior of the egg, near the periphery; it exercises a certain attraction on the protoplasm, which results in a radial arrangement of the granules around a clear space surrounding the spermatic (?) nucleolus; this slowly advances towards the centre of the egg, where it is met by the nucleus advancing from the other side. A juxtaposition, and finally conjugation and confluence of these opposite elements takes place, and the first "nucleus of segmentation" is thus formed. The first division of the egg is now preceded by a stretching and subsequent division of this nucleus, and by the development of clear spaces, forming new centres of radiation for the protoplasm, at its extremities; and similar proceedings are repeated each time a new segmentation takes place. These manifestations of the protoplasmic yelk-segments are evidently governed by those of their nuclei which act as the automatic centres of the cells. [Compare the critical remarks of Bütschli, Abh. senck. Ges. x. pp. 432–438; and cf E. v. Beneden, on the germinal vesicle, &c.: Q. J. Micr. Sci. (2) xvi. pp. 153–182, and Bull. Ac. Belg. (2) lxi.]

Some paragraphs of Greeff's short preliminary notes on the anatomy and evolution of Echinoderms (7) are devoted to the evolution of *Asterias rubens*. Several details brought forward by Hertwig, Selenka, van Beneden, and others, in other sub-classes, are here indirectly confirmed. Greeff, however, has not seen anything corresponding with Hertwig's "spermatic nucleolus" and its conjugation with the nucleus; on the other hand, he has observed the "globule of direction," preceding or succeeding the first division of the egg, and he is inclined to believe that the "germinal spot" disappears completely after having assumed a fixed granular character. It may also be noted that J. Müller's "*Bipinnaria* and *Brachiolaria* of Elseneur" are both referable to *Asterias rubens*, which is sexually matured in spring (April and May). His assertion that non-fecundated eggs are capable of evolution parthenogenetically, at least as far as the stage of the ciliated *Gastrula*-larva, is very remarkable. The evolution of the non-fecundated eggs, however, is much slower than the normal one.

*Anatomy of Holothuriidæ.* Teuscher (20) has studied several points of the more delicate anatomy and histology, especially of *H. tubulosa*. As in all Echinoderms, there is one aquiferous and two distinct sanguiniferous vascular systems, without any mutual communications, in the *Holothuriidæ*. Each of the large ambulacral water-vessels is separated from the nervous trunk, situated outside and alongside of it, through a blood-vessel of the neuro-dermal system; a nerve and a branch from the blood-vessel go with each branch of the ambulacral water-vessel to the feet or suckers. The nerve-trunks and neuro-dermal vascular stems also go together to the pharynx, where their ring-like connecting parts are like-

wise in juxtaposition, but separate from the ring of the aquiferous system. There is no organic connection between the "rete mirabile" of the intestinal vascular system and the internal gills. The chief histological elements of the nerves are longitudinal and transversal fibres and peripherical cells, the latter, perhaps, connected with the longitudinal nerve-fibres. GREEFF (7, § 4, 2) has studied the "Cuvierian organs," occurring in some *Holothuriidæ* (*H. polii*, e.g.), and agrees with Semper in regarding these elastic and glutinous filiform organs as weapons, which are protruded from the cloaca for defensive purposes.

*Anatomy of Echinidæ.* TEUSCHER (20) has likewise investigated several portions of the anatomy of *Echinus esculentus* and *Spatangus "meridionalis."* In *Echinus*, there is a ventral and a dorsal intestinal vessel, and, in the upper winding of the intestine, a mesenterical vessel, which anastomoses frequently with the dorsal; the ventral vessel is probably continued in an anal ring, though that could not be made out. The ventral intestinal vessel (perhaps also the dorsal) further communicates with the vascular ring encircling the œsophagus immediately above the "lantern"; it probably gives origin (thus establishing a communication between the intestinal and neuro-dermal systems) to the five sanguiniferous vessels running down the pharynx; close to the mouth, they are placed in juxtaposition with the five nerve-trunks, branching off from the nerve-ring situated within the lower extremities of the pyramids; thus the central rings of the nervous and sanguiniferous systems are, in the *Echini*, placed at a certain distance from each other, separated by the whole height of the "lantern." Immediately below the vascular ring, lies the central ring of the aquiferous system, giving off (1) the stone canal, (2) the Polian vesicles (apparently abortive organs without any definite function like the so-called "heart" of the dorsal intestinal vessel), and (3) the five ambulacral vessels, running first horizontally below the rectangular covering-pieces of the lantern, afterwards perpendicularly down the outside of this organ, along the muscles between the pyramids, and finally turning upwards, in company with the five nerve-trunks and the five neuro-dermal vessels, on the inside of the shell. The ambulacral vessel is the innermost of the three, the nerve-trunk is enclosed in the neuro-dermal vessel, which gives off, like the nerve, a branch accompanying each lateral branch of the water-tube to the ampullæ and suckers. Between the intestine and the ventral vessel, is interposed, in a portion of the superior winding of the intestine, the "organ of Hoffman," previously discovered in the *Spatangi*, an (abortive?) diverticle of the intestine, communicating with its cavity at both extremities. A communication between the sanguiniferous and aquiferous systems was not made out in *Echinus*; in *Spatangus*, a double communication of this kind exists: between the "stone canal" and the intestinal sanguiniferous system, and between this and the central ring of the ambulacral system. The central portion of the sanguiniferous system is, in *Spatangus*, a large oral sinus, enclosing in its interior the nerve-ring; close to it, but outside of the "sinus," the central ring of the aquiferous system is placed. L. FREDERIQ (5, 6) has also studied the nervous system in *Echinus esculentus*; his description agrees in most points with that of Teuscher, but

he has not recognized the sanguiniferous or vascular nature of the tube surrounding the nerve-trunks and their branches, and he describes the central nerve-ring as enclosed in a similar tube, on which Teuscher is silent. He further observed that the nerves for the suckers make their exit through the pore nearest to the axis of the ambulacrum, of the two pores belonging to each foot. The nerve-ring is composed of two concentric portions, the separation of which is, however, only indicated by a furrow; from the external, the ambulacral nerve-trunks are given off; from the internal, ten branches to the digestive tube. Each ambulacral nerve-trunk terminates abactinally below the skin, which closes the pore of the 'ocular' plate; of eyes there is no vestige, nor was Frederiq capable of discovering the unpaired tentacle described by Agassiz. The cutting through of the nerve-trunks at their origin from the ring does not disturb the functions of the ambulacra, but disturbs their co-operation; after the operation, the sea-urchin is unable to move from the place, or to change its position if laid on the back. Von Ankum (1) has examined a large number of male and female *E. esculentus*, and ascertained that in the majority the ovaria (or testes) are coalesced, always excepting however the two on both sides of the rectum; in the few specimens examined of other genera (*Strongylocentrus*, *Heterocentrus*, *Tripneustes*, *Echinometra*), the same rule was found to prevail. He further describes the buckle- or S-shaped calcareous spicula of the sexual organs in *E. esculentus*; in the genital glands and intestinal walls of *Echinometra lucunter* they have a great resemblance to those of the *Calcispongiæ*, being typically tri-radiate (though with many individual variations) with a central canal and central protoplasmic filament, &c.

*Anatomy of Asteridæ.* Of the nervous and vascular systems Teuscher (*l. c.*) gives the following description, based chiefly upon *Astropecten aurantiacus*. The ring-shaped central portions of the sanguiniferous, aquiferous, and nervous systems are placed close together, encircling the mouth, above the calcareous ossicula forming the mouth-angles. The band-shaped nerve-trunks form the bottom of the ambulacral furrows, being the parts placed most externally; inside of them are placed the chambered neural vessels; and innermost, the aquiferous tubes. These bands have been falsely interpreted as consisting exclusively of nerve-substance, or as belonging chiefly to the skin; the truth is that both elements are present, the dermal layer externally, commonly very intimately connected, the true nervous layer presenting the same structure as in other Echinoderms, especially in those (Crinoids, Holothurians) in which it is unprotected by a calcareous shell. It is continued upon the inside of the basal portion of the suckers, where it ends abruptly; it does not form the whole outer covering of these organs. It is also continued, with its dermal covering, into the unpaired feeler at the extremity of the arms; the eye also is a specially developed part of the nervous band, crystal corpuscles being imbedded in its dermal layer. The principal neural vessel, immediately inside the nervous band, is subdivided by transverse (hitherto overlooked) septa, corresponding to the "vertebræ" of the skeleton, in chambers, without any immediate mutual communication; these chambers are further

subdivided by a (sometimes incomplete) longitudinal vertical septum, and by more or less complete horizontal longitudinal septa; the innermost (proximal) of these chambers unite to form an external vascular ring, close to which lies another, internal, which gives off two delicate vessels, running along each arm in the longitudinal septa. From both sides of these central-neural vessels (not demonstrated, however, in *Asterias* pr.), short lateral vessels spring, encircling the feet, and united by four other longitudinal vessels, thus forming a regular angular meshwork along each ambulacrum; the most external of these longitudinal vessels on each side communicate with the outer vascular oral ring. How the chambers of the neural vessels are filled by injection from the ring, is still a mystery. The heart appears to be an abortive functionless organ in the adult; in the young, it is a dense convolute of delicate vessels: it is enclosed within the "sack-shaped organ," which springs from the internal neuro-vascular ring, and afterwards embraces the stone-canal, accompanying it to the "madreporite," which puts the two vascular systems in communication with each other and with the sea-water. From the "sack-shaped organ" the anal ring was easily injected in *Echinaster*, and shown to consist of 2–3 parallel vessels; it gives off the ovarian vessels, but the *venæ intestinales* of Tiedemann are apparently abortive, if vessels at all. The ampullæ of the suckers have, in *Astropecten* and *Luidia*, a vigorous muscular coating, which is wanting in those *Asteridæ* of which the suckers are provided with discs. LANGE (10), on the other hand, describes the ampullæ of *Asterias rubens* as highly muscular; and though he describes the septa dividing the space between the nervous band and the ambulacral water-tube very much in the same manner as Teuscher, his conception of the histological composition of the band and of the limitation of its nervous and dermal elements is much at variance with that of Teuscher. Its tissue is only a qualitative modification of the common epithelium of the starfish. The cones which form the ocelli of the composite eye of the starfish, are formed of pigment cells, bearing on their heads clear rod-like bodies, converging towards the axis of the cone. The cavity of the terminal feeler is the continuation of the ambulacral aquatic vessel. Lange also describes a valve on each side of the orifice, between the suckers and the ambulacral vessel, forming an obstacle for the reflux of the liquid during the contraction of the feet or ampullæ.

*Anatomy of Ophiuridæ.* In the cavity between the ventral arm-plates and the inferior surface of the "ambulacral vertebræ" lies, according to TEUSCHER, innermost (uppermost) the ambulacral aquiferous vessel; it gives off, in pairs, branches for the feet, and communicates with the more external of the two annular vessels, which are located in the metamorphosed vertebræ, forming the central body-skeleton round the mouth. In some species, Polian vesicles are attached to this outer, or ambulacral, vascular ring; one of these vesicles, communicating with the "madreporite"-mouth-shield, is the "stone-canal." Below the ambulacral water-tubes of the arms, the neural blood-vessel is situated; it encloses the nerve-trunks on both sides, and gives off, for each "vertebra," a ring-vessel, which reposes in its peripheral furrow, and is subdivided at its

origin for the purpose of encircling the feet; the succeeding rings are connected by one dorsal and two lateral vessels, which open freely and centrally in the body cavity; the lateral vessels also send branches into the lateral arm-plates and arm-spines. The chief, or ventral, neural vessels communicate with the internal and more deeply situated vascular ring, which also encloses the central portion of the nerve-system. The trunks of this system give off branches in pairs to the "vertebræ" and feet. A string on the internal (superior) face of the nervous band, Teuscher is inclined to regard (with Lange) as a vessel corresponding to the central vessels of the longitudinal septum in *Asteridæ*; in other respects, Lange's partial exposition of the nervous system of *Ophiuridæ* is hardly reconcilable with that of Teuscher, because of the discrepancy of the histological results of their investigations. What Teuscher describes as the nervous band, is, according to Lange, for a great portion, an epithelial band, homologous with that of the starfishes, but covered up by the closing of the ambulacral furrow through the ventral dermal plates. To SEMROTH (17) we are indebted for the first anatomical account of the anatomy of an Ophiurid (*Ophiactis virens*), comprising all parts of its organization. An abstract, however, is hardly possible here.

*Anatomy of Crinoids.* It is evident from the different and independent investigations of the anatomy of recent Crinoids (3, 4, 7, 12, 13, 20), that there exists in their arms and "pinnulæ," above the skeleton and the muscles, two large canals, which are diverticula from the body-cavity; an inferior or dorsal (*canalis cœliacus*, TEUSCHER'S "Muskelgefäss"), and a superior or ventral, often bipartite (*canalis subtentacularis*, TEUSCHER'S "Seitengefässe," described erroneously by J. MÜLLER as the "tentacular" cavity). Between these two canals, lies a third, much narrower, communicating with the two other canals through delicate "canaliculi," or vessels, according to TEUSCHER (20); it encloses the genital string, in which (especially in its dilated portion in the lower pinnulæ) the ova and sperma are developed; it was described by J. MÜLLER erroneously as the nerve. (In some species [*Actinometra armata*] the production of eggs is not limited to the pinnulæ, but takes place also in the true arms.) Above the "subtentacular" cavity are placed, from above downwards, (1) in the very bottom of the ambulacral furrow the (sometimes divided, or double) nerve-band, giving off branches to the tentacles (feet); (2) the nervous vessel; (3) a muscular band; (4) the true ambulacral vessel, or water-tube, giving off the ordinary lateral branches for the tentacles. The nerve-vessels and the nerve-trunk are continued to the mouth, which is surrounded by their annular central parts, the three rings lying in the same order as in the arms. Numerous delicate tubuli, comparable to the "Polian vesicles," or "stone-canals" of other Echinoderms, hang down, ending open (?) in the body-cavity, from the aquiferous vascular ring; numerous cœcal prolongations also spring from the nervous vascular ring (12). In *Rhizocrinus*, only five (in 5-rayed specimens) "stone canals" are present, and the same number holds good for the tubular perforations of the perisoma, which in other Crinoids occupy, in large number, its superior

(ventral) surface, or at least large portions of it, and are analogous to the "madreporites" of other Echinoderms. In *Antedon*, the "pinnulæ orales" are without tentacles, nerves, and nerve-vessels (but not without the aquatic vessel); in *Actinometra*, large portions of the arms, or whole arms (of the aboral side) are equally deficient, though with great individual variation. Special "sense-organs" [?] are limited to the terminal pinnulæ of these non-tentacular arms (3). As to the string-shaped organ in the axis of the arm-skeleton, opinions are much divided; the experiments of CARPENTER (4), and its nerve-like ramifications beyond the limits of the calcareous segments, strongly advocate its nervous character and high importance for the movements of the sea-lily. Below the first bifurcation of the arms, there are five such strings, arising from ten, which again are produced by the bifurcation of five basal chords emanating from the fibrillated envelope of the 5-chambered organ, or "heart," situated in the centro-dorsal piece of *Antedon*; the axis of this organ is formed by several vessels, which, upwards, are apparently continued in the perivisceral vascular plexus of the body-cavity; dorsally, the five peripheral vessels open in the five chambers of the heart, while the axial vessels are continued into the central vessels of the axial chords of the older dorsal cirri, and—in stalked Crinoids—into those of the stem; those of the younger (outer) cirri spring immediately from the chambers of the heart. Whether vessels are continued from these into the interior of the lower portion, at least, of the brachial central chords, is still a matter of doubt; on this, and on other questions of detail, there is apparently some difference in the short summaries hitherto published of the greater number of these delicate and difficult investigations. It is not always possible to identify the parts and organs described by the authors, or to reconcile the results arrived at. According to TEUSCHER, who regards the "cœliac" and "subtentacular" canals as vessels, the upper one is continued below the ambulacra to the mouth, where it forms a ring-shaped vessel; the lower one forms a ring around the upper portion of the heart. He also describes the intestine as provided with numerous branched cœca, and the spongeous vascular tissue filling up the interspaces between the convolutions of the intestine as separated from the true body-cavity, and from the "cœliac" and "subtentacular" vessels, while these parts are regarded and described by others as parts of a common lacunose system. According to CARPENTER (4), the cœliac vessels act as the venous, the subtentacular as the arterial portions of the circulatory system. The subtentacular canals are continued into the axial canal of the visceral cavity, and the genital strings, are probably in like manner connected with the axial pedicle, and thus with the axial organ of the stem in pedunculate Crinoids.

