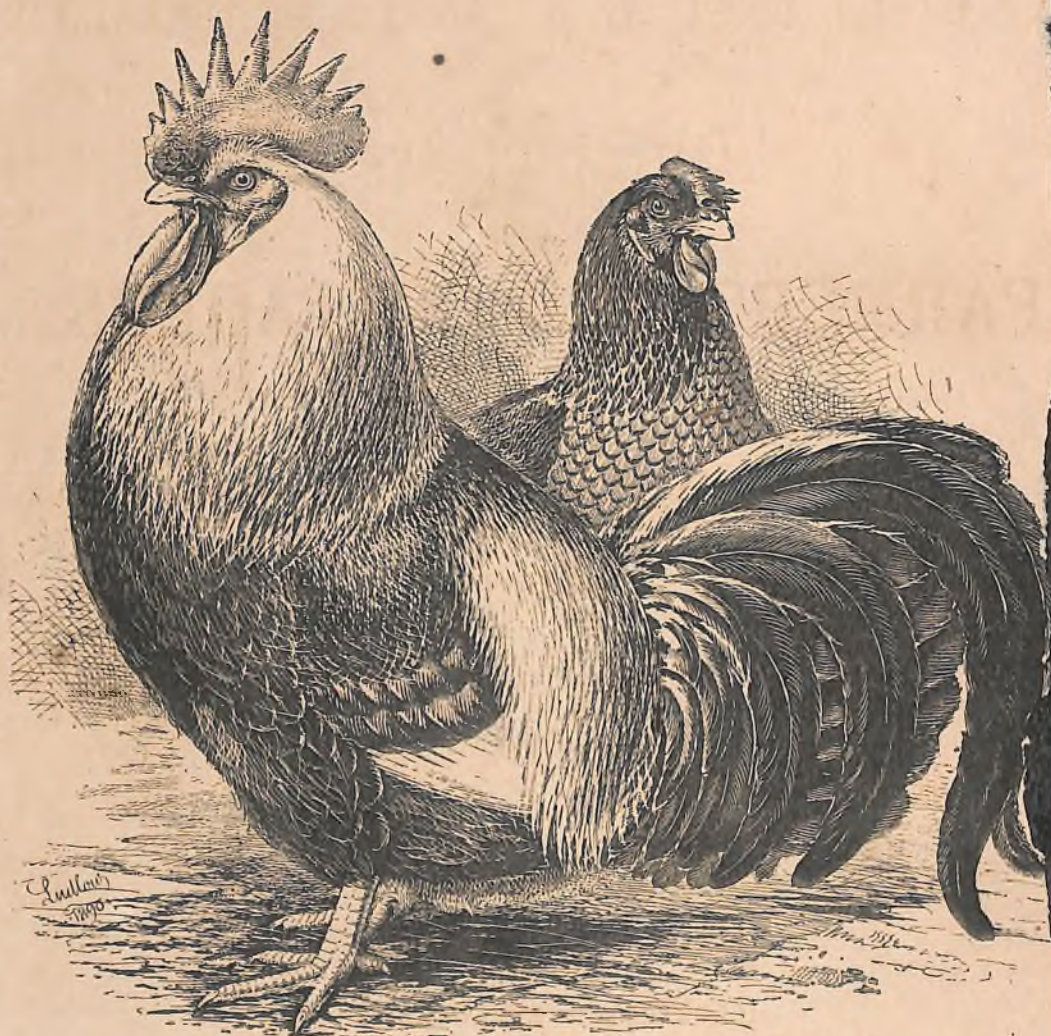


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DARK (OR COLOURED) DORKINGS.

BRED BY, AND THE PROPERTY OF, MR. W. S. PINSENT, ROSE HILL, NEWTON ABBOT.
Winner of Cups, Birmingham, 1889.

POULTRY KEEPING

AS

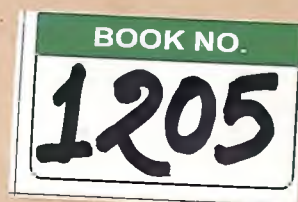
An Industry

FOR

FARMERS AND COTTAGERS.

BY

EDWARD BROWN, F.L.S.



Editor of the "Fanciers' Gazette;" Lecturer on Poultry at the Munster Dairy and Agricultural School, Cork, and the Eastern Counties Dairy Institute, Akenham, Ipswich; Special Commissioner (1888) of the "Weekly Freeman" (Dublin); and Author of the "Freeman (Poultry) Handbooks;" "Poultry, their Characteristics, &c.," (Dean & Son).

ILLUSTRATED BY LUDLOW.

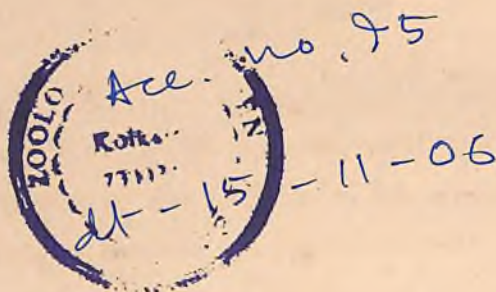
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P R E F A C E .

THE enormous amount now being paid annually by the United Kingdom for Poultry and Eggs shows no sign of decrease, but is advancing year by year at a rapid rate. In 1864 we spent £835,028 for eggs; in 1880, the amount had advanced to £2,235,451; whilst last year (1890), the total paid to the foreigner for eggs and poultry was no less a sum than £3,926,660, an increase of £331,161 over the total of 1889. To this must be added the value of imports from Ireland, which has been calculated at £1,750,000, so that the total indebtedness of Great Britain to producers without its own borders for these two articles of food was close upon five and three-quarter million pounds sterling. The entire cost of Poor Law Administration is about ten and a half million pounds sterling per annum, so that we pay more than half this amount for poultry and eggs produced by others than our own farmers and cottagers. No fact can impress the importance of this question more than that just named, but it needs to be emphasised again and again. Happily the attention of agriculturalists is being called to this subject, and steps are being taken to develop Poultry Keeping as an Industry—not by itself, but in conjunction with other branches of farming. The present movement in the various County Councils with regard to Technical Education, will assuredly include poultry keeping in the agricultural section. Societies, schools, and private influence are also concerned in it, and this work has been written to disseminate the latest and best information, showing the directions in which developments must take place, learning from experience at home and abroad the best methods to adopt, and what dangers to avoid. It is the outcome of careful observations and a deep personal interest in the subject for many years.

I desire to acknowledge my indebtedness to many poultry keepers, both at home and abroad, who have from time to time placed their experience at my disposal. Up to the present time we have not had in this country the benefit of practical experiments made, similar to those undertaken

on behalf of the Governmental Agricultural Departments of Canada and the United States, but so soon as our Board of Agriculture is fully developed in its plans we may hope for similar facilities. Whilst private enterprise may do much, there are certain sections of enquiry which can best be conducted by those who have not immediate results in view. The much needed encouragement and development of Poultry Keeping as an Industry may now be looked for through the channels already referred to. I desire to testify to the great value of Mons. Lemoine's tables, which have received confirmation as to their reliability from other students of poultry in this country. So far as I am aware every quotation made is acknowledged. Should any have been omitted, it has been unintentional on my part.

Readers will greatly oblige me personally, and render a service to others, if they will communicate to me the results of their own experience, which I may be able to utilise in the future.

EDWARD BROWN.

September, 1891.

CONTENTS.

	PAGE
INTRODUCTION	9
CHAPTER I.—Poultry Farming and What it Means	13
„ II.—Farm Poultry in England and France	16
„ III.—Recent Attempts at Improvement	23
„ IV.—The Breeds of Poultry	27
„ V.—The Selection of Stock	32
„ VI.—Poultry Houses	39
„ VII.—Formation of the Egg and Chicken	45
„ VIII.—Management of Breeding Stock and the Sitting Hen	52
„ IX.—Rearing of Chickens	60
„ X.—Artificial Hatching and Rearing	67
„ XI.—The Feeding of Poultry	73
„ XII.—Poultry Fattening	79
„ XIII.—Killing, Dressing, and Marketing Poultry	86
„ XIV.—Marketing and Preserving Eggs	95
„ XV.—Profitable Duck Keeping	102
„ XVI.—Geese	111
„ XVII.—Turkeys	116
„ XVIII.—Diseases and General Management	122
„ XIX.—Conclusion	132

ILLUSTRATIONS.

PLATES.

Coloured Dorkings	...	...	...	...	...	...	...	...	Frontispiece.
Indian Game	...	...	...	...	...	...	...	...	<i>facing</i> PAGE 16
Brown Leghorn Pullet	...	...	...	...	...	...	...	...	" 20
Plymouth Rock Hen	...	...	...	...	...	...	...	...	" 34
Houdans	...	...	...	...	...	...	...	...	" 52
Wyandotte Cockerel	...	...	...	...	...	...	...	...	" 60
Minorcas	...	...	...	...	...	...	...	...	" 70
Crèvecoeurs	...	...	...	...	...	...	...	...	" 76
Redcaps	...	...	...	...	...	...	...	...	" 86
Rouen Ducks	...	...	...	...	...	...	...	...	" 92
Aylesbury Ducks	...	...	...	...	...	...	...	...	" 102
Toulouse Geese	...	...	...	...	...	...	...	...	" 108
Bronze Turkey	...	...	...	...	...	...	...	...	" 116
Langshans	...	...	...	...	...	...	...	...	" 122

GENERAL.

	PAGE		PAGE
Type of General Purpose Fowl	... 33	How to Test an Egg	... 59
Type of Table Fowl	... 33	Chicken Coops	... 63, 64, 65
Type of Laying Fowl	... 33	Chicken House	... 66
Poultry Houses	... 40, 41, 42, 43	Incubators	... 68, 69
Cheap Chicken House	... 43	Brooders	... 68, 69, 70
Mon. Lemoine's Chicken House	... 44	Fattening Pens	... 80, 83
Formation of the Egg	... 46	French Salle d'Engraissement	... 81
Development of the Chicken	47, 48, 49, 50, 51	Cramming Machines...	... 82, 84, 85
Hatching Boxes	... 56	French System of Shaping	... 89
Capt. Terry's Hatching and Rearing		Egg Boxes	... 97, 98
Coop	... 57		



POULTRY KEEPING AS AN INDUSTRY

FOR FARMERS AND COTTAGERS.

INTRODUCTION.

 HITHERTO it has been charged, and with truth, against our systems of training and education, that technical subjects have not received the attention their importance demands. Why this should have been so it is not necessary for us now to enquire, as the fact is sufficiently apparent to all who have considered the matter. Happily it is no longer true, and the present movement towards technical and secondary education promises to have a great and widespread influence upon the future of our various industries. The chief industry of all—agriculture—is rightly regarded as of supreme importance, and whilst other branches are being encouraged fully, it occupies a most prominent position amongst the schemes adopted by County Councils throughout the country. Many of these bodies have taken up the question with great earnestness, and for the first time have been in a position to deal with the training of students in subjects which have perforce been neglected in all branches of the curriculum. However great their desire may have been, they had not the means for offering technical and secondary education, except to those who could afford to pay at a high rate for this knowledge. Such a limitation necessarily excluded the majority of our rural population from its benefits, but with the funds now placed at the disposal of local authorities they are enabled to bring the much-needed education to the people themselves, and deal with them in detail rather than in great masses. The results of this movement are yet to be seen, and can only be arrived at in years to come, when they have had time to develop. But we can look forward with great confidence, and, so far as can be observed, those responsible

for administering the Local Taxation Act, 1890, and the Technical Instruction (Amendment) Act, 1891, have approached the question in a broad-minded and liberal spirit. From the Fourth Annual Report (1890-91) of the "National Association for the Promotion of Technical and Secondary Education," which Society has rendered the greatest service in connection with this subject, we find that only two local authorities have applied all their quota of the new fund from the first-named Act to reduction of rates, whilst eighty-three have devoted all to education, and thirteen have divided it between these two objects. This report further states that "The more practical sides of agricultural education, such as dairy work, have also been vigorously promoted, large grants having been made for this purpose by several counties. In many cases the various Agricultural Societies have undertaken to organise this branch of work, besides instruction in such subjects as farriery, poultry keeping, &c." Other branches of rural work will be taken up from time to time, for it is impossible to do everything at once.

Whilst it is to be expected that the more important subjects connected with agriculture, such as the general principles of farming, stock breeding, and dairying, should receive the first place, what may be termed minor sections, by which is simply meant that they do not total to such big figures in our products or imports, though in some districts they occupy a leading place, will not be neglected. Amongst these must be placed poultry keeping, fruit culture, forestry, rabbit breeding, &c., and as these touch the smaller producers chiefly, i.e., small farmers and cottagers, no scheme could possibly be regarded as anything like complete which

failed to provide for them. But these subjects are of import to others as well as those just named, for it has been shown in many cases that neglect of the minor products of a farm will probably mean failure, whereas attention to these subsidiary productions will determine success. This view, scouted at one time, has more and more impressed itself upon the minds of those concerned, and to-day agriculturalists regard various branches of rural work very differently to a few years ago. In this there is hope for the future. The following pages bring into one focus the best knowledge attainable as to poultry keeping, and the figures given indicate the importance of this question to farmers and cottagers, and to the community at large.

Poultry keeping is a pursuit which recommends itself very strongly indeed to the small farmer and cottager, in that the outlay of capital required is very little indeed, and the returns are quickly arrived at. Chickens bred for the table can be marketed within a few weeks; those intended as layers will commence operations by the time they are five months old. Only in one or two other branches of farming can the same rapid return be secured. There need be no outlay for rent, and, except upon large farms, where a special poultry woman is kept, wages do not enter into consideration. It is, in fact, one of those pursuits which can be engrafted upon the regular operations with very little additional outlay. But there is a further benefit to be derived. Fowls play an important part in cleaning and enriching land upon which they are kept, and in the following chapters evidences of this are given. If the example shown by vine growers in France were followed, and every fruit grower maintained a flock of poultry, large or small according to his occupation, his profits would be added to considerably, his land would be cleaned by the fowls, their manure would improve his crops, and their produce would be a welcome addition to his income. We are strongly of opinion that every fruit grower should also be a poultry keeper. The same applies to dairy farms. In Devon and Cornwall nearly every dairy farmer keeps poultry, and in his contracts bargains for delivering so much butter and so many eggs. As a rule he declines to sell one without the other. Milk or butter and eggs are bought together, and ought to be produced on the same place, and equal care should be taken to market one as fresh as the other. The dairy farmer has a great advantage in that his connections enable him to find a sure and constant outlet for his eggs, with a minimum of trouble.

Whilst to some extent attention has been paid to improvement of breeds, and just as we are going to press an announcement is made that the Congested Districts Board of Ireland has granted £100 and the Royal Dublin Society £50 for the purchase of stock birds to be distributed in the West of Ireland, the equally important details as to preparation of and marketing poultry, and the collection, sorting, packing and marketing of eggs, have, as a rule, been dealt with in a most haphazard fashion. It is true that in Sussex, in Buckinghamshire, and Norfolk, so far as poultry are concerned, the trade is conducted on systematic lines. In these counties may be found examples of what can be done by method and enterprise, examples which ought to stimulate the efforts of breeders and dealers in all parts of the country. But in Britain we cannot point to any district where a system of collecting and marketing eggs has been adopted at all approaching that met with in France and other continental countries, except in Devon and Cornwall. Last spring we made an enquiry into this question in Yorkshire, and learnt that, with a practically unlimited demand on the one side, and a specially favourable district for poultry keeping on the other, the York and Malton districts are dependent on foreign supplies during a large portion of the year. A trader in York informed us that he sells about 7,000 eggs per week, but, excepting the first three or four months of each year, he has to obtain Irish, French and Danish eggs to supply his needs. What is true there applies to many other sections of the country.

In view of the revolution needed in the fattening, dressing and marketing of poultry, also in the collection and marketing of eggs, it has been deemed desirable to give considerable attention to these subjects, and the several chapters devoted thereto embody the experience of many countries, but which is as applicable to our own. We would impress upon all who take up poultry keeping as an industry the importance of paying every attention to this part of the subject, for neglect of it will be fatal to success.

We would further desire to advocate the application of true business principles to poultry keeping, as in every other pursuit, and the great value of co-operation. There are powerful reasons why poultry keepers of every denomination in each district should combine to mutual advantage, more especially in the direction of marketing. Failing this, the middleman becomes indispensable. To him we have no objection

when kept in his proper place, namely, as the servant of producers and consumers, not their master, as is too often the case. A middleman, be he employed by poultry keepers or as an independent trader, who undertakes the duties of collection, fattening and marketing, renders a service which is incalculable to the community at large, and can do more to stimulate and develop poultry breeding than any one else. He can undertake these duties better than breeders themselves. This will not, however, be his only reward, for in Sussex and Ulster, Normandy and Norfolk, Buckinghamshire and Devon, fortunes have been made by men who have entered upon the business. We hope to see ere long, in every district of the United Kingdom suitable for poultry keeping—and there are not many unsuitable districts—this trade organised in the way here sketched out.

It is a pleasure to acknowledge that this subject of poultry keeping has received attention from those whose influence is great throughout the country, and the following letters received by the Author are welcome as evidencing an awakening interest in the question.

From the RIGHT HON. W. E. GLADSTONE, M.P.
Hawarden Castle, Chester.

SIR,—Though my time is so fully occupied that I cannot try to peruse your proof sheets, and can only give passing attention to the subject, I continue to sympathise heartily with your purpose. I witness your activity with satisfaction, and I am very glad that you are about to work in concert with that valuable institution, the Cobden Club.¹

Your very faithful servant,
W. E. GLADSTONE.

Aug. 12th, 1891.

From the COUNTESS OF ABERDEEN.
New York, Sept. 2nd, 1891.²

DEAR MR. BROWN,—Allow me to send a line on Lord Aberdeen's behalf and my own, to wish your new book on poultry keeping the success it deserves. As you are aware, we have for a considerable period taken great interest in all efforts to encourage the rearing of

¹ Mr. Gladstone here refers to a leaflet by the Author, recently issued by the Cobden Club.

² This letter was written by Lady Aberdeen whilst en route to Canada.

poultry amongst smaller tenants and working people generally, and have endeavoured to do something in this direction in the neighbourhood of Haddo House. Our experience has once more demonstrated the truth of your opinion that it is among the small agriculturalists that poultry keeping will pay best, if they will give the necessary attention to the details of breeding, feeding, fattening, killing, and packing, which will enable them to obtain a good price in the market. The sound and practical advice, illustrated by facts and tested by experience, which you give in this book, should be of immense assistance to this class of poultry rearers, and we hope it will be the means of increasing their numbers, and thereby add largely to the prosperity arising from the development of home products.

With best wishes,
I remain, yours very faithfully,
ISIDEL ABERDEEN.

From the RIGHT. HON. SIR WILLIAM HART DYKE,
BART., M.P., Vice-President of the Council on
Education.

Privy Council Office, Aug. 27th, 1891.

SIR,—I am directed by Sir William Hart Dyke to thank you for forwarding him a copy of the commencement of your work on poultry keeping, and he is glad to think, from the manner in which you propose to treat the subject, that a matter of such importance to our rural population has been taken in hand by so competent an authority.

I am, Sir,
Your obedient servant,
ALMERIC FITZROY,
Private Secretary.
Edward Brown, Esq.

From JAS. MACDONALD, ESQ., Agricultural Superintendent Royal Dublin Society, Editor of "Stephen's Book of the Farm," Joint Author of "Black Polled Cattle," "Hereford Cattle," &c., &c.

*Royal Dublin Society,
Kildare Street,
Sept. 15th, 1891.*

DEAR MR. BROWN,—I am very glad to see by the prospectus enclosed in your letter to hand that you have given your attention to the production of a book that

will be a reliable guide to the profitable raising of poultry. It is a subject of the greatest national importance, and by many years of industrious research and careful study you have qualified yourself to speak upon it with authority.

In farming in the United Kingdom the day of small things has assuredly come. Poultry keeping is one of many small things which might well contribute in a much greater extent than heretofore to the income of the farmer. To small farmers and cottagers poultry keeping is indeed, or ought to be, much more than a "small thing." When properly conducted, it is a

reliable and remunerative source of income, and its reliable character is a consideration of the greatest importance, especially to the poorer classes of farmers, who require the entire produce of their holdings for the bare necessities of life.

I cannot doubt that the publication of your work will assist materially in that extension in poultry keeping which is so much to be desired.

I am, Yours faithfully,

JAMES MACDONALD,

Editor of the "Book of the Farm," &c.

CHAPTER I.

POULTRY FARMING, AND WHAT IT MEANS.

WHAT IS POULTRY FARMING?—AS AN ACCESSORY—DEVON AND CORNWALL—SURREY AND SUSSEX—BUCKINGHAMSHIRE—DISPOSAL OF PRODUCE—CONSUMPTION IN BRITAIN—IMPORTS FROM ABROAD—IRISH SUPPLIES.

 POULTRY Keeping as an Industry" is so important a subject that it is essential at the commencement we should clear the ground of all prejudices, and indicate the real meaning of terms employed. Without this is done the probabilities are that we shall be misunderstood, and our subject misconstrued. In no branch of stock keeping is this more likely to be the case than with poultry. Hitherto it has been a commonly accepted axiom that "poultry do not pay," and as profit in one direction or another is essential to the success of any commercial enterprise, unless we can give good reason for the belief within us, it is scarcely possible to command attention. To disarm those who are wedded to the idea that poultry farming does not pay, we at once declare that this is our belief, confirmed by observations at home and abroad. Then why, it may be asked, trouble to recommend a pursuit which fails to fulfil the purposes of all undertakings of this nature? Farmers have been only too familiar with lack of profit, and do not conduct their business with any philanthropic motive. For them it is of supreme importance that the balance shall be on the right side of the ledger. To these statements we would reply that it is entirely a question of what is meant by poultry farming. Commonly accepted, it denotes the conduct of a separate business, such as fruit-growing, and the attempts made to establish large poultry farms, which have been many, show a long record of failures. Many of these experiments have been conducted with considerable energy and at great cost. Others have been damned at the outset by the inexperience of their authors, who have been led on by misleading statements and by the fascination of statistics made to prove that poultry keeping was the high road to fortune. In the sense, therefore, of these attempts we are at one with those who declaim against poultry farming, for we do not believe the elements of success are contained in this pursuit conducted under such conditions. How then can

it be made a success? Our reply is—By employing it as part of the farmer's operations, one of the many departments of his work, the combination of which enables him to attain that result for which he seeks. Or to put it into the words of the late Mr. H. M. Jenkins, for many years Secretary of the Royal Agricultural Society: "Commercial poultry will only pay as an accessory to something else—whether it be a farm or a household—to eat scraps which would otherwise be lost, and to utilise time which would otherwise be wasted . . . and to give to the land, in the shape of manure, properties which cannot otherwise be obtained except by a heavy outlay." We believe that poultry can be made to do more than Mr. Jenkins stated, but it is in this spirit that we approach the subject, and our object is to show farmers and cottagers that in poultry keeping there is money to be made, money which is now poured into the pockets of their foreign rivals, who could not hope to compete with them if they took up the pursuit with enterprise and skill.

We have therefore dismissed the idea from our own mind, and, we hope, that of our readers, that any attempt will be made to advocate the establishment of large poultry farms where fowls are the chief or the only object in view. If anyone desires to again try the experiment, we can only point out those failures that strew the path of past experience in this direction, and wish them well. Should they succeed, we shall rejoice, and be ready to herald their doing so. On the lines we intend to lay down there are many successes to be recorded. Farmers in various parts of the country can be found who regard poultry as an important branch of their work. In Devon and Cornwall poultry-breeding and egg production enter into farm work to a greater extent than is perhaps the case in any other English counties, and is there an important element. In Surrey and Sussex, in Buckinghamshire, and to some extent in Lincolnshire, much is already done; while occasionally we come across a farmer in other parts of the country who

is alive to the value of poultry-breeding, and lays himself out for its development. But of these we shall have more to say in our next chapter, which deals with the subject of "Farm Poultry in England and France." It must not be expected that we can furnish balance-sheets showing how much given farmers make out of their poultry. These would be, as they almost always are, unreliable and merely approximate, for it is scarcely possible to divide receipts and expenses on any farm so as accurately to show how much each branch makes. But when we find men who are known as ready to adopt new methods, and yet make a success of their farming, declare that their poultry leave them a satisfactory profit, there is no reason whatever why we should doubt the truth of their statements.

Apart altogether from other considerations, one of the first questions which must naturally arise in connection with the probable success of poultry keeping is the opportunities for disposing of the produce, and the price that can be obtained for it. In several departments of farming the great reason of recent years' depression has been entirely due to competition from abroad. All businesses are subject to such fluctuations, either by diminution of demand or reduction of returns through excessive supply. This has been so in corn-growing and some other branches of agriculture, but to-day the best qualities of eggs and chickens are as dear as ever they were, and fifty per cent. more costly than was the case a generation ago, so far as the consumer is concerned, for unfortunately all does not go into the pockets of the producer, that insatiable middleman taking an undue share of the advance. Still the producer does obtain more for his goods than did his father, much less his grandfather. Together with this fact it must be noted that food for his stock is at a lower figure, and hence it cannot be claimed that poultry will not pay. With the advance in price has come an enormous increase in demand. It is not only that there are more people to eat eggs and poultry, but people eat more of them. Where one egg was consumed thirty years ago probably ten are used now. For one chicken purchased then, probably half a dozen are now eaten. If we assumed that the home production has been stationary during the last generation (which we do not think is the case, but believe there has been an advance in this respect), and that the increased consumption has been entirely provided for by foreign imports, it would mean that an average of nearly forty foreign eggs per annum are consumed by the people of Britain. If we allow one hundred eggs per annum to each fowl, the imports in 1890 would require nearly twelve and a half million hens for their production, and a quarter of a million farmers in this country, by each maintaining fifty more hens than they now do, could have retained for themselves the golden guineas which for many years have been pouring out of the country—surely not a very difficult thing to attain.

We have already stated that the volume of imports has very rapidly advanced of late years, and in 1890 the amount paid was greater than 1889 by several hundred

thousand pounds, and in face of an increased production in Ireland. Of the eggs received by us about thirty-five per cent. come from France, and of the best qualities, Denmark, Germany, Austria, and Italy also sending large quantities, those from Southern Europe being commonest and cheapest. In 1890 we paid France alone £1,270,092 for eggs, and £180,820 for poultry and game. Since the passing of McKinley's Bill by the American Congress, a large quantity of eggs have come from Canada, whence we have for some years received a moderate supply of poultry, chiefly geese. The following is the table of imports since 1864:—

		Eggs.	Poultry and Game.
		£	£
1864	..	835,028	—
1865	..	928,247	—
1866	..	1,105,653	—
1867	..	989,837	—
1868	..	1,009,285	—
1869	..	1,126,853	—
1870	..	1,102,080	—
1871	..	1,263,612	—
1872	..	1,762,600	—
1873	..	2,359,022	—
1874	..	2,433,134	—
1875	..	2,559,860	—
1876	..	2,620,396	—
1877	..	2,473,377	—
1878	..	2,511,096	—
1879	..	2,295,720	—
1880	..	2,335,451	—
1881	..	2,322,390	—
1882	..	2,385,263	—
1883	..	2,732,055	—
1884	..	2,910,493	—
1885	..	2,931,237	—
1886	..	2,884,063	351,888
1887	..	3,085,681	410,094
1888	..	3,083,167	403,537
1889	..	3,127,590	473,193
1890	..	3,428,802	497,858

These figures show that the imports of eggs alone have advanced during the twenty-seven years here recorded upwards of 300 per cent. The reason why we have not given the imports of poultry and game before 1886 is that previously rabbits were included. But it may be mentioned that the imports of poultry, game, and rabbits in 1864 only amounted to £131,179, whereas the inclusive total is now nearly £900,000. Of poultry and game imports for 1890 it is probable that not more than a tenth is the game value, and if that be deducted it will be seen that our total indebtedness to foreign countries for poultry produce alone was upwards of £3,875,000. To this must be added the Irish supplies, which in connection with the *Freeman's Journal* inquiry we calculated at more than £1,613,000, and have probably reached by this £1,800,000. These two sums give us a total of £5,675,000 sterling as the expendi-

ture of Britain upon poultry and eggs raised and laid without its own borders. In face of figures like these it is impossible for anyone to pretend that the question of poultry-keeping is beneath the notice of farmers and cottagers, for though five and a half million pounds would not save the agriculturist from ruin, it would be a very material help to that end, and under any circumstances is better in his pocket than in those of his rivals. But the benefit is not to be measured by this sum alone, for the work done by fowls in the way of manuring and cleaning the ground is incalculable. Nor must we think of farmers only in this connection, for the money which cottagers and labourers can make by keeping a few fowls would do much to make their position in life brighter and better.

If we make further inquiries into the consumption of poultry produce in the country, some of the facts arrived at are very startling. Taking the metropolis first of all, we find that its population is, roughly speaking, one-sixth that of Great Britain, but it may fairly be assumed that the great conglomeration of human beings within the metropolitan area, so few of whom can possibly be producers, absorb at least one-fourth of the produce obtained from foreign countries and Ireland. If that be so, London's annual bill for other than English

eggs and poultry will reach the grand total of nearly £1,420,000 per annum. During inquiries in the north of England we arrived at the conclusion that Lancashire pays £850,000 per annum, and Yorkshire £820,000 per annum, for these articles of food, laid or raised without this tight little island, and we do not think these figures are at all exaggerated.

There is yet a further consideration, namely, that of further growth. We have already seen how rapidly imports have increased. The advance in eggs from 1880 to 1890 was £1,093,351, or about 47 per cent. Now if the same ratio of increase be maintained during the next decade, our foreign imports of eggs and poultry in 1900 will be close upon five and three-quarter million pounds sterling. And if the Irish exports advance at anything like half that ratio, we shall be paying eight million pounds for poultry and eggs produced out of Great Britain. Whether the increase continues to anything like the extent we have indicated must depend upon our farmers and cottagers. If they are content to allow the foreign producer to secure the trade, he will assuredly do so. Population in this country is rapidly increasing, and with it means to indulge in luxuries. Therefore, we do not believe that there will be any check to demand, but rather that it will increase rapidly.



CHAPTER II.

FARM POULTRY IN ENGLAND AND FRANCE.

POULTRY A NEGLECTED QUANTITY—NOTABLE EXCEPTIONS IN BRITAIN—PARIS SHOW—POULTRY AND POULTRY PRODUCTS IN FRANCE—POULTRY ON FRENCH VINEYARDS—QUALITY OF FLESH—PRICES OF FOWLS AND EGGS—POULTRY IN BORDEAUX MARKET—NORTH AND NORTH-WESTERN FRANCE—OTHER DEPARTMENTS.

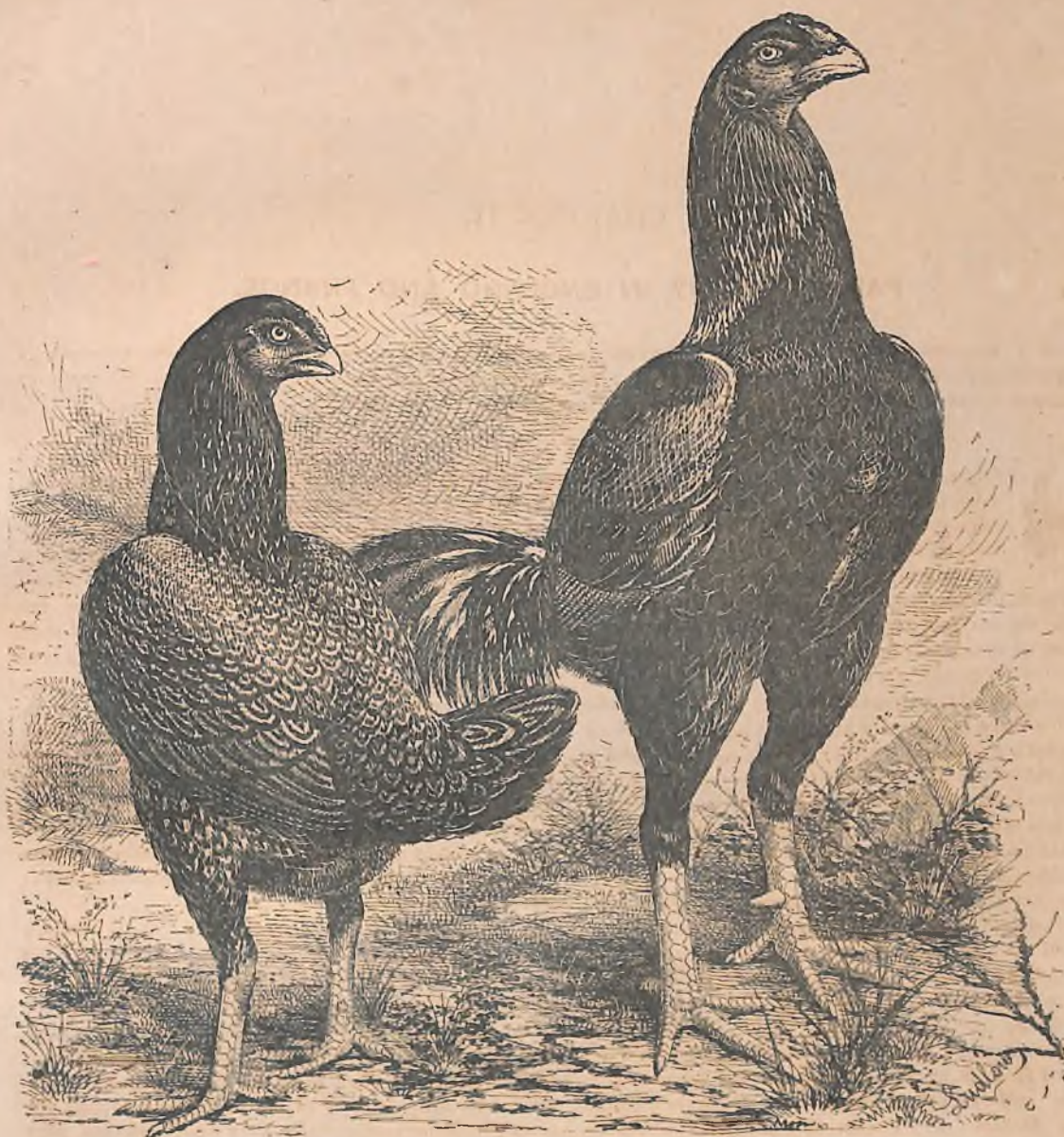


ITHIERTO, with a few notable exceptions, the farm poultry of this country has been a very neglected quantity. As a rule, fowls were relegated to the farmer's wife and daughters, to whom every bushel of grain was either begrudged, or regarded in the light of a contribution to the women folk, enabling them to obtain sundry articles of ornamentation without troubling their husbands for the money. When farms were small, and the wife jogged weekly to market with her "good man," she carrying there her store of butter and eggs, this sort of thing did not matter, for all the operations were upon a comparatively moderate scale, and poultry probably held a relative proportion to other products. But now a different condition exists, and in face of the vast volume of foreign imports, as well as their own needs, it is necessary to rise to a higher conception of the question.

The notable exceptions have been in East Anglia, Lincolnshire, Devon and Cornwall, and Cumberland, as well as, to some extent, in the south-west of Scotland, and to a greater extent in Ireland, where poultry-keeping is largely followed. In the district first named turkeys and geese are produced to a large extent every year, and it may safely be asserted that no fowls of these two races in the whole world can be said to equal them. Even the mammoth bronze turkeys of America do not rival them in quality; and a prime-fed Norfolk turkey will command the top price everywhere. In Lincolnshire, geese are reared to a considerable extent, though not nearly so much as might be, and the same can be said of Cumberland. But it is something to know that some farmers are alive to the profitable nature of this branch of poultry keeping. In Surrey and Sussex large numbers of poultry are reared, but chiefly by cottagers, who sell them to fatteners; and even here the demand is beyond the supply, for vast numbers of Irish lean chickens are

brought there to be fattened, and afterwards are sold on the London market as Surrey fowls. But upon this subject we shall speak more fully when discussing the question of fattening and marketing; and when we take up duck keeping, we shall deal at length with the system adopted in Buckinghamshire, whence are derived the famous Aylesbury ducklings, for which are obtained such high prices in the spring season, and which industry is of great importance to dwellers in the Vale of Aylesbury. In Ireland vast quantities of eggs and fowls are produced, but there is much yet to be done, both as to development and improved systems of marketing. With these exceptions, poultry keeping by farmers and cottagers cannot be said to receive anything like the attention it deserves, and there are few who give it a really serious thought as part of their regular operations, though many are now looking upon it with less prejudice than was the case a few years ago.

When we come to France a different state of matters exists, and it has ever been so. Arthur Young tells repeatedly in his travels of seeing immense quantities of poultry there. The Ministry of Agriculture lends its powerful assistance and support to whatever will develop the industry, and annual shows held under its auspices embrace poultry, both living and dead, as an important and prominent feature. If more of our farmers would visit the great exhibition held at Paris every year, about ten days before Shrove Tuesday, they would see what has never been presented in Britain, and which would at once emphasise the importance of this product. Some time ago a calculation was made as to the value of poultry and poultry products in France by the journal *Le Poussin*. From this we learn that there were 43,858,780 head of poultry, which, valued at three francs (2s. 6d.) each, gave a total of £5,482,872 10s. A fifth of this number is sold off every year for the table, value £1,114,210, leaving altogether about 2,400,000 capons, and a total of



INDIAN GAME.

"AGITATOR" AND "LADY WHITFIELD."

THE PROPERTY OF MR. G. T. WHITFIELD, COLEBRIDGE, GLOUCESTER (Hon. Sec. of the Indian Game Club).

Cock, winner of 2nd prize Birmingham; 3rd prize Crystal Palace. Hen, winner of 1st prizes at Crystal Palace, Birmingham, &c., &c.

32,982,024 head of poultry for breeding, which annually produce 101,000,000 chickens. Out of this number about 79,000,000 are sold for 1s. 6d. each, amounting to £3,920,000; or taking into account the value of poultry sold for what may be termed fancy prices to breeders, *Le Poussin* made the total value to be £7,176,210. Calculating the average number of eggs laid by each hen per annum at one hundred, the total, exclusive of those which are used for setting, would be 3,187,702,800, and their value £8,925,568, so that altogether the value of poultry and eggs produced in France to be rather over £16,000,000—probably treble, and certainly more than double, the annual product of the United Kingdom. France not only supplies her own needs, which are great, but is enabled to export vast quantities, both of eggs and poultry.

Personal observations in several parts of France have impressed one fact, namely, that poultry are made a portion of the regular work of all cultivation, even where to our English ideas they would be least looked for, upon the vineyards which occupy so much of French land. The vine is subject to many enemies, and at one season of the year vineyards are infested by hordes of slugs and earth-worms, which, if not kept down, destroy the growth. It is customary at this season (June) to employ labour to pick off those slugs, but the efforts of fowls are also largely depended upon for the same result, and at other seasons they are found to be most valuable helpers to successful working of the vineyards. Fowls are to be seen on every side and in every field. For them houses are provided, scattered here and there near to or among the vines. Some are permanent, but the majority are moveable, and narrow enough to stand between the rows, generally provided with handles at each end to facilitate carrying. At all seasons the poultry are permitted to wander at will, save when the fruit is just ripening, and we have seen a flock of thirty or forty birds eagerly following the plough, rejoicing in all the good things turned up by it. The quality of their flesh and the richness of their eggs is very great, and it is a remarkable fact that the best birds for table purposes are to be found where the finest wine is produced. For quality of meat we have seldom found the equal of those produced in the Medoc, considering that the birds are not specially fattened, but simply picked up from the vineyards to be killed.

The fowls found on the vineyards are known as the Landes fowls. These owe their name to, and doubtless emanate from, the Landes district, lying between Bordeaux and the Pyrenees. They are very irregular in colour. Many are black, but some are speckled, like the Campines, the Ermines, and the pencilled Hamburgs; others are very bad imitations of or offshoots from brown Leghorns; whilst there are others not unlike the silver-grey Dorking, especially in the hens. Though this variation in colour is to be found, the type of all the fowls is pretty much the same, the shape being not unlike that of the Spanish race, though perhaps a little

shorter in the leg than we are now accustomed to see in the Leghorn, more resembling what that fowl was when first introduced into Britain. The size of the fowl is very good, better than it appears at first sight, for the food they obtain makes them very plump and heavy. The great majority have single combs, and we should think, from their external appearance, are good layers. Like the great proportion of French fowls, most of the fowls in these vineyards have black legs, but there are a goodly number with yellow legs, and a very few have white. We thought that we could recognise several varieties besides the Landes amongst the fowls in the vineyards of the Medoc, and it has been suggested that as there are so many chateaux there, the wealthy owners of which have gone in for purer and rarer breeds, it has led to a mixing up of the stocks. There appears every reason to accept this as the explanation. One thing we have specially noted, namely, that in all the district we never saw a feather-legged bird. All were clean-legged, and of an active habit of body. The fowls are well cared for, they are well treated, but not pampered in any way, and the houses in which they are kept are of a very ordinary type, though in some cases more elaborate structures have been built.

The best soil for vine-growing consists chiefly of gravel, and in many places could not be used for anything else. There is a great variety in the quality of the soil for this purpose—in fact, as much variety as in the wines they produce. One very remarkable thing we learnt is that the best fowls are reared on the estates where the best wine is made. Evidently the qualities which go to make these wines are just those needed to produce fine quality of flesh in fowls. What these qualities are is not stated, but there is the fact. Of course, the quality of the soil must have much to do with the flesh, for the richness of the Dorking country in England, and of the La Sarthe district in France, has been instrumental in making the fine fowls produced therein. We have tasted fowls in many places, but are fain to confess that we have never enjoyed any so much as those which we had in the Medoc. For quality of meat we have not had any that were superior to these. They are not so large as many that we have seen, but yet are very fleshy, and with meat beautifully white. Perhaps the method of cooking has a considerable share in arriving at this desirable end, for the fowls are roasted before an open wood fire, and we are convinced that to this is due something of the beautiful flavour of the fowls, but yet not all.

The prices at which fowls are sold in the Medoc, and even in Bordeaux itself, are enough to make the mouth of an English housewife water with envy. At the Bordeaux market, capital fowls could be bought for half-a-crown each, whilst at a market held in one of the towns in the Medoc the price of the best adult fowls was four shillings the couple, of spring chickens two shillings the couple, and of eggs 5½d. the dozen.

At Bordeaux is an arrangement which we have never seen elsewhere, namely, the sale of fowls in sections. At Paris, half fowls can be purchased, but at Bordeaux the system is carried much farther. Here, almost any portion can be purchased separately—breasts, legs, wings, or carcase. This method is applied to all kinds of fowl, and we saw chickens, turkeys, ducks, and geese so treated. The blood is also sold separately, and thus no portion of the fowl is wasted. Thus the Bordelaise housekeeper, able, as most of the French are, to make a fine dish with little meat, can buy a leg or a wing, or, on a special occasion, the breast, needing to buy no more, and those who like soup can buy the carcase.

Whilst almost every part of France produces considerable quantities of eggs and poultry, the departments which chiefly supply our English markets are the northern, north-western, and western, or those bordered by the English Channel and the Bay of Biscay. Over the whole of this large area poultry keeping is an important part of all rural operations. Every farmer and cottager maintains a considerable flock of poultry, and some depend chiefly upon them for their livelihood. But there are no large poultry farms to be found in these or any other districts of France. The system adopted is that collectors visit twice or thrice a week, and sometimes daily, each farm or cottage, taking the eggs obtained to dealers, who pack and forward to England. So perfect is this system on the northern seaboard that it is possible for eggs to be offered for sale in London the third day after they are laid. Without such a system of collection French eggs would never hold the position they now occupy, for it prevents the eggs being marketed when they are stale. The methods of sorting and packing will be dealt with later on, as they are important factors in the success of the French egg trade.

It may, therefore, be taken as a certain fact that universal production of a few each, and not large numbers kept by individual farmers, is the basis of French poultry keeping, for, as we have already said, large poultry farms do not exist, by which is meant farms devoted to poultry alone. Community of ideas and of interest have, however, led to the adoption of varieties of poultry which rank amongst the best of all for economic purposes. These vary with each district. In Normandy we find the La Flèche, the Le Mans, the Crève-cœur, and the Courtes Pattes, all famous for their superb table qualities. Nearer to Paris we find birds of the Houdan type, and across the Loire a breed called the

Barbezieu, bearing many resemblances to the Minorca, both of these being excellent layers, and yet not so dry in flesh as the laying breeds here generally are. In the Burgundy district are bred those famous La Bresse fowls which are finest of all French poultry, and command very high prices on the French markets. Whilst in other departments are to be found varieties not sufficiently prominent to be separately named, but combining qualities which make them especially adapted to the conditions where they are bred. We do not say that all French poultry-breeders pay the same attention to pedigree as do the British stock-raiser or the poultry-fancier, but the rule is certainly to maintain purity of blood, and to retain external characteristics as well as economic qualities. It would be nonsense to say that mongrels are unknown, for we have seen plenty of them in France, usually, however, when the farmer has been trying to improve his stock by infusion of fresh blood, or where egg production is regarded more than poultry for the table. But in those districts where the great majority of supplies are derived, the character of fowls seen there is wonderfully uniform. Nor is there any slavish following of what people do elsewhere. The object seems to be finding out a variety best suited to their own needs and conditions, modifying existing breeds in accordance therewith. This involves study and thought. We question whether the French farmer is equal to our English farmers in intelligence, but, so far as poultry are concerned, he is free from that prejudice which has been a great barrier to the latter. Further, he is more disposed to regard detail; is more willing to handle small things; and from his earliest years has been taught that fowls will pay if treated properly. Nor is he afraid of their predatory disposition. We have already seen how they are permitted to run on vineyards; and amongst the orchards of Normandy, as on arable lands elsewhere, they are given full freedom. What they may eat or destroy is far more than compensated for in the way of manure, and that cleaning of the ground at which fowls are so great adepts. But, in short, the French farmer needs no one to impress upon him the advantages to be derived from poultry-keeping. In his rural schools he is taught the principles of this and allied subjects; if he goes to an agricultural college, what he already knows is emphasised and corrected; and he has the constant example before him of those who find their largest and surest source of income from the fowls reared and eggs produced upon their farms.

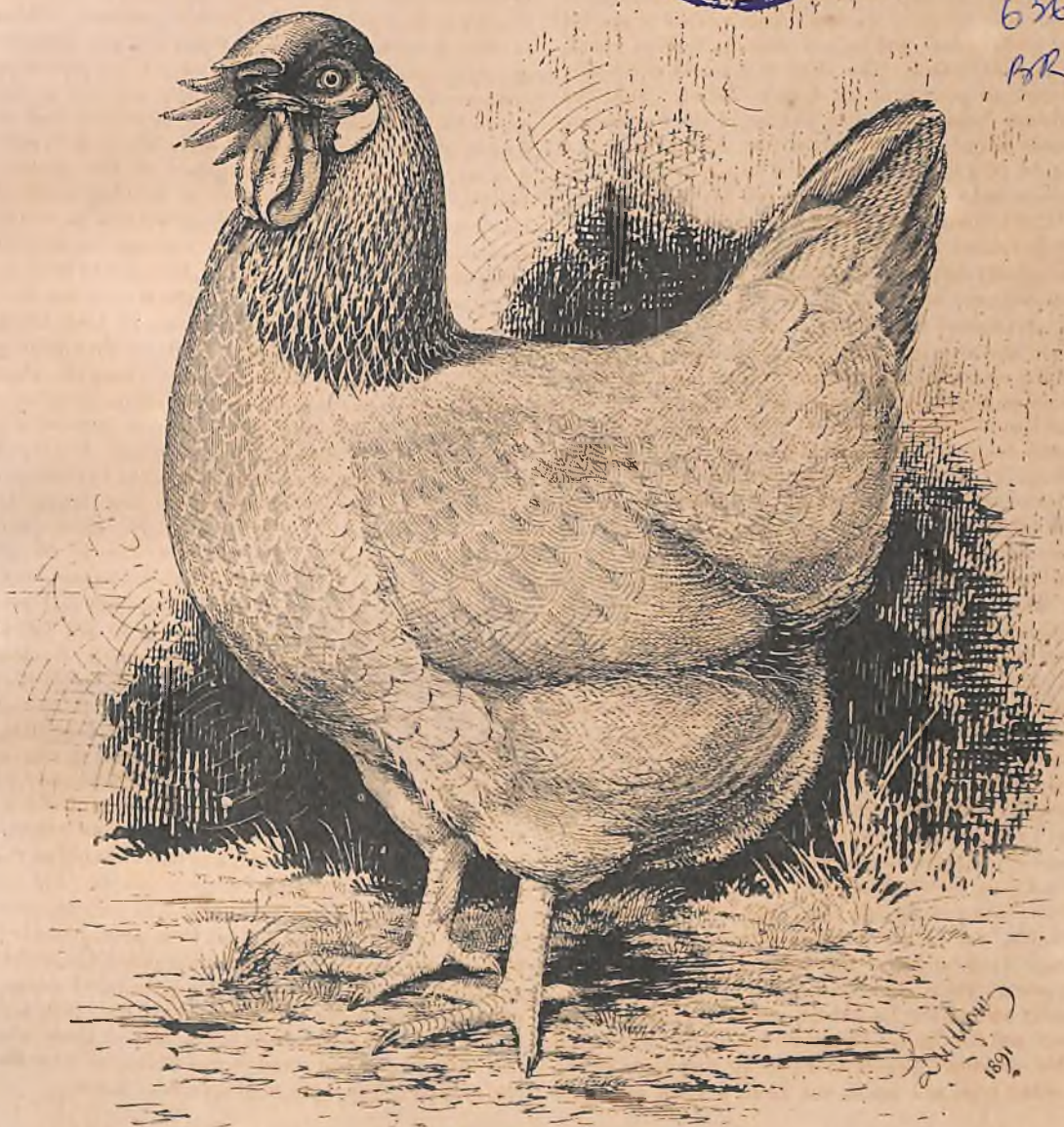


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BROWN LEGHORN HEN.

BRED BY, AND THE PROPERTY OF, MR. JOHN HURST, GLOSSOP, DERBYSHIRE.
Winner of Challenge Cup, and Cup for Best Leghorn, Crystal Palace Show, 1890, &c,

CHAPTER III.

RECENT ATTEMPTS AT IMPROVEMENT.

EFFECTS OF GREATER COMFORT AND TRAVEL—BETTER PRICES CAN BE GOT—FARMERS COMPELLED TO LOOK IN NEW DIRECTIONS—ROYAL AGRICULTURAL SOCIETY—MR. GLADSTONE ON POULTRY KEEPING—DIRECTIONS FOR IMPROVEMENT—DEVON AND CORNWALL—INFLUENCE OF SHOWS—NORTHUMBRIAN POULTRY FARMING.



HERE can be no question but that the last few years have found a large increase in the consumption of poultry produce. The greater comfort in which many of our great industrial army now live than was the case with their grandfathers, and the enormous increase in wealth of the middle class, has resulted in a seeking for finer and more delicate articles of food. Further, travelling in other countries has broadened the ideas and cultivated the tastes of our people, for when they have experienced the delicacy of French cookery, and learnt the multifarious ways in which both fowls and eggs can be served, they seek to follow on similar lines. And there is every reason to assume that this line of progression will continue, and that poultry produce will more and more enter into the food supply of the country. We have a long way to go ere we come up to the French standard, but the chase has been an active one for some years. Where there is most to be done is in the direction of better produce. So far as eggs are concerned, it is chiefly a question of quantity and methods of marketing, for France cannot send us any better eggs, and maybe not as good, as are to be obtained in Great Britain or Ireland. Some day it may be that eggs will be sold for quality and by name of breed, for there is no reason why the quality should not be paid for as well as the quantity. In the case of poultry, however, there is yet much to be done. We need fear no one with regard to the quality of our turkeys, geese, and ducks, but in respect to fowls we are a long way behind our neighbours across the English Channel. Well-fed fowls can be obtained upon the London markets, chiefly from Surrey and Sussex, but even the best of these do not compare favourably with what are regularly to be seen in Paris and other French markets, where much higher prices can be secured for the best specimens than at present are obtainable in England. Still, when we re-

member the rates asked for spring ducklings, for Christmas geese and turkeys, it is very evident that there are plenty of people ready to pay top prices for first-class fowls, if they are to be had. This has been the experience in all other branches of food, and would undoubtedly be so with poultry.

The force of recent events in connection with agriculture, and the necessity for paying attention to other branches of this great industry than was the case a few years ago, is doing much to compel farmers to look for fresh developments. Many who would have spurned the idea of poultry breeding as an important part of their regular operations, are now looking to it with a friendlier eye. Careful observations throughout the country have led us to the opinion that more fowls are kept than ever was the case before. Much of this is due to the fact that in 1835 the Royal Agricultural Society determined to add a poultry section to its annual shows, and since that time it has been a most interesting feature of the great society's annual exhibition. This is now upon an excellent basis, providing classes for all the most useful breeds as well as various crosses, and by means of dead poultry classes giving a practical object lesson which cannot fail to be of great benefit to those who see the specimens displayed. At both the Bingley Hall, Birmingham, and Dairy Shows table poultry classes have been given of late years, and more has been learnt in connection with these displays as to the relative value of poultry upon the table than would have been possible in any other way. We can bear emphatic testimony to the fact that since the Royal Agricultural Society lent the support of its influence to the encouragement of poultry culture, prejudice has been easier to combat, and farmers generally have looked with more favour upon this as a branch of their operations. And in many parts of the country examples can be met with of those who have gone in for it with decided

success. But there is much yet to be done. The influence of a few successes will go far to break down prejudice remaining, and when it is seen that farmers can add to their success by taking up poultry-keeping with energy and skill, the more conservative of their neighbours will ere long be compelled to recognise its importance. Dissemination of the best information as to breeds and methods of management, and better ways of bringing producers and consumers into closer touch, materially help to this end. We are pleased also to acknowledge greater readiness on the part of chambers of agriculture and of farmers' clubs to allow this subject to be discussed, and we have welcomed the opportunity afforded us from time to time of attending such gatherings and delivering addresses thereat. In a few instances dairy and agricultural schools have established a regular series of lectures on poultry-keeping, and much more might be done in this direction with manifest advantage. The training of young agricultural students will have a vast influence in the future, and we hope that ere long every such school will make poultry-keeping a part of its regular course. There is yet another way in which influence can be brought to bear, namely, by landowners and men of leading position in the country. In the autumn of 1889 the Right Hon. W. E. Gladstone, in an address at Hawarden, dealing with the subject of *petit culture*, made reference to the subject of poultry-rearing, as he had done in a previous speech to that of fruit-growing. Through the right honourable gentleman's observations attention was called in a very prominent manner to the question, and many were induced to regard it with more favourable views than had been the case before. Thus in various ways has the matter been brought forward, and the all-powerful press has from time to time lent the weight of its influence. Consequently it is not at all surprising that poultry-keeping occupies an altogether different place from that held by it a few years ago. And as the various County Councils are now engaged in considering the question of technical education, it is not unreasonable to hope that in agricultural districts poultry-keeping will be included in any scheme they may adopt. It is all-important, therefore, that this subject shall be kept to the fore, and that farmers and cottagers should recognise the possibility of making it a profitable source of income. To do this right methods must be adopted, and the present work has been written with that object in view.

The directions in which improvement must take place are: (1) better breeds; (2) more correct methods of management; and (3) improved systems of marketing, each of which are essential to success, and the neglect of which must greatly minimise any profit derived from the pursuit. The question of breeds is of primary importance, for there is a great difference in the respective breeds of poultry as to their economic qualities, and these must be studied in order that

selection may be made of those most suitable to the place and the object in view. Fortunately there is an abundant variety from which choice can be made, so that every condition and need can be provided for. What we recommend is that a breed which at once supplies the requirements of any district, and is found to adapt itself to its special condition, should be adopted. This has been done in Devon and Cornwall, where poultry-keeping is more universally carried on than in any other district of Britain, and also to an even greater extent in France and Denmark. In the first-named counties are to be found the Minorca and Indian Game, the former one of our best laying varieties, and the latter excelling greatly in its table properties. It is in the way here recommended that our country has become famous for its cattle and horses and other kinds of stock. Divided and erratic methods will never succeed, and we believe that when fowls of a common type are found universally in any district—provided, of course, that they be of the best kind for that district—the results will be much more satisfactory than when selection is made upon a higgledy-piggledy fashion which is only too common. We have had the pleasure of meeting several agriculturists who breed poultry extensively, and the plan adopted by them has been to test different varieties upon a small scale, and then adopt the breed which proved to be most suited to their place and conditions. It is often found desirable to keep two varieties in order to provide for both a winter and summer supply of eggs, and still more so when chickens are to be marketed; and as one of the matters which every poultry-keeper must bear in mind is the maintenance of a regular supply of eggs, it is not surprising to find that the winter laying breeds are becoming more and more popular.