## GENERA AND SPECIES.

### HOLOTHURIIDÆ.

*Cuvieria porifera*, sp. n., Studer (19) p. 452 (Kerguelen, 63 fathoms).

*Trachythyone*, g. n., Studer. "Corpus fusiforme, undique papillis

conicis, singulos pedicellos gerentibus, æqualiter sparsis tectum. Tentacula 10, arborescentia, quorum 2 minora. Anus dentibus quinque calcareis munitus. Tabulæ calcareæ cribrosæ instratum continuum subcutaneum in papillas extensum coalitæ." *T. muricata*, sp. n., *id. l. c.* p. 453 (Kerguelen, 50 fathoms).

*Pentactella*, g. n., Verrill. In general appearance like *Pentacta*, but destitute of calcareous plates around the œsophagus and having a distinct muscular gizzard. Tentacles 10, arborescent, nearly all equal; suckers in 5 double rows, the intervening spaces smooth. *P. lævigata*, sp. n., *id.* Bull. U. S. Nat. Mus. iii. p. 68 (Kerguelen, 12 fathoms).

*Thyone scabra*, *id.* Tr. Am. Ac. iii. p. 51.

*Psolus ephippifer*, sp. n., Wyv.-Thomson (22) p. 60 (Heard Island, 75 fathoms).

*Molpadia violacea*, sp. n., Studer, *l. c.* p. 451 (Kerguelen, 100 fathoms).

*Sigmodota*, g. n. (*Synaptidarum*), id. *ibid.* "Tentacula 12, digitiformia; cutis mollis, lævis; corpuscula calcarea rara sigmoidea." *S. purpurea* (Less.) (*Chirodota purpurea*, Less.).

*Elpidia glacialis*, g. n., Théel (21), from the Karian Sea.

## Echinidæ.

*Echinolampas alexandri*, sp. n., Loriol (11), p. 4, pl. i. figs. 1–3, Mauritius; *E. oviformis*, Lmk., described and figured for comparison, *id. l. c.* p. 7, pl. i. fig. 4.

*Hemiaster cordatus*, sp. n., Verrill, Bull. U. S. Nat. Mus. iii. p. 69 (Kerguelen). (Sexual differences in the size of the genital pores and the depth of the lateral ambulacral grooves). (According to A. Agassiz, this = *H. australis, cavernosus*, Phil.).

*Aerope rostrata*, g. & sp. nn. (Thomson MS.), remarkable new type of Spatangoid, described (P. R. Soc. xxv. p. 211) by A. M. Norman from specimens dredged in Davis' Strait (1750 fathoms). Allied to *Pourtalesia* and *Archiacia*. Shape subcylindrical, sloping anteriorly; ambulacral system eccentric, confined to the anterior slope, circumscribed by a fasciole; one ambulacrum the largest, situated in a broad but shallow depression; lateral ambulacra short; mouth inferior, not situated in a groove; anal aperture dorsal, nearly flush with the surface.

*Brissus* (*Metalia*) *robillardi*, sp. n., Loriol, *l. c.* p. 9, pl. ii. fig. 1 (Mauritius).

*Goniocidaris membranipora*, sp. n., Studer (19), p. 454 (Kerguelen); *vivipara*, id. *l. c.* p. 455 (East Coast of Patagonia, 60–63 fathoms).

*Echinus diadema*, sp. n., *id. l. c.* p. 456 (Kerguelen).

*Astropyga elastica*, sp. n., *id. ibid.* p. 465 (New Britain).

*Cidaris nutrix*, Thomson (22) p. 63 (Kerguelen).

*Schleinitzia*, g. n. (*Cidaridarum*), Studer. "Testa globosa, supra et infra complanata, poris sulco connexis, tubercula perforata et crenulata: areola tuberculorum paullum immersa, ovalis, circulo granulorum circumdata. Zona ambulacralis angusta, paullum flexuosa; area abactinalis permagna, scutellis analibus numerosis, tabulæ genitales ab ocellaribus plane sejunctæ. Aculei primarii inæquales; infimi spatulati, margine crenulati;

vicini bacilliformes, longi, apice excavati, sulcis scabris; superiores acuti longi." *S. crenularis*, sp. n., *id. l. c.* p. 469 (New Guinea, 28 fathoms).

## Asteridæ.

*Asterias meridionalis*, Perr., Smith (18 A), p. 105 (Kerguelen); *perrieri*, sp. n., Smith, *l. c.* p. 106 (Kerguelen, 5–10 fathoms); *mollis*, sp. n., Studer (19), p. 457 (Kerguelen, 60 fathoms); *rupicola*, Verr., Bull. U. S. Nat. Mus. iii. p. 71 (Kerguelen).

Verrill (23) comments upon the great variability in characters of the species of *Asterias*, especially those of Eastern America. *A. berylina* and *arenicola* = *A. forbesi* (the southern form), while *A. stimpsoni*, *fabricii*, and *pallida* = *A. vulgaris*, St. (the northern form). *A. borealis*, Perr., is a variety of *A. polaris*.

*Pedicellaster scaber*, sp. n., Smith, *l. c.* p. 107 (Kerguelen, 5–10 fathoms).

*Othilia spinulifera*, sp. n., *id. ibid.* (Kerguelen); *sexradiata*, sp. n., Studer, *l. c.* p. 458 (Kerguelen, 14 fathoms).

*Pteraster affinis*, sp. n. ?, Smith, *l. c.* p. 108 (Kerguelen, 5–10 fathoms); *Hymenaster nobilis*, sp. n., Thomson (22 B), p. 74 (South of Australia, 1800 fathoms).

*Porania antarctica*, sp. n., Smith, *l. c.* (Kerguelen); *magellanica*, sp. n., Studer, *l. c.* p. 459 (Magellan Straits).

*Astrogonium meridionale*, sp. n., Smith, *l. c.* p. 109 (Kerguelen, 5–10 fathoms).

*Astropecten meridionalis*, sp. n., Studer, *l. c.* (Kerguelen, 120 fathoms) (near *A. aurantiacus*).

*Archaster excavatus*, sp. n., Thomson (22 B), p. 72 (Kerguelen, 30 fathoms).

*Leptychaster*, g. n. (near *Luidia*), Smith. "Discus 5-radiatus, compressus; radii mediocriter elongati; superficies dorsalis fasciculos pedunculatos confertos spinarum minutarum gerens; radiorum latera serie unica tessellarum tenuium transversarum lamellarium, ad ambulacra haud productarum, munita; interstitia inter tessellas et ambulacra spinarum parvarum fasciculis ordinatim cum tessellis dispositis ornata; tessella madreporiformis marginalis, in angulo interradiali sita." *L. kerguelensis*, sp. n., *id. l. c.* p. 110 (Kerguelen).

*Luidia chefuensis*, sp. n., Grube, Ber. schl. Ges. 1876, p. 28 (Chefoo).

Perrier (15) describes the following new genera and species:—

*Nectria ocellata* (*ocellifera*, Gr., *nec* Lmk.), p. 4 (Southern Seas).

*Pentagonaster gunni*, p. 19 (Australia), *minimus*, p. 23 (hab. unknown), *dilatatus*, p. 33 (New Zealand), *gibbosus*, p. 35 (hab. unknown), *mirabilis*, p. 40 (Smyrna), *granulosus*, p. 43 (Australia).

*Goniodiscus rugosus*, p. 49 (hab. unknown), *forficulatus*, p. 50 (Mingpou).

*Pentaceros nodulosus*, p. 53 (Australia), *alveolatus*, p. 59 (New Caledonia).

*Anthenea articulata* (Val.), p. 89 (Seychelles), *grayi*, p. 94 (hab. unknown).

*Gymnasterias valvulata*, p. 99 (Lord Hood's Island).

*Dermasterias*, g. n., type, *D. inermis*, Verr. (*imbricata*, Gr.).

*Disasterina*, g. n. (Fam. *Asterinidæ*), "Ossicules disjoints; peau nue." *D. abnormalis*, p. 208 (New Caledonia).

*Asterina gayi*, p. 225 (Valparaiso), *pusilla*, p. 226 (Talcahuano), *fimbriata*, p. 227 (Chiloe? Bourbon?), *novæ-zelandiæ*, p. 228 (New Zealand), *wesseli*, Peters, p. 231 (Barbadoes), *granulosa*, p. 232 (Sandwich Islands), *squamata*, ibid. (Senegal), *stellaris*, p. 233 (hab. unknown).

*Asterina* (*Nepanthia*) *belcheri*, p. 240 (hab. unknown), *brevis*, p. 241 (Prince of Wales' Straits).

*Chætaster nodosus*, p. 250 (Guadaloupe).

*Luidia elegans*, p. 256 (Florida Strait, 101 feet), *variegata*, p. 257 (Breton Island, Gulf of Mexico).

*Archaster echinulatus*, p. 268 (Barbadoes, 100–315 feet); allied to *A. tenuispinus*.

*Astropecten arenarius*, p. 268 (hab. unknown), *dussumieri*, Val., p. 291 (hab. unknown), *richardi*, Val., p. 292 (Cayenne), *alatus*, p. 294 (hab. unknown), *spatuliger*, p. 296 (Nicaragua). (Gray's *Platasterias* is a species of *Astropecten* nearly allied to the three last-named species).

Hutton's *Pteraster inflatus* is a *Palmipes*.

For numerous other emendations of nomenclature, corrections of synonymy, etc., the paper itself must be consulted. Several of the proposed alterations of the generic or specific denominations in common use, cannot be approved, as they are based upon misconceptions of the law of priority, or, in some instances, quite arbitrary.

## Ophiuridæ.

*Ophiacantha vivipara*, var. *kerguelensis*, Studer (19), p. 460 (Kerguelen, 5–60 faths.). *Cf.* Smith (18 A), p. 110. (Probably *Ophiocoma didelphys*, Thomson, *l. c.* p. 78, Kerguelen, is the same species.)

*Ophioglypha hexactis*, sp. n., Smith, *l. c.* p. 111 (Kerguelen). Verrill, Bull. U. S. Nat. Mus. iii. p. 72; *brevispina*, Smith, *l. c.* p. 112 (Kerguelen).

*Ophiolepis carinata*, sp. n., Studer, *l. c.* p. 460 (Kerguelen. 60–65 faths.).

*Ophiagona*, g. n., Studer (between *Ophiolepis* and *Pectinura*). "Discus pentagonus, incisuris radialibus nullis; cutis dorsi mollis, scutellis non contiguis parvis tecta; scuta oralia magna scutiformia in spatium interambulacrale prolongata; papillæ orales 7, dentales nullæ, dentes biseriatæ: papillæ ambulacrales 3–5, spinæ brachiales 7–9, appressæ, breves." *O. lævigata*, sp. n., *id. l. c.* p. 461 (Kerguelen, 120 faths.).

*Pectinura verrucosa*, sp. n., Studer, *l. c.* (Kerguelen, 150 faths.).

*Amphiura antarctica*, sp. n., Studer, *l. c.* (near *A. eugeniæ*) (Kerguelen, 5 faths.); *A. abyssorum*, sp. n., Norman, P. R. S. xxv. p. 215 (North Atlantic, 1785 faths.).

*Ophiomyxa vivipara*, sp. n., Studer, *l. c.* p. 462 (Patagonia).

*Ophicoma variegata*, sp. n., Smith (18C), p. 39 (Rodriguez); *brevispinosa*, sp. n., *id. l. c.* p. 40 (Kerguelen).

*Astrophyton australe*, sp. n., Verrill, Bull. U. S. Nat. Mus. iii. p. 74 (Tasmania).

## CRINOIDÆ.

*Comatula indica*, sp. n., Smith (18 n), p. 406 (Rodriguez).

*Bathycrinus aldrichianus*, sp. n., C. W. Thomson (22A) p. 47 (1° 47′ lat. N., 24° 26′ long. W., 1850 faths). Ten arms, not simple, as in *B. gracilis*, but with well-developed short pinnulæ; stem very long; a few jointed branches forming a root of attachment. Five basals soldered into a ring, scarcely discernible from the upper stem-joint; the five "first radials" in old specimens frequently soldered into a funnel-shaped piece, articulating with the "second radials," which are united by sutures with the "third, or axillary radials." Disk membranous, with scattered calcareous granules, mouth subcentral, without regular oral plates, anal opening on a low inter-radial papilla; ovaries borne on the 6–8 proximal pinnules.

*Hyocrinus bethellianus*, g. & sp. nn., *id. l. c.* p. 51 (46° 16′ lat. S., 48° 27′ long. E.). Stem rigid, composed of short joints, united by sutures; basals 2–3 large, more or less fused together; one cycle of large radials, articulating with five narrow arms, bearing at certain distances long pinnulæ, which decrease successively in length, but all reach nearly to the same level. The basal portion of the arms, between the radials and first pinnula, consists of three double (syzygial) articles; the following internodes are made up each of four syzygial articles. Peripheral part of the disc paved with closely set plates, irregular in form; mouth closed by four large triangular plates; anal opening upon a short plated inter-radial tube. Ovaries on the 3–4 proximal pinnulæ. In facies, *Hyocrinus* is somewhat like *Platycrinus* and *Poteriocrinus*, and other palæozoic Crinoids.

The *Echinodermata* dredged on the "Valorous" Expedition in Davis's Strait and the North Atlantic are recorded by NORMAN for each station in P. R. S. xxv. pp. 202–215.

## FOSSIL ECHINODERMATA.

G. COTTEAU, Echinides nouveaux ou peu connus (N. 104–110), R. Z. (3) iv. pp. 317–326, pls. i. & ii. (xxxvii. & xxxviii.); *id.*, Description des Echinides tertiaires des Isles St. Barthélémy et Anguilla, Sv. Ak. Handl. (n.f.) xiii. 6, 47 pp. 8 pls. (J. Zool. vi. pp. 62–64), Bull. Soc. Geol. (3) v. pp. 126–130 (*Peripneustes*, g. n., Cotteau, allied to *Maeropneustes*, differing through the depth of the anterior and lateral ambulacal furrows, and through the large sinuous fasciole, circumscribing the ambulacra and the large dorsal interambulacral tubercles); *id.*, PERON & GAUTHIER, Echinides fossiles de l'Algérie, 3me. partie; *id.*, Paléont. française, terrain jurass., Echinides réguliers, Livr. 36, pls. clxxix.–cxc. P. M. DUNCAN, On the *Echinodermata* of the Australian cainozoic (tertiary) deposits, J. G. Soc. xxxiii., Ann N. H. (4) xviii. p. 185. G. PANZI, I Fossili del monte Vaticano (Echinodermi), Atti Acc. Rom. (2) iii. pt. 2, p. 947 *et seq.* — HÖRNES, Die Fauna des Schliers von Ottnag (JB. Geol. Reichsanst. xxv. pp. 389–391, pls. xii. & xv.) (*Schizaster laubei*, *Brissopsis ottnagensis*, spp. nn.). P. DE LORIOL, Note, &c. (11) (*Enallaster*, *Pseudocidaris*, *Astropecten*). W. KEEPING, On the

discovery of *Melonites* in Britain, J. G. Soc. xxxii. pp. 395–399, Ann. N. H. (4) xviii. pp. 181 & 182. F. B. Meek, Note on the new genus *Uintacrinus* (Grinnel), Bull. U. S. Geol. Surv. ii. pp. 375–378; *id.*, Invertebrate Cretaceous Fossils, Rep. U. S. Geol. Surv. ix. p. 5 (*Hemiaster*). G. B. Grinnel, On a new Crinoid from the Cretaceous formation of the West, Am. J. Sci. (3) xii. pp. 81–83, pl. iv. [*Uintacrinus* (g. n.) *socialis*, a stemless form, allied to *Marsupites*]. G. Meneghini, I Crinoidi terziarii, Atti Soc. Tosc. ii. p. 36. G. A. Philippi, *Cothacrinites*, ein neues Geschlecht der fossilen Crinoideen, Z. ges. Naturw. (2) xiii pp. 68–71, pl. ii. A (Abstr. JB. f. Mineral. xliv. p. 978). B. Lundgren, Ueber Säulenglieder von Crinoideen bei Köpinge unweit Ystad, JB. f. Mineral. xliv. pp. 181–183. R. Etheridge, On the occurrence of the genus *Astrocrinites* (Austin) in the Scotch carboniferous limestone series, with the description of a new species (*A.? bennili*), and remarks on the genus, J. G. Soc. xxxii. pp. 103–114, pls. xii. & xiii., Ann. N. H. (4) xvii. pp. 255 & 256.