A word may be here spoken as to the influence of shows, which has been discussed so often, not only in respect to poultry, but other branches of live stock. Fanciers' shows, pure and simple, are not established for the improvement of poultry in their economic qualities, but for fancy points. We have no reason to blame the fancier for this, nor expect him to do the work of those whose primary object is those qualities which he regards as of minor importance. But this much must be said, whatever harm the fancier in his striving for external points has done to some breeds—and no one denies the harm, though not nearly so great as stated—by his constant seeking after fresh varieties he has been the means of discovering, conserving, and producing varieties of the greatest value, which without his efforts would never have been seen. Thus the benefit derived from fancy poultry is vastly greater than any harm the fancier may have wrought. Shows properly conducted and upon right lines are of the highest educational value, and we cannot do better than point to the classification adopted by the Royal Agricultural Society as an example worthy of being followed.

POULTRY FARMING IN NORTHUMBERLAND.

In November, 1890, we delivered an address to the Newcastle Farmers' Club on "Poultry as Applied to British Agriculture," and at that meeting reference was made to Mr. H. Annett's poultry-keeping at Widdrington. Since then we have had an opportunity of visiting the farm, and below are the results of our observations.

The development of this section has been a gradual one, and one of the first experiments made by Mr. Annett was in the direction of learning what breed of fowls was most suited to his place and requirements. The farm, which consists of 2,000 acres largely devoted to dairying, runs by the sea shore, and though there are sandhills which give a measure of protection, those keen north-east winds which have such great force on the Northumbrian coast can blow at will over its entire surface. No delicate breed could withstand such a climate. Mr. Annett has spent much time and thought, making many experiments, in order to discover what breed would prove most successful as an egg-producer, as his object is to supply this article of food, ever in demand. To this end he tried all our best laying varieties, and as a result he has selected the white Leghorn. Mr. Annett placed the results of his experiments at our disposal, and the following are the figures obtained from his carefully kept records:—

	1890.	1890.
	Ten White Leghorn Hens from Jan. 1st.	Ten White Leghorn Pullets from Jan. 15th.
January ..	174	17
February ..	178	154
March ..	226	204
April ..	238	228
May ..	249	238
June ..	208	216
July ..	134	189
August ..	131	151
September ..	64	63
October ..	7	44
November ..	5	112
December ..	45	45
Totals ..	1,659	1,661
Averages	165.9	166.1 per hen.

These figures, covering as they do an entire year, are most valuable, and remarkable in that the grand totals are within an ace of each other, though the pullets would show a higher average if the fifteen omitted days had been given. It will be seen, however, that during the first five months of the year, from January to May, the elder birds laid a larger number of eggs, but that in June the younger took the lead; and, excepting September, maintained it, being vastly superior in October and November, when the old ones were doubtless in the moult. It would seem to show that eggs can be secured all the year round from white Leghorns alone by arranging for a succession of young pullets every year

—a most important point which requires emphasising constantly.

During the present year these statistics are still being gathered. Every house has a board supplied on which the number of eggs laid are daily recorded; and as Mr. Annett is making further experiments, and in several cases with cross-bred fowls, the statistics will be found of great interest. It may be mentioned that whilst every effort is put forth to obtain heavy layers, and that any hen found to be a large egg-producer is bred from, the object is not to make tables for publication, but to gauge results; as he stated repeatedly to us, the enterprise is purely one of business. If it did not pay it would be abandoned at once, but every effort is made to secure the best results, and the same care is expended in securing success as in the dairy. Unless this is done it would be impossible to measure success or failure.

The records for 1891, from January 1st to June 19th, are as follows:—

	12 White Leghorns.	50 Minorca and Ham- burghs.	50 Houdans and Brown Leghorns.	50 Black Ham- burghs and White Leghorns.	50 White Leghorns and Houdans.	50 White Leghorns and Plymouth Rocks.
January ..	146	220	164	236	319	377
February ..	204	483	481	695	650	667
March ..	222	657	857	761	655	907
April ..	289	875	878	899	678	957
May ..	300	827	773	871	901	339
June (to 19th)	140	329	449	401	491	524
Totals ..	1,301	3,381	3,602	3,863	3,704	4,371
Averages per hen for 24 weeks ..	108	67	72	77	74	87

Here, again, the pure-bred white Leghorn and its crosses stand easily first for laying qualities, but it is never fair to draw conclusions from one part of the year alone, as it is possible that the others may improve later in the year. But from appearances we should say that the white Leghorn and Plymouth Rock will come out the best amongst the crosses. They have all the make of good laying hens.

Finding an outlet for produce is equally important to securing it, and in this respect Mr. Annett has had no difficulty whatever. He has entered into a contract with the Co-operative Society of Newcastle-upon-Tyne, the price of which is one shilling for thirteen eggs all the year round, a price which is certainly satisfactory, but in no way exceptional. The society will take as many as he can produce, and at any time, making no restrictions as to delivery, only asking that they be sent regularly and fresh, by which they mean at least once a week. Such a contract does not encourage production of winter eggs, nor yet the importance of marketing eggs absolutely new laid; but doubtless the managers would soon com-

plain unless a reasonable proportion from October to March was supplied. During the fifty-two weeks ending June 6th, 1891, the grand total of eggs marketed by Mr. Annett was 121,966, of which 87,282 have been in 1891 alone. In addition, about 2,000 eggs have been used on the farm for sitting, and 1,000 more sold for the same purpose.

There were at the time of our visit 1,600 laying hens on the farm, but it is intended as soon as possible to increase this number to 2,400, which it is intended shall be the normal standard, and it is hoped that an average of 6,000 eggs per week can be marketed. As already stated, the fowls are scattered over the farm, and as its extent is so vast, there is no danger whatever of the ground becoming foul. For every fifty fowls a separate house is provided, and these dwellings are made on an excellent plan. They are of Mr. Annett's own design, have a raised floor, which is kept covered with peat moss litter, a thatched roof for the sake of warmth, but to prevent the fowls flying thereon and tearing it to pieces, the thatch is covered with wire netting. Inside the fittings are very simple indeed. The perches are all on the same height from the floor, and can be removed in a moment. Each house is fitted with nest boxes, to which access is obtained from the outside by means of a flap door, and by a very simple arrangement when once the trap of the fowls' entrance is closed it cannot be opened from without—a capital arrangement for preventing night marauders. This trap has a slide door, and above it is a wooden half-button, which holds down the trap when once closed. It is found that although the inmates of various houses may mix during the day, they all return to their own abodes at night, and so far as any harm being done to herbage, it has vastly improved, and wherever the poultry have been running is easily distinguishable by greater luxuriance of growth.

Clibburn is the centre of the three farms under Mr. Annett, and is the headquarters of the poultry industry. Provision of the usual kind is made for hatching by means of long rows of boxes placed in a well-protected yard. Hitherto hens only have been used for hatching and rearing, but with the growth of his operations Mr. Annett intends next season to have some incubators at work. The chicken coops are placed in fields adjoining the farmstead, and after using one field for a couple of years, this season fresh ground was taken. Plain, comfortable coops of the regular pattern are employed, and everything about the place is designed for practical use. The eggs as gathered are stored on shelves in a large cool shed, and they are packed in hampers between layers of straw. Thus far nothing has been done in the way of grading or selecting eggs, for the Co-operative Society does not ask it. The food given is good but plain, and from what we could see the common mistake of overfeeding is not made. As an indication of what this enterprise means, 1,700 hens will consume a ton of food in five days. The work is done by one man and two women, each of whom has a defined circuit to look after, and the head poultrywoman has evidently the whole thing at her finger ends, taking great interest in her duties, being intelligent and active. The total cost per head for food, labour, and depreciation of houses and stock is 6s. 6d. per annum, and the returns has thus far been averaged 10s. per annum, but in some cases have reached 12s. 6d. per bird, leaving a profit of 3s. 6d. per hen, a margin which ought to satisfy the requirements of any farmer. Mr. Annett is more than satisfied with the results thus far, and he believes that when the full strength in layers is reached, better returns will be secured, as the labour now employed will be sufficient, and the consequent score on that head materially reduced.

CHAPTER IV.

THE BREEDS OF POULTRY.

PURE-BRED STOCK v. MONGRELS—VALUE OF EXTERNAL CHARACTERISTICS—EGG PRODUCTION—LAYING OF VARIOUS BREEDS—
WEIGHT OF EGGS—TABLE PROPERTIES—QUALITIES OF BREEDS—COLOUR OF FLESH AND SKIN—WEIGHT OF MEAT, BONE
ETC.—CONSUMPTION OF FOOD—DESCRIPTION OF BREEDS—CLASSIFICATION OF BREEDS.



WHILST the poultry fancier must necessarily regard as all-important external characteristics, devoting his attention to the perfection of feather or other arbitrary points, the poultry-keeper should make economic qualities the object of his consideration, only studying external points in so far as they can be the embodiment of those qualities for which he is seeking. It would be a futile waste of time and space to discuss whether pure-bred stock is preferable to mongrels. The entire position of the United Kingdom as a great breeding centre has been built up on its pure races of horses, cattle, and other varieties of stock. If mongrelism were to be preferred, then all the efforts of breeders for the last hundred years have been in vain, and the sooner we abandon the system better will it be for all concerned. But whilst it may be conceded that sometimes pedigree and high-class breeding is carried to an extreme, and that competition for prizes does not tend to encourage reproductiveness, the benefits of our system are too apparent to need repetition. What applies in the larger branches of stock, equally does so with poultry, and we believe that it is imperative for pure races to be maintained. Without them we should waste our energies in breeding, whereas now we can conserve the qualities for which we are seeking, and by judicious breeding obtain results which would have been impossible under other conditions. External points should be regarded as determining the internal qualities of any breed only so far as they show that it has been bred to a given type. The colour of plumage is no indication as to whether a fowl is a good or bad layer, nor are the fifth toes on the Dorking and the Houdan related to their edible qualities. But correct colour of feathering tells of continuity in breeding, and although there are as good table fowls as the Dorking and better than the Houdan, who carry no supernumerary toe, we know that when these fifth toes are met with there is a fowl in which one or other of these breeds must

have a very large share. Whilst, as we shall afterwards indicate, first crosses may be recommended for reasons which will then be given, we are very strongly of opinion that purity of stock should be maintained in all its rigidity, at the same time avoiding an extreme to which many fanciers are prone to go, namely, destroying economic qualities in their haste to secure perfect show points. The most skilful breeder would be he who could retain the one and engraft on to it the other. There is, however, one fact which deserves notice, namely, that qualities overborne by external characteristics are not lost but merely suspended. Lewis Wright emphasises that "the knowledge, enthusiasm, and patient perseverance of the fancier are necessary to improve and maintain any breed in perfection for even the utilitarian. But," he continues, "it may still be asked, if in the fanciers' hands these breeds have lost some of even the original economic value they had, how then? The answer to this is very simple, and consists in the fact that however much these qualities have diminished, they usually reappear in all their original perfection in the first cross; and as farmers or market breeders usually employ such first crosses, which are better for nearly all purposes, every practical end is secured. Thus, supposing a strain of Brahmas to have deteriorated in laying, and a strain of Houdans to have suffered in the same way, through long breeding to merely fancy standards, and omitting to select the best layers, the chickens produced by crossing these two families will, in almost every case, reproduce the faculty in all its original perfection."* We, therefore, strongly urge that the basis of all breeding for economic purposes be pure stock, and that whatever crossing be made shall be within the power of the breeder.

EGG PRODUCTION.

In determining what variety is most likely to suit his needs and conditions, the amplitude of choice is very

* "The Illustrated Book of Poultry." London, 1885. Page 115.

apt to perplex, and may easily lead to confusion through wrong selection. Fortunately there is a large amount of experience as a guide, and by means of this a right selection can be made. Some five years ago Mons. E. Lemoine, of Crosne, a noted French poultry breeder, whose establishment was described in the report made to the Royal Commission on Agriculture, and which we have since visited, published a most elaborate and valuable series of statistics, showing the qualities and characteristics of fowls. These we translated at the time into the *FANCIERS' GAZETTE*, and though, as Mons. Lemoine pointed out, they must not be taken as exact, so far as other places are concerned, because every place varies in its conditions, but as the result of three years' careful observations and conscientious testings, these figures are important, and the only statistics afforded of this nature up to the present time. There are, unfortunately, several prominent breeds not included in the list, and whilst we have not similar tables for these, we can indicate relatively their position by other experiments made.

Mons. Lemoine's tables show—(1) Number of eggs per annum; (2) average weight of egg; (3) weight of food consumed per day; (4) quality of flesh; (5) weight of meat on fowl at six months old; (6) ditto on bone of fowl at six months old; (7) characteristics; (8) colour of chicken when hatched; (9) weight of chicken when hatched; and (10) increase of weight for first twenty days. We have not the space requisite for the giving of all the tables prepared by this gentleman, interesting though they are, but will refer to them from time to time.

LAYING OF VARIOUS BREEDS.

Respecting the egg-laying powers of the respective breeds, the following are given by Mons. Lemoine:—

Spangled Hamburgs	239 per annum.
Pencilled Hamburgs	225 "
Brown Leghorns	190 "
Cuckoo Leghorns	190 "
Black La Bresse	160 "
Grey La Bresse	150 "
Barbezieux	150 "
Courtes Pattes	150 "
White Leghorns	140 "
La Fleche	140 "
Silver-grey Dorkings	130 "
Houdans	125 "
Crèveceur	122 "
Langshans	115 "
Buff Cochins	115 "
Du Mans	111 "
Brown-red Game	100 "

These figures must not be taken as absolute for all conditions and circumstances, and in other places would doubtless be considerably modified. For instance, we have always found the white Leghorn equal as a layer to any other of that family, and we think Mons. Lemoine places the Cuckoo Leghorn too high. It has also been pointed out that the Langshan is much superior as a layer to the Cochin in nearly every place, and that few find the

Cochin lay 115 eggs per annum. Such facts do not weaken the effect of Mons. Lemoine's researches, but confirm them as being the result of a careful test. They further go to prove that no one breed can be relied upon to suit every condition. Some varieties there are which adapt themselves to the greater variety of circumstances, but a breed has yet to be discovered which will do equally well, no matter what the condition of food, of atmosphere, or of soil may be. The omissions from this list are important, and we wish that such varieties named below had been included in Mons. Lemoine's figures. Personal inquiries have led us to the belief that the numbers we now give will represent the laying powers of breeds not named above, *under favourable conditions*. We say this, because good housing and feeding will add considerably to the number of eggs laid, and still more to the weight of each egg.

Black Minorcas	180 per annum.
Andalusians	150 "
Scotch-greys	140 "
Wyandottes	140 "
Plymouth Rocks	120 "

Waterfowl are not included in Mons. Lemoine's tables, and we have been unable to secure sufficiently reliable data to go upon as to the laying powers of ducks and geese.

WEIGHT OF EGGS.

It is very evident from Mons. Lemoine's statistics that his birds were excellently fed, for the weights of eggs recorded are much greater than would ordinarily be the case. In order to make a comparison we have obtained weights of eggs from a large number of breeders, which we now give parallel with those of this French authority. In some cases we are unable to make the comparisons, because of omissions on one side or the other:—

	English, per dozen eggs.		French, per egg.*	
	oz.		oz.	gr.*
Game Bantams ..	13½	.. ..	—	
Dark Brahmas ..	28½	.. ..	—	
Buff Cochins ..	24	.. ..	2	20
Partridge Cochins	25½	.. ..	—	
Dark Dorkings ..	27½	.. ..	—	
Silver-grey do. ..	27½	.. ..	1	411
White do. ..	26½	.. ..	—	
Houdans ..	26	.. ..	2	8
Brown-red Game	24	.. ..	2	99
Black Hamburgs	19½	.. ..	—	
Spangled do. ..	—	.. ..	1	303
Langshans ..	27	.. ..	2	69
Brown Leghorns	22	.. ..	2	99
White Leghorns	27	.. ..	2	99
Malays ..	21	.. ..	—	
Minorcas ..	28½	.. ..	—	
Plymouth Rocks	27½	.. ..	—	
White-crested Polish	23½	.. ..	2	7
Scotch-greys ..	29	.. ..	—	

* There are 437.5 grains to the ounce.

	English, per dozen eggs.	French, per egg.
	oz.	oz. gr.
Wyandottes ..	25 ..	—
Crèveœur ..	— ..	2 331
Du Mans.. ..	— ..	2 113
Houdan	— ..	2 83
La Fleche ..	— ..	2 208
Grey La Bresse ..	— ..	1 395
Black La Bresse ..	— ..	2 362
Barbezieux ..	— ..	2 203
Aylesbury Ducks ..	34 ..	—
Rouen Ducks ..	39 ..	—
Pekin Ducks ..	39 ..	—
Toulouse Geese ..	80½ ..	—
Embsen Geese ..	87 ..	—

We do not pretend that as a rule poultry kept on ordinary farms and fed in the usual manner will reach such high averages as are here given, nor do we think it desirable that they should do so. At present eggs are sold by number, not weight, though a box of small ones will not realise what a box of average size will fetch. This is a rough-and-ready fashion which makes it desirable to produce eggs of an average size, as near two ounces each as possible. Some day eggs may be sold by the pound, when the benefits of extra good feeding will be secured, which is not the case at present, and it is useless giving away to the consumer what he does not pay for. Only one observation more is here needed with regard to the kind of eggs marketed, and that is in many places a better price can be obtained for tinted than for white shelled eggs, in spite of the fact that the former are smaller in size than the great majority of the latter. The prejudice in favour of tinted shelled eggs is largely, but not altogether, a mere fancy, for we believe they are the richer of the two. Still, it is mainly a matter of taste, and was explained to us by the manager of a large London dairy company as being due to the fact that in West-end houses eggs are merely an incident on the breakfast-table, but that for this reason a small pretty-looking egg is all that they require. In his case Langshans just fitted the requirements of his trade, and he used eggs largely from that breed in the winter season.

TABLE PROPERTIES.

When we come to consider the question of table poultry, there are several points to be regarded. It is not enough that a fowl shall have fine flesh, but it is necessary to know whether it is an easy fattener; if it develops rapidly or the reverse; and whether it is at all delicate. As a rule, the table breeds are scarcely so hardy as are laying and general purpose varieties. Mons. Lemoine thus classifies the respective breeds in his tables:—

QUALITIES OF BREEDS.

CREVECEUR.—Flesh delicate, white, and fine; requires mild climate; develops rapidly; fattens easily.
LA FLECHE.—Flesh very fine; requires mild climate and dry soil: develops slowly, fattens easily.

HOUDAN.—Flesh very fine; suitable to all climates, especially on calcareous ground; develops rapidly with crossing.

DU MANS.—Flesh fine and white; suitable to all climates; develops rapidly.

LA BRESSE.—Flesh very fine, exquisite flavour; suitable for all climates; develops rapidly; fattens easily.

BARBEZIEU.—Flesh fine; requires mild climates and dry soil; develops slowly.

COURTES PATTES.—Flesh good; suitable to all climates; develops moderately.

SILVER-GRAY DORRING.—Flesh exceedingly fine; requires dry soil and mild climate; develops very rapidly.

LANGSHAN.—Flesh excellent; suitable to all climates; develops moderately.

LEGHORN.—Flesh indifferent; develops moderately; suitable to all climates.

HAMBURG.—Suitable to all climates; requires large run; very rare sitter and mother.

BROWN-RED GAME.—Suitable to all climates; develops rapidly; moderate sitter.

BUFF COCHIN.—Very tame; suitable to all climates; develops slowly; excellent sitter, but too unwieldy.

These comprise all the breeds which it is necessary to reproduce from Mons. Lemoine's valuable list, but the omissions are very important, and it is desirable to supplement that gentleman's information, which we now attempt to do.

INDIAN GAME.—Flesh excellent; develops rapidly, suitable to most climates.

OLD ENGLISH GAME.—Flesh excellent; develops quickly; suitable for most climates.

PLYMOUTH ROCK.—Flesh moderate; suitable for all climates; good sitter and mother; develops quickly.

BRABIA.—Flesh moderate; hardy; good sitter and mother; develops slowly.

WYANDOTTE.—Flesh moderate; suitable for all climates; good sitter and mother; develops quickly.

MINORCA.—Flesh indifferent; suitable to all climates; develops quickly.

ANDALUSIAN.—Flesh indifferent; requires dry soil and mild climate; develops quickly.

SCOTCH-GRAY.—Flesh good; develops slowly; requires dry soil; as a rule a non-sitter.

COLOUR OF FLESH AND SKIN.

These statistics give no further particulars as to the colour of the skin or flesh, which is a most important point, more especially in Europe; though from a different standpoint it is equally important in America. On the Eastern Hemisphere white-fleshed fowls are regarded as the best, and dark or yellow skinned or fleshed fowls can never command anything like the same price. With this preference we entirely agree, and for quality of flesh and delicacy of flavour we should look to the best of white-fleshed varieties. The American demand for what are termed "broilers" is very great, and for these fowls it is not so essential that the flesh be white, though we think they would be none the worse with that colour of flesh.

Taking the lists we have just given, the following are the respective colours of the flesh or skin:—

White-fleshed fowls: Crèveçœurs, La Flèche, Du Mans, La Bresse, Houdans, Courtes Pattes, Barbezieux (a dark-fleshed fowl would not be tolerated in France), Dorkings, Old English Game, Scotch-greys.

Yellow-fleshed fowls: Leghorns, Plymouth Rocks, Brahmas, Wyandottes, Cochins. Such breeds as Indian Game, Langshans, etc., cannot be called white-fleshed nor yellow-fleshed in the same way as are the others named above, but might perhaps be classed as yellowish-white or cream-fleshed.

Dark-fleshed fowls: Hamburgs, Game, Minorcas, Andalusians.

Here it is desirable to mention that in Britain there has been a strong prejudice in favour of white-legged fowls for table purposes, it being thought that black-legged fowls were not nearly so fine in flesh. Consequently, with the exception of one breed of old Game fowls, the only variety fitting this prejudice was the Dorking. Happily the prejudice is dying out, for it has been abundantly proved that two or three French breeds are quite equal to the Dorking in table properties, and of these there is not one with white legs and feet. The colour of the pedal limbs is not influenced by or does not influence that of the flesh and skin on the body.

WEIGHT OF MEAT, BONE, ETC.

We now come to a most important consideration, namely, that of the relationship between meat and bone or other non-edible elements, important because, no matter what the size of the fowl may be, or however rapid his growth, if this is in the direction of bone or of no real purpose will have been served. What in table poultry is required is flesh, with only as much bone as will carry the flesh, and as little offal as possible. Here again we must turn to Mons. Lemoine's observations, but as yet we have none to supplement his omissions; these, however, we hope to obtain later. Mons. Lemoine shows the relative weight of meat and of bone, etc., on a fowl six months old.

	Weight of meat			Weight of bone,		
	on fowl six months old.			etc., on fowl six months old.		
	lb.	oz.	grs.	lb.	oz.	grs.
Barbezieux ..	4	10	92	4	15	0
Cochins, buff ..	4	9	0	5	4	327
Courtes Pattes ..	3	10	99	2	8	316
Crèveçœurs ..	4	9	66	4	14	197
Dominiques ..	3	11	66	2	8	279
Dorkings, silver-grey	5	4	282	4	13	403
Du Mans ..	4	6	64	2	11	11
Game, brown-red ..	3	15	233	2	7	301
Hamburgs, pencilled	1	15	335	2	7	224
„ spangled 2	3	236	2	7	301	
Houdans ..	3	7	0	2	10	140
La Bresse, grey ..	3	7	67	2	8	163
„ black ..	3	7	375	2	8	240
La Flèche ..	3	5	339	2	9	269

	Weight of meat			Weight of bone,		
	on fowl six months old.			etc., on fowl six months old.		
	lb.	oz.	grs.	lb.	oz.	grs.
Langshans ..	5	4	359	5	1	78
Leghorns ..	3	15	233	2	10	140
Polish, spangled ..	2	12	348	2	8	18

CONSUMPTION OF FOOD.

In this relationship it is important to learn how much food each variety of fowl will consume, because it may be that it pays to feed well in order to secure good results, though the table given below shows that the heaviest eaters are not those who produce the greatest amount of flesh or eggs. We remember reading what was said by an observant poultry-keeper when Cochins were first introduced, for he remarked as to this breed: "Well, sir, if you do get many eggs from them chaps' bodies, you mun put a lot of grub in their bellies." The following are Mons. Lemoine's records:—

	Weight of food consumed per day.
Barbezieux ..	6 oz. 391 grs.
Cochins, buff ..	17 „ 296 „
Courtes Pattes ..	6 „ 391 „
Crèveçœurs ..	7 „ 31 „
Dominiques ..	4 „ 336 „
Dorkings, silver-grey ..	6 „ 391 „
Du Mans ..	7 „ 0 „
Game, brown-red ..	4 „ 275 „
Hamburgs, pencilled	4 „ 152 „
„ spangled	4 „ 122 „
Houdan ..	6 „ 391 „
La Bresse, grey ..	5 „ 254 „
„ black ..	6 „ 391 „
La Flèche ..	6 „ 391 „
Langshans ..	7 „ 31 „
Leghorns ..	4 „ 398 „
Polish, spangled ..	4 „ 28 „

From these figures it will be seen that the Cochins are by far the heaviest eaters, and probably with them would be associated all the heaviest type of Asiatic fowls. Of the others the table varieties come next, and the laying breeds are the smallest eaters.

DESCRIPTION OF BREEDS.

It is not necessary that we should go into very great detail as to the individual characteristics of different varieties of poultry, but our purpose will be served if we indicate the leading points, and for facility of reference we give these in alphabetical order, omitting such as are of no practical use to the poultry-keeper who is seeking to produce either eggs or poultry for market. But we hope at an early date to publish a work dealing exhaustively with all the races of domestic poultry.

ANDALUSIANS.—A member of the Mediterranean family which has been described as having a smallish-sized body, placed upon legs of a good length; the neck rather long, with a fine head; a large upright single comb in

the cock; in the hen also large but falling over on one side; and the cocks have large sickle-shaped tails. Andalusians are clean-legged; colour, slate, except on the cock's neck and back, where it is dark purple, nearly black.

BRAHMAS.—Large, full-feathered birds, feathers extending down the legs and feet; small, neat heads, with pea combs; two varieties—darks and lights.

CREVECŒURS.—A French breed of great size; great breast development; carries a medium-sized crest of feathers; legs black, but clean, *i.e.*, not feathered; plumage entirely black.

DORKINGS.—Body large and deep, and when viewed sideways almost forming a square, breast well forward; neck short and head medium; legs clean, white in colour and carrying a fifth toe; four varieties—darks, silver-greys, whites, and cuckoos.

GAME.—What are known as modern Game are not so good as the old-fashioned fighting type, which are close, compact, and hard-feathered; bodies medium in size, broad in breast; legs clean, and rather long; several varieties, of which the white-legged are preferred for table purposes. The old English type of Game is best for profitable purposes.

HAMBURGHS.—Small-sized, well-shaped bodies on longish legs; large sickle tail; full hackle, with neat head, and rose-comb; five varieties—blacks, gold-spangled, silver-spangled, gold-pencilled, and silver-pencilled, all very rich in colour; save the blacks, they lay too small eggs to be of marketable value.

HOUDANS.—Of French origin; large size, broad and massive; clean legs, pale in colour, carrying a fifth toe; head crested; plumage, mottled black-and-white.

INDIAN GAME.—Large, somewhat heavily-boned fowls, but carrying a large amount of flesh on the breast; partridge in plumage, which is very rich in colour; clean, yellow legs; long neck and legs; small tail.

LA FLECHE.—Large French fowls; massive in body, deep in breast; clean black legs; neat head, with forked comb; plumage entirely black.

LANGSHANS.—Large Chinese fowls, on rather long legs; full tails, carried high; slightly feathered on the legs; comb single; plumage entirely black.

LEGHORNS.—Of the Mediterranean type; active fowls of great precociousness; legs clean and yellow; several

varieties—white and brown being oldest and best known; other colours are cuckoo, black, pile, duckwing, and buff.

MINORCAS.—Also of the Mediterranean family; two varieties—namely, black and white, but the latter seldom seen; one of the most valuable breeds we possess as egg layers.

ORPINGTONS.—Really clean-legged Langshans, which they resemble, except that the legs are not feathered.

PLYMOUTH ROCKS.—A breed of American composition; large in body; rather big in bone; clean yellow legs; three varieties—barred (cuckoo), whites, and blacks, the first-named being most popular.

REDCAPS.—An offshoot of the golden-spangled Hamburgh; similar in colour, not so even in markings; very large comb, hardy, and most prolific layers.

SCOTCH-GREYS.—Most nearly like the Dorking in shape, and has white or speckled legs; plumage black and white.

WYANDOTTES.—Another breed of American production, and one of the most recent; comb rose; legs clean and yellow; large-sized body; plumage laced; in two colours or varieties, silvers and golds; also whites.

CLASSIFICATION OF BREEDS.

The following is a list of breeds classified according to their leading or general qualities:—

Laying (or non-sitting) Varieties.

Hamburghs	Redcaps
Minorcas	Andalusians
Leghorns	Houdans
Scotch-greys	

Table Varieties.

Dorkings	La Bresse
Indian Game	La Flèche
Game	Crevecœur

General Purpose Varieties.

Plymouth Rocks	Langshans
Wyandottes	Orpingtons
Brahmas	

It will be seen that we only include in the above list such breeds as are known in this country, and which are suitable to those conditions under which the British agriculturist must work. Several of the French varieties already named are not to be found here, and most probably would not easily adapt themselves to our climate.

CHAPTER V.

SELECTION OF STOCK.

CHOICE OF BREEDS—LINING A FOWL—BREAST AND EGG-ORGAN DEVELOPMENTS—SELECTION OF BREEDERS—INFLUENCE OF THE PARENTS—CROSS BREEDING—HOW TO CROSS—THE BEST CROSSES—IMPROVEMENT OF PRESENT STOCKS.



IN the previous chapter we have dealt very fully with the question of breeds, showing the special characteristics of each, and classified as far as possible their respective varieties. There should be no difficulty in determining what breed is best suited to the requirements of any reader, and the choice is sufficiently large to provide for all needs. But as there are great and widespread variations between the breeds of poultry, there are also important differences between individual members of one variety, due to the fact that they have been bred under different conditions and for different ends. For instance, if one breeder of Dorkings set himself to improve the laying qualities of his fowls, and for several years selected for breeding only those who had proved good egg-producers, he would succeed, no doubt, but probably at the expense of the table properties. On the other hand, if a second breeder devoted his care to the quality and quantity of meat carried by his birds, at the end of, say, ten years both of these families would still be Dorkings, but they would vary considerably in their qualities. This is a point which must not be lost sight of, for there are great and important variations in respect to economic qualities in all varieties of domestic poultry, though not more so than is found amongst our races of horses and cattle.

LINING A FOWL.

We want, therefore, some further guide as to the economic merits of fowls, so that in the absence of actual knowledge of any family its merits may be rightly gauged. Such a method is to our hand, as will be seen below. Of course, there are ordinary outward signs which seem to tell us of internal qualities, as, for instance, large combs are usually found on the best laying varieties, and no really first-class table fowl is found with feathered legs. But these are not enough, and they may be induced by breeding for points without any commensurate improvement in the corresponding quality. Consequently we

have been led to seek for some other method of determining the economic merits of fowls, and the following is the result of our observations.

When we come to examine the structure of fowls, we are at once met with a fact that the best quality of meat is found on the breast. The object of all who seek for first-class table fowls is flesh on the breast, with as little as possible elsewhere. This is secured by expanding the muscles covering the sternum, and as a consequence development is almost entirely in that direction. On the other hand, if we seek to develop the laying powers of a hen there is enlargement of the egg organs, for one of the best known facts in connection with every form of life is that use increases, and disuse diminishes size; or, as Darwin puts it* :—“Increased use or action strengthens muscles, glands, sense organs, etc.; and disuse, on the other hand, weakens them. . . . The flow of blood is greatly increased towards any part which is performing work, and sinks again when the part is at rest. Consequently if the work is frequent the vessels increase in size, and the part is better nourished.” Now, as the egg organs of a fowl must necessarily lay in the posterior part of the body, if they are specially developed it will be found that the entire part is large as compared with breeds or families bred for table or breast properties. But it must be here pointed out that the posterior part of a hen must always be greater than those of a cock, for the simple reason that she has to provide for egg organs, and he has not. Therefore, in lining fowls this fact must be kept in view. To test, therefore, the respective qualities of any fowl a median line should be drawn from the point of the shoulder where the neck joins it, to the thigh. If a greater bulk of the body lies in front of this imaginary line, the fowl may be classed among table

* “Animals and Plants under Domestication,” vol. II., p. 283.

varieties, and its position therein will be determined by the extent of its development, though, of course, quality and flavour of flesh are also to be taken into consideration. On the other hand, if the

bad points are also reproduced, and may be aggravated unless great care is taken. By skill and knowledge the former *can* be increased, and the latter decreased, if not altogether removed, but it must be borne in mind



TYPE OF GENERAL PURPOSE FOWL.

greater bulk of its body lies behind this imaginary line, that will indicate laying qualities, these also being determined by extent. There are, however, several races of poultry whose outline is represented by the letter Y, or by the letter U upon legs, in that they are almost equally balanced upon both sides of this imaginary line. Such we place in the general purpose class, that is, they do not excel either as layers or table fowls, and according to their development upon either side will be their merits in the directions named. We have carefully observed large numbers of fowls since we were led to adopt this method of testing the qualities of poultry, and have found it most reliable, nay, the only true way of determining what is a most important point.

SELECTION OF BREEDERS.

The selection of birds for breeding is a very important matter, more important than is generally regarded, as the parents impress upon the chickens their own characteristics. Good points are reproduced, and if the breeding has been careful, these are improved upon. But



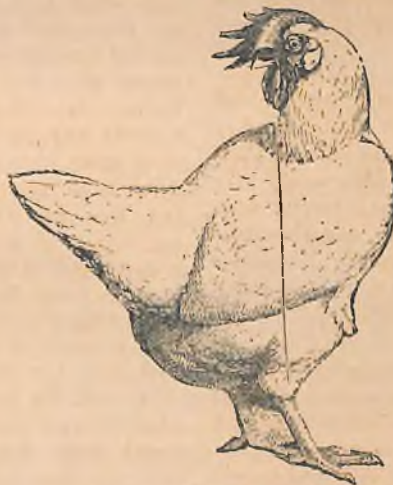
TYPE OF TABLE FOWL.

that the bad qualities are apt to return if vigilance is relaxed. The poultry breeder needs to have a clear idea as to his aims, and he must ever keep that end in view. Those who have high-class exhibition poultry are most

particular regarding the choice of stock birds, and will take an amount of trouble which may be regarded as unnecessary by those who are unaware of the importance of this matter. Years of careful breeding can be upset by one injudicious cross, and though the poultry farmer need not be so particular as those who breed merely for feather, yet it is necessary to exercise considerable thought regarding the question. It would be foolish, indeed, to spoil a good strain for want of a little forethought and trouble.

INFLUENCE OF MALE.

As the male parent influences external structure and characteristics as well as the



TYPE OF LAYING FOWL.

shape of the bird, the first thing, therefore, is to see that the cock selected for breeding purposes shall have size, and by this we mean size of frame, not merely fat and feathers. A fat bird is seldom a good breeder, and

there is many a fluffy feathered one which appears to be of a large size, which when taken in the hand is found to be very light. A small bird will never breed large ones, and thus the point is most important. Then the bird should be looked at to see if there are any grave defects; that is, whether deformed in body or limbs, or has any characteristics that are regarded as blemishes in the special variety to which it belongs. However good a bird might be in other respects, it would be very foolish to select a bird so affected, as it would transmit its fault, and probably in an intensified form, to its descendants. A bird weak or deformed in its organs of locomotion would be a bad one to breed from, and, in fact, it may be taken as a rule that the bird which is shapely, of good size, and looks best, is to be preferred for breeding purposes. Many birds with defects such as we have referred to are of no use for laying or table purposes, and, if bred from, these defects will not only be perpetuated, but intensified, until it will be very difficult to get rid of them. In choosing a cock to breed layers, we should select one firm and close in body, of a good size, though not abnormally big, well developed behind, as referred to above, clean and tall on leg, and active in its habits; whilst for the production of birds for table purposes it is better to pick one heavy in body, shortish on the leg, deep in breast, and not very active.

INFLUENCE OF FEMALE.

The hen, as we have seen, influences the internal structure and vital organs. Thus it will be found that a good layer will produce good layers, a good mother good mothers, and a ready fatterer those most suitable for table purposes, if—and the “if” is an important item in the calculation—the male bird is selected accordingly. With respect to hens, the same thing applies to the selection of shapely, well-made, and good-sized birds, for though a hen may have a fault in the organs which she does not influence so much as the cock, yet that defect will almost certainly be transmitted to a greater or lesser degree. We need scarcely add that no bird with the slightest sign of disease or hereditary complaint should ever be bred from. Stamina and good condition are of equal importance to anything else in a breeding fowl, and it is courting failure to neglect these points. Consanguinity is also to be guarded against, as breeding-in soon debilitates and reduces the size.

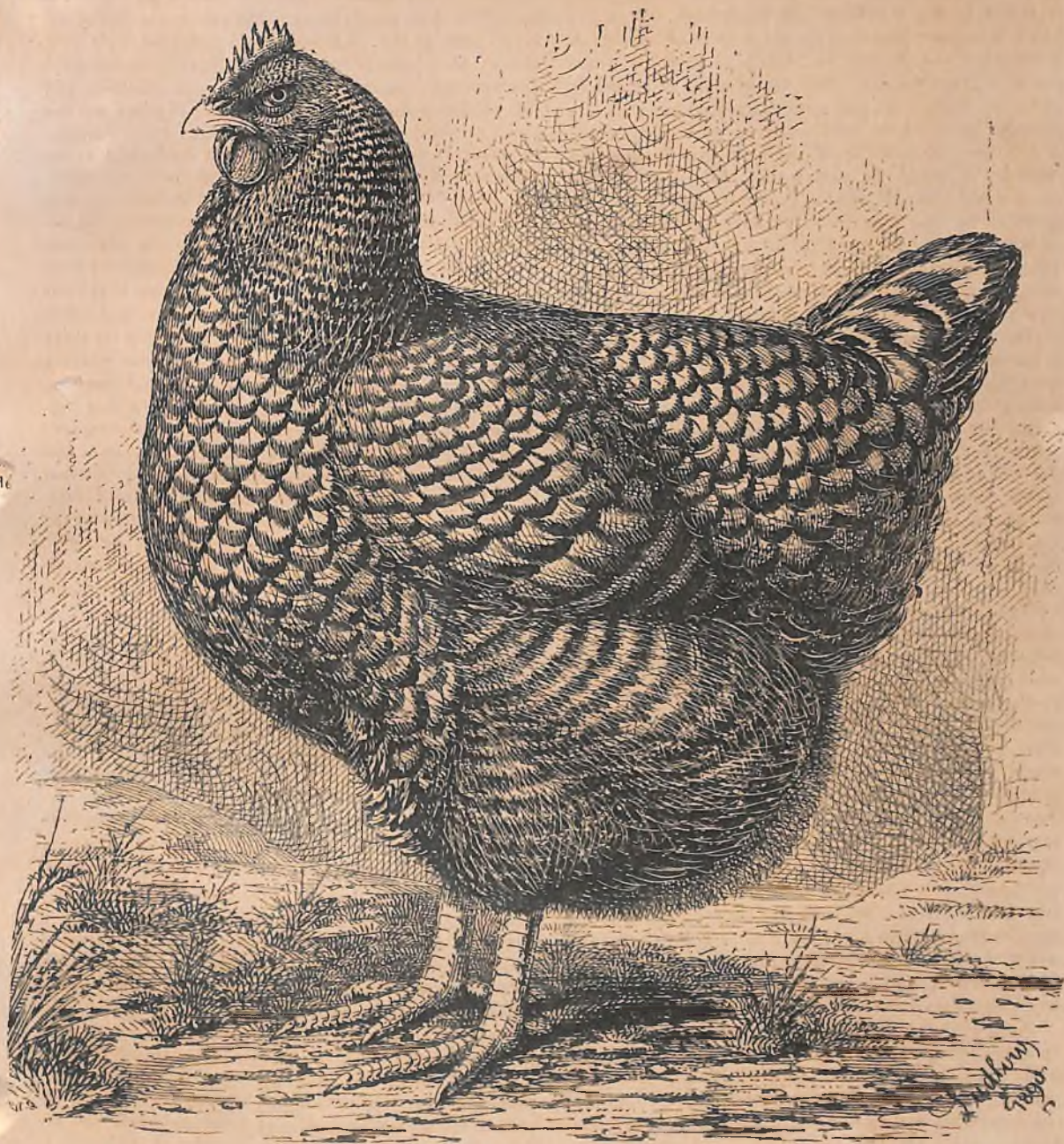
Each of the sexes have a certain and defined influence upon their progeny, and knowing this we have a sufficient guide to enable us to select those we require. The male parent influences the external structure—shape, outward characteristics, and movements of bird; whilst the female parent controls internal structure—constitution, temper, fecundity, and habits. Here are defined lines upon which to proceed

CROSS BREEDING.

It has been found from long experience, and of the fact there is really no doubt, that for the poultry-keeper, whose object is profit, judicious crossing is a decided

advantage to his pocket, in that it assists the securing of a better result from his venture than if he restricted himself to pure breeds alone. The reason for this is not far to seek, as the tendency of all pure-bred fowls that are at all carefully bred is to improve in outward characteristics at the expense of inward qualities, and this tendency must certainly be combatted if success has to be attained. French poultry-breeders have managed to preserve the characteristics of their fowls, and at the same time maintain, if not improve, the economic qualities, but it is to be noted that they place the latter first. This must not be taken to mean that the outward characteristics are neglected, but that they do not make the improvement of these their chief aim, regardless of what effect may result in other ways. They know that birds which have special outward characteristics are best either as layers or on the table, and thus they look out for these points and breed to them. But they give the points a much greater breadth of meaning than do British fanciers, and in judging go upon a different plan to that followed here. In a purely fanciers' show the judge regards as all-important shape, size, colour, comb, legs, and general contour, and does not usually care whether the birds are likely to make good table fowls or first-rate layers. Across the English Channel judging is exactly reversed; the points which denote economic qualities are looked for first of all, and then an examination is made for externals. At the great Paris Show we have seen good-looking La Flèche thrown out because they were rather coarse in comb, a fine comb being regarded as the sign of a superior fleshed table fowl. A Crève with white feathers is there thrown out as in an English show, these being thought a sign of impurity, but the crest is not allowed to settle matters entirely, as is too often the case here, the result of which is seen in diminished size of the fowls and lessened fecundity.

From what we have here stated it will be seen that the system of breeding adopted in England—that is, amongst those who go in for keeping show fowls—is to place first those qualities that are of the lesser importance, and hence it is that we find a deterioration in profitable qualities among some of our varieties. Re-crossing very largely remedies this, for it is found that first crosses between suitable breeds at once give us hardier and more prolific birds than were either of the parents. This crossing, strange to say, is very beneficial between two pure breeds when it is the first cross, but if persisted in afterwards, as is too often the case, without rhyme or reason, it soon results in injury to the whole stock. A pure-bred cock introduced into a lot of mongrels will improve them, but a bird so introduced that is himself a cross will not have nearly so much influence. This fact needs to be repeated continually, for farmers and others seem very slow to realise it. The thing is, however, self-evident to all who have in any way tested the question, and it is this fact which accounts for the poor, miserable specimens that we see in so many farmyards. These



PLYMOUTH ROCK HEN.

BRED BY, AND THE PROPERTY OF, MR. J. A. GOTT, HORSFORTH, NR. LEEDS.
Winner of about thirty First and Special Prizes.

have generally been crossed for years without thought, except that perhaps a new cock has been introduced now and then, just as fancy dictated—sometimes a Brahma, now a Cochin, then a Game, and so on, until the produce is a mixed-up lot, and the cleverest ornithologist would be puzzled to tell what breeds have been concerned in the business.

These results, as seen in only too many farmyards, show that, whilst judicious crossing is undoubtedly beneficial, without proper consideration it is positively injurious, and does more harm than good. For instance, a Brahma has a large frame, fairly good meat, though this meat is not in the right place, is a moderate layer, and a good mother. To cross it with a Cochin, which is as large in frame and something of the same shape and type, would at once injure the quality of the flesh and impair the productiveness as layers of eggs, and do no good so far as the size is concerned, only showing improvement in one point, if that be an improvement, namely, in the sitting quality. Leghorns and Minorcas are good layers, small eaters, non-sitters, and, being essentially laying fowls, are only moderate in quality of flesh. To cross in Game would certainly improve the quality of flesh, but it would at the same time injure their laying powers, reduce size of the eggs laid, whilst the progeny would be uncertain sitters, and not such as we should care to entrust with valuable eggs. In order, therefore, to obtain the benefits from crossing it must be done in a proper manner, and the characteristics and qualities of the fowls mated be so blended as to best secure the object in view, or the result is certain to be a great disappointment.

HOW TO CROSS.

From what we have here stated it will be seen that one of the first things to do is to ascertain the characteristics of the fowls which it is proposed to use, both as a breed and as individuals. In all the pure breeds there are leading points, as already indicated, that we can look for, and which are to be found in all varieties specially noted either as layers or as table fowls. For instance, all the best layers are noticeable as having large combs—large, that is, for the size of the fowls themselves. Leghorns, Minorcas, Andalusians, and Spanish have large single combs; Hamburgs and Redcaps large rosecombs; and Houdans large leafcombs—in every case this being a very prominent feature. We do not say that the comb is the unvariable sign of good laying qualities, for Dorkings have large combs, and sometimes Cochins also, though in both these cases the comb is not nearly so large in proportion to the size of the fowls as in those breeds just mentioned. With these exceptions it will be found that size of the comb is a pretty sure indication as to laying qualities in the birds; and in looking out for good layers this will be found a pretty safe guide when found in conjunction with a rather small body.

On the other hand, qualities which indicate the best

table-fowls are to be looked for in the body rather than on the head, though, as we have already mentioned, in France a small neat comb is regarded as the *sine qua non* of a good table fowl. Dorkings, Crèves, Game, and Indian Game, which stand in the forefront of this section, have thick-set bodies, showing the greatest depth from the breast to the back, and have flesh upon the bodies rather than upon the thighs. Game fowls are now bred long on the leg for show purposes, but, for producing table fowls, we prefer them shortish in this respect, though Indian Game are to be preferred even to the latter, and both Dorkings and the best varieties of the French breeds are, or should be, of this stamp. Birds with a lot of flesh on the thighs are not well furnished with meat on the breast, and, as the quality of meat on the former is decidedly inferior to that on the latter, such fowls are by no means so good for table purposes. Hence it is that Asiatic varieties, *i.e.*, Brahmas, Cochins, etc., are not regarded as first-class on the table. What is known as depth of keel should always, therefore, be looked for in selecting birds intended for table purposes.

General purpose fowls are those which, whilst not excelling in any one quality, are yet good in all. These are very good indeed, where it is found that a fowl which is at once a fairly good layer and yet a passable table bird, pays best. Of course, in such a case as this, the profit will not arise from the one quality, but from a combination. It is necessary in crossing, therefore, to remember that what is wanted is to have sympathetic breeds put together—that is, breeds which will reproduce their good qualities in an even stronger form in their progeny. Unless care is taken to secure this, the crossing will only result in greater hardiness of the fowls, but will not in any way add to the profit on them. This hardiness may be at the expense of some intrinsic merit, and thus be purchased dearly. We do not say that if a man has a good table fowl, which he wishes to make a better layer without losing the good table quality, he cannot succeed. But, unless he exercises very great care in the selection, he will injure what already characterises his fowls. As a rule, we may take it as certain that a really first-class layer will not be a good table fowl. There is a further point to be kept in mind, namely, that as far as possible colour should be kept in view. Fowls of all colours never look nearly so well as those which have some uniformity of type; and though this is by no means an important matter, still it is desirable to regard colour in cross-breeding.

VARIOUS CROSSES.

Below we name some of the best crosses:—

FOR TABLE FOWLS.

- Indian Game—Dorking.
- Old English Game—Dorking.
- Indian Game—La Flèche.
- Old English Game—La Flèche.

FOR LAYING FOWLS.

Minorcas—Black Hamburgs.
 Minorcas—Leghorns.
 Minorcas—Houdans.
 Leghorns (white preferred)—Black Hamburgs.
 Leghorns—Houdans.
 Leghorns—Scotch-greys.

FOR GENERAL PURPOSE FOWLS (Winter Layers).

Langshans—Leghorns.
 Langshans—Minorcas.
 Plymouth Rocks—Langshans.
 Plymouth Rocks—Wyandottes.

IMPROVEMENT OF PRESENT STOCKS.

When it is desired to rapidly improve present stocks, it is best to buy fresh birds and commence *de novo*, for a cock and six hens will in one season breed sufficient chickens to stock any farm of ordinary dimensions. The pullets so bred will be ready in the autumn to take the place of the oldest hens, who can be killed off just before moulting, a further supply the following season being substituted for any remaining of the older type. To secure the best results no hen should be kept after she is twenty-seven months old, or ere she enters her second adult moult, for every year after her second a hen's moult becomes more prolonged, and she is longer ere resuming laying.

A much cheaper method, and one which will probably recommend itself to all who have a fair number of birds on hand, because there is less disturbance of present arrangements, and brings more rapid results, is to buy a few male birds of the breed or breeds selected, and run them with a number of selected hens, breeding from these alone. If it is wished to make the table properties stronger, a cock bird of the following varieties should be introduced:—Indian Game, Old English Game, Dorking, or Crève. If the laying is to be improved, obtain a Minorca, Leghorn, Andalusian, Scotch-grey, or Redcap cock;

or if the birds are to be made better all round, secure a Langshan, Wyandotte, or Plymouth Rock cock. In this way the quality of poultry can be improved year by year, but a fresh stock bird of the same variety must be introduced every season.

A couple of cocks with twenty young hens would be sufficient to produce several hundred chickens in one season, the cockerels of which could be killed off for market poultry; and those of the pullets which are best in size, most rapid in growth, and most nearly resembling their fathers, should be again selected for breeding the following spring, when they should be mated with a couple of fresh two-year-old stags of the same variety as those used the year before. By continuing this process year by year, ere long the breed will become almost pure, though there will constantly reappear traces of the mongrel blood. Still, these will be fewer and fewer, for pure blood is usually greater in its prepotency. After the second or third year two-year-old hens only should be mated for breeding with a young cock, but pullets may be put to run with an old cock. Of course, if a fresh breed be introduced, all the previous efforts will be largely upset.

On large farms it is a wise plan to keep two or three distinct breeds, which can easily be done if each variety is placed apart at different places. This we have seen carried out to complete satisfaction. By so doing the breeding can be kept thoroughly in hand. Further, if a table variety, a laying breed, and a general purpose fowl be selected, all the needs of any market, both winter and summer, can be provided for; and, in addition to early chickens, eggs will be obtained all the year round. This is the method we strongly recommend, where practicable, and each variety can be placed in charge of a farm servant, who will easily undertake the duty of looking after them. Where such a plan is adopted, the results ought to be more satisfactory than if only one breed is kept; but, of course, sufficient space is required to carry it out effectually.



CHAPTER VI.

POULTRY HOUSES.

POULTRY IN NATURE—CHANGES UNDER DOMESTICATION—IMPORTANCE OF HOUSING—GENERAL PRINCIPLES—PERMANENT BUILDINGS—
VENTILATION—DAMP AND DIRT—FARMERS' POULTRY HOUSES—PERCHES AND NESTS—PROTECTION AGAINST MARAUDERS—
CHICKEN HOUSES.



POULTRY in a state of nature are accustomed to roost in the trees, and all the shelter they obtain, which is very little, is just what can be secured on a hill-side or in a belt of woodland. Accustomed to this sort of thing they grow up hardy and healthy, or, if there be any weakly ones, they fall before the inexorable law of "survival of the fittest," and all who remain are, so far as stamina is concerned, the pick of the lot. Such birds have everything in their favour, for their natural climate is warm and favourable to them. Freedom, natural food, and natural conditions combine to make them hardy. They live according to their own instincts, not the whims or prejudices of their owners.

It will be seen, therefore, that when we alter this state of things by domestication, it is imperative that we should provide for a change which must come over the birds. Everything is altered. Instead of freedom there is restriction, instead of natural food—namely, that which the instincts of fowls teach them to obtain for themselves—we substitute artificial, and as a consequence the first effect is to enfeeble the race, making it less able to resist unfavourable circumstances. But whilst all this is true, it is difficult to see how it can be otherwise. Domestication of any animal has a tendency at the outset to weaken all bodily powers. Therefore, we must prepare for the result, allowing nature to adapt herself to altered circumstances, which she will do if not hindered. We must seek by a careful study of our fowls, their habit, and nature, to attain that happy mean by which they can be kept healthy, and yet be guarded by such conditions that when unfavourable circumstances arise, circumstances which they would meet by their own instincts, they may be protected therefrom. The stamina of a fowl is its reserve force. If we weaken this we must substitute some other without the fowl itself, or when a strain comes upon it there will be collapse.

Thus it will be seen that the question of housing is of great importance. It is possible to keep fowls healthy by allowing them a large measure of freedom, and some of the hardier varieties could thrive out of doors all the year round, but they would not be domesticated, and we should fail to secure that profit for which we are seeking. Their reserves which now go to produce flesh and eggs would be spent in keeping themselves warm, and the whole object of domestication would be sacrificed. It is essential, therefore, that they be well housed, so that the qualities for which they are bred may be conserved and developed. Badly housed poultry will never pay for the trouble taken upon them, any more than would badly sheltered dairy cattle.

GENERAL PRINCIPLES.

Dealing with general principles first, we find that in housing the primary point to be regarded, is the giving of sufficient air space for the number of fowls to be kept upon any place. Overcrowding is always an economic mistake. Something can be done by a proper system of ventilation to overcome the evils of overcrowding, but even perfect ventilation can never make a house that is only capable of holding comfortably a dozen birds suitable for twice that number. Nor is there any excuse whatever for either farmers or cottagers sinning in this manner. If too many birds are placed in a house they rapidly exhaust the oxygen in the air, and it soon becomes foul. By creating a strong draught this may be prevented; but draughts are dangerous, and serious evils would follow the adoption of such a plan. A gentle current of air, imperceptible except when tested, is all that can be safely applied; and only as many fowls should be kept in a house as such a current can deal with. On the other hand, too large houses are equally injurious. In these there is during the winter season always a great bank of cold air which the fowls are unable to withstand, and which has to be fought against all night long. We

know what it is to enter a very large room unwarmed during cold weather, and the chill there experienced is just what birds have to bear if roosting in a huge house such as we have sometimes seen. A house six feet by eight feet is of useful dimensions, and will comfortably hold forty medium or thirty large-sized fowls. The height of the roof should be proportionate to its size. In no case do we like them less than six feet high, and one of the size just named can with advantage be a foot or eighteen inches higher.

These remarks, however, do not apply to permanent stone or brick buildings, more especially if they adjoin dwellings or cattle sheds, for they then are warmed by a gentle heat. Under these circumstances there is no reason why they should not be twice the size in area, and half as high again. In fact, if there are any permanent buildings on the farm which can be devoted to this purpose, it is much better to utilise and adapt them to the requirements of poultry. Such houses do not usually require much alteration, as they are generally large and roomy; and if they be dry and are dealt with on the general principles we are now laying down, nothing could be better. But they must be dry, and this is a point to be always insisted upon.

VENTILATION.

Ventilation is the next matter requiring attention. By ventilation we mean a current of fresh air passing through the house, but a current properly directed in its course. We have seen many poultry-houses, every board of which was ill-jointed, and the entire building more like a sieve than anything else, letting in both wind and water. Draughty buildings of this kind are worse than no house at all, and it is small wonder that fowls kept in them are scarcely ever free from disease, and never thrive at all. The walls, windows, door, and roof of the house should be air and water-tight in every way, and the ventilation be so arranged that the birds will never roost in a direct current of air. The simplest way is to make a chamber in the roof, with loosely fitting boards as its floor, and louver boards or ventilating holes at each end of the gable, if there be one, or near the highest point of

the roof, if there be no gable, which, of course, will be higher than the perches. By this arrangement, when the foul air rises, as it will do, it is carried away at once by the current passing through the chamber. Another way is to put one or two ventilators in the walls level with the roosting places, but covered on the inside by a box or spout, with only the upper side open, so that the incoming current of air will be directed upwards, and will carry off the vitiated air through holes in the walls near the roof.

DAMP AND DIRT.