# CŒLENTERATA.

BY

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## ANTHOZOA.

1. Agassiz, A., & Pourtalès, L. F. de. Recent Corals from Tilbiche Peru. Bull. Mus. C. Z. iii. 13, pp. 287–290, 1 pl.

2. Duncan, M. Notices of some deep-sea and littoral Corals from the Atlantic Ocean, Caribbean, Indian, New Zealand, Persian Gulf, and Japanese, &c., Seas. P. Z. S. 1876, pp. 428–442, pls. xxxviii–xli.

3. Eisen, G. Bidrag till kännedomen om Pennatulid-slägtet *Renilla*. Sv. Ak. Handl. (n.f.) xiii. 1, 15 pp. 3 pls.

4. Fischer, P. Anthozoaires du département de la Gironde et des côtes du sud-ouest de la France. (Act. Soc. L. Bord. xxx.) 12 pp. (27 species are enumerated).

5. Korotneff, A. de. Organes des sens des Actinies. Arch. Z. expér. v. pp. 203–208.

6. Lindström, G. On the affinities of the *Anthozoa tabulata*. Ann. N. H. (4) xviii. pp. 1–17.

7. Moseley, H. N. Preliminary report on the true Corals dredged by H.M.S. "Challenger" in deep water. P. R. S. xxv. pp. 543–569.

8. ——. On the Structure and Relations of the Alcyonarian *Heliopora cærulea*, with some account of the anatomy of a species of *Sarcophyton*; notes on the structure of species of the genera *Millepora*, *Pocillopora*, and *Stylaster*, and remarks on the affinities of certain Palæozoic Corals. P. R. S. xxiv. pp. 59–70; Ann. N. H. (4) xvii. pp. 147–158; Arch. Z. expér. v. pp. xxxviii.–xlii.; Phil. Tr clvi. pp. 91–129, pls. viii. & ix.

### Generalities.

Moseley's investigations (8), made during the cruise of the "Challenger," have established the important and unexpected fact that

*Heliopora* is not a polyactinarian Anthozoon, but an Alcyonarian. It will form (with the fossil genera *Polytremacis* and *Heliolites*) a family *Helioporidæ*, thus characterized:—"A compact corallum, composed of a fibro-crystalline calcareous tissue, and consisting of an abundant tubular cœnenchyma; calicles having an irregular number of lateral ridges resembling septa, closed below, as are also the cœnenchymal tubes, by a succession of entire transverse partitions (tabulæ); polypes completely retractile, with tentacles when in retraction introverted: mouths of the sacs lining the cœnenchymal tubes closed with a layer of soft tissue, but communicating with one another and with the calicular cavities by a system of superficial transverse canals." The "cœnenchymal tubes" surrounding the calicles of the true polypes, are evidently rudimentary "zooids," analogous to those of the *Pennatulidæ* and *Sarcophyton* (of which a species is studied for comparison), but closed up, without mouth, stomach, mesenteria, sexual organs, or mesenteric filaments. The structure of the polypes is that of the *Alcyonaria*: eight tentacles and mesenteria, mesenteric filaments, &c. The bilateral arrangement of the retractor muscles of the mesenteries agrees with that of the *Pennatulidæ* and *Sarcophyton*, and, as in these, a "dorsal" and a "ventral" compartment may be distinguished. The hard parts of the corallum are not formed by the fusion of spicules, as in *Tubipora*, &c. Among the fossil "*Tabulata*," *Chætetes*, *Favosites*, *Michelinia*, *Alveolites*, and *Syringopora* are probably also Alcyonarians. The Actinozoon nature of *Pocillopora*, on the other hand, is confirmed.

Korotneff (5) has studied, without knowing anything of the researches of Duncan and Ludwig [Zool. Rec. xii. p. 557], the enigmatical marginal bodies of *Actinia mesembryanthemum*. Though his interpretations and results agree best with those of the last-named author, these are however, somewhat modified. The said organs are special sense organs, most resembling organs of taste, but not of a very highly specialized type. Externally, is a stratum of triangular "cnidocils" with elliptical bases, Rötteken's "rod-like" bodies and "lenses," and then a layer of long cylindrical nematocysts, each abutting against a "cnidocil," while other cnidocils are connected with fibrils from the third or fibrillary layer, consisting of fibrils, traversing and connecting fusiform cells, probably of nervous nature. The fourth layer is the "elastic membrane" (hyaline lamella" in Hydroids), Rötteken's muscular stratum; the fifth the endoderm. The tentacles of *Lucernaria* and *Corynactis* afford similar structures.

Eisen's monograph (3) of a littoral *Renilla* from the Californian Coast is of value, because of its being based upon the examination of fresh and living specimens. Kölliker's statements on the structure of these *Alcyonaria* are confirmed. The polypites, which are, as ordinarily, only placed upon the superior surface of the reniform disc, are of two kinds: the true polypites (provided with tentacula of the usual conformation and with organs of generation), retractile into their "zoœcia," which, placed side by side, and only separated by the walls of the sarcosoma, constitute the whole polyparium; and the small "zooids" (without reproductive organs and without tentacula, but with a short stomach and

short mesenteric partitions), are commonly gathered in groups and placed upon the uppermost mesenteric chamber of the polypites. Two polypites, one of each order, are distinguished through their size, viz., one true polypite placed a little before the anterior extremity of the superior stem-canal [the oldest primordial individual of the whole colony ?], and one large single zooid placed a little more backwards at the very extremity of this canal; its mouth establishes the only direct communication between the channel-system and the sea-water, with the exception made of the afferent orifice at the inferior extremity of the stem. The position of the (commonly five) conical protuberances at the base of the protractile portion of the polypites, in relation to the eight mesenteric chambers, is subject to definite rules. The zoœcia communicate through minute openings in the walls, as do also the two large canals of the hollow stem, separated by a longitudinal septum. (The axial skeleton of the stem of most other *Pennatulidæ* is wanting.) New individuals are formed at the periphery of the polypary, strictly on its inferior surface, but turned upwards during growth. The polypary is not only capable of retiring below the surface of the sand during low-water, but also of *creeping like a snail* over a smooth sea-bottom by voluntary motions, and of moving its stem in a trunk-like fashion; the natural position of the stem, however, is vertical, at right angles with the disc, which is expanded horizontally at the surface of the sea-bottom, &c.

## Genera and Species.

Moseley (7) has published a very suggestive report upon the deep-sea corals dredged from 50–1095 fathoms during the cruise of H.M.S. "Challenger." As the report is only preliminary, and the statistical results may be somewhat modified in the final one, a more detailed account of the general results may properly be deferred; the names of the new forms, which have received specifical denominations, are given below.

On the corals dredged at 56° 1′ N. lat., 690 fathoms; Duncan, P. R. S. 1876, p. 223.

(*Actinidæ*) *Cerianthus borealis*, Verrill, Tr. Conn. Ac. iii. p. 54, pl. ii. fig. 5; *Epizoanthus americanus*, Verr., *ibid.* pl. viii. fig. 2.

(*Turbinolidæ*) *Conocyathus zelandiæ*, sp. n., Duncan (2), p. 431, pl. xxxviii. figs. 1–3 (Cook's Strait, New Zealand) (allied to the miocene *C. sulcatus*, from Mayence).

*Deltocyathus orientalis*, sp. n., *id. ibid.* pl. xxxviii. figs. 4–7, Japanese Seas, 34° 12′ N. lat., 136° 20′ E. long., 52 fathoms (allied to the miocene *D. italicus*). *D. magnificus*, sp. n., Moseley (7), p. 552 (off Ké Island, 129 fathoms).

*Platytrochus rubescens*, Moseley (7), p. 553 (Ké Island).

*Paracyathus persicus*, sp. n., Duncan, *l. c.* p. 431, pl. xxxviii. figs. 8–10′ (Persian Gulf); *P. coronatus*, sp. n., *id. l. c.* p. 432, pl. xxxviii. figs. 11–13 (Persian Gulf).

Under the name of "*Turbinolidæ reptantes*" a new subfamily is defined: "Corals rising from a prolongation of the basal structures, some-

times distant, sometimes very close; the septa are plain; and there is no endotheca." Comprising the following two genera:—

*Polycyathus*, g. n., Duncan. "An epitheca covering the costæ; pali are present; the columella is usually deeply seated." *P. atlanticus*, sp. n. Duncan, *l. c.* p. 433, pl. xxxviii. figs. 14–16 (St. Helena).

*Agelacyathus*, g. n., Duncan. "No epitheca nor endotheca; the costæ well developed, especially near the calices; septa more or less exsert; pali and columella present." *A. helenæ*, sp. n., Duncan, *l. c.* p. 434, pl. pl. xxxix. figs. 4–6 (St. Helena); *A. persicus*, sp. n., *id. ibid.* figs. 1–3 (Persian Gulf).

*Javania*, g. n., Duncan. "Corallum simple, tall, compressed at the calyx, adherent by a broad base; epitheca complete, dense inferiorly, pellicular superiorly; large septa very exsert, primary and secondary costæ projecting; no columella; calicular fossa very deep." *J. insignis*, sp. n., Duncan, *l. c.* p. 435, pl. xxxix. figs. 11–13 (Japanese Seas, 34° 13′ N. lat., 136° 13′ E. long., 48 fathoms).

*Brachytrochus*, g. n., Duncan. "Corallum short, free or incrusting (on Annelid shells), calix circular, deep centrally; no columella; septa exsert, papillose; costæ well developed, merging into a granular structure on the rounded centre of the base." *B. simplex*, sp. n., Duncan, *l. c.* p. 436, pl. xxxix. figs. 7–10 (Gaspar Straits, 12 fathoms).

*Ceratotrochus diadema*, sp. n., Moseley (7, p. 553), 37° 26′ N. lat., 25° 14′ W. long., 1000 fathoms; off Pernambuco, 675 fathoms; *platypus*, sp. n., *id. l. c.*, p. 554, off New South Wales, 410 fathoms; *discoides*, sp. n., *id. ibid.*, off Pernambuco, 675 fathoms; *nobilis*, sp. n., *id. ibid.*, off Fayal, 1000 fathoms.

*Flabellum alabastrum*, sp. n., *id. l. c.* p. 555 (off the Azores, 1000 fathoms); *apertum*, sp. n., *id. l. c.* p. 556, off Portugal, 900 fathoms, and off Prince Edward's Island, 310 fathoms; *angulare*, sp. n., *id. ibid.* (off Nova Scotia, 1250 fathoms).

(*Oculinidæ*) *Oculina cubaensis*, sp. n., Duncan, *l. c.* p. 436, pl. xl. figs. 1 & 2 (Caribbean Sea, incrusting dead *Polyzoa* and *Serpulæ*).

*Sclerohelia hirtella*, Pall. (St. Helena), redescribed, *id. l. c.* p. 437, and figured (pl. xli. figs. 3 & 4); additions to the description of *Cyathohelia axillaris* (Ell., Sol.), *id. l. c.* p. 438.

(*Astræidæ*) *Antillia lonsdaleia*, Dunc., var., *id. l. c.* p. 438, pl. xli. figs. 1 & 2 (Japanese Seas) (hitherto known only as miocene from S. Domingo).

*Convexastræa* (?) *peruviana*, Pourtales (1), p. 290, figs. 4 & 5 (semi-fossil, Peru).

*Isophyllia duplicata*, id. *l. c.* p. 289, figs. 1–3, (semi-fossil, Peru).

(*Cladocoraceæ*). *Dendrocora*, g. n., Duncan. "Corallum bushy, branches short, frequently forming groups in one plane; wall thick, except near the calices: costæ distinct, thicker than the septa; columella lax and trabecular; pali placed before the tertiary septa in perfect systems; fissiparity common in the terminal calices, presenting short broken series; no epitheca; endotheca tolerably abundant." *D. fissipara*, sp. n., Duncan, *l. c.* p. 439, pl. xl. figs. 5–7 (off Bonito, W. Africa, 4½ fathoms).

(*Astrangiaceæ*) *Astrangia minuta*, sp. n., Duncan, *l. c.* p. 439, pl. xl.

fig. 8 (St. Domingo, on reef-corals); *epithecata*, sp. n., *id. l. c.* fig. 9 (West Indies, on reef-corals).

*Cyclicia tenella*, var. n. *natalensis*, id. *l. c.* p. 440, pl. xl. fig. 3 (Port Natal, on *Kraussia* shells).

(*Madreporaria perforata*) *Balanophyllia helenæ*, sp. n., *id. ibid.* pl. xli. figs. 5 & 6 (St. Helena, on shells); *B. striata*, sp. n., *id. l. c.* p. 441, pl. xli. figs. 7–9 (St. Helena, on shells).

*Placopsammia darwini*, sp. n., *id. l. c.* p. 441, pl. xl. fig. 4 (Galapagos Islands).

*Stephanophyllia complicata*, sp. n., Moseley (7), p. 558 (off Ké Island, 129 fathoms); *formosissima*, sp. n., *id. l. c.* p. 561 (Ké Island, and off Cebu, 95 fathoms).

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## Anatomy, Physiology, Evolution, &c.

G. v. Koch (13) confirms the derivation of the spermatozoa from the ectoderm in *Hydractinia echinata* and *Tubularia larynx*, and that of the ova from the endoderm in the last named species and in *Coryne fruticosa*. He further describes the male gemmules in *Eudendrium ramosum*. Also in *Tiarella* (24), the spermatozoa originate from the ectoderm. On the other hand, Allman (2) was unable to confirm this origin in *Myriothela*, where, according to his observations, both sexual products

* "Analysé du Russe (Mém. Soc. impér. de St. Petersbourg, xx. 1876) par J. Fescenko." The original paper is unknown to the Recorder.

originate in the endodermal layer. Again, in *Podocoryne*, the sexual products (ova) are developed in the ectoderm, according to GROBBEN (10); in *Lucernaria*, in the endoderm according to KOROTNEFF (14); this author however tries to reconcile the contradictory observations by the explanation, that they are, in fact, in all *Cœlenterata* and Sponges, developed in the mesoderm, in some instances outside of, in others inside of the hyaline membrane, and therefore apparently in the ectodermal or endodermal layers, respectively. Korotneff further criticises the statements of KLEINENBERG concerning the histology of *Hydra*, and gives an explanation of its muscular ectoderm more in accordance with the histological structure of other *Hydrozoa*. Among his own contributions to the histology of *Lucernaria*, the existence of a micropyle in the ovum and the fibrillary connection of the nematocysts of the tentacular heads with more deeply situated simple or multipolar (nervous ?) cells, may be entitled to peculiar attention.

To the valuable experimental investigations of ROMANES (20), it is impossible to do justice in the brief space allowed here to statements of facts; it must, however, be mentioned that his physiological experiments demonstrate the reality of the nervous system, the existence of which was positively asserted by L. AGASSIZ, and that the marginal organs (*e.g.* in *Sarsia*) are in fact organs of vision, or at least of perception of light. In the naked-eyed *Medusæ*, the centres of spontaneity are experimentally shown to be localized in the margin of the nectocalyx, and especially, but not exclusively, in the lithocysts; in the hooded-eyed *Discophora* their localization in the marginal portion of the disc is less exclusive, but, on the other hand, as far as the margin is concerned, more sharply constricted to the eight lithocysts.