It is necessary to say a few words on the question of damp and dirt. The former we have already referred to, but although everyone theoretically condemns them, there are comparatively few poultry-keepers who pay proper attention to these important points in management. Damp, either from defective walls or a bad floor, is an evil that must be combated. For this state of things there is no excuse, as dampness can be easily avoided. If neglected it will be fatal to success, for to it are due many diseases affecting the respiratory organs; and from the accumulation of dirt we have numerous diseases affecting the stomach and bowels. Foul odours arising from a floor covered by the droppings of fowls

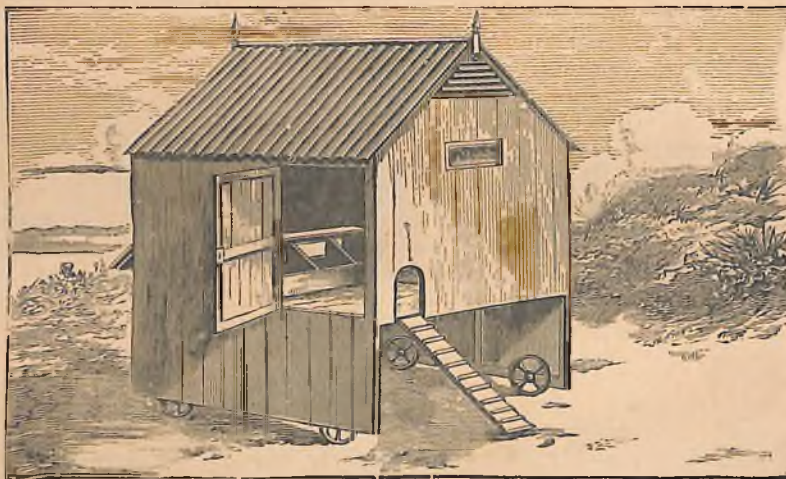


FIG. 1.—PORTABLE POULTRY HOUSE.
(Spratts Patent, Limited, London.)

poison the atmosphere, and make the inmates fit subjects for the first trouble that may appear. Insects are encouraged by dirt, and when they are numerous fowls can never thrive. Such pests are often present when they are not suspected to be there. Fig. 2 shows a house with sliding floor to facilitate cleaning—a useful arrangement.

FARMERS' POULTRY-HOUSES.

Where a farmer can, without fear, scatter his houses about on the land, the most suitable houses are such as will accommodate from thirty to fifty birds. These should be about 7 ft. square, or 6 ft. by 8 ft. (the latter preferred), and 6 ft. high to the point of roof. It is an excellent plan wherever possible for the roof to be 6 ft. high to the apex, and for the floor to be raised about 30 in. above the ground, so as to form a shelter beneath for the birds, as in Figs. 1 and 2. The advantage of a

raised floor is that the birds have a shelter below where they can retire in cold or wet weather. Such a house can be made by a handy man at home for 45s. or 50s., and is none the worse if made of unplanned deals, and many such houses are now sold at very reasonable prices. It can be put on wheels, which will add somewhat to the expense, so that it can be easily moved. Fig. 3, made by Messrs. Boulton and Paul, of Norwich, is an excellent form of house for farms. The wood used should not be less than three-quarters, and it will be all the better if an inch thick. There should be a good window, say 2 ft. square, on two sides of the house, placed to face the south-east and south, so that the whole of the sun's rays falling thereon will find their way inside the house, and add considerably to the comfort of its inmates.

An excellent arrangement in wooden houses placed out on fields is to thatch the roof, but the thatch should be covered with wire netting to prevent the fowls tearing it open. This for the sake of warmth, and for the same purpose the sides should be covered with tarred felt or Willlesden paper. Brown paper laid between coats of tar is a cheaper and equally effective method, if well done.

PERCHES AND NESTS.

Perches are best made of fir poles about 3 in. in diameter, sawn in two, or a moveable block of roosts can be made to stand about 2 ft. above the floor, each perch at least 20 in. from the next one.

Nests may be formed of bottomless boxes about 15 in. square. A small trap will be necessary for the fowls, a larger door to admit within for cleaning, and a ventilating shaft in the roof. It is also a good plan to put flap-doors all round the sides of the sheltered run below. These need simply be hinged, with a cheap iron hook to hold them up, so that the cost will be but small, and they are very useful indeed during hot or wet

weather. Closed on the side in which the rain or snow would drive if open, they will do much for the comfort of the fowls. A hen ladder made out of a seven-inch deal, with strips of wood nailed horizontally on every six inches, will complete the house. It must be mentioned, however, that these strips of wood should have the edges smoothed, or they will cut the feet of the fowls, which, of course, would never do. Wherever a house with raised floor is employed it should have a layer of peat moss litter at least six inches thick, which will serve the dual purpose of keeping the house sweet and clean, and maintain it much warmer in winter than it could possibly be if the floor is uncovered.

These houses may be used in a variety of ways. On one farm with which we are acquainted they are placed out on the grass land during the early part of the year,

but as soon as crops begin to be gathered — whether hay, corn, or roots — they are put in the fields, and the farmer declares that the benefit derived from this course, by the manuring and gleanings of the ground, is very great, whilst the fowls are kept by the grain after harvest that would otherwise be wasted. A

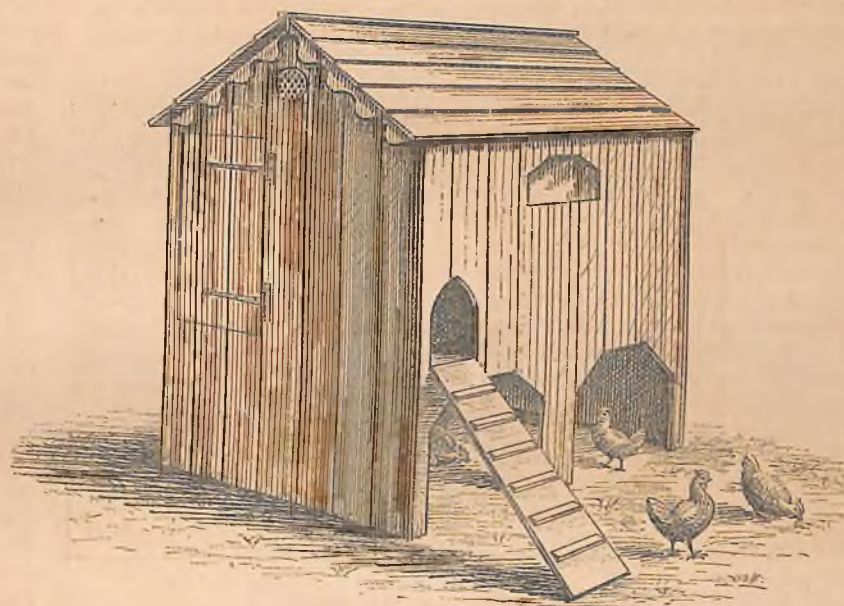


FIG. 2.—IMPROVED POULTRY HOUSE.
(Barnard, Bishop, and Barnards, Limited, Norwich.)

other farm, which is largely given up to dairying, has a large number of these houses placed about in the fields. Fowls do not interfere with the cattle, or the cattle with the fowls, and the maintenance of several head of poultry does not necessitate the reduction of the cows by a single one. On a third they are placed near the various buildings or labourers' cottages; in this case, however, they are not portable. And on yet another farm, which is mainly devoted to grain, the houses are placed in corners of the fields where grain is growing, and though for a yard or two around the ground is bared, that is all the damage done. The birds wander in and out among the grain stalks and growing roots, not only doing no harm, but a very great deal of good. It is

commonly thought that fowls would injure growing crops, but if readers try this plan during the next season they will find that after the plants are about six inches above the ground there is no risk whatever in doing so, and only good will result from it. The plan adopted on French vineyards has already been recorded.

Sometimes it is necessary to protect the fowls from marauders, either man or beast; then some enclosure must be provided, as they should not be kept shut up in the house until some one goes to open it, if that means an hour or two after daylight. The early bird is said to get the worm, and fowls obtain many worms early in the morning. Under these circumstances it is better to have houses either part of farm buildings or ad-

joining the labourers' cottages. If this be done, then the required protection can be given, and the proximity of some one is generally a sufficient warning to both biped and quadruped. By housing in this way, closing the trap-door is sufficient, for it can be opened very early, just as soon as the fowls wish to be out. There can be no question that fox preservation is a great hindrance to poultry-keeping; and from the English agricultural returns published some years ago we learn that in those counties which are noted as hunting districts fowls are least kept. Mr. Annett, of Widdrington, Northumberland, who has gone in large way for poultry keeping, and whose place we speak of fully in another chapter, has an arrangement by which, when the trap is shut, it cannot be opened from the outside.

This is by a simple half button, which keeps the sliding-trap fixed when down.

COTTAGERS' POULTRY-HOUSES.

As a rule cottagers will prefer to adapt some outhouse for this purpose, or erect a roosting-place near to their dwelling. The observations already made apply equally here, and all we need add is a warning as to the

danger of keeping too many fowls in a house, so often done by small poultry-keepers. Fig. 4 shows a house suitable for this class of poultry-keeper; and Fig. 5 is a capital house for half-a-dozen fowls, one that can be made out of a sugar or other cask, which may be purchased for 2s. or 2s. 6d. In buying it should be seen that the staves are all in good order, for if this be not the case the whole will be at fault. The bands, top

and bottom, should also be examined. It must be properly cleaned out, and, if a sugar hogshead, it ought to be placed in the sun to dry, or, if it be winter, in a warm shed. Probably the drying will reveal some weak places. These, if not very large, should be covered with

pieces of tin, and any interstices closed up with clay or putty. It is well worth a little extra trouble to have this properly done. The top must next be fitted on, part of it being formed into a door sufficiently large to allow of the barrel being cleaned out, and also a trap-door for the fowls. We have

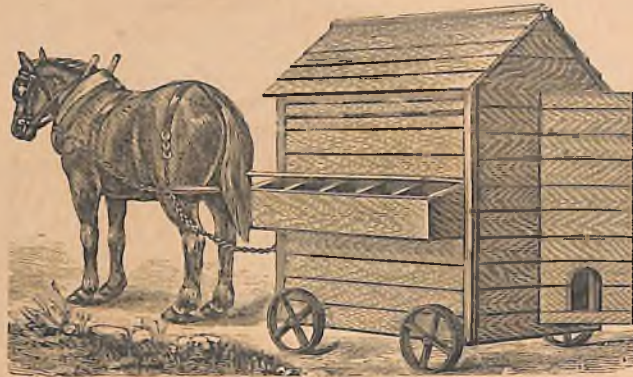


FIG. 3.—FARMERS' POULTRY HOUSE.
(Boulton and Paul, Norwich.)

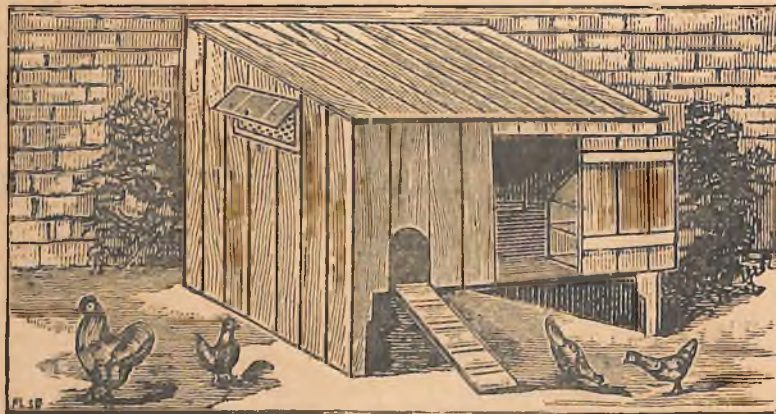


FIG. 4.—COTTAGERS' LEAN-TO POULTRY HOUSE.
(Mr. W. Calway, Sharpness, Glos.)

generally made the former by permanently fixing half of the top, and hinging the lower half to it, the latter, of course, forming the door, which will be complete with a button, bolt, or padlock. If the trap is to be at this end

of the house it had better be in the door itself, but if the barrel is to stand where both ends are accessible, it is the better plan to put the trap in the bottom, and make the nest next to the door. The inside should have a good coating of lime, in which some carbolic acid has been mixed, and the outside well tarred. When perfectly dry it should be placed on bricks, or blocks of wood, so as to raise it a few inches above the ground, and so soon as the perch and nest are in it is ready for the inmates. The whole cost need not be more than 3s.

CHICKEN HOUSES.

Where a large number of birds are to be reared, and more especially if early in the year, a chicken-house is indispensable. Chickens can, in one of these houses, be reared with greater ease at all seasons, as they are completely protected from the bad weather, and the attention given them is very much more comfortable than when they are outside. Not only so, but the chicken-house can be used as a place for hatching, and, after chicken rearing is over, for fattening or as an ordinary fowl-house.

It is always advisable to have a run in front of the house, two-thirds of which should be laid down in grass, and the other third—that next to the house—in gravel. The larger the run the better—up to half an acre. When the season is well advanced the coops may be placed out of doors altogether, or out during the day and inside the house at night.

The best position for a chicken-house is facing the south, or south-east, as then it obtains all, or nearly all, the sun. It should be built with a roof sloping from front to back, about 7 ft. high in front and 5 ft. or 5 ft. 6 in. at the back. Whether the house is built of wood or brick the front

wall should be nearly all glass, and if this front can be made entirely of wood and glass, that is to be preferred; or the 30 in. next to the ground may be of wood, made to open upwards and outwards, and the upper portion of glass, the latter a fixture. This answers very well if the coops are set well back in the house at night, or when it is closed up; but we prefer all the front to be of glass.

In any case the lower part must be made to open, so that the birds can go in and out when the weather is seasonable. It is always well to have a large window in the east end also, and thus from early morning till late at night every ray of sunshine falling on the house must enter therein. It is a fact that in this country we do not use glass nearly enough in our poultry-houses, and the 6 in. skylights or win-

dows generally to be found therein are useful for little more than making the darkness visible. The most effectual warming power is the sun, and instead of shutting out its rays we should welcome and utilise them in every way that we can. All poultry-houses would be the better for

a sheet of plate glass in the sides which face the east, the south, and the west, and, if the roof should be a gabled one, also on that side which faces any of these ways. If plate glass is too costly, then a double sash of ordinary window glass will answer as well. Should corrugated iron be used to cover the roof—and it is doubtless one of the best and cheapest

roofing materials that can be employed—it must be lined with wood, as it is a rapid conductor of heat and cold. Consequently it is very hot in summer and very cold in winter, and if used alone is objectionable on that account.



FIG. 5.—COTTAGERS' BARREL POULTRY HOUSE.

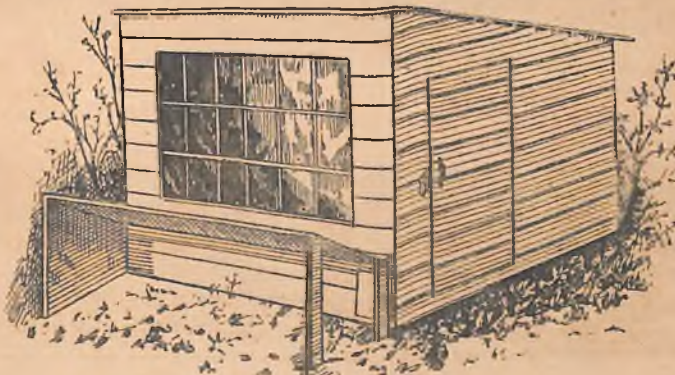


FIG. 6.—CHEAP CHICKEN HOUSE.

It is scarcely necessary to say that such a house as this should be well built. If wood is used, deals an inch or an inch and a quarter in thickness ought to be employed. After they are put together several coats of tar should be given to make it waterproof and warm. We prefer the width to be not more than 6 ft., as then the maximum of space is obtained for the coops, and a larger surface given for the reception of the sun's rays than in a squarer building. Of course, if some existing building is to be employed, it must

brick or cement floor be employed, and if there already it will be better to have this removed. They are both much too cold for chicken rearing.

A shelf should be put up against the back wall of the house, about three feet above the ground, if it is intended to be used for hatching or fattening. Upon this shelf the hatching boxes or fattening pens may be placed, though we should prefer devoting a part of the house to the hatching operations, and having boxes for sitters on the floor. Wherever possible, bushes or trees should be at

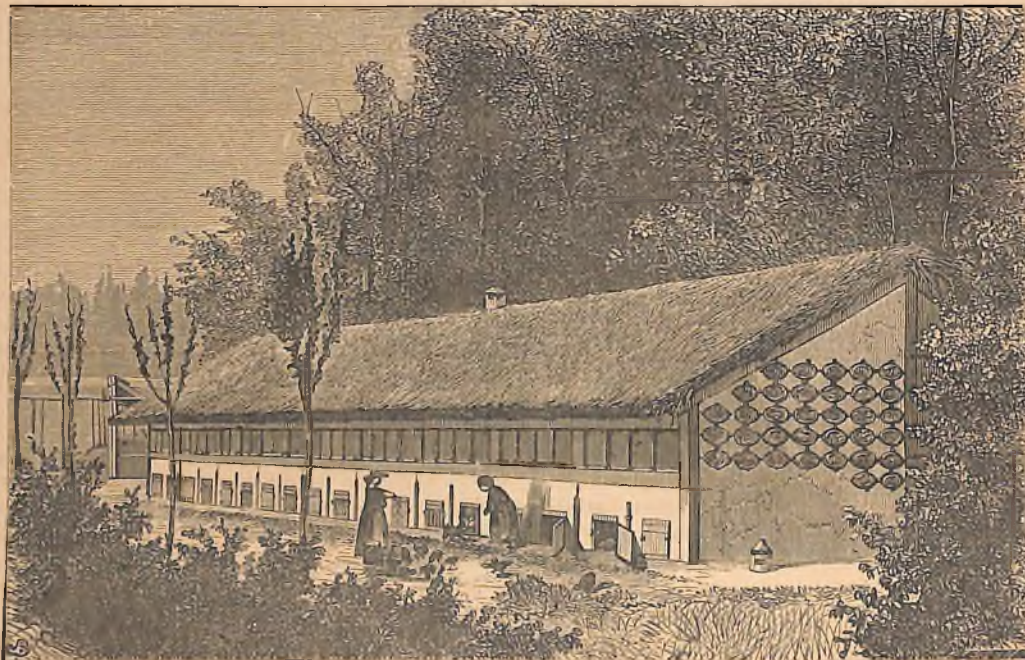


FIG. 7.—MONS. LEMOINE'S CHICKEN HOUSE.

be adapted in the best manner possible. The floor should be dug out about a foot, and half filled in with coarse gravel, broken brick, or burnt ballast, and after being well hammered down, covered over with as much sand, or peat moss litter as will raise it three or four inches above the level of the ground outside. Sand will serve without renewal for one or two seasons if it is raked over daily, and dug up once a month, but litter will need to be oftener renewed. Upon no account should a

hand, for not only do they give abundance of shelter to the chickens, but amongst them the young birds will find plenty of insect life, which conduces greatly to their rapid growth.

Fig. 7 gives illustration of house employed by Mons. Lemoine at Crosné (France), one of the most complete we have ever seen. It is thatched, and very comfortable. Each hen has a separate compartment, and the chickens can run about outside at will.

CHAPTER VII.

FORMATION OF THE EGG AND CHICKEN.

WHAT IS AN EGG?—MALE BIRD NOT NECESSARY FOR EGG PRODUCTION—SHAPE OF EGG-SHELL—MEMBRANES—ALBUMEN, OR WHITE OF EGG—YOLK—PROCESS OF PRODUCTION—SIZE OF EGGS—FORMATION OF THE CHICKEN—ELEMENTS NECESSARY—INFERTILE EGGS—APPEARANCE OF EGG DAY BY DAY—PROCESS OF DEVELOPMENT—FUNCTIONS OF THE YOLK-BAG—EXIT OF THE CHICKEN.



ANY of the most familiar things around us we are most ignorant of, and it will doubtless be interesting to readers to know the process of formation of an egg, for, although this is one of the commonest articles of food, yet there is a great want of knowledge as to its composition and formation. It has been well described as "a mass which forms in the ovaries and oviducts of a large number of animals, and which in a common envelope encloses the germ of the future animal, with the liquids destined to nourish it during a certain lapse of time, when the vital impulse has been communicated to it by fecundation and incubation." This is true so far as fertile eggs are concerned; but, though the object of the egg is undoubtedly to envelope the germ, yet impregnation of an egg by this germ has no influence upon the actual laying thereof, and a hen will lay at the proper season independently altogether of her being mated with a male bird. Millions of eggs are laid every year which would never hatch, simply because they contain no germ, not having been fecundated. An infertile egg can be known after it has been sat upon by a hen through its contents becoming yellow and fusty, whereas an addled, *i.e.*, one in which there has been a living germ, but which has died during the earlier stages of incubation, will become rotten. This the former never does.

It is a very common idea, but an erroneous one, that in order to keep hens laying they must have a cock bird running with them. That such is altogether wrong is easily proved in practice, as there are many who keep fowls without a male bird, and yet have an abundant supply of eggs. This is, of course, different to the case of most animals, for, as a rule, impregnation is the incentive to reproduction; but it must be remembered that an egg with a germ only represents the first stage, and its voidance does not, as in the birth of animals, mean actual

appearance of the living being itself. There is consequently a further process for its completion.

HOW AN EGG IS FORMED.

The form of an egg is well known (Fig. 7), with its two diameters, one of its length and one of its breadth, a small end and a large one. Eggs vary in weight according to the breed and age of the hens, but eight to the pound, or two ounces each, is regarded as a fair size. The outer envelope or shell is white or coloured according to the species, and is composed of carbonate of lime, phosphate of lime, and animal gluten. Salts of lime give the shell its hardness, and cause the particles to adhere together. Soft eggs are those that have no shell, or which have too thin a shell, and are deficient in salts of lime. Hence the necessity for introducing lime into the food of the fowls. It is surprising where a hen finds all the carbonate of lime necessary, for if she lays 100 ordinary sized eggs in the year, she will have produced about 22 oz. of pure carbonate of lime. Thus, as Mr. P. L. Simmonds, F.L.S.,* observes, if a farmer has a flock of one hundred hens, they produce in egg-shells about 137 lb. of chalk annually; and yet not a pound of the substance, or perhaps not even an ounce, may be found on the farm. The materials for the manufacture are found in the food consumed, and in sand, pebbles, brick-dust, pieces of bones, etc., which hens and other birds are continually picking from the earth. Their instinct is keen for these apparently innutritious and refractory substances, and they are devoured with as eager a relish as the cereal grains or insects. If hens are confined to barns or out-buildings, it is obvious that the egg-producing machinery cannot be kept long in action, unless materials for the shell are supplied in ample abundance. If fowls are confined in a room, and fed with any of the cereal grains,

* "Journal of the Society of Arts," December 9th, 1837.

excluding all sand, dust, or earthy matter, they will go on for a time and lay eggs, each one having a perfect shell, made up of the same calcareous elements. Vauquelin, the distinguished chemist, confined a hen for ten days, and fed her exclusively upon oats, of which she consumed 7,474 grains in weight. During this time four eggs were laid, the shells of which weighed nearly 400 grains. Of this amount, 276 grains were carbonate of lime, $17\frac{1}{2}$ phosphate of lime, and 10 gluten. Of course, it is more than likely that there was some amount of reserve stock of shell-forming substances in the body ere the hen was shut up, and that if the experiment had been continued longer shell-less eggs would have been laid. Still, it is a fact that there is only a little carbonate of lime in oats.

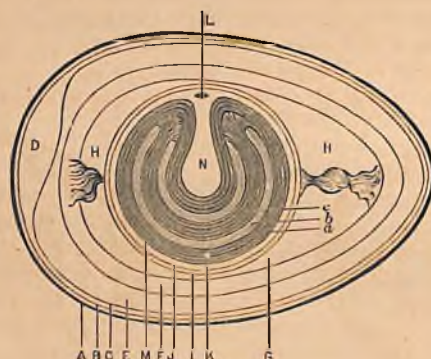
The shell is porous, or permeable by the air, without which the chick could not live during the process of incubation. The white, fragile, outer envelope is composed of mineral matter, but is not the light, compact covering its appearance would indicate, for it is completely perforated with a multitude of minute holes or pores. When examined by the microscope the shell has a sieve-like appearance, very much resembling the white perforated paper sold by stationers. By means of these holes there is a constant evaporation going on, and thus from the time it is laid until it is consumed there is a constant evaporation. This evaporation depends upon the conditions under which the egg is kept, and will vary in accordance with these conditions, being much more rapid in hot weather than in cold, and in warm places than in cool. It is for this reason that eggs are not so easily kept in summer as in winter. If by any means this evaporating process can be stopped, and no other influence of an antagonistic nature be brought into play, the egg remains sound and good for a great length of time. The substance used to close the pores of the egg must not be soluble in watery fluids, or liable to be readily removed. By means of chemical agencies the holes on the shells of eggs can be closed or filled with lime placed in contact in solution, and the contents preserved sweet and good for months.† With this question we shall deal later on.

Within the shell are two membranes or skins, the outer one of which adheres to the shell, and the inner one slightly to the outer. But towards the large end of

the egg the two are separate, and this forms the air chamber. The white of the egg partly consists of albumen, and is a transparent liquid, free from smell when the egg is fresh and tasteless. The albumen coagulates on the application of heat at 140 degrees, and is insoluble in water. Chemical analysis has demonstrated that it is composed of carbon, oxygen, hydrogen, azote, phosphorus, and sulphur in various proportions. A part of the oxygen and hydrogen evaporates during incubation, or when the egg gets stale. In the white there are three distinct and separate layers of albumen, the outer (a liquid), the second in which chalazæ terminate, and an inner layer. The chalazæ are two twisted cords of a more dense albuminous character, which have their origin in the outer albuminous membrane, and take the form of a spiral cord in the

direction of the longer axis of the egg. They are well known to all eaters of eggs, and are the portions which cooks take out when beating an egg. They form a ligament by means of which the yolk remains suspended in the midst of the albumen encircled by the thin membrane known as a membrane of chalazæ.

The yolk is the principal part of the egg, and is separated from the white by a very thin enveloping membrane, called the vitelline membrane, and is slightly lighter than the white, filling the upper part of an egg when it is lying on its side. It is the yolk which ultimately furnishes nourishment for the embryo, and its composition is richer than that of the white. It comprises a layer of white yolk which does not harden even in cooking, and within this are concentric layers of yellow



SECTION OF AN EGG.—A, the shell; B, membrane, adhering to the shell; C, second membrane, slightly attached to B, except at large end of egg, where they separate and form D, the air space; E, the white or albuminous part of the egg (first layer liquid); F, the white of the egg (second layer semi-liquid); G, the inner white; H, H, chalazæ; I, inner membrane; J, very fine vitelline membrane; K, the outer part of yolk; L, germ; M, yolk; N, utricle; a b c, separate layers composing the yolk.

FIG. 7.—FORMATION OF THE EGG.

and white, which curve round the utricle, the interior part of which contains the germinative vesicle. When the egg is perfect the vesicle touches the vitelline membrane, at the upper part of which is found the germ, known from its yellowish white colour. The yolk is composed of albuminous matters, of organic salts, of vitelline, of colouring matters (a red and a yellow), of phosphoric acid, and of a fatty phosphoric substance of itself sufficient to support the chick during its earlier stages.

PROCESS OF PRODUCTION.

The process of production of an egg is a most interesting one. The ovum, or yolk, which, as we have already seen, contains the germ in a fertile egg, is generated in the ovary, and during its passage is coated with successive layers of albumen, has the chalazæ placed in their proper position, and finally receives the

† Ibid.

skins and outer shell. As may be easily imagined, this delicate organisation is very easily thrown out of gear, more by over-feeding than anything else. Eggs are produced from what may be termed surplus food, by which we mean such food as is not absolutely required for sustenance of the bird, and if food be given in excess or of too stimulating a nature, the result is, in the one case, that the organs are clogged up with fat, and the egg-laying machinery stopped, or, in the other, that the ova are produced too rapidly. In the ordinary course of things only one ovum should be generated in 24 hours, and the fowl ought not to lay more than five or six times a week. If two ova are produced in one day many eccentricities are the result, which puzzle the poultry-keeper. Sometimes the two ova pass into the oviduct together, and then a double-yolked egg is formed. If this egg is set and the yolks have been fertilised, then come some of those freaks of nature which are communicated as great wonders. Occasionally two perfect chickens are developed and hatched out of one shell, but as a rule only one ovum comes to maturity, and thus we get four-legged or two-headed monstrosities. Another result of over-

own punishment, and therefore great care needs to be taken in the feeding of poultry so as to maintain them in full health and vigour.

As will have been seen by the tables already given, there is a great variation in size of eggs laid by different breeds. Nor is this variation relative to the size of body, for many of the largest varieties produce comparatively small eggs, and *vice versa*. Speaking generally, there is little doubt but that on the whole the size of eggs, and the fecundity of our domestic fowls, has greatly increased within the last thirty years. Some varieties may have suffered in both respects, due to close breeding and attention to mere external qualities, but we have many other breeds that have more than taken their places. In Mr. Simmonds' paper it is stated that in the markets of France the largest eggs come from Normandy, the smallest from Picardy, and the mean, or average, from Flanders. In Normandy the fowls have been most carefully bred for a long period of time, both for their egg and table qualities, and the eggs produced there are above the average in size. Good feeding will do much to increase the size of eggs, hence the reason why eggs from the yards



FIG. 8.—DEVELOPMENT OF THE CHICKEN—SECOND DAY.

feeding is the production of one perfect egg within another. This is caused by an irritation of the oviduct, which contracting in front of the perfectly-formed egg, instead of behind it, forces it back until it meets another yolk, when the two join company, and again being coated with the white and the shell, produce the wonder spoken of. Soft eggs result from over-fattening food and too little exercise, the ovum passing down the oviduct too rapidly for the secretions to be properly made, or, on the other hand, they may be caused by absolute want of lime, without which, as we have already seen, the shell cannot be properly made. None of these irregularities are found in wild birds, and these must be put down as one of the penalties of domestication. But knowing what dangers to avoid, it is then not very difficult to so feed and manage the birds that their organs may work in their proper and natural order. Birds when wild lay very few eggs, and it is only by the handiwork of man that they have been brought to their present productiveness, but it has been gradually done, and with no apparent injury to them. It must, however, be borne in mind that overstepping the boundary soon brings its



FIG. 9.—DEVELOPMENT OF THE CHICKEN—THIRD DAY.

of those who only keep a few fowls are usually larger and richer than are the regular market eggs.

FORMATION OF THE CHICKEN.

The small speck to which reference has already been made contains the embryo chick, and it is one of Nature's great mysteries how that this, when subjected to heat and moisture, gradually develops until the fully-formed bird is produced. All the efforts of our great scientists have been baffled in their attempts to discover the secret of generation, and to-day we know no more of this mystery than has ever been known before. We may understand a little better the workings of Nature, and how that by observing certain conditions we may expect defined results, but how life is imparted is beyond our ken.

As already mentioned, the conditions necessary to the development of a germ are heat and moisture. Given the presence of an embryo within a shell, if proper heat and a sufficiency of moisture are provided, with daily cooling and turning of the egg, these gradually cause development which results in the appearance of a chicken at the end of twenty-one days. In order that the germ may receive heat there is a most delicate and beautiful

arrangement by which it floats ever to the top. This is secured by the chalazæ, which not only keeps the yolk in its place, but weighs down the lower side of it, and however the egg is turned the germ floats at the top. It is for this reason that in working an incubator regular turning of eggs is insisted upon so strongly. When a hen is employed she does the work herself, but if it is not done there is danger that the heat will cause yolk and white to adhere together, and as a consequence the embryo dies. Very many added eggs are so caused by want of being properly turned.

As soon as the fertile egg is subjected to proper conditions the germ therein at once begins to expand, and within twenty-four hours has very sensibly enlarged. The heat necessary to secure this is between 102 and 106 degrees. Less than the former is not sufficient to bring the germ to maturity, though 100 degrees would start it, and over 106 degrees is most likely, if maintained for several hours, to kill it. Generally we have found that the best plan is to keep the heat as near 104 degrees as possible. That will permit of a little variation without danger, and yet be sufficient to effectually mature the chick.



FIG. 10.—DEVELOPMENT OF THE CHICKEN—FIFTH DAY.

If an egg is examined that has been subjected to incubating influences for twenty-four hours, a small speck will be discernible if it is fertile. This is, of course, not very pronounced, but to those who have had experience in the matter it is easily distinguishable. In very thick-shelled eggs, however, no reliance can be placed on an examination so early as this, for the mark may be due to some extra thickness of the shell. But with thinner shells there is little difficulty in the matter. Sometimes a mistake is made, as infertile eggs, after being sat on for a few days, show a very similar mark—due to the effect of heat upon the yolk. And those eggs which start, but after a few days go back, also have a similar appearance. It is on this account that we discourage rejecting eggs on the strength of an examination so early as twenty-four hours after incubation has begun.

A few words here as to infertile eggs will not be out of place to emphasise what has already been stated. By the term infertile is meant an egg that has never been impregnated, and consequently one that cannot possibly hatch, for it does not contain a life germ, and

without this germ no amount of heat can develop a chick. The germ must be communicated ere the egg is formed, and the egg is meant to be its protecting envelope. The effect of heat upon an egg is to dry up the contents, and reduce them to a smaller compass. An infertile egg does not as a rule go rotten, a fact not generally known. Without death there can be no decay, and there cannot be death unless there has been life. Absence of a fertilising germ means that the contents of the egg are inert and will not become rotten. On the contrary, when there has been life, but this life has died, all the elements of decay are within the shell, and that which would have been its strength becomes its weakness. The dead embryo—or, if the chick has been more or less formed, the dead chick—begins to decay, and soon the whole contents are a mass of corruption. This fact is needing of explanation, as many persons have erroneous ideas thereon. We have known purchasers of eggs say, in a tone which indicated that they thought they had been cheated, that the eggs were actually rotten; whereas this fact showed that the vendor had sent eggs which were at all events fertile. Eggs may die at any stage of incubation, but our experience has been that there is most



FIG. 11.—DEVELOPMENT OF THE CHICKEN—SEVENTH DAY.

danger between the third and fifth days in the first stage and between the twelfth and sixteenth days in the second stage.

The outward appearance of a fertile egg at the end of twenty-four hours after incubation has commenced is, therefore, simply that of having a dark mark or spot about the centre of the yolk, perhaps a little to the left or lower side, as shown in Fig. 8.* If the egg is broken open it will be seen that the vesicle has considerably enlarged, darkened much in appearance, and that from it are a large number of minute blood vessels, which are beginning to spread themselves around the yolk.

At the end of another twenty-four hours, that is, forty-eight hours after the process of incubation has commenced (Fig. 8), the outward appearance is much more decided. Those who have had any practice can now tell without any doubt whether the egg is fertile or not. The black mark can be clearly seen, and it will be larger than

* For this and the other illustrations we are indebted to "Élevage des Animaux de Basse Cour," by Mons. Er. Lemoine. Paris: G. Masson. 1883.

on the previous day. If the shell is a thin white one some traces of the blood-vessel will be discernible if the egg is held between the eye and a strong, clear light. The germ will be of an oval shape, as if it was taking a more definite form. When examined internally this is found to be the case. The embryo has enlarged still more, and the veins from it have become thicker, feeling their way farther around the yolk.

On the third day, that is, seventy-two hours after the incubation has commenced (Fig. 9), these veins may be said to have completely surrounded the yolk, and in the centre of the embryo will be seen a small spot, which will in a day or two develop into the eye or brain. The outward appearance of an egg is not very different to that described on the second day, but all the marks are more clearly defined. The air space at the broad end of the egg will be seen to have enlarged a little, and this will continue all through the process, due to the evaporation of water in the albumen through the pores of the shell.

On the fourth day after incubation has commenced the blood-vessels are seen to be much more clearly defined, and they all radiate from what becomes

seventh day this cannot be done by the means of light. An egg which had been addled at the tenth day would be dark.

At the fifth day the head begins to take a definite form, the eye still being very prominent, as, in fact, it is until about the fifteenth day. At the sixth day the body begins to assume shape, and at the seventh the limbs can be distinguished. By this same time internal organs are being rapidly developed, and the heart is now formed. On the seventh day these internal parts, as well as the liver, kidneys, etc., have assumed their definite shape, and it may be said that all vital parts of the system, which it is noticeable are first to be perfected, are complete. By the tenth day there is a very remarkable and appreciable advance. The bones of the skeleton have begun to assume a decided consistency, so much so that the legs have some of the scales thereon, and on parts of the body feathers are showing themselves. From this time onward the progression is very rapid, though there are no such changes as have gone before. It is entirely a development on the basis already laid down.



FIG. 12.—DEVELOPMENT OF THE CHICKEN—NINTH DAY.



FIG. 13.—DEVELOPMENT OF THE CHICKEN—ELEVENTH DAY.

the brain. The eye has been called "the inlet to the soul," and there is more than was intended in this truism. The brain appears to be the first part of the chick which takes definite form, and in the embryo all the life comes therefrom. The eye is an integral part of the brain, and it is first to be recognisable amongst organs of the body. From this time onward external examination of the egg reveals less than during the first three days. The continued development of the chick begins to render the egg opaque, until at the seventh day it is almost entirely darkened. It is darker in the centre than at the edges, but nothing inside can be distinguished. About the fourth day there is formed a respiratory membrane, called the allantois, which, lining the shell, temporarily provides for the supply of oxygen to the blood. This allantois adds also to the opacity of the egg, as it is dark in its colour. Therefore the best guide to those who examine eggs at the seventh day is that fertile eggs are nearly dark throughout when held before a light. Later on there are other methods of discovering whether the chick is progressing satisfactorily, but after the

The most remarkable development about the twelfth day is that the living life within begins to give out heat. This is due to the fact that the blood vessels have become much stronger, and the blood richer, the heart also taking up with some degree of power the work it has to perform in pumping blood through the veins. After the tenth or eleventh day much less heat is required in order to keep up the temperature in an incubator. In fact, during warm weather it is often difficult to keep the temperature down after eggs have been in the machine twelve days. Eggs at this stage can stand much more than they could before, as they have power to resist external influences, and the germ is less easily destroyed. It is by the warmth of an egg itself that the examination already spoken of is made. Every egg that has either been under a hen or in an incubator will be found warm to the touch for a short time after the source of heat has been removed. But after twelve days, if the chick is progressing, the life within will keep the shell warm, and half-an-hour subsequent to the removal of the heat there will be found a considerable amount of warmth if the egg is handled. If, however, the embryo has died, removal of

the hen or taking from the incubator will find an egg cold within a very short time. This is a most reliable test and one that cannot fail. The twelfth day is as early as we care to rely upon it, but it may be then depended upon. There is another lesson to be learnt from this fact, namely, that there is much more danger in exposure of eggs during the early stages of incubation than later on. We sometimes read accounts of how eggs have hatched when they have been deserted by the hen and been exposed for a long time, perhaps long enough to become thoroughly cold. These matters are important to know, as they may not only prevent eggs being thrown away which will most probably hatch, but an examination of eggs may be made a week or so before hatching is due, and those removed which will not produce chicks.

The chick may be said to have reached a perfect form on the fifteenth day, when it will be found to be complete in all its members. The eye is now proportionate to the body, in that the body has developed up to the eye. Feathers cover the body, the colours thereof, as of the legs, beak, etc., are the same as will be seen when the

that it is not so. These were described by him as follows:—"Whilst recently engaged in some investigations concerning the young chick at various periods of its growth in the egg, I was led to doubt the common explanation of the so-called tapping like sound, from observing, first, that it was so continuous, or prolonged, it being heard for about forty eight before a fracture in the egg was made, thus involving an amount of labour on the part of the young tenant not commensurate with the effect produced; and, secondly, as the slightest tap with the nail, or similar hard substance, on an egg, produces when the ear is applied, a very much louder sound than that made by the chick. The so-called tapping is not caused by the stroke nor by any other mode of contact of the chick's bill with the shell. It is simply respiratory, and produced during the expiration of the breath. It is further observable that the so-called tapping sound begins to be heard, though indistinctly at first, at that very period of incubation at which air first enters the lungs, namely, on the nineteenth day, or two days before hatching. The sound in question is sometimes heard, not as a single, but as



FIG. 14.—DEVELOPMENT OF THE CHICKEN—TWELFTH DAY.



FIG. 15.—DEVELOPMENT OF THE CHICKEN—FIFTEENTH DAY.

bird emerges from its shell. The only real difference is that of size. At the fifteenth day the chick does not nearly fill the shell, in fact, as already explained, the heat to which an egg is subjected gradually evaporates part of the contents, and an examination at any period up to the nineteenth day shows that the air space is becoming larger than it was when the egg was fresh. From the fifteenth to the nineteenth day the growth is in the size of body, and by the later time nothing remains of the original contents save the chick and yolk-bag.

On the nineteenth day the allantois is ruptured, and the chick for the first time breathes through its lungs. The change can be seen if the egg is held up in front of a light, as it will be noted that the air space has become partially filled up, and in some cases movements of the chicken's head are distinguishable. Now can be heard a tapping noise, which at one time was supposed to arise from the attempts of the inmate to escape from its shell, but the experiments of the late Dr. Horner, of Hull, as given in a paper read by him at the British Association meeting some years ago, would seem to show

a double sound, corresponding to the expiration and inspiration of the breath." Dr. Horner, in the same paper, went on to show that from examination of eggs two days before hatching he had come to the conclusion that the position of the chicken's head prevented this sound being made by the beak. We must say that this theory is not satisfactory, for if eggs are placed in warm water on the nineteenth day in order to test them, they will be found to dance or "bob" in the water in a strange manner, in some cases when the chick is very hardy almost jumping out of it. This cannot be from the respiratory action alone. Often the eggs lie for a minute or two before commencing to "bob," and with some of those breeds that are early hatching we have very frequently seen the shell fractured whilst in the water. Our own impression is that, even as early as the nineteenth day, the inmate can at times use its beak, and that it does so, but not with sufficient force to fracture the shell unless stimulated to do so as when placed in water. The inner membranes require to be broken, and it appears more than probable that these earlier efforts of the chick

are in the direction of clearing a way to the shell. The experience of all poultry breeders shows that if from the want of proper moisture the membranes are dry and tough the chick cannot find its way out; in fact, that it has not the opportunity of attacking the shell. Still there is no doubt that Dr. Horner was correct in pointing out that all the sound heard during the last two days of the process is not due to striking of the shell by the chick's beak.

Examination of an egg shows that the position of the inmate is changed much during the last two days, but at the proper time it is, if all has gone right, just where it can break the shell with greatest ease to itself. Of course there are times when this is not so, and to this cause may be attributed many instances when the shell is cracked in one place, and then the process is stopped. Arrestation may be due to varied causes, which are, chiefly, weakness on the part of the inmate, toughness of the shell, and false presentations. The latter is generally induced by some undue shaking of the egg, such as letting it fall whilst being handled; hence the great importance of care in this respect. Fear of such accidents

very best that can be devised. At one time old hen-wives in this country used to make the newly-hatched chick swallow a peppercorn, and even tear from its beak the horny scale found thereon, the object of which we will explain below. But such practices as these have no reason whatever. The one is folly, the other barbarity. To compel a young chick's delicate stomach to first digest the pungent peppercorn must be injurious, and on a par with the giving of neat brandy to a newly-born child.

Generally, on the twentieth day the chicken is prepared for its exit into the world. If all is right its head is able to freely move about in the broad end of the egg. Its body is resting in the narrow portion, with the legs midway, so that they can assist in the process. It will thus be seen that when the upper part of the shell is broken off mere stretching of the body gets rid of the other part, and the bird is free. Nothing could be simpler or more beautiful in its arrangement. As already stated, the young chick is provided with a hard scale on its beak, the object of which is to provide it with a tool sufficiently strong to



FIG. 16.—DEVELOPMENT OF THE CHICKEN—NINETEENTH DAY.

is the reason why some poultry breeders object to the examination of eggs at any stage of incubation, but if ordinary care is exercised there is no danger whatever, and even if occasionally this should result the advantage from examination is so great that it is quite worth the risk.

Before stating how the chick makes its way out of the shell we must explain the functions and uses of the yolk-bag. Up to within a few hours before actual hatching takes place the yolk-bag lies outside the bird, but connected with it by a tube. It is from this that food required by the chick is derived during the incubatory period. Immediately before hatching this yolk-bag is drawn up into the abdomen, and there forms part of the intestines. Its contents, which have not been all exhausted, provide sufficient food for a chick during the first twenty-four hours of its existence in the outer world, and for this reason no attempt to force it to eat should be made until that period has expired. The effect of doing so is almost certain to be harmful, and it is great folly to attempt any improvement on the provisions of nature, which may always be safely regarded as the



FIG. 17.—EXIT OF THE CHICKEN.

fracture the shell. The beak itself would not do this, for it is soft. The scale is a mere temporary arrangement, which drops off in a few days. With this scale the chick commences its work, first making a starlike fracture about one-third of the distance from the broad end of the shell. The fracture should be a decided one, and we always regard it as a sign of weakness when this is not the case. The chick now turns round a little, makes another fracture, equidistant from the broad end of the shell with the first. That done, then another turn and another fracture, until there is a circle of these round the shell, true to a nicety. A slight movement on the part of the chick, and the top is off. Then a little wriggling of the body, with the stretching already spoken of, and the chick is free. The ease and regularity of the whole business is surprising, beating all mechanical effects man can produce. The first appearance of the chick is not all pleasing, as it looks wet and slimy. This, however, soon passes away, and an hour or two in incubator or under a hen dries the feathers beautifully, when the bird is a lovely ball of soft wool.

CHAPTER VIII.

MANAGEMENT OF BREEDING STOCK AND THE SITTING HEN.

EFFECTS OF DOMESTICATION—CAUSES OF INFERTILITY—ESSENTIALS TO SUCCESS—NUMBER OF HENS WITH COCK—ELEMENTS IN HATCHING—EAST WINDS AND HATCHING—PLACES FOR HATCHING—HATCHING BOXES—HATCHING ROOMS—MAKING THE NEST—FEEDING HENS AND COOLING EGGS—DAILY EXAMINATION—HATCHING BY TURKEYS—TESTING THE EGGS.

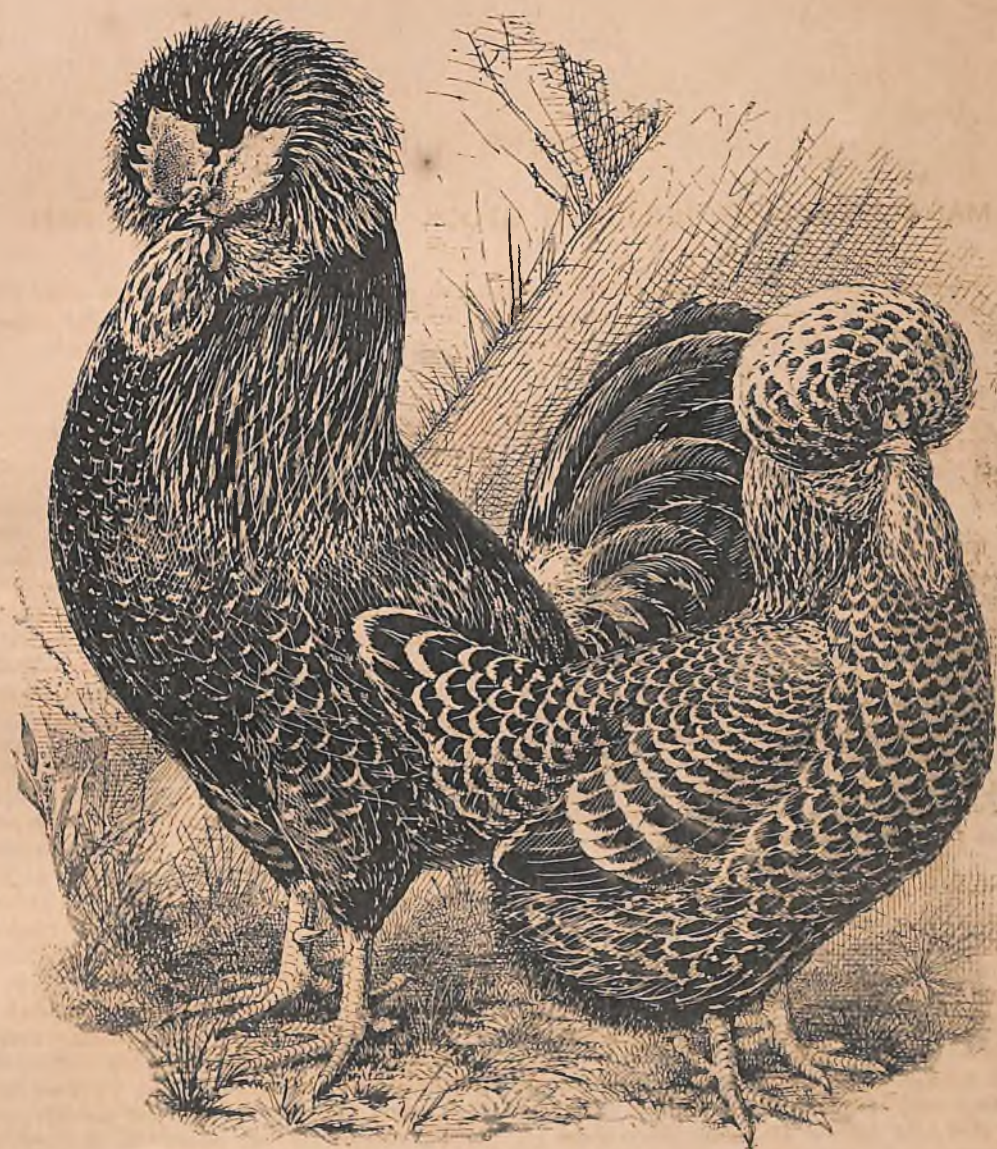
NATURE is a marvellous mother. In all her steps every provision is made for the well-being of creatures born into the world, and no study presents more features for investigation than the production of animal life. There are no wheels missing in this machine, no methods which we could improve upon. There is a completeness which utterly puts to shame all the inventions of man. And with respect to the formation of chickens in the shell, there is nothing more wonderful within the whole realm of nature. When we look at an egg we are astonished at its form, its symmetry, its strength; but we could never imagine, if we did not know, that the white within an egg contains all elements for making a chicken, and that the application of heat and moisture will produce from it bone, flesh, and feathers, all of which need many various materials in formation. They are produced in different fashions, and, we could almost say, under different conditions.

It must be remembered in approaching this subject of incubation, that by domestication we have altogether altered the environment of fowls, and we therefore must expect that the same results will not be secured as under natural conditions. Too much is, we think, made of the "copying nature" theory. The whole face of things has been changed, and what would be perfectly suitable in one case is altogether unsuitable in another. Eggs laid by birds in a wild state, so far as our observations go, seldom fail to hatch. But this does not prove that eggs laid by domesticated fowls would hatch as well if set in the same way. It cannot be gainsaid that domestication has resulted in a weakening of constitution, but it has resulted in an increase of size in all breeds except Bantams, and in stimulation of the laying faculty. Careful poultry keepers do all they can to overcome this weakening of constitution, in some cases by allowing full liberty, but it appears to be utterly impossible to

obtain the same surety in hatching as is met with in wild fowls.

CAUSES OF INFERTILITY.

In the first place, eggs are less fertile, for an infertile egg would be a *rara avis* in a wild bird's nest. The cause of this infertility may possibly be due to the larger number of eggs produced by birds in domestication, but it is also due to reduced vigour of the male bird. Then, again, a very large number of eggs are lost during the process of hatching by their becoming addled—that is, the germ in the earlier, or the chick in the later stages, dies. Such fatality may be due to several causes, such as want of strength in the embryo, caused by reduced vitality in the cock, already referred to above, to improper conditions under which the hatching is carried on, to want of moisture, or to lack of attention on the part of the hen. One reason why wild birds seldom desert their nests is, that they do not commence sitting until the proper season has arrived, and consequently there is not the same risk of changes in the weather. Also, a hen knows by her instinct what kind of place is most suited to her nest. This might at first be thought to be conclusive that hens should be allowed to sit where they like. But we must remember that domestication has enormously increased the number of fowls, and, therefore, what would be best for them in a wild state, where the nests are few and far between, is not equally so when they are numerous. And, again, if we wish to make poultry-keeping really profitable, it is necessary that hatching should commence early. Therefore, if we permitted the hens to sit just when and where they think fit, it would mean our being too late. Almost every poultry-keeper who desires to obtain early stock has to depend upon other than his own yard for broody hens early in the year, or upon an incubator; for if he relies upon his own stock, unless he keeps a breed that makes sitting the rule of life, he will not be able to secure



PAIR OF HOUDANS.

BRED BY, AND THE PROPERTY OF, MR. S. W. THOMAS, COCKETT, SWANSEA.
Cock, Winner of Cups at Crystal Palace, Birmingham, Worcester, &c. ; Hen, Winner of Two First Prizes at
Birmingham, Special Newport, &c., &c.

sitters when he needs them. In this point the letting alone, or so-called "natural," system does not work advantageously.

ESSENTIALS TO SUCCESS.

In the sitting of hens there are several things essential to success. We do not mean by this that unless these are observed hatching is impossible, for we have known eggs hatch under the most untoward conditions, and in spite of most disadvantageous circumstances. But such a state of affairs must not be reckoned upon. The first essential to success is vigour and stamina of the stock birds. The dangers of in-breeding have already been pointed out, and one of the most frequent results of this close breeding is that very large numbers of the eggs produced are infertile, or become addled, or die during the early stages after hatching. Many instances could be cited in proof of this contention. Vigour in the stock birds is absolutely necessary if the progeny are to be healthy and strong, and we require strong, healthy, untainted birds upon good runs.

NUMBER OF HENS WITH THE COCK.

Another matter which requires attention is that there shall be enough yet not too many hens running with the cock bird. It is generally known and accepted that too many hens with a cock bird will result in a large number of infertile eggs, or of weakened chicks, but there are not many who understand that the same result may be due to the hens being too few. All depends upon the breed, and the vigour of the male bird. Some of the more vigorous breeds need from six to twelve hens, according to the season of the year, and less would be hurtful to the hens; whilst there are others, less vigorous, for whom six hens would at any time be too many, and in the colder season two or three are sufficient. There is, of course, also a difference in individual hens of the same breed, and no certain rule can be given that will apply to every case. The best plan is to give the heavier varieties three hens early in the year, increasing up to six as the weather becomes milder; and in the case of the lighter and more vigorous varieties, giving five or six at first, and increasing the number to ten or twelve. If the hens seem to be distressed, and show this by the loss of feathers on their backs, then more hens should be given at once. There is also another cause of infertile eggs, and one which is often unsuspected, viz., that the cock bird does not get sufficient food. His gallantry to the ladies of his harem leads him to see that they are all fed before he partakes of any food, and if there is only a limited supply, or they are fed by an attendant who only throws down as much as the birds appear to eat greedily, then the probabilities are that he will not get half enough to eat. This is a matter which needs attention, and often explains the laying of infertile eggs.

ELEMENTS IN HATCHING.

Heat, moisture, and occasional cooling are the factors at work in the production of chickens. Heat is, of

course, supplied by the hen, who, also, if she be a good sitter, will see to the cooling, though, as a rule, it is better not to trust entirely to her for this. But moisture is beyond her control if the place of sitting is allotted to her. In some districts there is no trouble whatever on this score, as the atmosphere is naturally charged with sufficient for the needs of eggs. But in others very great care has to be taken, or dryness of the atmosphere will be fatal to successful hatching. Seasons also differ. A very dry spring will demand more attention being given to the question of moisture than a wet one, and thus the poultry-keeper has to use his brains if he wishes to be successful. There is another influence which must be referred to, as it is a most important one to all those whose places are subject to cold easterly winds. It needs no description to impress this fact upon most poultry keepers. What is the influence of east winds upon our fowls and their eggs has never been satisfactorily explained, but eggs are less fertile, fertile eggs are very likely to be addled, and hens simply go on strike, unless they are set in places much more comfortable than falls to the lot of the greater majority of human beings. A hen's maternal instincts appear to be lost during such a season, and we have often seen inveterate sitters, who had been known to do their work without interruption during frost and snow, desert their eggs apparently without compunction. If we could learn just what is the cause of all this, it might be possible to find a remedy. As it is, however, we have to give up the thing for the present and simply state a fact.

PLACES FOR HATCHING.