The admirable paper by ALLMAN on *Myriothela* (2) has largely advanced the knowledge of this remarkable type, and indirectly thrown light upon the intimate structure and physiology of Hydroids generally. The large single worm-like hydranth is provided near its basal extremity with a chitinous perisarc and with short organs of attachment; its distal portion with a number of short capitate tentacula; below the tentacular region is the zone of the blastostyles (proliferous polypites), without a mouth, but with some capitate tentacula; a third set of zooids are the "claspers," thread-like bodies with a slightly dilated distal extremity, placed commonly in pairs near the base of the blastostyles. On these the gonophores are developed, male and female together, often on the same blastostyle. While still enclosed within the gonophore, the "ova" coalesce into a sort of "plasmodium," covered by a thin structureless membrane; when set free through the opening and retraction of the maternal gonophore, this plasmodial egg is seized by one or more claspers, and retained there until the bursting of the membrane and the liberation of the embryo Actinula. In what manner the fecundation takes place has not been observed, but probably the spermatozoa wanders into the gastric cavity of the hydranth, through the "spadix" of the male gonophore, and communicate with the plasmodial egg through the cavity of the "claspers." The long, capitate, thread-like preliminary tentacles of the "Actinula," which afterwards disappear during the evolution of the

numerous short permanent tentacles, and the attachment of the young animal by a kind of sucker, placed at the ab-oral extremity of the body, are the most characteristic peculiarities of the organization of this stage. Among the more remarkable facts of the organization of *Myriothela*, resulting from ALLMAN's exceedingly careful and minute investigation, are the internal *villi*-like prolongations from the endoderm, in the gastric cavities of the hydranth, blastostyles, and gonophores (not in the "claspers"); the cells of these *villi* and of the endodermal layer of the tentacles contain dark corpuscles. The ectoderm and endoderm are separated as usual by a "hyaline lamella," composed of a structureless internal and a fibrillated (muscular ?) external layer, to which are affixed the extremities of the ramified clavate cells, forming another intermediate (nervous?) layer between the endoderm and the true ectodermal cells, with their interspersed cordate and fusiform thread-cells. In the knobs of the tentacula, this claviform layer is modified into a thick cap of rod-like (sensitive ?) tissue, from the surface of which a stratum of pedunculated capsules, containing peculiarly modified "thread-cells," is continued into the ectodermal covering. The modifications introduced into the corresponding tissues in the extremities of the claspers, the sucker, and the transitory arms of the Actinula, corroborate the conclusion that the bacillar tissue is of a sensitive nature, and that the ordinary thread-cells themselves are not without some connection with sensitive functions.

From GROBBEN's investigation of *Podocoryne* (10), the following notes may be gathered: the spines are regarded as a peculiar kind of zooids, "skeleton polypites;" the proliferous zooids are sometimes without tentacula; the part played by the marginal "spiral zooids" (without mouth or tentacula, but with a head of large nematocysts) is probably that of defence; they are apparently only found in male colonies. There is no external cœnosarcal investment of the chitinous spines and stolons; the muscular fibrils forming a layer on the outside of the basement-lamella are direct continuations of the ectodermal ("neuro-muscular") cells. The development of the sexual products in the Medusa begins at a time when it is still included in its cuticular capsule, and before the union of the radial canals into the circular vessel has taken place. The abnormal conditions of the nutritive and proliferous zooids caused by parasitic Pycnogonida are described, also abnormal bifurcate spiral zooids, twin-Medusæ, &c.

According to PANCERI (18), the seat of the luminosity in *Campanularia* is in the cells of the ectoderm, not only of the polypites, but also of the peduncles and stolons.

## HYDROCORALLIA.

The investigations of MOSELEY (15), made during the expedition of the "Challenger," have proved beyond doubt that *Millepora* really belongs to the *Hydrozoa*, as previously asserted by L. AGASSIZ, and have confirmed, though in a rather unexpected manner, the suspicion that the *Stylasteridæ* (*Stylaster*, *Cryptohelia*, *Errina*, *Polypora*, g. n., *Acanthopora*, g. n., *Lepidopora*, *Distichopora*, *Pliobothrus*) are likewise *Hydrozoa*. As only preliminary reports are at hand, this abstract must be restricted to a

short characteristic of the "zooids of both groups, derived from the preliminary reports. - *Millepora* has two kinds of zooids, the one short and stout, occupying the larger central calicles, and provided with gastric cells, with a mouth, and 4–6 short knobbed tentacles; the other, occupying the smaller calicles, longer and more slender, without mouth, but with 5–20 tentacles, which are larger than in the mouthed zooids, have spheroidal heads composed of masses of thread-cells, and are disposed at irregular intervals along the body. Reproduction unknown. [According to drawings by Gen. NELSON, made years ago, and now published (16), of *M. alcicornis* (Bermudas) the tentacles are placed in whorls of 4, 2–6, above each other at regular intervals; no mention is made here of zooids of two kinds. Moseley's description, however, agrees with that of L. Agassiz.] In all *Stylasteridæ*, there are likewise two kinds of "zooids," the larger and less numerous are short and cylindrical, or flask-shaped, have mouths and a special layer of digestive cells lining their body cavity; in some genera they have 8, 12, 6, 4 clavate tentacles, forming a single whorl at the base of the hypostome, in others none. The more numerous smaller or tentacular zooids are long and tapering, have no mouth, no gastric cells and no tentacles; in some genera they are dispersed irregularly among the alimentary zooids, in others (*Allopora*, *Stylaster*, *Cryptohelia*) they are arranged in a circlet around the centrally placed alimentary zooid in each so-called "calicle" of the corallum; the "pseudosepta," therefore, in these genera are not true septa, but intersept imperfectly the tentacular zooids from each other and from the central alimentary polypite, which is placed on the columella, if present. Nematophores are disposed irregularly among the zooids, or regularly in the intervals between the tentacular zooids at the margins of the "calicles." The reproduction in all these deep water *Hydrocorallia* takes place by means of "adelocodonic gonophores," developed from the cœnosarcal network of the "pseudocorallium," in the interior of the so-termed "*ampullæ*." All *Stylasteridæ* are dioecious. The planulæ are probably set free through the mouth, or through resorption of the thin external walls of the "*ampullæ*." The specimens (six genera and seven species) on which these investigations were made were mostly brought up by the trawl from a depth of 600 fathoms, off the mouth of the Rio de la Plata. The possibility that *Cystiphyllum* and *Cyathoxonia* might be palæozoic "*Hydrocorallia*" is suggested.

## PHANEROCARPA (STEGANOPHTHALMA).

The monograph by GRENACHER & NOLL (9) contains an anatomical description of Häckel's *Crambessa tagi* (1869) and of *Rhizostoma* (*Stylonectes*) *luteum*, Q. G. The characters attributed to *Crambessa* by Häckel are shown to be partly erroneous; *Cephea* (*Cotostylus*) *mosaica* is a nearly allied type, perhaps also *Cephea octostyla*, Forsk., and *Rhacopilus cruciatus*, Less. The true characters of *Crambessa* may be learned from the following abstract of the synopsis of the *Rhizostomidæ* given by the author:—

1. *Rh. percir.* Arms attached to the umbrella through four isolated

pillars; no special genital cavities, or rather a single large open infra-umbrellular cavity, with four inter-radial orifices; central gastro-vascular cavity cruciform, the four branches ascending in the pillars and uniting in the centre of the sub-umbrella; four genital ribbons, each formed of two bands, accompanying the four divisions of the central gastro-vascular cavity, on either side.

I. *Crambessidæ*. Arms elongate, undivided, without cirri, but provided, in the greater portion of their length, with oral frills; eight marginal sense-organs, four radial, four inter-radial; four strongly developed genital valves, formed each of two rectangularly connected plates, protect the sub-umbrellular portions of the central cavity and of the genital organs (*Catostylus*, *Crambessa*).

II. *Rh. imperviæ*. Arm-pillars not isolated, united through the gastro-genital membrane, and forming in this manner four or eight genital cavities, which include the genital ribbons; central body-cavity simple, undivided (*Rhizostomidæ*, *Leptobrachidæ*, *Cepheidæ*, *Polyclonidæ*, *Cassiopeidæ*).

*Charybdea periphylla*, Pér. & Les.?; Verrill, Tr. Conn. Ac. iii. p. 52.

Abnormal forms and monstrosities of *Aurelia aurita*; Romanes (23), pls. xv. & xvi.

## Distribution, Local Lists, &c.

On the zoo-geographical sub-division of the coast of Alaska and N.W. America, from Monterey to the Bering Sea, and on the character of the hydrozoan fauna of the Aleuteo-Alaskan region, *vide* the introductory notes by W. H. Dall and S. F. Clark to Clark's paper (5). The occurrence of a species of *Stephanoscyphus* in the N. Atlantic (56° 11′ lat. N., 37° 41′ long. W., depth 1450 faths.) is announced in the report on the "Valorous" expedition (P. R. S. xxv. p. 223). S. J. Smith and O. Harger's Report on the dredgings in the region of St. George's Bank; Tr. Conn. Ac. iii. pp. 1–57. The geographical and bathymetrical distribution of the *Plumulariidæ* is discussed by Kirchenpauer (12), pp. 31–39.

## Genera and Species.

### Athecata (Gymnoblastica) and Gymnophthalmic Medusæ.

*Tiarella*, g. n., Schulze (24). A solitary conical hydranth, with a short hypostome and three cycles of tentacles: an oral one, consisting of four or five short knobbed filaments, an intermediate of six, and a basal cycle of ten to fourteen more elongate, knobbed tentacles, provided near the tips with two external half-rolls, formed like the knobs of macro- and micro-cnidia; hydranth continued inferiorly in a thin peduncle, the slightly dilated base of which forms the attachment. The hydrocaulus and the lower part of the hydranth are covered with a soft perisarc, of which the internal portion is partially condensed into a chitinous tube, protecting the lower part of the, in older specimens, almost evanescent

hydrocaulus. Reproduction through gonophores (the male gonophores only are known) provided with four radiating canals and one encircling the terminal orifice; the gonophores are developed from the supra-basal portion of the hydranth, between the two inferior tentacular cycles. Also an asexual propagation through buds developed from the infra-tentacular basis of the hydranth. *T. singularis*, sp. n., *id. l. c.* (Muggia Bay, on *Cystosira* tufts).

*Perigonimus* (?) *multicornis*, sp. n., Allman (3), p. 252, pl. ix. figs. 1 & 2 (Kattegat).

*Endendrium rigidum*, sp. n., *id. l. c.* p. 253, pl. ix. figs. 3 & 4 (Denmark; allied to *E. capillare*); *pygmæum*, sp. n., Clark (5), p. 232 (Alaska).

*Hydractinia monocarpa*, sp. n., Allman (3), p. 254, pl. x. figs. 1–3 (Spitzbergen, on *Trophon clathratum*).

*Podocoryne inermis*, sp. n., *id. l. c.* p. 255, pl. x. figs. 4 & 5 (Denmark, on *Nassa reticulata*; perhaps a variety of *P. carnea*).

*Coryne* (?) *conferta*, sp. n., *id.* (4), p. 115 (Kerguelen Island).

*Cladocoryne pelagica*, sp. n., *id.* (3), p. 255, pl. x. figs. 6 & 7 (on Gulf weed).

*Tubularia borealis*, sp. n., Clark (5), p. 231 (Alaska).

*Amalthæa* (?) *islandica*, sp. n., Allman (3), p. 256, pl. ix. figs. 5 & 6 (Iceland).

*Monocaulus grœnlandicus*, sp. n., *id. l. c.* p. 257, pl. ix. figs. 7 & 8 (Greenland).

*Rhizonema*, g. n., Clark (type of family "*Rhizonemidæ*"). Polypites solitary, unconnected, attached by filaments developed from the swollen, mamillate, basal portion of the polypite; tentacles of two kinds (?), the inner ab-oral ones branched. *R. carnea*, sp. n., *id.* (5), p. 233 (Alaska).

*Tiaropsis indicans*, sp. n., Romanes (23), i. p. 525, ii. pl. xv. fig. 1, *oligoplocama*, sp. n., *id. ibid.* fig. 4, *polydiademata*, sp. n., *id. ibid.* fig. 3 (Cromarty Frith).

*Sarsia erythrops*, sp. n. ?, *id. l. c.* p. 526 (Cromarty Frith); a six-rayed *Sarsia*, id. *l. c.* p. 527.

*Bougainvillea gigantea*, sp. n. ?, and *allmanni*, sp. n.? *id. ibid.* (Cromarty Frith).

*Stomobrachium octocostatum*, Forb., var., *id. ibid.*

*Thaumantias crucifera*, sp. n., *id.* ii. p. 190, pl. xv. fig. 2; *helicobostrycha*, sp. n., *id. ibid.* fig. 5.

### Thecaphora (Calyptoblastica).

*Hypanthea*, g. n., Allman (4). Hydrothecæ pedunculate, inoperculate, walls enormously thickened, encroaching upon the cavity so as to prevent the complete retraction of the hydranth; gonangia enclosing fixed sporosacs. *H. repens*, sp. n., *id. l. c.* p. 115 (Kerguelen's Island).

*Campanularia crenata*, sp. n., *id.* (3) p. 258, pl. xi. figs. 1 & 2 (Japan, on *Thuiaria*); *grandis*, sp. n., *id. l. c.* p. 259, pl. xii. figs. 2–4 (Japan, on *Selaginopsis*); *gracilis*, sp. n., *id. l. c.* p. 260, pl. xii. figs. 5 & 6 (Japan); *juncea*, sp. n., *id. ibid.* pl. xii. figs. 3 & 4 (Ceylon); *cylindrica*, sp. n., *id.* (4), p. 114 (Kerguelen's Island); *bilabiata*, sp. n., Coughtrey (7), p. 25 (New

Zealand); *denticulata*, sp. n., Clark (5), p. 213, pl. i. fig. 4, *circula*, sp. n., *id. ibid.* pl. i. fig. 4, *turgida*, sp. n., *id. ibid.* pl. ii. fig. 8, *compressa*, sp. n., *id. l. c.* p. 214, pl. ii. figs. 5 & 6, *speciosa*, sp. n., *id. ibid.* pl. iii. fig. 11, and *urceolata*, sp. n., *id. ibid.* p. 215, pl. ii. fig. 7 (all from Alaska); *integra*, McGill, *id. l. c.* pl. iii. figs. 9 & 10 (Alaska); *pygmæa*, sp. n., Clark (6) p. 59, pl. ix. fig. 9 (Maine); *nodiformis*, McCr., *id. l. c.* p. 60, pl. x. fig. 5 (New England); *calceolifera*, Hcks., *id. l. c.* p. 60, pl. x. figs. 7 & 8.

*Obelia* (?) *pygmæa*, sp. n., Coughtrey (7), p. 25, pl. iii. fig. 3 (New Zealand); *bicuspidata*, sp. n., Clark (6), p. 58, pl. ix. fig. 1, *bidentata*, sp. n., *id. ibid.* pl. ix. fig. 2 (Long Island Sound).

*Gonothyræa hyalina*, Hcks. *id.* (5), p. 215, pl. i. figs. 1 & 2 (Alaska); *tenuis*, sp. n., *id.* (6), p. 61, pl. x. fig. 8 (Newhaven).

*Lafoea pocillum*, Hcks. *id.* (5), p. 215, pl. v. fig. 21 (Alaska); *gracillima*, Sars, *id. l. c.* p. 216, pl. vi. fig. 21, and Tr. Conn. Ac. iii. p. 53, *dumosa*, Sars, pl. vi. fig. 23, and *fruticosa*, S., pl. vi. fig. 22 (Alaska).

*Opercularella pumila*, sp. n., Clark (6), p. 61, pl. ix figs. 3–5 (Maine, Long Island); *lacerata* (Johnst.) *id. l. c.* p. 62, pl. ix. fig. 6.

*Calycella syringa*, L., *id.* (5), p. 217, pl. vi. fig. 25 (Alaska); var. *id.* (6), p. 63, pl. x. figs. 1–3 (Maine).

*Campanulina* sp., Coughtrey (7), p. 25, pl. iii. figs. 1 & 2 (New Zealand).