Where there are to be only two or three batches of eggs hatched during the season there need not be much difficulty in providing for them. A hen can be set in some quiet outhouse or shed, where the work will probably go on without any trouble. In this case, if the house or shed can be given up to the hen entirely, it will be best to provide a square box without a bottom, which, standing either upon the earth, if its floor be of that material, or upon sand or earth, if it has an artificial floor, will be the simplest arrangement. This box is best if made to completely cover the hen, but without a front, so that she can leave the nest whenever she wishes so to do. The advantage of a hatching-box like this over a square, open topped box, is that moisture can be given to the earth below during a very dry season without disturbing or alarming the hen. If it is thought desirable, such a box can be made with a door in front, so that if necessity should arise, the hen can be enclosed. As we shall have occasion to refer to the hatching-box which we have used so successfully, it will be well to give a description. It consists of a box without bottom (Fig. 18), and for ordinary sized fowls is made about fifteen inches square, and eighteen or twenty inches high. The material, wood of course, is half or three-quarter-inch boards, and it is built with solid back,

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sides, and top. The upper part of the front forms the door, which is the width of the box, and fifteen inches high. A piece of deal three or five inches in depth, according to the height of the box, forms the lower section of this front, or, if a twenty-inch high box, the bottom piece may be three inches, and a similar lath two inches wide fixed at the top of the front. The loose portion is made the door, and is hinged at the bottom, fastening to the top by a button. When this door is open it falls downwards, and thus provides a firm footing for the hen in entering or leaving the nest. Three ventilation holes should be made in each of the sides and back, quite close to the top, and half a dozen in the top, to which a handle can be fitted, but of course these are only needed if there is a door fitted to the box. There are several appliance makers who sell hatching boxes with netting stretched across the bottom as a protection against rats, which is a very necessary precaution where these pests are troublesome, and also with doors and backs covered with netting (Fig. 19). Such a box as this can be used anywhere, whether one or a score hens are set in the same

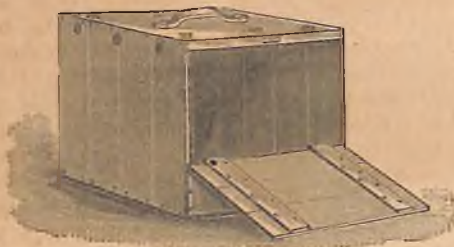


FIG. 18.—CLOSE HATCHING BOX.

place, and they can also be utilised as laying boxes when the hatching season is over.

Where only a few hens are to be set we should advise that later in the season (except in unusually cold springs), say, after the early part of May, the hens have their nests made out in the open. Of course, some shelter will be necessary, but if one of the hatching boxes be used, all that will be required is either a rough covering or a coop, or the hen can be set in a coop, and then will not need to be disturbed when her chickens come out. On farms there are often sheds scattered about which can also be utilised. One of the difficulties of this plan, at least in many parts of England, is that foxes are preserved, and help themselves, as is their wont, to the poultry. A capital arrangement in such districts is that adopted by Captain Terry (Fig. 20), a coop and run combined.

Perhaps one of the best plans for those who have large farms is to put the hatching in charge of some of their labourers, so that they can rear the chickens near their residences. The usual plan is to pay a specified sum per bird hatched and reared to a given age. In this way cordial co-operation by those taking charge of the sitting hens is secured. This applies only

to such as go in for poultry-keeping on a large scale; but if poultry are to be made to pay, it is desirable that the attendants should have some direct interest in their success. However slight this interest may be it will prove a stimulus to greater care and effort, and far more than repay the outlay involved.

HATCHING ROOMS.

By the expenditure of a little trouble arrangements can be made by which a large number of hens can be set in a single room, and it is only because of this trouble that we suggest non-adoption of the plan in small poultry yards. Still even there, and especially when ladies undertake the work of attending to the fowls, it is much more convenient to have the hens in a room. In selecting a room for the purpose of sitting hens it is desirable to have one as little subject to variations of temperature as possible, for there is then much less danger from sudden frosts. Our own experience is that the loft over a stable is the best place for this purpose. Heat from the stables below will keep up an even

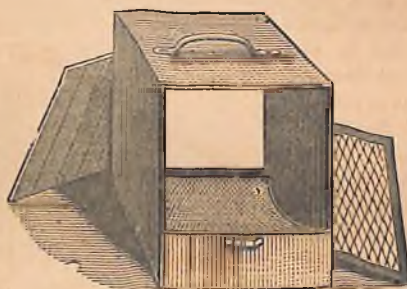


FIG. 19.—SPRATTS PATENT HATCHING BOX.

temperature. It is not at all necessary that the hatching room should be perfectly dry; in fact, if the atmosphere is somewhat damp it will be none the worse, moisture being a most important element in hatching operations. Of course by this we do not mean that a place soaking with wet should be selected, but if there is a natural but gentle dampness, it will be all the more suitable for the purpose. Then, again, if it is rather dark hens will sit all the better, but in any case the sitting-room should be darkened if it is not already sufficiently so. The thing to avoid most of all is a hot, dry place, for there it will be almost impossible to succeed in hatching operations.

The plan we adopted, and with the greatest success, was to place several of the hatching boxes already described around a loft or room, with their backs to and about a foot from the walls. In a room fifteen feet square sixteen or eighteen of the hatching-boxes can be accommodated, and we have had as many as twenty going at one time. Each box should be at least a foot to eighteen inches removed from its neighbour, so that there may be a free current of air all around, for air is a most important factor in the hatching of eggs. Thousands of eggs are added, or the

chickens asphyxiated, by foul air with which they are surrounded, and which the chicken, if it can be so termed at that early stage, within a shell is thus compelled to breathe. There should be a layer of fine earth or ashes, say six or seven inches thick, on the floor, upon which the hatching boxes are to be placed. This layer is better if continued entirely around the room, and in no case should it be merely enough for the box to stand upon. The reason for this will be explained afterwards. It will thus be seen that when the boxes are all placed in position, the doors will face towards the centre, for it is necessary to have doors on the hatching boxes when this plan is followed.

MAKING THE NEST.

In making nests within the boxes a shovelful of earth or ashes is first placed therein, and then hollowed out into basin shape, taking care that all the corners are filled, lest any of the eggs roll therein and are chilled. There are breeders who use damp grass sods, but as the object of both earth and sod is to give that cool dampness which is so essential to successful hatching, earth is to be preferred, as it can be made to fill up the box better. Upon this earth a nest is made of fine straw, oat straw preferred, and which is all the better if well beaten or rubbed in the hands before being placed in the nest.

When completed the nest should be slightly below the level of the cross piece at the front. The eggs should have no tendency to roll out, but always strongly incline to the centre of the nest. As a rule when eggs are placed in a hatching box, and a broody hen put down before it, she will go on at once of her own accord, but sometimes it is not so. It is always desirable, therefore, in setting hens, when they are put to a strange nest, to let them have a few addled or dummy eggs at first. This is to prevent valuable eggs being wasted. We prefer the night for setting hens. If the nest be prepared, and a lantern or lamp so placed that the light falls directly upon it, the hen appears to enter as a matter of course.

FEEDING AND COOLING.

So far all is right, and there are no difficulties in the business. But if there are twelve or fifteen hens sitting at one time, and all these have to be liberated for feeding and dusting separately, it will be seen that the attention of someone will be pretty fully taken up. The hens must be allowed out daily, and they cannot be let out

together, or there will be conflict, resulting in general disaster. If the time of an attendant can be given to the sitting hens, a simple way is to open the door of each box in turn, give the hen half an hour, then close her in, and open the next. Should any not have come off they must be lifted, both for their own sake and cooling the eggs. The earth or ashes below the box will provide much of the dampness needed by the eggs; but in a very dry place, or during dry weather, it is desirable to keep the earth moist by pouring on it, around the box, a pint or two of hot water daily. This is much to be preferred to moistening eggs themselves, a plan, we think, which does more harm than good. A method which we have at various times adopted for liberating the hens, is having three or four wire runs, such as are often used for coops, and placing these around as many boxes not adjoining, so that several hens can be out at one time, and yet not be able to interfere with each other.

Such a plan as this makes it possible to shorten very considerably the time required for attending to sitting hens.

There is yet another plan which we have at times adopted with great success. At one time we had a large loft fitted up with pens in which exhibition and surplus birds were kept. These pens were, as a rule, about three feet square, and in double

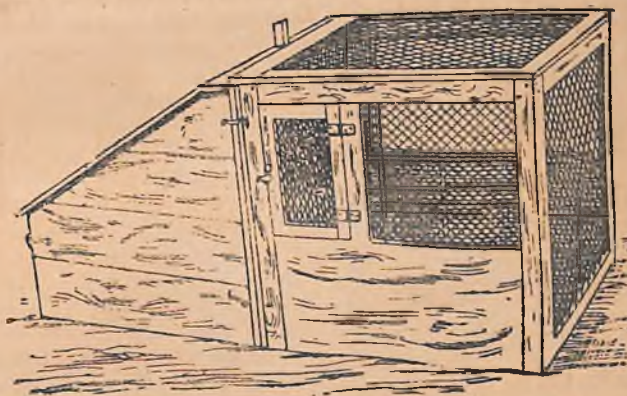


FIG. 20.—CAPTAIN TERRY'S HATCHING AND REARING COOP.

tiers all round the loft. In each of these we placed a hatching box, standing it upon earth in the manner already described. Food and a dust bath were placed in every pen, with a dish of water, and every morning the doors of the boxes were all opened for a couple of hours, thus allowing the hens to come off whenever they thought fit, when they were closed again. This plan, of course, greatly minimised labour in attending upon the hens, but it had one drawback, namely, that it did not give an opportunity for that daily observation of each nest which we regard as most important. Fouling of a nest, or accidental breaking of an egg, if not seen to at once, will almost certainly be fatal to success in hatching. And we have always made it a practice to examine the various nests every day. If it were not for this the plan of setting hens in pens such as we have described would be the best. It does not answer to disturb a hen when she has been off her nest, for very often she resents it, and in the scrimmage there is danger that some of the eggs will be broken. When a

hen has to be lifted off, it is necessary to exercise very great care in doing it, to avoid breaking any eggs. Hens usually tuck the eggs tightly under their wings, especially when disturbed, and if a hen be lifted up bodily the chances are all in favour of an egg dropping down upon others in the nest and making a general smash. Therefore, in lifting off a hen, the hand should first be slid under each wing so as to lift the latter from the eggs, and then the hen lifted off by her wings. Properly done this method will effectually remove all danger of broken eggs from the cause already named. Sometimes an egg is accidentally broken and the contents adhere to her breast and to the shells of eggs remaining in the nest. If this be the case a breakage is certain to result unless the matter be put right. Should a hen foul her nest, which will never take place if she be let out at regular periods, the same result may accrue. It is to prevent this kind of thing that we advocate daily examination of nests. And as it is desirable not to allow a hen to be disturbed more than is necessary, this should be done at the time of feeding. Hens should be fed on hard grain, such as wheat, or barley, or oats; they should be provided with fresh water daily, and have a good dust bath. The latter is most important, as in warm weather hens are often so pestered with fleas that they desert their nests. For this reason we have found it an excellent plan to dust a little black sulphur, or some carbolie powder, through the straw. Nests should also be made afresh after every hatching, and hatching boxes should be well limewashed two or three times during the season.

HATCHING BY TURKEYS.

A very interesting description of the system of hatching by turkeys was given a few years ago by Mr. C. L. Sutherland, in his report on West Central France to the Royal Commission on Agriculture. In this he says:—"At Houdan, in the Seine-et-Oise, which I visited on the 26th of March, 1880, the poultry-breeding industry may be seen in full force. Houdan fowls alone are kept, and it is calculated that the pullets, when well fed, will commence to lay at five months old. Artificial incubation is not generally practised, but it is considered that it will come into use as soon as the means for hatching a larger proportion of the eggs has been discovered.* At present it has been found, in the case of incubators, that the embryo is very apt to perish on the eighteenth or nineteenth day. The majority of breeders adopt the plan of placing twenty-five fowls' eggs under a young turkey hen. When it is desired that the turkey hen shall commence to sit, be it January or June, she is placed in a suitable box almost entirely covered by a board, and some dummy eggs are put under her. She is generally kept in the dark. She soon takes to the dummy eggs, which are then removed, and twenty-five fowls' eggs are placed beneath her. She is taken off the eggs once a day to feed, and carefully replaced, not on the eggs but in

front of them, and she then, after the manner of turkeys, carefully hooks them underneath her with her beak. When the chicks are hatched they are removed from under her, to be sold or sent off at once, or to be brought up by another turkey hen, which is perhaps an indifferent sitter, and which, in lieu of sitting, has from 80 to 100 chicks given her to bring up. Orders are kept on hand for these chicks (poussins), which, within twelve hours of being hatched, are despatched all over France in well-ventilated boxes holding from twelve to twenty each, and at the following prices, viz.:—One dozen, 12s.; 25, 22s. 5d.; 50, 44s.; 100, 80s. The hen turkey which hatches out the chicks is then provided with twenty-five more eggs, upon which she at once sits, and this process I was assured was carried on six, seven, and eight times in succession. Young turkey hens are preferred to old ones for the purpose. Such a thing as a coop is rarely to be seen. In the morning as soon as it is light the doors of the sheds in which the young chicks with their foster-mothers—the indifferently sitting turkey hens—have passed the night are thrown open. The inmates are driven out mostly by old women with long poles, who conduct the whole lot gently into some covert, or along the country lanes, where the chicks can find plenty of insect life, the old ladies sitting with their work and keeping careful watch over their charges."

There are a few poultry-breeders who have at times tried the same system in this country, and they speak in unqualified approval thereof. They claim that not only can a turkey cover twice the number of eggs as an ordinary hen, and care for three times the number of chickens, but that they are more reliable both as hatchers and brooders, that they are less affected by the weather, and that they will be ready at three or four days' notice whenever called upon. These, it must be conceded, are strong claims, and so far as we can learn they are quite warranted by the facts of the case. And it is not only the turkey hen that will take up the duties of maternity, but her mate is just as eager for this work. He may not be quite so deft at it, though in this respect there is very little to choose between the sexes, but he can be trusted, and may be thoroughly relied upon. With both cocks or hens there is little or no attempt to rebel against the chicks being removed. This is altogether different to what we have experienced with hens. Many a stiff fight have we had with an ordinary hen when taking her brood away to be placed in the artificial mother, and she has resisted strongly, also refusing to be comforted with another batch of eggs. But it is not so with the turkey, who is obedient in all things. Perhaps this does not show such a strong maternal affection, but it is a very convenient state of affairs for the poultry-keeper who is utilising the turkey.

TESTING THE EGGS.

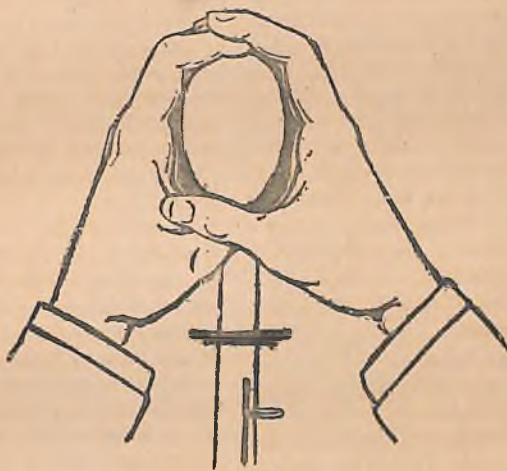
At one time many poultry-keepers had a very decided objection to in any way interfering with the eggs during the time of sitting, but this has been shown to be a merely sentimental objection, and that there are very many

* Mr. Sutherland's anticipation has since been realised.

advantages in so testing them. We ourselves, both when hens were doing the work, or when the eggs were in incubators, have always tested the eggs twice during the process. The first time is on the seventh day, and then by candle light. The object of this test is to see how many of the eggs are fertile, so that those that are clear can be taken away, and as they are still good for culinary purposes, it will be seen on that account alone there is a very strong argument in favour of the system. In large establishments some hundreds of eggs can be saved every year in this way, which will represent a respectable item in the year's returns. But there is another and still more important argument in its favour, and that is, the space occupied by these useless eggs can be filled up and the work either of hen or machine be used for such eggs as are of real value for hatching purposes. For instance, if three hens are set at one time—and we always set two or three together—and on the first examination, it is found that one-third of the eggs are unfertile, when the useless ones are removed there will just be sufficient for two hens, and the third hen can be set again with a fresh batch of eggs. The fact is that this test enables, as a rule, as many chicks to be hatched with two-thirds the number of hens as would be needed under the other system.

Coming to the method of examination; first remove all eggs from the nest either when the hen is feeding or after lifting her off for the purpose, and hold them between a candle or lamp and the eye. The best time to do it is at night, and a candle can be placed at a convenient height for the purpose. Then take an egg in the left hand, holding it between the forefinger and thumb, using the other finger of the hand as a shade to keep the light from the eye. The right hand is next put around the part of the egg left exposed and the fingers of that hand used also as a shade. The object is to only permit the light to be seen by the eye through the body of the egg, and a very little practice will enable anyone to hold it properly. Some use cardboard, cutting in it an oval hole scarcely so large as the egg, and there are also egg testers sold at about a shilling each, made of tin covered partially with black cloth. These are perhaps the simplest, though we have always been able to test much more quickly when using only the hands, as already described. When the egg is fertile there will be seen, at the seventh day, a large black spot in the centre of the egg, covering it so that it

is perfectly opaque, but getting lighter in colour nearer the edges. If the examination had taken place a day or two earlier there would have been seen a small black spot in the centre, and a host of little streaks, or veins, radiating from it. But at the seventh day these cannot be seen, for the chick is then beginning to assume more of its natural form. This opaqueness shows that the egg is fertile, for an unfertile one is clear to the end, no matter how long it is sat upon. Some people we have met with would not accept this test; they thought that perhaps the chick would develop if sat upon a little longer, but every fertile egg by the seventh day has developed sufficiently to declare itself in an unmistakable manner. We have sometimes been deceived when testing incubator eggs at the third or fourth day, but never at the seventh, and thus it is better, as a rule, to accept that time as the right one for applying the test.



HOW TO TEST AN EGG BY CANDLE LIGHT.

We come next to the second test, which is made on the nineteenth day, that is, two days before the eggs are due to hatch. This is by means of warm water, and it has a double purpose; first, the discovery of all dead eggs, and second, softening the shell, so that the chick may more easily find its way out. The plan we have always followed is to get a pail or large bowl nearly full of water, heated up to 105 degrees; that is, just as hot as the hand can comfortably bear it. If a bowl is used it should be a deep one, say, having not less than six or eight inches of water in it, and the difficulty of getting one suffi-

ciently deep has generally led us to use a pail. The eggs are removed from the nest, and placed in the water, when it will be seen that the majority will float broad end upwards, about two-thirds in and one-third out of the water. Those that sink may be counted as useless, and put out of the reckoning, as they are generally addled eggs, that is, eggs which have been fertile, but in which the process of evolution has been arrested at some stage of their progress. Some breeders have stated they have known eggs that sunk to hatch, but we have never once done so, and of the scores we have broken not one has been alive or even fully formed. In a few moments some of the eggs will be seen to jump about in a curious manner, caused, it is said, by the effort of the little prisoners to get out. It is better when the eggs have been in three or four minutes to put back into the nest, without drying, those that so jump, and if there are any that do not move it may be accepted as fact that they are dead.

CHAPTER IX.

THE REARING OF CHICKENS.

THE PLACE TO REAR—VALUE OF CHICKEN-HOUSE—NO CODDLING OF CHICKENS—CHICKEN-COOPS—SUSSEX COOP—EARLY DAYS OF CHICKENHOOD—FEEDING CHICKENS—SPACE FOR CHICKENS—CLEANLINESS ESSENTIAL TO SUCCESS—THE ORPHANS—DIVISION OF THE SEXES—SELLING YOUNG CHICKENS—PESTS IN THE CHICKEN-HOUSE.



MUCH of the way in which the chicken-yard should be arranged depends upon the place at the disposal of each breeder, and upon the number of fowls he intends to hatch.

Where he wishes for only a few batches in the year, he needs only to devote one of the poultry-houses and runs to the purpose of rearing. But where the breeding is on a more extensive scale, it is desirable to have some special provision made for the chickens. Under such circumstances a chicken-house, such as we have already described, is invaluable, of the greatest service in this work, and is well worth its cost.

THE PLACE TO REAR.

Wherever the chickens are reared they must have a dry house and run. Damp is fatal to them—more fatal than almost anything with which they have to contend. Of course the ideal spot for rearing chickens is on the slope of a gravelly-soiled hill, around which there are plenty of bushes and trees. But unfortunately the majority of poultry-breeders have not such a place at command, and they have to make the best they can of the place in which they reside. As they cannot make the conditions, they must use and improve them to the best of their ability. Still it is imperative that the place be dry, and if it is not naturally so it must be made artificially dry. In temperate zones north of the equator a chicken-yard should face the south, and if there is a slight incline in the ground it will help in carrying off the water. It may here be mentioned that the best soil upon which to rear chickens is not sand. One of the most important elements in the successful rearing and maintenance of fowls is that they should have a proper supply of natural food, such as worms, grubs, etc., which they can best obtain from the earth. Insect and grub life is less found in sandy than in any other kind of soil, and therefore whilst sand is splendid as an upper-coating, from its dry and warm nature, it is

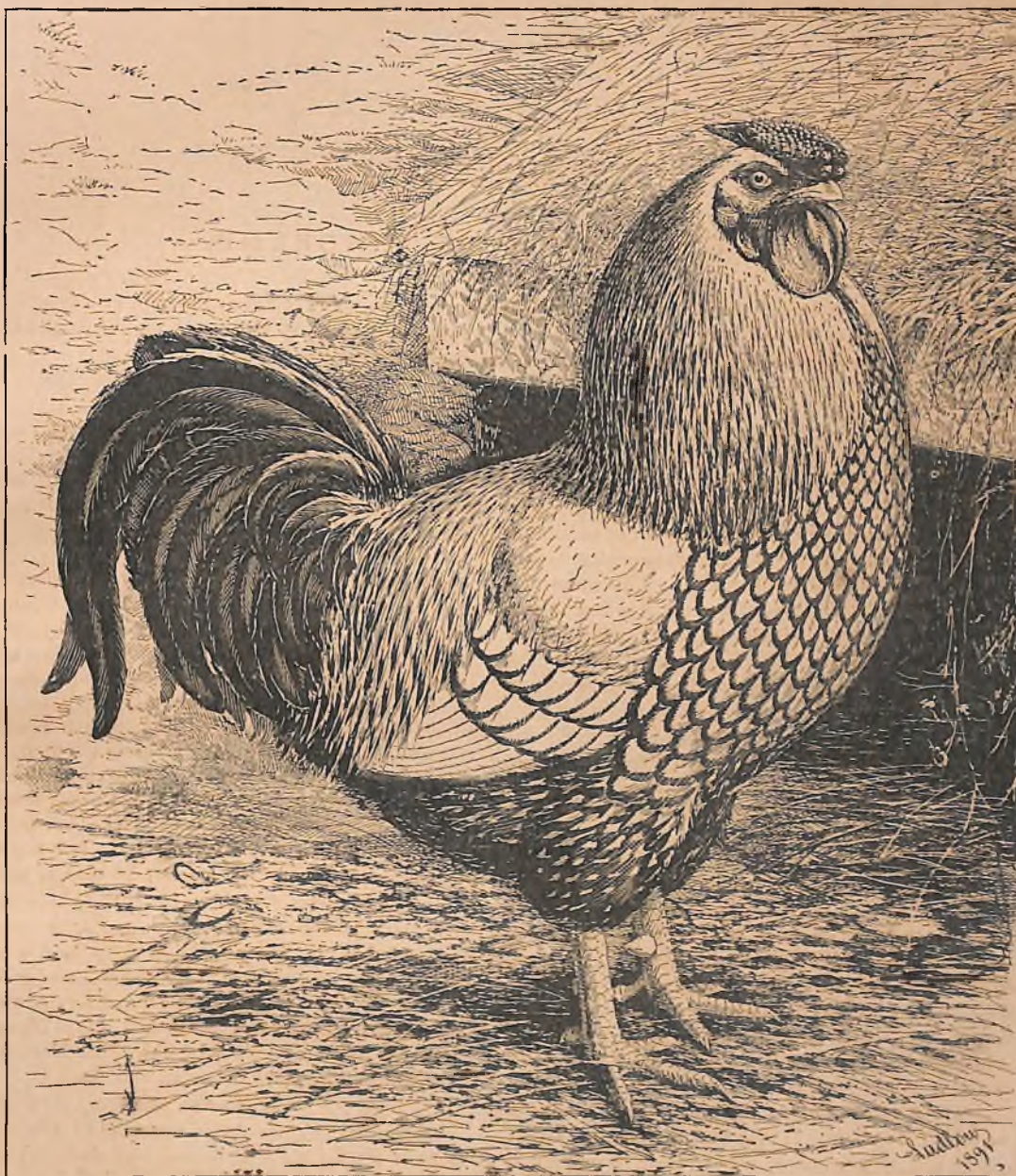
not the most desirable for fowl-rearing. Many poultry-keepers make a great mistake on this score, thinking that if they are on sandy soil the matter is all right, whereas they may really be on the very worst place that could be found.

VALUE OF CHICKEN-HOUSE.

A chicken-house is not an absolute necessity, except for those who desire to breed early chickens, whether for the market or for exhibition. When the first batches do not come out before the latter end of March then no such house is required, for the coops in which the hens and chicks will be placed provide sufficient shelter, but we should not advise anyone to attempt the rearing of chickens in January or February out in the open. As a rule it is the better plan to bring up chicks in a hardy fashion, and we are very glad to note that there is a reaction against the pampering methods which have been in vogue for some years, and which have been the means of inducing a very serious amount of disease amongst our domestic fowls. We do not mean by this that we should put chickens out in coops during severe weather, say in January. That would be folly, and courting disaster. But later on it is much the better plan to let the birds rough it a little, and be exposed to the variable weather of April. Fresh air is essential, and in the spring-time all living things are reproducing themselves, so that it is desirable that there should be freedom.

CHICKEN-COOPS.

Many different kinds of coops are made. The requirements of a coop are that it shall give shelter to the inmates, be warm and comfortable, protected from marauders at night, and easily removed. If only to be used in the chicken-house, as described by us a week or two ago, the shape is of small moment. A bottomless box with wooden laths or wire bars at the front will answer just as well as anything else. But if it has to be put out in the open, then there must be something very much stronger,



SILVER WYANDOTTE COCKEREL.

BRED BY, AND THE PROPERTY OF, MR. C. NEWINGTON, RIDGEWAY, TICHEMURST, SUSSEX.
Winner of Cups, Specials, and First Prizes at Crystal Palace, Dairy Show, &c., 1890.

offering more protection, both against weather and the enemies of chickendom.

Amongst the earliest coops made was the ordinary Sussex coop, which at one time was almost universally employed. It is triangular in shape, and presents at front the appearance of an inverted V. This generally stands about 24 or 27 inches high in the centre, and is the same width at the ground. The sides and back are solid, but the front is made of upright laths, one of which is loose, so that when taken out the hen can get out. Of course the laths, as in all coops, are sufficiently apart to allow the chicks to pass between them. This coop usually has no floor, but in such dry districts as Surrey and Sussex a floor is not needed in any coop. Wherever the ground is at all damp or cold, a floor is an indispensable adjunct to any coop, of whatever kind it may be. This coop may be regarded as old-fashioned, but it is none the worse on that account. Its chief fault is that the front does not give much space for a shelter flap being fitted thereon—an almost necessary part of it either on wet or sunny days. A wire run, of course made the same shape, can be fitted to the coop. Mr. Calway makes a very nice coop of this kind (Fig. 21),



FIG. 21.—CALWAY'S SUSSEX COOP.

without run, and those who wish to buy rather than to make their own will find two or three kinds in the price-list of that firm, as well as such other makers as Spratts Patent, Barnard's, Boulton and Paul, Frazer's, etc.

A second kind of coop is the square one, which may have either a roof sloping from front to back, or be gabled, either of which form does equally well. The size depends upon the hen, but we have always found 21 and 24 inches square the most useful sizes. All coops should have solid sides and back, and the design will not in any way affect this matter. The front should be formed of wire bars or wooden laths. If the former are employed, all but two should be fixed in the upper and lower frames; but these two (those in the centre) should be rather longer than the rest, and in one piece, the bend being on top to form a handle. The ends of this long $\cap$ will come to the bottom frame, and should be fixed into a loose piece of wood long enough to nearly touch the next bar on either side of these two; that is, if each bar is two inches apart, this piece of wood should be $5\frac{1}{2}$ inches long. A piece of tin carried loosely round the bar, and then tacked to the wood at each end, will keep the door in position, and prevent the hen making

her way out when not wanted. If wooden laths are used, it will be sufficient to make the centre one longer and loose, and then it can be lifted right out. A flap should be made to fit at top of the front for shelter, and be arranged to be flat or at an angle, and another may be placed at the foot to close up at night—though if a wire run is employed this latter is not needed—for then cats or other night marauders cannot find their way in, unless the run be very loose. This ought never to be, for sometimes the chicks get out when that is the case, and cannot return again.