*Halecium muricatum* (E. S.), Clark (5), p. 217, pl. iv. fig. 15 (Alaska); ? *plumularioides*, sp. n., *id. ibid.* pl. iv. figs. 16 & 17; *scutum*, sp. n., *id. l. c.* p. 218, pl. iv. figs. 13 & 14 (Alaska); *mutilum*, sp. n., Allman (4), p. 114 (Kerguelen Island); *delicatulum*, sp. n., Coughtrey (7), p. 26, pl. iii. figs. 4 & 5 (New Zealand); *articulosum*, sp. n., Clark (6), p. 63, pl. x. fig. 6 (Maine, Long Island); *robustum*, Verrill, Tr. Conn. Ac. iii. p. 53.

*Hydrallmania* (?) *bicalycula*, sp. n., Coughtrey (7), p. 29, pl. iii. figs. 8 & 9 (New Zealand).

*Sertularia arctica*, sp. n., Allman (3), p. 264, pl. xiv. figs. 1 & 2 (Spitzbergen); *ramulosa*, *trispinosa*, *longicosta*, *pumila*, Coughtrey (7), p. 29, pl. iii. figs. 8 & 9 (New Zealand); *filicula* (E. S.), Clark (5), p. 219, pl. vi. fig. 30, *similis*, sp. n., *id ibid.* pl. ix. fig. 56, *cupressoides*, sp. n., *id. l. c.* p. 220, pl. vii. fig. 37, *variabilis*, sp. n., *id. l. c.* p. 221, pl. viii. figs. 40–48, pl. ix. figs. 49 & 50, *inconstans*, sp. n., *id. l. c.* p. 222, pl. ix. figs. 51 & 52 and *thuiarioides*, sp. n., *id. l. c.* p. 223, pl. vii. figs. 38 & 39 (all from Alaska); *argentea*, S. E, var. *dicaricata*, Clark (6), p. 64, pl. x. fig. 7 (Maine).

*Sertularella tricuspidata*, Hcks. *id.*, (5), p. 224, pl. vi. figs. 26 & 27, *rugosa*, L., pl. vii. fig. 31, *polyzonias*, Gr., pl. vii. figs. 34 & 35, *robusta*, sp. n., *id. l. c.* p. 225, pl. vii. figs. 32 & 33, and *pinnata*, sp. n., *id. l. c.* p. 226, pl. vi. figs. 28 & 29 (all from Alaska); *johnstoni*, Gr., Allman (3), p. 261, pl. xiii. figs. 1 & 2, *integra*, sp. n., *id. l. c.* p. 262, pl. xiii. figs. 3 & 4, and *episcopus*, sp. n., *id. l. c.* p. 263, pl. xiii. figs. 5–7, *ibid.*, = *S. fusiformis*, Hutt. (New Zealand); *kerguelensis*, sp. n., *id.* (4), p. 113, *unilateralis*, sp. n., *id. l. c.* p. 114, and *lagena*, sp. n., *id. ibid.* (Kerguelen's Island); *robusta*, sp. n., Coughtrey (7), p. 26, pl. iii. figs. 4 & 5 (New Zealand).

*Diphasia mirabilis*, Verrill, Tr. Conn. Ac. iii. p. 53.

*Desmoscyphus*, g. n. (*Seratulariidæ*) Allman (3). Hydrocaulus jointed, each internode corresponding to one or more pairs of hydrothecæ, which are adnate to each other in pairs and to the front of the hydrocaulus; gonangia simple, borne along the front of the hydrocaulus. *D. buski*, sp. n., *id. l. c.* p. 265, pl. xiv. figs. 3–7 (New Zealand). [This genus is named *Gemminella*, Nature, xi.; *cf.* Zool. Rec. xi. p. 528.]

*Synthecium*, g. n. (*Sertulariidæ*), Allman (1871). Hydrocaulus divided into internodes, each internode carrying a pair of opposite sessile hydrothecæ; gonangia supported upon peduncles, which spring from within the cavity of certain hydrothecæ, where they take the place of the hydranth. *S. elegans*, id. *l. c.* p. 266, pl. xv. figs. 1–3 (New Zealand).

*Thuiaria*. Generic characters emended so as to include *Sertularia argentea* and *cupressina*: joints of hydrocaulus distant and irregular, numerous hydrothecæ corresponding to each internode. *T. crassicaulis*, sp. n., Allman (3), p. 267, pl. xvi. figs. 1–5 (Japan); *coronifera*, sp. n., *id. l. c.* p. 268, pl. xvii. figs. 1–3 (Japan); *bidens*, sp. n., *id. l. c.* p. 269, pl. xviii. figs. 1 & 2 (New Zealand); *dolichocarpa*, sp. n., *id. l. c.* p. 270, pl. xix. figs. 3 & 4 (New Zealand); *cerastium*, sp. n., *id. l. c.* p. 271, pl. xviii. figs. 3 & 4 (New Zealand); *persocialis*, sp. n., *id. l. c.* pl. xvii. figs. 4–6 (Natal); *cylindrica*, sp. n., Clark (5), pp. 226, pl. x. fig. 57 (Alaska); *robusta*, sp. n., *id. l. c.* p. 227, pl. ix. figs. 53–55 (Alaska); *plumosa*, sp. n., *id. l. c.* p. 228, pl. x. fig. 62 (Alaska); *turgida*, sp. n., *id. l. c.* p. 229, pl. x. figs. 58–61 (Alaska); *gigantea*, sp. n., *id. l. c.* p. 230, pl. x. figs. 63 & 64 (Alaska).

*Selaginopsis*, g. n. (*Sertulariidæ*), Allman (3): allied to *Grammaria*. Hydrophyton consisting of a single axile tube, to which the hydrothecæ are adnate, and on which they are disposed in several longitudinal rows. Gonosome unknown. *S. fusca*, sp. n., *id. l. c.* p. 272, pls. xii. fig. 1, xix. figs. 1 & 2 (Japan.)

*Pericladium*, g. n. (*Sertulariidæ*), Allman (3). Hydrothecæ more or less immersed and closely set round bifurcating ramuli, which spring from the sides of a common stem; gonangia scattered, springing from between the hydrothecæ. *P. bidentatum*, sp. n., *id. l. c.* p. 273, pl. xx. figs. 1–4 (Japan).

*Plumularia verrilli*, sp. n., Clark (6), p. 64, pl. x. fig. 9 (Maine, 10–20 fathoms).

*Halicornaria* Busk (emend.). Hydrocaulus pinnate; hydrothecæ usually with an intra-thecal ridge; nematophores fixed; mesial nematophore more or less adnate to the front of the hydrotheca, rarely free; gonangia not included in corbulæ or protected by gonangial ramuli, but carried on the common stem, or on more or less modified hydrothecal pinnæ. Type, *Plumularia setacea*, Lin. *H. saccaria*, sp. n., Allman (3), p. 277, pls. xv. fig. 4, xxii. figs. 1 & 2 (Ceylon); *insignis*, id. *l. c.* p. 278, pls. xxii. figs. 3 & 4, xxiii. fig. 1 (Ceylon) (referred to *Macrorrhynchia* ?, Nature, xi.; *cf.* Zool. Rec. xi. p. 528); *bipinnata*, id. *l. c.* p. 279, pls. xxii. fig. 5, xxiii. fig. 2 (Ceylon) (= ? *Taxella eximia*, Allm., Nature, xi. p. 179; *cf.* Zool. Rec. xi. p. 528).

*Aglaophenia acanthocarpa*, sp. n., *id. l. c.* p. 274, pl. xxi. figs. 1–4

(New Zealand); *laxa*, sp. n., *id. l. c.* p. 275, pl. xxi. figs. 5–7 (New Zealand). Several new species are named by Kirchenpauer (12), but not described. *Macrorrhynchia dalli*, sp. n., Clark (5), p. 230, pl. v. figs. 18–20 (Alaska).

Kirchenpauer's (12) system of *Plumulariidæ*:—

I. *Aglaophenia*. Vide Zool. Rec. ix. p. 468.

II. *Plumulariidæ*, quarum hydrothecæ et nematothecæ disjunctæ sunt, et quarum gonothecæ gonocladiis carent.

1. *Plumularia*: polyparia hydrocladiis biseriatis penniformia.
   - A. Subg. *Isocola*: hydrocladiorum articulis æqualibus omnibus polypiferis (*P. frutescens*, Sol., *pinnata*, L., *disticha*, Heller, *gaymardi*, Lmrx., *Polyplumaria flabellata*, Sars, *Diplopteron insigne*, Allm.).
   - B. Subg. *Anisocola*: hydrocladiorum articulis inæqualibus, alternatim polypiferis (*P. gracillima*, Sars, *setacea*, Ell., *cornucopia*, Hcks., *diaphana*, Hell., *catharina*, Johnst., *secundaria*, L., *bifrons*, Hell., *halecioides*, Ald., *pinnatifrons*, Hell., *belleri*, Hcks., *echinulata*, Lmk.).
   - C. Subg. *Monopyxis*: hydrocladiis hydrothecam singulam ferentibus (*P. obliqua*, Johnst.).

2. *Nemertesia*: polyparia hydrocladiis pluriseriatis, non penniformia.
   - A. Subg. *Heteropyxis*: hydrocladiorum articulis æqualibus, omnibus polypiferis (*H. tetrasticha*, Hell., *norvegica*, Sars, *ramosa*, Lmk.
   - B. Subg. *Antennularia*: hydrocladiorum articulis inæqualibus, alternatim polypiferis (*A. antennina*, Lmrx., *janini*, Lmrx., *triseriata*, Pourt.).

3. *Ophionema*: *Plumularia* organis filiformibus capitatis, ad basin cupula chitinosa (nematotheca) obtectis, munita (*O. parasiticum*, Sars).

The following species of these genera are described (of many others, iconographic analyses are given):—

*Plumularia* (*Isocola*) *tuba*, sp. n., Kirchenpauer (12), p. 44, pls. i. & ii. fig. 2 (Algoa Bay); *cylindrica*, sp. n., *id. l. c.* p. 45, pls. i. & iv. fig. 1 (Java, Philippines); *badia*, sp. n., *id. l. c.* pls. i. & iv. fig. 3 (East Australia, Singapore); *effusa*, Busk, *id. l. c.* p. 46, pls. i. & v. fig. 4 (Philippines, Singapore, Torres Straits); *obconica*, sp. n., *id. l. c.* pls. i., iii., & v., fig. 5 (Australia); *P.* (*Anisocola*) *rugosa*, sp. n., *id. l. c.* p. 47, pl. vi. fig. 8 (European Seas ?); *filicaulis*, Poepp., *id. l. c.* pl. v. fig. 6 (Chili); *oligopyxis*, sp. n., *id. l. c.* p. 48, pl. vi. fig. 9 (Pacific); *P.* (*Monopyxis*) *obliqua*, var. *australis*, id. *l. c.* p. 49, pl. vi. fig. 10 (Australia).

*Nemertesia* (*Heteropyxis*) *intermedia*, sp. n., *id. l. c.* p. 50, pl. vii. fig. 23 (Madeira); *N.* (*Antennularia*) *antennina*, var. *minor*, id. *l. c.* p. 51 (Madeira); *paradoxa*, sp. n., *id. l. c.* p. 52, pls. ii., iv. & viii. fig. 27 (Madeira); *hexasticha*, sp. n., *id. l. c.* pls. ii., iii. & viii. (Java); *johnstoni*, sp. n., *id. l. c.* pl. viii. fig. 26 (Algoa Bay); *decussata*, sp. n., *id. l. c.* pls. ii., iii. & vii. fig. 24 (Cape of Good Hope).

## Graptolites.

Kirchenpauer (12) discusses the relations between the *Graptolites* and the *Plumulariidæ*; the hypothesis that the cells of *Graptolites* are not hydrothecæ, but only nematothecæ, is hardly tenable: the *Graptolites* are rather comparable with the *Sertulariidæ*.

F. McCoy: "On a new Victorian *Graptolite*," Ann. N. H. (4) xviii. pp. 128–130. G. Linnarsson: "On the vertical range of the graptolitic types in Sweden," Geol. Mag. (2) iii. pp. 241–245. H. A. Nicholson: "Notes on the correlation of the graptolitic deposits of Sweden with those of Britain," *tom. cit.* pp. 245–249, pl. ix. C. Lapworth: On Scottish *Monograptidæ*, tom. cit. pp. 308–321, 350–360, 499–507, 544–582, pls. x.–xiii. & xx. (*Dimorphograptus*, g. n., p. 545, for *D. elongatus*, p. 547, and *swanstoni*, p. 548, pl. xx. figs. 12 & 13; new species of other genera are also described) [Abstract of these papers; JB. f. Mineral. xlv. pp. 109–112.] A note by Dames on *Dictyonema* and its relation to *Diplograpsus*; J. Geol. Ges. xxviii. p. 776.

# SPONGOZOA.

BY

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9. Schmidt, O. Nochmals die *Gastrula* der Kalkschwämme. Arch. mikr. Anat. xii. pp. 551–556.

10. Schulze, F. E. Zur Entwickelungsgeschichte von *Sycandra*. Z. wiss. Zool. xxvii. pp. 486 & 487.

A note on the structure of *Halisarca dujardini*, by G. v. Koch, Morph. JB. ii. pp. 83 & 84.

## Evolution, Anatomy, &c.

Metschnikoff (8) has convinced himself that a true ectoderm (different from the skeletogenous layer or "syncytium") exists in different Sponges (*Reniera*, *Halisarca*); the Sponges therefore are not bifoliate but trifoliate creatures, and the extracellular substance of the mesoderm is probably homologous with the gelatinous substance of the *Medusæ*. The two layers observed in the larvæ of different Sponges are the ectoderm and the mesoderm; the endoderm is a later production; the spicules are developed in the hitherto so-called endoderm of the larva, which is in fact the mesoderm. These views, which in several important particulars rectify the results previously attained by the same author [Zool. Rec. xi. p. 532], agree well with the results obtained by Barrois (1); but, though this author cordially acknowledges the "brilliant light" thrown upon the *Calcispongia* by Häckel's monograph, his results are much at variance with the ideas concerning the evolution of these organisms promulgated in that work [Zool. Rec. ix. p. 474], only partially based on observation, and for the greater portion on combination and imagination. The egg of *Sycandra*, &c., takes its origin in the skeletogenous layer (the mesoderm) below the endoderm; the segmentation is total and regular; the blastodermal cells are differentiated in such a manner, that those of the larger anterior portion become elongate and prismatic, the posterior roundish and dark. These large posterior cells invaginate themselves in the hemispherical cap formed by the prismatic anterior cells; but this invagination is only transitory and devoid of morphological importance, like the obliterated central cavity of segmentation. At this period, the flagella are developed from the prismatic (ectodermal) cells and the embryo liberates itself by pushing its way through the endoderm of the parent sponge. Perhaps the uppermost ring of the large posterior cells constitute the starting-point for the evolution of the future mesoderm [?]. The larva fixes itself by its posterior extremity, and is rapidly transformed into a minute flattened crust-like sponge. It is now formed of two layers, an inferior of dark protoplasm, and a superior thin transparent layer, showing amœboid movements and pushing out pseudopodial expansions for attachment; vacuoles and irregular pores are also formed in this superficial layer; there is no interior cavity, the canals are new formations, hollowed out in the mesoderm, from which the endoderm is not yet distinctly separated; the rod-like spiculæ are formed before the radiate spiculæ; the irregular shape of the young sponge is transformed, during its growth, into a more cylindrical one; the "osculum" is formed, &c. Sometimes several larvæ will attach themselves so close to each other, that they coalesce superficially and provisionally, or completely and definitely with their pseudopodia. In *Halisarca* the segmentation of the egg is more irregular; there is, at first, no difference between the anterior and the posterior cells of the embryo; there is no invagination, and only a single layer of cells. When the larva is set free and covered with cilia, the posterior cells are distinguished by their shorter cilia; they afterwards increase in size, while the other blasto-

dermal cells are transformed into a thin layer of small ciligerous cells, forming in the young fixed sponge the superficial or ectodermal layer, while the large basal cells form the inferior layer, in which the canals and vibratile baskets are developed. The oscula are only formed at a late period. In the siliceous sponges examined (*Isodictya, Desmacidon*), a complete segmentation of the egg takes place; in the larva the larger portion of the body is formed of a layer of small ciligerous ectodermal cells; the posterior and the whole interior consists of a confluent protoplasmic mass; the limit between this protruding plasmodium and the ciliated portion is marked out by a ring of large flagella. The larva does not always fix itself by its posterior extremity. The young sponge is composed of the same two layers as in other groups: in the inferior (mesodermal), the spicules (the development of which begins in the larva), the "vibratile baskets" and canals are formed; in the superior, the pores and oscula, which are homotypical with the pores, but not with the mouth of the *Cœlenterata*. A close parallelism with the *Spongozoa* therefore appears inadmissible.

Keller (6), on the other hand, emphatically denies, in the calcigerous and siliceous Sponges, the existence of the layer of plate-like epithelial (ectodermal) cells observed by Schulze and Metschnikoff; the skeletogenous syncytium really corresponds with the ectoderm of the larva. His embryological observations were made on *Calcispongia*, especially *Sycandra raphanus*. The fecundation of the egg by spermatozoa was observed in a single instance. The amœboid ambulatory cells of the syncytium are developed into eggs, but probably originate in the syncytium, and are not emigrants from the endoderm. In opposition to the observations of Barrois, Keller maintains that a true invagination and formation of a "gastrula" takes place *after* the liberation of the larva from the ectodermal (or mesodermal) tissue and its migration into the tubes or gastral cavity of the parent sponge, the dark moiety being invaginated in the ciligerous portion, constituted by the yellow prismatic cells; in this manner a stomach is formed, and a mouth, which is afterwards obliterated; the syncytium (in which the first spiculæ afterwards appear) is formed by fusion (progressing from inwards) of the ciligerous ectodermal cells, while the dark invaginated cells build up the endoderm. The larva fixes itself by the ab-oral pole (this is contrary to the majority of observations); before the fixation, the cilia become feeble and finally disappear. These results are again made doubtful by F. E. Schulze (10), who, after repeated investigations, made independently of those of Barrois, has arrived precisely at the same results on the main points, the true epoch of the invagination and its transitory character, in opposition to his own earlier observations and views [Zool. Rec. xii. p. 564]. On the other hand, Keller allows that the invagination may (exceptionally) take place before the birth of the larva, but the fact that the "gastrulæ" are found swimming freely in the tubes and "stomachs" of the parent sponges, proves, in his opinion, that the gastrula-state is later than the oviform larva. He never saw the formation of spiculæ in the non-ciligerous portion of the larva, as asserted by Metschnikoff and Götte (O. Schmidt, 9).

Under the name of *Physemaria*, Häckel (5) proposes a distinct class, intermediate between *Hydrozoa* and *Sponges*, or rather a sub-class of Sponges, distinguished from the true "poriferous" Sponges by the absence of pores, and from the *Hydrozoa* by the want of nematocysts. They are sessile animalcules of a most simple organization, consisting only of a membranous sac-shaped body, provided with a terminal mouth and a short stem, through the dilated base of which they are fixed, sponge-fashion, to foreign bodies on the sea bottom. The body-membrane consists only of two layers: an endoderm of flagellate cells, and an ectodermal syncytium, in which are immersed grains of sand, sponge-spicules, shells of Foraminifers and Radiolarians, Coccoliths, &c., selected and arranged in a manner peculiar to each species. A more or less developed spiral line of larger flagellate endodermal cells governs the afferent and efferent water-currents. The ova are metamorphosed endodermal cells, in some species confined to the basal portion of the body-cavity, the superior portion whereof may be furnished with glandular cells, which are differentiated epithelial cells. The evolution and segmentation of the egg and formation of the gastrula-stage by invagination were observed in *Gastrophysema*. From Häckel's hypothetical (extinct ?) "*Gastræade*," they only differ in their fixed (not free swimming) condition in the adult state. Two genera are known: *Haliphysema primordiale*, sp. n., Häckel (*l. c.* p. 180, pl. ix.), Mediterranean; *H. echinoides*, sp. n., *id. l. c.* p. 186, pl. x., Norway, probably = *Wyvillethomsonia wallichi*, Wr.); *H. globigerina*, sp. n., *id. l. c.* p. 189, pl. xi., North Sea, deep water; *H. tumanowiczii*, Bow., and *H. ramulosum*, Bk. [compound!]. *Gastrophysema*, g. n., Häckel: body cavity divided in a series (two to five) of chambers; *G. dithalamium*, sp. n., Häckel (p. 196, pls. xii.–xiv.), Mediterranean; also *G. scopula* (Cart.), wrongly referred to *Squamulina*, according to Häckel.

## Genera and Species.

Carter (4) describes and figures the following:—

*Grantia ciliata*, Fl., var. *spinispiculum*, p. 468, pl. xii. figs. 6–8 (Shetland, 64–75 fathoms).

*Halisarca cruenta*, sp. n., p. 228 (North of Cape St. Vincent, 374 fathoms, on *Corallistes* and other sponges).

*Corticium parasiticum*, sp. n., p. 229, pl. xvi. fig. 25 (English Channel, 862 fathoms).

*Aplysina nævus*, sp. n., pl. xii. figs. 2 & 1 c (N. of Scotland and Shetland, 170–345 fathoms).

*Spongia officinalis*, p. 231, pl. xii. fig. 1 a (with the preceding).

*Spongelia pallescens*, Sdt., p. 232 (155 fathoms).

*Dictyocylindrus abyssorum*, sp. n., *ibid.* pls. xii. fig. 3, xv. figs. 25, a, b, and *simplex*, sp. n., p. 234 (N. of Scotland, 345–440 fathoms); *virgultosus*, Bk., *id. l. c.* pl. xii. fig. 5, pl. xv. fig. 27 (Shetland, 64–75 fathoms).

*Plumohalichondria microcionides*, sp. n., p. 236, pl. xii. fig. 11, pl. xv. fig. 30 a, b (N. of Scotland, 440 fathoms).

*Microciona jejusculum*, Bk., p. 237 (Hebrides, off Cape St. Vincent, 374 fathoms, Færö, 114 fathoms); *longispiculum*, sp. n., pl. xii.

fig. 1 H, pl. xv. figs. 31 A–C (N. of Scotland, 345 fathoms); *plana*, sp. n., p. 238 (off Cape St. Vincent, 374 fathoms); *intexta*, sp. n., *ibid.* pl. xv. figs. 43 A–C (ibid.); *pusilla*, sp. n., p. 239, pl. xvi. figs. 51 A–D (on *Polytrema utriculare*, tropical?).

*Phacellia infundibuliformis* (Johnst.), p. 240, pl. xii. fig. 1 F FF.

*Hymeraphia vermiculata*, Bbk., var. *erecta*, p. 307, pl. xii. fig. 4, pl. xv. fig. 26 A, B (N. of Scotland, 114–640 fathoms).

*Cornulum textile*, sp. n., *id.* p. 309, pl. xii. fig. 9, pl. xv. figs. 28 A, B (N.W. of Shetland, 345 fathoms).

*Halichondria foliata*, Bk., p. 310, pl. xii. fig. 10, pl. xv. fig. 29 A, B (N.W. of Shetland); *phlyctenodes*, sp. n., p. 314, pl. xiii. fig. 17, pl. xv. fig. 35 (N. of Cape St. Vincent, 374 fathoms); *abyssi*, Cart., p. 315, pl. xiv. fig. 24 A, B.

*Isodictya spinispiculum*, sp. n., p. 310, pl. xv. fig. 42 (off Cape St. Vincent, 75–374 fathoms).

*Thalysias tricurvatifera*, sp. n., p. 311 (off Cape St. Vincent 374 sp.).

*Reniera crassa*, sp. n., p. 312 (S. of Færö, 167 fathoms).

*Halichondria forcipis*, Bbk., var. *bulbosa*, pl. xiii. fig. 19, pl. xv. fig. 37 A, B (North of Cape St. Vincent, 292–374 fathoms).

*Cribrella hospitalis*, Sdt., pl. xiii. fig. 18, pl. xv. fig. 36 A, B.

*Esperia placoides*, sp. n., p. 316, pl. xiii. fig. 12, pl. xv. fig. 32 (N.W. of Shetland, 345 fathoms); *borassus*, sp. n., p. 317, pl. xiii. fig. 13, pl. xv. fig. 33 (Cape St. Vincent, 374 fathoms); *cupressiformis*, var. *bihamatifera*, sp. n., p. 318, pl. xiii. fig. 14, pl. xv. fig. 34 A, B (English Channel?).

*Cladorhiza abyssicola*, Sars, var. *cortico-cancellata*, p. 319, pl. xiii. fig. 16 (N. of Scotland, 345–632 fathoms).

*Hymeraphia verticillata*, Bk., p. 321, pl. xiv. fig. 21, pl. xv. fig. 39 A, B (off Shetland, 345 fathoms); *microcionides*, sp. n., p. 330 (off Cape St. Vincent, 374 fathoms).

*Cometella pyrula*, sp. n., p. 388, pl. xiv. fig. 20, pl. xv. fig. 38 (N.N.W. of Orkney, 290 fathoms); *simplex*, sp. n., p. 395, pl. xvi. fig. 53 (English Channel, 500 fathoms).

*Suberites massa*, Sdt., p. 391 (off Shetland, 345 fathoms).

*Polymastia stipitata*, sp. n., p. 393 (N. of Scotland).

*Geodia nodastrella*, sp. n., p. 397, pl. xvi. fig. 45 (N. of Scotland, off Cape St. Vincent); *megastrella*, sp. n., p. 400, pl. xvi. fig. 46 (Cape St. Vincent, 374 fathoms); var. *lævispina*, pl. xvi. fig. 47 (Cape St. Vincent, 292 fathoms).

*Stelletta pachastrelloides*, sp. n., p. 403, pl. xv. fig. 40 (Cape St. Vincent).

*Tethya cranium* var. *abyssorum*, p. 405, pl. xvi. fig. 49 (N. of Scotland); var. *infrequens*, pl. xvi. fig. 48 (632 fathoms).

*Pachastrella amygdaloides*, p. 406, pl. xiv. fig. 22, *geodioides*, p. 407, pl. xiv. fig. 23, *intexta*, p. 409, pl. xv. fig. 41, *parasitica*, p. 410, pl. xvi. fig. 50 (on *Polytrema utriculare*), spp. nn. (Cape St. Vincent).

*Ophiraphidites tortuosus*, sp. n., p. 458 (Cape St. Vincent).

*Thecophora ibla*, Thoms. ; Tr. Conn. Ac. iii. pl. vii. fig. 1.

*Desmacidon plumosa*, sp. n., Bowerbank (2) p. 768, pl. lxxviii. (Shark's Bay, West Australia).

*Chalina verticillata*, sp. n., *id.* (3), p. 769, pl. lxxix. (Australia).

*Oplitospongia fucoides*, sp. n., *id. l. c.* p. 771, pl. lxxx. (Shark's Bay).

*Rhaphiodesma radiosa* [*-sum*], sp. n., *id. l. c.* p. 773, pl. lxxxi. (Savanilla, S. America, 11° S. lat., 75° W. long).

*Deanca favoides*, sp. n., *id.* (2), p. 535, pl. lvi. figs. 1 & 2 (W. Indies ?).

*Farrea inermis*, p. 536, pl. lvi. figs. 3 & 4 (W. Indies ?), *perarmata*, p. 538, pl. lvii. figs. 1 & 2 (W. Indies), *irregularis*, p. 539, pl. lvii. figs. 3 & 4 (Algiers), *id. l. c.* spp. nn.

*Corallistes bowerbanki* (Johns.), Carter (4), p. 460 (= *C. typus*, Sdt.), (Cape St. Vincent, 75–374 fathoms).

*Discodermia polydiscus* (Boc.), *id. l. c.* p. 462 (Cape St. Vincent).

*Macandrewia azorica*, Gr. (*Dactylocalyx macandrewi*, Bbk., *Corallistes clavatella*, Sdt.), *id. l. c.* p. 464.

*Azorica pfeifferæ*, Cart., *id. l. c.* p. 766, Cape St. Vincent.

Marshall's classification (7) of the *Hexactinellidæ* :—

I. Synauloidæ : *Sclerothamnus*, M. (*clausi*, M.). II. Asynauloidæ : A. Monacidæ : *Eurete*, Semp. (*simplicissima*, S.). B. Pleionacidæ : *Lanuginella*, Schm. (*pupa*, S.), *Asconema*, Kt., (*setubalense*, K.), *Farrea*, Bk., *Dactylocalyx*, Stb. (*pumiceus*, St., *crispus*, Schm.), *Periphragella*, M. (*elisæ*, M.), *Aulodictyon*, Kt. (*facundum*, Schm.), *Fieldingia*, Kt. (*lagettoides*, K.), *Aphrocallistes*, Gr. (*beatrix*, Gr., *bocagii*, Wr.). C. Pollacidæ : (α) *Holteniidæ* : *Holtenia*, Schm. (*pourtalesi*, Schm.), *Crateromorpha*, Gr. (*meyeri*, Gr.), *Rossella*, Cart. (*velata*, Th., *antarctica*, Cart., *philippinensis*, Gr.), *Sympagella*, Schm. (*nux*, S.), *Placodictyon*, Schm. (*cucumaria*, S.) ; (β) *Euplectellidæ* : *Euplectella*, Ow. (*oweni*, Herkl. & Marsh., *aspergillum*, Ow.), *Habrodictyon*, Th. (*speciosum*, Th.) ; (γ) *Hyalonematidæ* : *Labaria*, Gr. (*hemisphærica*), *Pheronema*, Leid. (*annæ*, L., *carpenteri*, Th., *grayi*, Kt.), *Semperella*, Gr. (*schultzi*, G.), *Hyalonema*, Gr. (*cebuense*, Higg., *thomsonis*, Marsh., *sieboldi*, Gr.).

## Fossil Sponges.

Zittel, K. A. Ueber *Cœloptychium*, ein Beitrag zur Kenntniss der Organisation fossiler Spongien. Abh. bayer. Ak. xii. 3, pp. 1–80, pls. i.–vii. (Abstr. JB. f. Mineral. xliv. pp. 578 & 579.)

*Cœloptychium* is an upper cretaceous representative of the *Hexactinellidæ* ; its sarcode spicules belong to many types, some apparently belonging to the *Lithistidæ*, others to the *Pachytragidæ*, and possibly indicate a relationship between the older members of these groups. (A preliminary notice of Zittel's researches on fossil *Hexactinellidæ* and *Radiolaria*, JB. f. Mineral. xliv. pp. 286–289 ; *cf.* also Z. geol. Ges. xxviii. pp. 631 & 632.

Sollas, W. J. On *Eubrochus clausus*, a vitreo-hexactinellid Sponge from the Cambridge "Coprolite" bed. Geol. Mag. (2) iii. pp. 398–403, pl. xiv.

# PROTOZOA.

BY

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## INFUSORIA.

1. Bütschli, O. Studien über die ersten Entwickelungsvorgänge der Eizelle, die Zelltheilung, und die Conjugation der Infusorien. Abh. senck. Ges. x. pp. 213–464, pls. i.–xv.

2. ——. Ueber die Entstehung des Schwärmsprösslings der *Podophrya quadripartita*. Jen. Z. Nat. x. pp. 287–309, pl. ix.

3. Cox, J. D. Multiplication by fission in *Stentor mulleri*. Am. Nat. x. pp. 275–278; M. Micr. J. xvi. pp. 201–203.

4. Engelmann, Th. W. Ueber Entwickelung und Fortpflanzung von Infusorien (Over ontwikkeling en voortplanting von Infusoria: Onderzoekingen gedaan in het physiologisch Laboratorium der Utrechtsche Hoogeschool; 3, iii. pp. 99–186, pls. v. & vi.). Morphol. JB. i. pp. 573–635, pls. xxi. & xxii. (Arch. Z. expér. v. pp. xxxiii.–xxxviii.).

5. Fouquet, —. Note sur une espèce d'Infusoires parasites des poissons d'eau douce. Arch. Z. expér. v. pp. 159–165, pl. v.

6. Koch, G. v. Zwei Acineten auf *Plumularia setacea*, Ell. Jena: 1876, 15 pp., 2 pls.

7. Maupas, —. [a] Sur l'état mobile de la *Podophrya fixa*. C. R. lxxxiii. pp. 910–912. [b] Sur l'organisation et le passage à l'état mobile de la *Podophrya fixa* (Ehrbg.). Arch. Z. expér. v. pp. 401–428.*

### Appendix.

8. Van Beneden, E. Recherches sur les Dicyémides, survivants actuels d'un embranchements des Mésozaires. Bull. Ac. Belg. xli. pp. 1160–1205, xlii. 66 pp., pls. i.–iii.; J. Zool. v. pp. 364–370, pl. xvii. (abstr.)

* Fromentel's work on the *Infusoria* [Zool. Rec. xii. p. 571] is mentioned in the following terms:—"Ce livre n'est qu'un ramassis prétentieux d'erreurs et de banalités qui dénotent chez l'auteur le plus complete ignorance du sujet."—C.F.L.

A ciliate Infusorian, infesting the skin of young trout in aquaria, residing in tumours of the epidermis, is described by FOUQUET (5) as *Ichthyophthirius multifiliis* [sic]. It has a horseshoe-shaped nucleus, a nucleolus only in the young state, many contractile vesicles, no vent nor mouth, but a mouth-like organ of attachment (degraded mouth). After leaving its abode in the skin of the fish, it sinks to the bottom, encysts itself, and divides, by repeated segmentations, into a number of small individuals, similar to the adult, but more elongate, &c.

MAUPAS (7) describes the fixed and locomotory state alternately assumed by *Podophrya fixa*, and by an allied form which he describes as var. *algirensis*, but which is evidently a separate species. The biological phenomena are, however, almost identical in both. The fixed condition is not always pedunculate, but most commonly so in *P. fixa*. The change from the fixed to the mobile state is introduced by the withdrawing of the tentacles or suckers, which finally disappear, while vibratile cilia are developed over a definite portion of the body, the shape of the body being altered from globular to elongate, &c. The animalcules reassume the immobile condition on protrusion of the suckers, disappearance of the cilia, &c. The whole process may be completed in fifty minutes. Division is also observed in the fixed stage, but before going away, the separating half goes through the metamorphosis characterising the change from the fixed into the free stage. BÜTSCHLI (2) has re-examined the formation of the "zoospore" (swarming germ) in *P. quadripartita*. There are always in the normal state of this species three contractile vesicles, forming a regular triangle, and a nucleus of inverted conical shape. When described otherwise, the presence of the germ has not been observed. The gemmule is formed as an internal bud; its appearance is preceded by the formation of an orifice, destined to give an exit to the zoospore when mature; during its growth, it encloses a part of the nucleus, the shape of which is changed, and the structure whereof, from granular, becomes fibrillate; after the birth of the zoospore, the portion of the nucleus enclosed by it and that remaining in the mother-animal resume their typical shape and structure; at birth, the zoospore is provided with a girdle and tuft of cilia, three vacuoles, &c. KOCH (6) has observed on *Plumularia setacea* two new species, *Podophrya pusilla* and *Ophryodendrum pedunculatum*, the last in two shapes, between which a genetic relation evidently prevails, but the precise nature of which was not made out.

ENGELMANN (4) has shown that the typical, full-grown *Opalina ranarum* is developed from young, found encysted in the intestine of tadpole of frogs; origin unknown. The young *Opalina* has only a single nucleus, which during growth is multiplied by fission, resulting in a large number of these bodies. The other chapters of Engelmann's investigations are especially devoted to the relation of the "nucleus" to the conjugation in the *Infusoria*; while in the composite (polypoid) *Vorticellina*, division (fission) is the only known method of propagation, a true gemmation (unequal fission) takes place in *Vorticella microstoma*; during this process a portion of the nucleus is severed and becomes the nucleus of the bud (microgonidium). These freely-swimming small bell-animalcules, whether produced by budding or by fission (as in *Epistylis*), are con-

sidered by Engelmann as representing, to a certain degree, the male element, since they conjugate (are completely fused) with the larger sessile ("female") individuals. During and before this fusion the "nuclei" of both individuals undergo a division, which results in the formation and mixing up of a great number of small nuclear globules; these, however, have no connection with any process of multiplication or propagation; subsequently they are reunited into larger and larger corpuscles until the single nucleus is thus entirely reconstructed. The *Vorticella* resulting from the "zygosis" is thus reorganized, and capable of resuming the process of fission; the "nucleus" is neither egg, ovarium, nor sporangium, it is only the true cell-nucleus of the monocellular animalcule. In other *Infusoria*, the whole animal is also reconstructed after the incomplete conjugation, which is followed by the separation of the individuals; but here also the conjugation provokes a disintegration and afterwards reconstruction of the nuclei, after which they are capable of resuming their propagation by division. These *Infusoria* (*Euplotes*, *Stylonichia*, &c.) are considered by Engelmann as *hermaphroditic*, because of the differentiation of the nucleus into a true (female ?) nucleus and a (male ?) "nucleolus." During the transformation of the nuclei, the "nucleoli" first increase, then divide into two, four, and eight, the contents whereof assume a fibrillate structure; these "seminal vesicles," or the "nucleoli" themselves, are exchanged between the conjugating individuals, and probably exercise a fecundating influence upon the reconstruction of the nuclear fragments into the new nucleus. In *Stentor*, *Trachelius*, &c., this hermaphrodite state of the animal cell is only transient [?]; in *Stylonichia* a complete zygosis ("copulation") occasionally takes place, accompanied by fusion of the respective nuclei and nucleoli, but not followed by any of the changes taking place after the ordinary incomplete conjugation. The so-termed "embryos" of different *Infusoria*—also when developed from "embryonal globules," which are in this instance encysted intruders; in others they are either excrementitious bodies or the corpuscles resulting from the disintegration of the "nuclei"—are always parasites, commonly *Acinetina*; the ciliated parasites (pseudembryos) of *Vorticella* are termed *Endosphæra* (g. n.). The "embryonal theory," therefore, is entirely rejected, after a profound criticism, though some of Engelmann's older observations have been regarded by STEIN as one of its most solid pillars.—These results are mainly confirmed by the detailed researches of BÜTSCHLI (1), made upon a considerable number of *Infusoria* (*Paramæcium*, *Cyrtostomum*, *Colpidium*, *Glaucoma*, *Blepharisma*, *Chilodon*, *Condylostoma*, *Bursaria*, *Stylonichia*, *Euplotes*, *Vorticella*, *Epistylis*, &c.); as they are made quite independently of those of Engelmann, some of the most important and most intricate questions in the history of *Infusoria* may now be regarded as definitively settled. Bütschli also considers the conjugation of the *Vorticellina* as analogous with the union of the spermatozoon with the egg, but he insists less strongly upon the hermaphrodite sexuality of other *Infusoria*; the only reproduction known in these *Protozoa* is division (or gemmation). When the divisibility of the individuals, after repeated fissions, begins to slacken, and the individuals themselves are becoming very small, the vital energy is re-

newed through the conjugation, which is to be looked upon as a more or less complete remodelling or reorganization of the animalcule, resulting in the active renewing of the faculty of propagating through fission; this process is analogous to the segmentation of the egg, resulting in the one instance in a multicellular organism, in the other in a series of generations of unicellular organisms. During the conjugation the "nucleus" is often completely expelled, in the same manner as the "nucleus" of the egg after (or before?) the fecundation; the new nucleus is then afterwards formed of the products of the division of the "nucleoli"; in other instances, it is only partially expelled, the remaining portion afterwards being united with the new nucleus, formed in the manner described; or this body unites itself with the entire old nucleus. The "nucleoli" are not nucleoli proper; they are not qualitatively different from the nuclei, and their number is independent of that of the nuclei; the (secondary) nuclei are only more strongly developed and modified "nucleoli" (primary nuclei); these are not wanting (as supposed) in the *Vorticellina*, and will probably be found in all *Infusoria*. During their division (and that of the animal) and after each conjugation, they assume (like the nuclei of the *Infusoria* and the "germinal vesicles" of the eggs of higher animals) a fibrillate structure (if that is not present before), which disappears when the division is at an end. This fibrillation, however, is not a formation of spermatozoids, and they do not exercise any visible fecundating power. Thus the sexual theory of BALBIANI is as utterly rejected as the embryonal theory of STEIN, while the unicellularity is upheld in all its force, a plurality of nuclei being, according to Bütschli, quite compatible with unicellularity.

According to the remarkable researches of E. VAN BENEDEN (8) the *Dicyemidæ* are neither worms nor *Protozoa*, but occupy an intermediate position, being "*Mesozoa*," viz., pluricellular animals, consisting of ectoderm and entoderm, but without any mesoderm; [this the author supposes to be present in all *Cœlenterata*, a supposition which still must be regarded as doubtful. They therefore must form by themselves one of the primary divisions of the animal kingdom, representing a state of evolution, which has left no other vestige among known living forms. Van Beneden distinguishes 4 genera and 7 species:—*Dicyema typus* from the spongious renal bodies of *Octopus vulgaris*; *D. clausiana* from *O. macropus*; *Dicyemella wageneri* from *Eledone moschata*; *D. mulleri* from *E. cirrosa*; *Dicyemina kollikeriana* from *Sepia officinalis*; *D. schulziana* from *S. biserialis*; *Dicyemopsis macrocephalus* from *Sepiola rondeleti*. The body of the *Dicyemidæ* consists of a single elongate axial or endodermal cell and a not very large (sometimes specifically definite) number of epithelium-like vibratile ectodermal cells; there are no other cavities, no mouth or vent, no muscular fibrils, &c. A definite number of the foremost ectodermal cells are differentiated into a sort of head; other ectodermal cells are often distended by accumulation of corpuscles, and form wart-like protuberances, which give to the specimens a peculiar physiognomy. The embryos are all produced in the axial cell; they are of two kinds, vermiform (filiform) and infusoroid, and each species of *Dicyemidæ* exists in the double shape; "nematogenous" individuals,

longer and thinner, often with a larger number of ectodermal cells, a different shape of the head, &c., producing vermiform embryos, which, simply increasing in size, are developed into typical *Dicyemidæ*; and "rhombogenous" *Dicyemidæ*, producing "infusoriform" embryos of a rather complicated structure. The further metamorphoses of the infusoroid embryos are unknown; they are probably destined to ensure the preservation of the species by dissemination, while the filiform embryos are developed to maturity in the individual host of their parent. The germs of the filiform embryos originate endogeneously in the delicate protoplasmic filaments traversing the cavity of the axial cell; the two first formed are constantly found at an early period in the embryo, and they are often present before its birth in great number, and already partially transformed into embryos. The germs do not multiply by fission, and are developed through segmentation; of the first formed four cells, one constitutes the endodermal cell, which is by and by covered by the others during their continued growth and multiplication, until the number of ectodermal cells typical to the species is reached. The ciliated embryos are set free through the "oral pole" of the head (corresponding to the closed up "blastopore"), or by pushing their way between or through the ectodermal cells of the body. The "rhombogenous" specimens contain in the interior of their axial cell a small number of peculiar cells ("germigènes"), in which are successively developed endogeneously a large number of daughter cells, which, after their separation from the mother cell, constitute the germs, and are, through regular segmentation, developed into the "infusoriform" embryos, which are set free in the same manner as the filiform, but are capable of living for some time in sea-water, while this medium becomes immediately fatal to the adult *Dicyemidæ* and to the filiform embryos.

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2. Barnard, W. S. Protozoan Studies. P. Am. Ass. xxiv. pp. 240–242.

3. Blake, J. F. On *Renulina sorbyana*. M. Micr. J. xv. pp. 262–264.

4. Brady, H. S. On some *Foraminifera* from the Loo Choo Islands. P. R. Irish Ac. (2) ii. pp. 589 & 590; Q. J. Micr. Sci. (2) xvi. pp. 404–406.

5. Broeck, E. v. d. Étude sur les Foraminifères de la Barbade, recueillis par L. Agassiz, précédé de quelques considérations sur la classification et la nomenclature des Foraminifères. Ann. Soc. Belg. Micr. ii. p. 55 *et seq.* pls. ii. & iii. (abstr. J. Zool. v. pp. 378–381).

6. Carpenter, W. B. On the genus *Astrorhiza* of Sandahl, lately described as *Hackelina* by Dr. Bessels. Q. J. Micr. Sci. (2) xvi. pp. 221–224, pl. xix. (*cf.* Zool. Rec. xii. p. 575).

7. ——. Remarks on Mr. Carter's paper "on the *Polytremata*, especially with reference to their mythical hybrid nature." Ann. N. H. (4) xvii. pp. 380–387.

8. Carter, H. J. On the *Polytremata* (*Foraminifera*), especially with reference to their mythical hybrid nature. Ann. N. H. (4) xvii. pp. 185–214, pl. xiii.

9. Gabriel, B. Untersuchungen über Morphologie, Zeugung und Entwickelung der Protozoen. Morph. JB. i. pp. 535–572, pl. xx. [abstr. Z. ges. Naturw. (2) xiii. pp. 106–108].

10. Hertwig, R. Bemerkungen zur Organisation und systematischen Stellung der Foraminiferen. Jen. Z. x. pp. 41–55, pl. ii. (abstr. Arch. Z. expér. v. p. xlix.–li.).

11. ——. Zur Histologie der Radiolarien. Untersuchungen über den Bau und die Entwickelung des Sphærozoiden und Thalassicolliden. Leipzig: 1876, 5 pls.

[Abstract of Hertwig's paper on *Podophrya* (Zool. Rec. xii. p. 571), Z. ges. Naturw. (3) xiii. pp. 286 & 287.]

12. Jones, T. R., & Parker, W. K. On some recent and fossil *Foraminifera* dredged up in the English Channel. Ann. N. H. (4) xvi. pp. 283–287.

13. Jones, T. R. Remarks on the *Foraminifera* with especial reference to their variability of form, illustrated by the Cristellarians. M. Micr. J. xv. pp. 61–92, pls. cxxviii. & cxxix.

14. Leidy, J. [A] Remarks on *Arcella*: P. Ac. Philad. 1876, pp. 54–58. [B] Remarks on the Rhizopodal genus *Nebela*. Tom. cit. pp. 115–119; J. Zool. v. p. 282. [C] Observations on Rhizopods: P. Ac. Philad. 1876, p. 187.

15. Plessis, G. du. [A] *Arcellina marina*, g. & sp. nn., eine neue Rhizopoden form aus der Familie der Arcellinen. SB. Soc. Erlang. 1876, 8 pp. [B] Notice sur un Rhizopode nouveau marin voisin des Arcelles et des Amphizonelles. Bull. Soc. Vaud. xv. pp. 1–13.

16. Schulze, F. E. Rhizopodenstudien. vi. Arch. mikr. Anat. xiii. pp. 9–30, pls. ii. & iii.

17. Schwager, C. Saggio di una classificatione dei *Foraminiferi*, avisto riguardo all lore famiglie naturali. Boll. Com. Geol. Ital. vii. pp. 475 & 476.

18. Sidall, J. D. On the *Foraminifera* of the River Dee. Ann. N. H. (4) xvii. pp. 37–47.

19. Wallich, G. C. Deep sea researches on the biology of *Globigerina* London : 1876 [not seen by the Recorder] (abstr. Ann. N. H. [4] xvii. pp. 245 & 246).

20. Wright, E. P. Note on a small collection of *Foraminifera* from the Seychelles. P. R. Irish Ac. (2) ii. pp. 586–588.

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W. B. Carpenter and A. M. Norman have reported (P. R. Soc. xxv. pp. 202–215 and 223–227) upon the *Foraminifera* dredged in the expedition of the "Valorous"; the *F. arenacea* forming, according to Carpenter, a peculiar series (the third with the *perforata* and *imperforata*, *Lituolæ*, *Rhabdammina*), especially characteristic of the great depths. A remarkable sand-incorporating *Nodosaria* from Davis Straits (1350 fathoms) may be noticed; *Astrorrhiza catenata*, sp. n., *l. c.* p. 213. A new pelagic generic type, *Hastigerina murrayi*, Wyv. Th., is figured, P. R. Soc., xxiv. pls. xxii. & xxiii., accompanying Murray's report on the work done on board the "Challenger." Also (pl. xxiv.), some new deep-sea *Radiolaria*, provisionally designated as "*Challengeridæ*." * According to Wallich (19), "the spined *Globigerinæ* found abundantly at the surface of tropical seas have nothing to do with those that form the deposits at the bottom."

*Arcella mitrata*, Leidy (14), p. 56 (New Jersey); *Nebela caudata*, id. *l. c.* p. 58 (New Jersey); on the generic characters of *Arcella* and *Centropyxis*, id. *l. c.* pp. 55 & 57; on those of *Nebela*, the variability of the structure of the shell (14 B); on *Hyalosphenia*, *l. c.* p. 197; on the habits and voracity of *Amœbæ* (14 C).

*Echinopyxis tentorium*, sp. n., Barnard (2), p. 241 (on the muddy and sandy bottom of creeks and ponds, New York); *hemisphærica*, sp. n., *id. l. c.* p. 242 (New York, same localities); *Euglypha tegulifera*, id. *ibid.* (among freshwater *Algæ*, New York).

*Arcellina marina*, g. n., Du Plessis (15), on *Algæ*, in sand or detritus on the shores of the Mediterranean. Chitinous shell, globular, stratified, and striated, with numerous perforate wartlets; minute granules, nuclei

* This will perhaps be the most convenient place to cite the various general reports published in P. R. Soc. xxiv. on the "Challenger" expedition:—C. W. Thomson's "Report on the cruise of H.M.S. 'Challenger,' from July to November, 1874," P. R. Soc. xxiii. pp. 245–250; "Report on the cruise of H.M.S. 'Challenger,' from June to August, 1875," *op. cit.* xxiv. pp. 33–40; "Preliminary report on some of the results of the cruise of H.M.S. 'Challenger,' between Hawaii and Valparaiso," *l. c.* pp. 463–470; "Report on the voyage of the 'Challenger' from the Falkland Islands to Montevideo, &c.," *l. c.* pp. 623–636. J. Murray, "Preliminary reports on work done on board the 'Challenger,'" *l. c.* pp. 471–537 (1, on oceanic deposits; 2, on some surface-organisms and their relation to oceanic deposits). R. v. Willemoës-Suhm: "Preliminary report on observations made during the earlier part of the voyage of H.M.S. 'Challenger,'" *l. c.* pp. 569–585; *Id.* "Von der 'Challenger' Expedition," Z. wiss. Zool. xxvii. pp. xcvii.–cviii. H. N. Moseley: "On the colouring matter of various animals, and especially of deep-sea forms, dredged by H.M.S. 'Challenger,'" Q. J. Micr. Soc. (2) xvii. pp. 1–23, pls. i & ii.

and sporules in the protoplasm; pseudopodia digitate, hyaline, without granules, now and then with vacuoles. Propagation through division, sporules, and zygosis [?]. Largest size equalling that of a hempseed; devours minute worms and *Crustacea*, diatoms and other microorganisms and substances.

*Troglodytes zoster*, Gabriel (9), is a minute (0.02 mm.) monostomatous monothalamian living in moist earth; it possesses an ovoid hyaline structureless shell, with a narrow slit-like orifice; a nucleus in the ab-oral nongranular portion of the plasmodium, two larger and two smaller contractile vacuoles in definite places; a girth of granular substance, of which the granules are dispersed rhythmically over the plasmodium, and again withdrawn (especially immediately before the period of propagation); lobose and filiform pseudopodia, &c. The first step necessary for propagation is the copulation of two individuals meeting each other; it consists in the formation, through confluence of the pseudopodia, of an intermediate connecting body in which an exchange of substance probably takes place; and is followed by the separation of the individuals, whose plasmodium now becomes the seat of changes of substance and remarkable vital phenomena, and undergoes a sort of concentration; the nucleus and nucleoles disappear, a sort of irregular segmentation takes place, and the plasmodium is metamorphosed into a "chagrin" of minute protoplasmic nodules or gemmules, which are set free through the disintegration of the plasmodium and the dissolution of the shell. These gemmules take the character of "*Monostigma*," being provided with a single vacuole; by "zygosis," viz., a complete fusion of two individuals, they are developed, increasing in size all the while, into "*Diplostigma*," which through the successive formation of nucleus, shell, the two large contractile vesicles, and protrusion of the pseudopodia, are transformed into typical adult *Troglodytes*. Analogous modes of evolution are characteristic of other *Rhizopoda* living under similar circumstances. The vital phenomena, internal changes of structure, and movements accompanying the passage from one of these phases of existence to the other, are observed with remarkable delicacy and described with minute accuracy.

*Calcarina hispida*, sp. n., Brady (4), Loo Choo Islands.

HERTWIG (10) has ascertained the existence of a single nucleus or several "nuclei" in several perforate or imperforate *Foraminifera*, thus removing the last barrier between the fresh-water and marine *Mono-* and *Polythalamia*, which he reunites under the name of *Thalamophora*, and divides into *T. imperforata* and *perforata*. The observations were made on young *Miliolæ* (*Spiroloculina*), *Rotaliæ*, and *Textilariæ*. The young specimens of *Miliola* and *Rotalia* are only provided with a single nucleus; more advanced ones with 1–3 in each of the older chambers; while only a single nucleus could be detected in 5–13-chambered *Textilariæ*. Thus there is no definite relation between the number of the nuclei and that of the chambers. SCHULZE (16) has likewise discovered a nucleus in *Entosolenia*, and ascertained its presence in *Rotalina* and *Polystomella*; in the latter genus, it is situated in one of the middle-aged chambers; rarely, there are 2 or 3 in contiguous chambers or in chambers separated by a single chamber; it is evident that, during the growth of the Foraminifer, the

nucleus changes its place, migrating through the narrow sarcodal passage connecting the chambers. Schulze further makes use of this discovery for a discussion of the limits and natural (phylogenetic) arrangement of the *Rhizopoda*, uniting with them the *Monera* and *Protoplasta*, but keeping apart the *Labyrinthuleæ*, *Myxomycetes*, and *Flagellata*. Considering the non-nucleated types as the lower and older, he derives from *Protamœba* and similar lobose forms, the nucleate *Amœba*, *Pelomyxa*, *Hyalosphenia*, *Quadrula*, *Arcella*, and *Difflugia*; also, several forms with more abnormal shapes of the pseudopodia: *Cochliopodium*, *Placopus*, *Podostoma*, *Petalopus*. *Myxastrum*, *Vampyrella*, and *Protogenes* may, in the same manner, be considered the more primitive non-nucleated representatives of the *Nucleata radiosa*: *Nucleata* (= *Leptophrys*, *Heterophrys*, *Heliophrys*), *Pedunculata* (*Clathrulina*, *Lecythia*, &c.), *Heliozoa* (*Acanthocystis*, *Acanthosphærium*), and of the more highly organized *Radiolaria*, distinguished by the presence of a "central capsule"; while *Protomyxa* (and *Myxodictyum*) are the innucleate prototypes of the *N. reticularia*, comprising naked forms such as *Lieberkuhnia* and the host of imperforate and perforate shelled *Thalamophora* (Hertw.); the *Diplostomida*, *Gromia*, *Euglypha*, *Miliola*, and *Lituola* being the chief types of the imperforate, *Lagena*, *Globigerina*, and *Nummulites* of the perforate division.

Hertwig (11) further arrives at the following results concerning the structure and propagation of the polyzoan Radiolarian, *Collozoum inerme*. The zooids of the colony are connected through the network of the anastomosing pseudopodia and an imbedding gelatine; they consist of the "central capsule" and the extra-capsular sarcode with its nucleated "yellow cells" and vacuoles (alveoli); probably the extra- and intra-capsular sarcode are in communication through minute pores in the membrane of the capsule, which is equivalent to a multi-nucleate cell (or syncytium), and contains one or several "oil-globules"; these are, however, not simply drops of fat, but contain an albuminous substratum. The nuclei of the central cell multiply by division, as does the cell (central capsule) itself, forming in this manner new zooids in the colony, or, by subdivision of the colony, new colonies or aggregates of individuals. True propagation is performed by the evolution and liberation of the numerous minute uniflagellate and nucleate zoospores, into which the whole contents of the "central capsule" is transformed, the extra-capsular elements disappearing during the process. In some colonies, each zoospore is provided with a crystal- or rod-like corpuscle; in others (perhaps specifically distinct), the zoospores have a somewhat different shape, are devoid of this corpuscle, and differentiated into "macrospores" and "microspores." The same propagation by "zoospores," produced chiefly by a metamorphosis and disintegration of the contents of the "central-globule," is demonstrated in the (monozoic) *Thalassicolla*, and is therefore probably characteristic of all *Radiolaria*. Hertwig is inclined to form a special division (*Collida*) of the genera, which, like *Thalassicolla*, *Thalassolampe*, *Myxobrachia*, *Physematium*, *Aulacantha*, *Aulosphæra*, *Heliosphæra*, *Diplosphæra*, have primordially a highly differentiated nucleus (the "internal vesicle"), pro-

vided with a perforate membrane, one large branched or many minute nucleoli, &c., in opposition to those which, like *Collozoum*, *Sphærozoum*, *Thalassophara*, *Thalassoplaneta*, *Cystida*, *Discida*, *Acanthometrida*, &c., have, from the first, numerous nuclei of a simple homogeneous structure; on the *Collida*, however, several small nuclei are developed by-and-by, and before the formation of the "zoospores," a retrograde transformation of the large central nucleus takes place, resulting in an organization similar to that of the majority of *Radiolaria*. The *Radiolaria* (the organization of which is, after all, more simple than hitherto supposed before Hertwig's researches) are especially characterized by the central capsule, its external gelatinous layer the yellow cells (only wanting in *Acanthometridæ*), and the propagation through uniflagellate zoospores, the mode of development of those elements, &c. Their nearest allies (in shape, skeleton, &c.), are the fresh-water *Heliozoa*, characterized by the absence of a true central capsule, and the presence of contractile vacuoles and of axial filaments traversing the pseudopodia and the body to the central granule; the zoospores are biflagellate, provided with several contractile vacuoles, a more differentiated nucleus, &c. They might, however, be considered as subclasses (*Heliozoa*, *Cytophora*) of a class (*Radiolaria*) forming, with the *Thalamophora*, the realm of *Sarcodina* or *Rhizopoda* (sensu latiore).

CARTER (8) has published detailed descriptions of *Polytrema miniaceum* (Linn.), *P. balaniforme*, Cart., *utriculare*, sp. n., *l. c.* p. 210, pl. xiii. figs. 11–16, and *P. planum*, p. 211, figs. 18 & 19 (Australia). *P. balaniforme* is identical with the genus *Carpenteria* of Gray, which is not a connecting link between Rhizopods and Sponges, the sponge spicules and similar foreign bodies being found embedded in its shell-substance or in its interior, drawn in with the sarcode, as is also often the case in *P. miniaceum*. CARPENTER (7), on the other hand, urges the necessity of retaining *Carpenteria* as a distinct genus, because the arrangement of the primary chambers is distinctly spiral, *Globigerina*-like, while *Polytrema* (like *Tinoporus*) is an extraordinary development of the Planorbuline type; "the branching canals or utricular dilatations of *Polytrema* are mere cavitary interspaces in the midst of a fabric built up by the aggregation of minute chambers; the cavities of *Carpenteria* are its true chambers, arranged in regular spiral succession, and separated from each other by complete septa, whilst partially subdivided into chamberlets by imperfect septa." "*Polytr. miniaceum* differs externally from all other known *Foraminifera* through its fixed calcareous arborescent test with superior apertures, internally from most *Foraminifera* in possessing a cancellous structure void of the canal system, but permeated with cavernous excavations communicating with the apertures, and more or less filled with sponge-spicules and other foreign objects" (Carter).

## FOSSIL RHIZOPODA.

J. BENNIE, Note on range of *Saccammina carteri*, Br., in the carboniferous series; Geol. Mag. (2) iii. p. 47. H. B. BRADY, Monograph of carboniferous and permian *Foraminifera*; London: 1876, 166 pp.

12 pls. (Mem. Pal. Soc. xxx.) (new genera: *Nodosinella*, *Stacheia*.) *Id.*, Notes on a group of Russian *Fusulinæ*; Ann. N. H. (4) xviii. pp. 414–422, pl. xviii. V. D. Broeck & Miller, Les Foraminifères des couches pliocènes de la Belgique; Bruxelles: 1876. J. W. Dawson, On some new specimens of fossil *Protozoa* from Canada; P. Am. Ass. xxiv. pp. 100–105. (*Eozoon canadense*, cretaceous *Foraminifera* from the West). F. Karrer & F. Simzow, Ueber das Auftreten des Foraminiferen-Genus *Nubecularia* in Sarmatischen Lande von Kischenew; SB. Ak. Wien, lxxvi. p. 13, 1 pl. G. Ponzi, I fossili del monte Vaticano. Rizopodi; Atti Acc. Rom. (2) iii. 2, 1876, pp. 451 & 452. K. A. Zittel, Ueber einige fossile Radiolarien aus der Norddeutschen Kreide; Z. geol. Ges. xxviii. pp. 75–86, pl. ii. (Abstr. JB. f. Mineral. xliv. p. 968).

*Eozoon*. O. Hahn, Giebt es ein *Eozoon canadense*? Eine mikrogeologische Untersuchung; Württ. nat. JH. 1876, Ann. N. H. (4) xvii. pp. 265–282 (Abstr. JB. f. Mineral. xliv. pp. 687 & 688), pp. 132–155, pl. iii. W. B. Carpenter, Notes on Otto Hahn's "Microgeological Investigations of *Eozoon canadense*"; Ann. N. H. (4) xvii. pp. 417–422. J. W. Dawson, *Eozoon canadense* according to Hahn; *op. cit.* xviii. pp. 29–38. *Id.*, On Mr. Carter's objection to *Eozoon*; *op. cit.* xvii. pp. 118–119. *Id.*, Notes on the occurrence of *Eozoon canadense* at Côte St. Pierre; Q. J. Geol. Soc. xxxii. pp. 66–74, pl. x. W. King & J. H. Rowney, Remarks on "The Dawn of Life," by Dr. Dawson; to which is added a supplementary note: Ann. N. H. (4) xvii. pp. 360–377. Also a review of J. W. Dawson's "Dawn of Life"; Geol. Mag. (2) iii. pp. 168–172, by T. R. J.

## GREGARINIDÆ.

1. Gabriel, B. Mittheilungen über die Entwickelungsgeschichte der Gregarinen. Ber. schles. Ges. 1876, pp. 22–25.

2. Giard, A. Sur une nouvelle espèce de Psorospermie (*Lithocystis schneideri*), parasite de l'*Echinocardium cordatum*. C. R. lxxxii. pp. 1208–1210; Ann. N. H. (4) xviii. pp. 192–194.

"*Lithocystis* is allied not to the lower animals but to the lower plants (*Myxomycetes* and *Chytridineæ*); on the other hand, the spores being identical with those described as originating from the cysts of *Gregarinæ*, it may be a question whether the relations of the *Psorospermia* to the *Gregarinæ* are not relations of parasitism rather than genetic."

On *Psorospermia* in Crocodiles; Gabriel, *l. c.* p. 22.

# APPENDIX.

## Generalities,* Phylogenesis, &c.

Several works and papers falling within this category—*e.g.*, the Reports from the "Challenger" and "Valorous"; Moseley, on the colouring matter of various animals; Dohrn's Jahresbericht; Bütschli, on the primordial phenomena of evolution in the egg; Semper, on the identity of type of Annelids and Vertebrates, &c., have been incidentally alluded to in the preceding chapters; the following may be here finally cited :—

Cope, E. D. On the theory of Evolution. P. Ac. Philad. 1876, pp. 15–17.

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INCLUDING NAMES PROPOSED FOR GENERA ALREADY CHARACTERIZED.

[The symbol ‖ indicates that the name to which it is affixed has been used before in Zoology.]

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