We have mentioned that sometimes a floor is necessary, because of the nature of the soil. When this is so it is important that it be properly made. A fixed floor to a coop is very bad, as it absorbs the damp from the earth, making the hen and her brood cold and uncomfortable, giving rise to colds and other diseases. Not only so, but a fixed floor cannot be cleaned properly, and on that score is very objectionable. A floor should therefore be moveable, and be raised two or three inches above the ground.

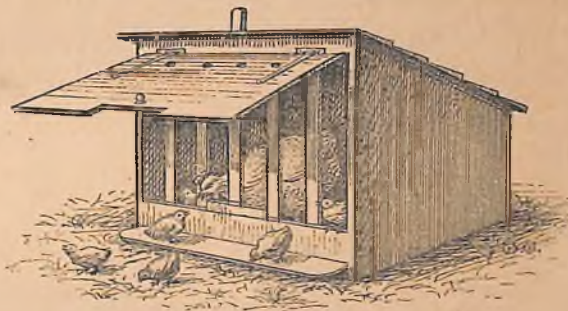


FIG. 22.—BARNARD, BISHOP, AND BARNARD'S SHELTER COOP.

The best method is one that we adopted years ago, and it is, in our estimation, perfect in every way. The boards forming it are nailed on to a couple of pieces of three-inch scantling, and fit entirely within the coop, the sides resting upon the scantling. In this way the inside of the coop is kept perfectly dry, for however hard the rain comes down it cannot splash within. When it has to be cleaned, lifting the coop leaves the floor lying so that both parts are at once accessible for cleaning. Another advantage is that the coop can be used with or without the floor, as the time of year and season may make desirable. Where the ground is sufficiently dry we prefer not to use a floor; but where one is used the boards should be kept well covered with dry earth and straw. Daily moving to fresh ground is essential, as is very careful attention to cleanliness. A coop should be well washed out between every brood's occupation of it, or insects will become a source of trouble and annoyance to both hen and chickens. The hen should always be let out for a short time every day, and be placed where she can enjoy the luxury of a dust-bath.

EARLY DAYS OF CHICKENHOOD.

For the first twenty-four hours after a chicken is

hatched it needs no more food than has been provided for it by nature. The yolk-bag, which is absorbed into the abdomen prior to the breaking of the shell, contains all the food needed for the time already stated. We believe harm is often done by forcing young chickens to eat, and it is not improbable that derangements of the stomach are set up by doing this, especially as rich food is often given. When the proper time comes there will be no need to force eating. The cravings of nature will remove all necessity for that. But the hen ought to be well fed, and when the anxiety of her maternal trial is over, she will be ready for and need something calculated to brace her up again.

FEEDING CHICKENS.

The whole question of feeding young chicks deserves the fullest attention, as upon it will largely depend the future of the birds. As already stated, there has been a revolt against pampering, but it is necessary to see that the other extreme is not taken. One would be just as bad as the other. We have always made it a practice to feed chicks the first few days on chopped egg and breadcrumbs, slightly moistened with milk, but we are fain to confess that we have seen chickens reared without egg at all quite as successfully as any of our own. There are those who say that chickens will do much better on hard plain food than with egg and other such—as they describe them—dainties. We do not think that very early-bred chickens would be reared without these kinds of food, but as to the later birds there would not be much difficulty with them, as they can get plenty of insect life, which, it must be remembered, is their natural diet. We lay very great stress upon this point. Many failures in chicken-rearing are due to absence of insects and ground worms, or it may be to their excess, for one of the effects of contamination of the ground by fowls is that it becomes charged with minute life, of which there is either too much, or it is of an injurious nature. The question is one that has not yet been studied out. We are familiar with results, but are certain as to causes. If the egg-food diet be adopted it must only be continued for a few days, say three or four at most, when there should be substituted a plainer food, such as Spratts Poultry Meal, Chamberlin's Canadian Meal, Calway's Meal, Lambert's Cereal Meal, coarse oatmeal, or coarsely ground barley-meal. The advantage all these foods have is that they can be prepared with hot water without becoming sloppy or pasty. Food should be given warm and a little at a time, taking care that none be left to sour and derange the delicate stomachs of the birds. But

we shall deal exhaustively with this subject in the next chapter, to which we refer the reader.

SPACE FOR CHICKENS.

The amount of space given to the chickens must depend largely upon how much is at command. The ideal manner of rearing chickens is to place the coops out in some nice sheltered place, sheltered to the north and east, but open to the south, and allow the hens to go about where they like, of course arranging that the coops shall be well apart. Where foxes and other pests of the poultry-keeper do not abound this is a good plan, provided that the hens are accustomed to full liberty. Then they will only go as far as their chickens can, and the whole arrangement is a beneficial one. But if the hens are usually kept in confinement, to place them out in the open in this way would be most disastrous, for the old birds would so enjoy their liberty and be thinking of their own pleasure to such an extent that the poor chickens would have their strength overtaxed. Many are lost in this way, and where the hens are usually kept in confinement it is desirable that they be restrained when in charge of chickens. There is also another point to be mentioned here, namely, that the habits of a hen and her brood must be regarded. For instance, if a hen is set upon eggs laid by herself, or by hens of her own breed, she is not likely to overtax them so much as if of different breeds. If it is "her nature to," to wander, the chicks will have the same leanings.



FIG 23.—BOULTON AND PAUL'S COMBINATION COOP.

But if, say, a Game hen is put with eggs from chickens of any other of less active races, the probability is that if given her liberty she may take them too far astray, and thus overtax their strength. These are matters which must determine the question of how much space should be given to the chickens, and if the happy mean can be secured all will be well. Theoretically, it is best to give the chicks as much space as possible, but there are certain limitations indicated above.

CLEANLINESS ESSENTIAL TO SUCCESS.

It is scarcely necessary to refer to the importance of cleanliness in the hen-coops, feeding-dishes, etc. But lest anyone might think this is non-important, we desire to remind the reader that want of attention to this point will be fatal to success. The coop ought to be thoroughly cleaned out every day, to have fresh soil placed in it and the straw be renewed twice or thrice a week. This, with a good limewashing after each brood has been taken from it, should keep down insects, which are so prolific a source of trouble. Fowls can never thrive when infested with insects, and the disease

known as gapes is due to worms in the throat, which worms are in many cases the development of body lice. We have always been very free in our use of Jeyes' purifying powder, or carbolic powder, both in the coops and hen-houses, as they are the best preventives of trouble with insects that can be obtained. But they will not do all, and together with their use there must be perfect cleanliness. Some arrangements should be made whereby the hens with chickens can have a good dust bath every day. In the summer-time if at liberty they can secure this for themselves. Some breeders have adopted the system of anointing the heads of chickens with an ointment made as follows:—Mercurial ointment, 1 oz.; lard, 1 oz.; powdered sulphur, $\frac{1}{2}$ oz.; crude petroleum, $\frac{1}{2}$ oz. This is warmed to semi-fluidity, well mixed, and the heads of the chicks anointed with it as soon as they are dry after hatching. The effect is that the insects will not remain on chickens so treated.

THE ORPHANS.

As a rule, when young birds are about six to eight weeks old the hen begins to get restless and neglects them.

She and they must be watched about this time, or the result may be disastrous. So soon as she is seen to be leaving them it will be better to remove her to the laying-houses again, and make some other provision for the orphans. What this provision will be must depend upon the season of the year, and, to a certain extent, the

nature of her chickens. If the weather is warm, and they are of a hardy race, they may be put at once into one of the fowl-houses. In this case it will be desirable to provide special perches, for bent breast-bones would result if they were allowed to roost on ordinary narrow perches. These special perches should not be less than six inches broad, and have the edges carefully rounded off. At one time we used broad shelves, but the six-inch perches are in every way as good. Some breeders do not permit their chickens to roost on perches until they are well grown, but make a thick bed of sand or straw on the floor. The objection to this is that so near the ground is generally draughty, and colds may not improbably be the result. In very cold weather, or in the case of delicate varieties of fowls, it will be necessary to provide more shelter for the deserted chickens, and for this purpose the best thing is what is known as a cold mother. This is a frame upon which canvas is stretched, and the canvas is lined with flannel, or flannel strips are suspended therefrom. The frame can either have end-pieces the required height to keep it from the floor, or it may simply rest upon bricks or blocks of wood. The size and height must

be regulated by the number and age of chicks which are to be accommodated. Chickens will nestle under, and they will be much warmer than if they were without it. A cold mother seems to be a most necessary part of the equipment of every poultry-yard, where the raising of chickens is regarded as an important work. As a rule, they will not need to be kept in the mother for long, and it will be to their benefit if removed therefrom as soon as the weather becomes at all warm.

DIVISION OF THE SEXES.

The division of the sexes is a matter which many breeders delay too long. In this matter it is not at all easy to define a time when it must be done, for the breeds differ much in rapidity of maturity. We have always regarded as a sign that the proper time has come when the little cockerels begin to attempt crowing. We do not mean that if some cheeky, precocious fellow makes a vain attempt at five or six weeks old the division should then be made, but that as soon as the crowing becomes pronounced it is time to do the work. It is better to err on the side of early than of late division, and in the lighter breeds the chicks are usually ready at ten weeks, and in the heavier varieties two or three weeks later.

On the Continent there is a considerable trade done in selling young chickens, from two days old and upwards. These are sent in specially made boxes, wherein is a

SELLING CHICKENS.

On the Continent there is a considerable trade done in selling young chickens, from two days old and upwards. These are sent in specially made boxes, wherein is a

sufficient supply of food, and they travel without injury many hundreds of miles. The convenience of this arrangement is very great, as those who have not accommodation or time for hatching operations can secure young chickens to rear at a small price. Evidently from the extent of this trade it is a profitable one, both to the seller and purchaser. If it were adopted here there are many who would doubtless avail themselves of the opportunity thus afforded.

PESTS IN THE CHICKEN-HOUSE.

The importance of this subject deserves careful attention, as very many chicks are lost through inattention to this point of detail. No bird or animal can possibly thrive if troubled with vermin, the irritation being a sufficient hindrance. The first thing is, of course, to see that the house or coop is well whitewashed out and kept thoroughly clean. Even at the risk of repetition we must again urge frequent coats of whitewash to be put upon the houses, and if some Jeyes' purifier or carbolic acid, say a breakfast-cupful to a bucketful of wash or carbolic powder be mixed with it, this will go a long way to keep down insects. Coops should have this applied every time

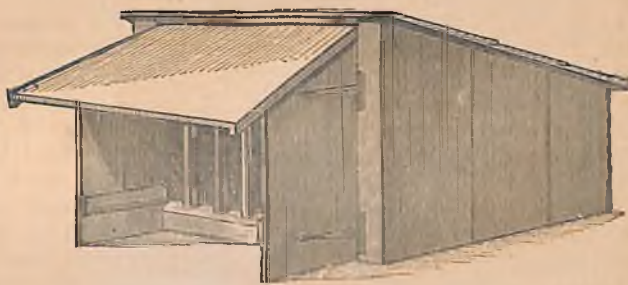


FIG. 24.—SPRATTS PATENT'S REGISTERED SHELTER COOP

they are used for a fresh brood, chicken-houses once every month, and ordinary fowl-houses once or twice every year.

It is scarcely necessary for us to say anything further about the importance of the dust bath, both for the sitting hen and brooder, but it must at the same time be remembered that the chicks almost always get fleas from the hen; and it is found that birds hatched in an incubator and reared by an artificial mother are less subject to gapes than those brought out and reared in a natural way. But it is also important to see that the chicks have a dust bath provided, as they begin at an early age to enjoy it if

sulphur, mixed with an equal quantity of carbolic or insect powder, will be sufficient. The hen, also, must be examined and treated in the same way, or no good will be done, as she will communicate the pests again to the chicks. After they have been dusted, put in a pen by themselves for an hour or two in a stable or outhouse, and afterwards pour boiling water over the ground to thoroughly destroy the insects.

When artificial mothers are used they must be cleaned out every day, or insects will breed in them to an enormous extent, especially those that have flannel or felt strips for the chicks to nestle in. The best way is to

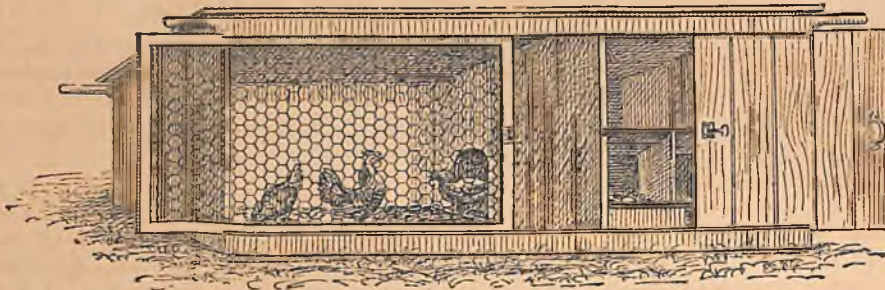


FIG. 25.—BARNARD, BISHOP, AND BARNARD'S PORTABLE CHICKEN-HOUSE.

given them; at any rate, this should be done when they leave the hen, but earlier is to be preferred.

The best way to discover if the birds are troubled with lice or fleas is to examine them under the wings and thighs, when the parasites will easily be discovered. As soon as the chicks are seen to be moping or a little out of condition this examination should take place, and many chicks would be saved in consequence. So much importance do some poultry-breeders attach to the question of insects that they always apply petroleum ointment to the head and under the wings and thighs a few days after the chicks are hatched. This is, perhaps, a rather strong remedy, and we think that dusting the birds with flour of

invert the frame and put a shovelful of earth among the flannel, which, when shaken well, will deodorise it, and then dust with carbolic or insect powder. We do not know whether it is true, as often stated, that fleas may be born and become parents and grandparents in twenty-four hours, but it is certain that they breed very rapidly.

Such enemies to chickens as rats, cats, and mice must be fought against in a sterner fashion, and traps are perhaps the best things to use. It is a good plan to train a kitten up to be accustomed to the birds, and it will in time be a protector to them. Rats are especially cunning, and require more than ordinary skill to overcome. They often kill both hen and chickens.

CHAPTER X.

ARTIFICIAL HATCHING AND REARING.

ARE INCUBATORS PRACTICAL?—THE HEARSON INCUBATOR—THE "WESTMERIA" INCUBATOR—OTHER MACHINES—GENERAL HINTS TO INCUBATOR WORKERS—BROODERS—"WESTMERIA" BROODER—HEARSON'S BROODER—CALWAY'S REARER.



ARTIFICIAL incubation has fascinated many minds. The story of the egg-ovens of China and Egypt is too well known to need repetition, and many have been the attempts to provide a machine which would be a perfect substitute for the hen. Some of these have been excellent, others far too elaborate or too cumbersome; but within the last two decades there have been introduced several incubators which are at once reliable, inexpensive, and comparatively simple. At first sight the work of hatching by artificial means appears so easy that it is small wonder many inventions have been introduced; but it took a long series of years and many failures ere the difficulties in securing regular temperature, fresh air, and moisture were solved. A machine cannot think; it is unlike the hen in that it does not possess instinct, and thus every difficulty has to be provided for, every need anticipated; but if we get a perfect machine it will work like clockwork.

ARE INCUBATORS PRACTICAL?

The first point to be settled is, are incubators of any practical value? To this we can unhesitatingly answer, "Yes," if there is a sufficient number of chickens hatched to repay the cost. An incubator for fifty eggs can do the work of four hens at one time, and is ready for work all the year round, without any cessation, so that really it is equal to sixty hens. It will work in winter as well as in summer if placed under favourable conditions. But it is only a machine. Brains must be supplied by the inventor and operator. Given a good machine, worked by an intelligent person, and it is an invaluable assistant. But it must have fair play. We are very strongly of opinion that the best place to keep an incubator is a room where the temperature will be even, for then there is least stress on its regulator.

THE HEARSON INCUBATOR.

The incubator which has attained the greatest amount of success is the Hearson (see figs. 26 and

27), and its widespread use in all parts of the world stamps it as an almost perfect machine. It is excellently designed and carefully made, with a marvellously delicate regulator, well applied to the purpose in view. This regulator consists of a small metal capsule, formed of two pieces of thin sheet brass, soldered together at the edges. Inside are about twenty drops of a liquid which boils at the temperature required to be maintained in the drawer (104 deg.). So long as this capsule is not subjected to sufficient heat to make the contents boil, the pieces of brass remain quite close together, but as soon as the warmth is high enough they distend considerably. The power thus generated is used to work a lever, by means of which a cap is raised from the escape chimney, and the hot air from the lamp, instead of entering into a tube running through the water-tank, passes off, and the temperature immediately sinks again. We have known this regulator keep an incubator to within half a degree for weeks, in spite of varying weather, and Mr. Hearson must be complimented upon producing the simplest and best regulator used for this purpose. The eggs are laid in a concave drawer, upon perforated zinc, below which is a water-tray, and as fresh air can only enter from below, and has to pass through a cloth soaked with water, it becomes charged with moisture, by which means this important element is provided for. All that is required is to see that the air is not too cold as it enters the inlet, for then there is danger of chilling the eggs, and also of too little water being absorbed by it. The Hearson incubator is made in many sizes, from a dozen upwards, but we do not recommend the use of those under fifty egg capacity, as they are not found so reliable, and the saving in cost is comparatively small.

THE "WESTMERIA" INCUBATOR.

So far as our experience goes, the "Westmeria" (fig. 28) incubator comes next to the "Hearson," and the vast improvements made in this machine since it was first put

HEARSON'S INCUBATOR.

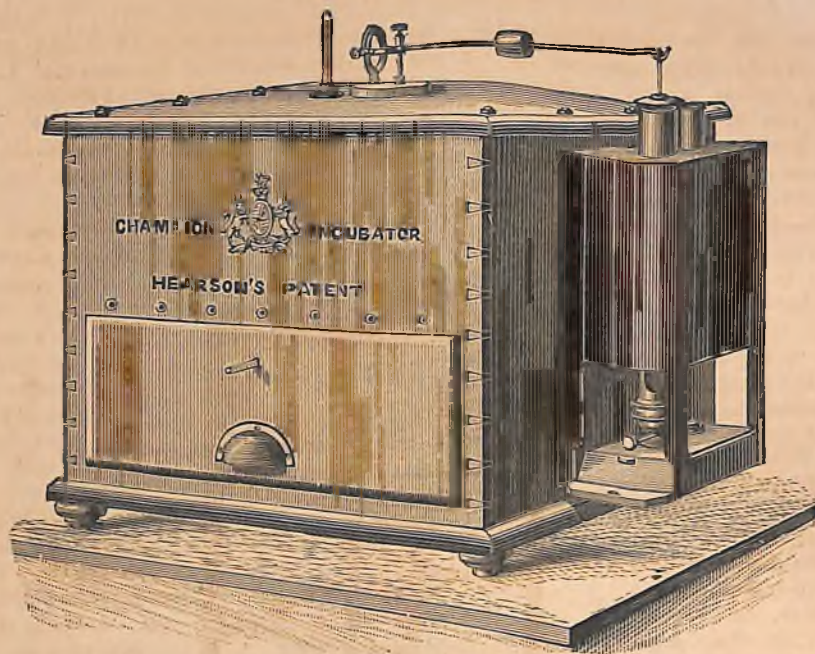


FIG. 26.—HEARSON'S INCUBATOR.

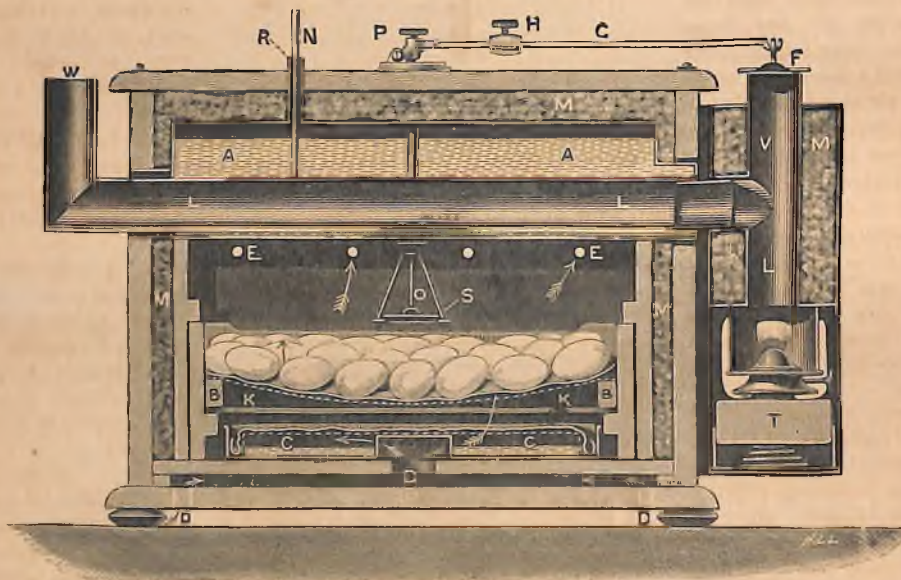


FIG. 27.—SECTION OF HEARSON'S INCUBATOR.

A A.—Tank of water.
 B B.—Movable egg tray.
 C C.—Water tray.
 D D D.—Holes for fresh air.
 E E.—Ventilating holes.
 F.—Damper.
 G.—Lever.

H.—Lead weight.
 K K.—Slips of wood.
 L L L.—Lamp chimney and flue pipe.
 M M M.—Non-conducting material.
 N.—Tank thermometer.
 O.—Needle for communicating the expansion of the capsule S to the lever G.

P.—Milled head screw.
 R.—Filling tube.
 S.—Thermostatic capsule.
 T.—Petroleum lamp.
 V.—Chimney for discharge of surplus heat.
 W.—Do. for discharge of residual products of combustion.

The overflow tube is the upper one, situated at the right hand side of Incubator, and the lower tube is for emptying the tank.

on to the market, with the practical knowledge of its inventor, Mr. W. J. Riley, promises that it will hold a leading position among appliances of this kind. It is less in price than the first-named. At first the regulator was by no means so reliable as could have been wished, but this has now been made very delicate and true, as well as much more simple. This machine stands upon four legs, the tank and egg chamber occupying the upper portion, with lamp below.

The heated air from the latter passes into a chamber above the eggs, in which is a side flue, operated upon by the regulator, so that when the requisite heat has been attained the heat is turned off, and the temperature at once falls. Excellent arrangements are made for a supply of moisture, and of a twofold nature. Steam from a vessel surrounding the hot flue just above the lamp passes straight into the chamber, warming the incoming fresh air. This moist fresh air carries the warmth from the heater down upon the eggs, spreading all over them. Below is the second supply, for there is placed a water-tray, which is kept at about 90 deg. Fahr.,

and the vapour, carried by the air entering from beneath, gives moisture to the lower half of the eggs. The inventor has bestowed very great care upon this necessary matter, and we think it about perfect in respect to its moisture supply. Another notable feature in the "Westmeria" is its turning apparatus, by means of which all eggs in the drawer can be moved at one operation, thus saving a large amount of labour, and performing with despatch an essential part of artificial incubation.

OTHER MACHINES.

Mr. C. J. Lathbury, of Barton-under-Needwood, has recently introduced an incubator which is very simple indeed, and has several excellent features. The air enters below, but as it must pass round the lamp it is warmed, and thus all danger of chilled eggs, even in the coldest weather, is obviated. It has also a double

bottom to the drawer. Water is placed immediately over the inlet for heated air, and the moisture is thus taken up evenly. The lamp is a smokeless one, but even if there should be any fumes, they can never enter the egg chamber. The regulator is very simple, and we have heard good accounts of its effectiveness. This is a

very cheap machine, and well made for the cost. Other makers are Mr. C. Cashmore, of Loughborough, and Hillier and Chamberlain, of Dursley.

GENERAL HINTS.

The following general hints should be observed by all incubator workers, in addition to directions sent out by makers of each machine:—

1. Place the machine where there will be a constant supply of fresh air, but carefully avoid draughts.

2. If possible, keep the temperature of the room at from 55 to 65 deg. Fahr.

3. See that the water trays are regularly supplied with water, which should be first warmed.

4. Always warm eggs before putting into the machine, by washing in water heated to 80 deg. This is specially important when there are eggs already in the drawer. The eggs should be well dried before putting in.

5. Mark the eggs with the date when put in, and that when due. Also, if there is no turning apparatus, put signs on three sides, to know how far they should be turned. They should be turned twice a day, but must be once.

6. Cool the eggs once a day—for five minutes in winter and for ten minutes in summer, or if the room is warm.

7. Observe the temperature of egg-drawer whenever the incubator is attended, as a guide to its correct working.

8. Do not open the egg-drawer too often when hatching is proceeding, but when chicks are out remove the empty shells and place the birds in drying-box.

9. Always keep the lamp clean, properly supplied with oil, and do not burn it higher than is necessary.

BROODERS.

Artificial mothers, or brooders, have for many years proved to be a practical success, even when they were not nearly so perfect in form as they are to be met with to-day. Nearly twenty years ago we employed a Cheshire mother with the best possible

results, and this in spite of many defects which that appliance had, necessitating very great care and watchfulness, specially a lack of provision for ventilation and fresh air. The advantages of being able to rear a large number of chickens together, and of dispensing with the hen, are obvious, simplifying the



FIG. 28.—THE "WESTMERIA" INCUBATOR.

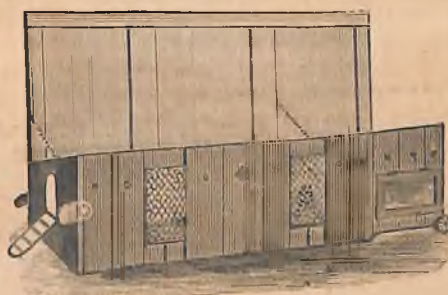


FIG. 29.—THE "WESTMERIA" BROODER.

labours of an attendant, and avoiding many troubles resultant from keeping a number of hens with their chickens together, which are inseparable from restricted areas. It is convenient to have the chickens within a short distance of each other, and hence the value of an arrangement which minimises its dangers. Further, there is no risk in a well-made brooder of a batch of chickens being trampled upon, or at their sudden desertion, and, like incubators, they are ready for work at all seasons of the year.

THE "WESTMERIA" BROODER.

At the present time there are several brooders which can be recommended without hesitation, and their increasing use proves that they are found to be all that is claimed for them. Of these we specially name three, viz., the "Westmeria," the Hearson, and Calway's Rearer. The first of these (fig. 29) is about as near perfection as we have seen, and has achieved remarkable success both for chickens and pheasants. It consists of a small shed-like structure, with a roof forming a lid. Rather less than one-third of the entire length is taken up with the nursery proper, which is heated by a lamp, the remaining portion being a covered run, suitable for wet weather. A couple of wheels at one end, with handles at the other, enable it to be moved about with the greatest facility, and there can be no question that one of the most important points in successful chicken-rearing, whether natural or artificial, is that the broods shall have fresh ground when placed out in the open air. There are excellent arrangements in this brooder for ventilation, warmth, and light, and we have had the highest testimonies as to its efficiency and simplicity in working. One very important feature is that the lamp is so well protected that it can scarcely be blown out, a manifest advantage when used out in the open. The fresh air is warmed as it enters, and by this means the chicks are not tempted to crowd each other seeking a comfortable place.

THE HEARSON REARER.

The "Hearson" rearer is of an altogether different

construction, and is not quite so easily moved about, as it has to be taken to pieces, which is probably often an excuse for not shifting it. We think that the run might be loftier, but with the exception of these two points it is an excellently arranged appliance, and large numbers are now in use. One decided advantage possessed by it is that the run is divided into two sections—one glass covered, and the other wire covered. Consequently the chicks can have either absolute or partial shelter, as they desire.

CALWAY'S REARER.

A third rearer (fig. 30) is made by Mr. W. Calway, and differs from all others in that it is round. It is very simple and cheap, the largest size only costing twenty-five shillings. We have never had this little rearer in operation ourselves, but those who have speak highly of it. The circular shape presents several advantages, and the heat is more evenly distributed. This machine had no run attached to it, and then it must always be placed in a chicken-house or shed. But recently, Mr. Calway has fitted a run, so that this difficulty is now obviated. A great improvement has also been made in protecting the lamp.

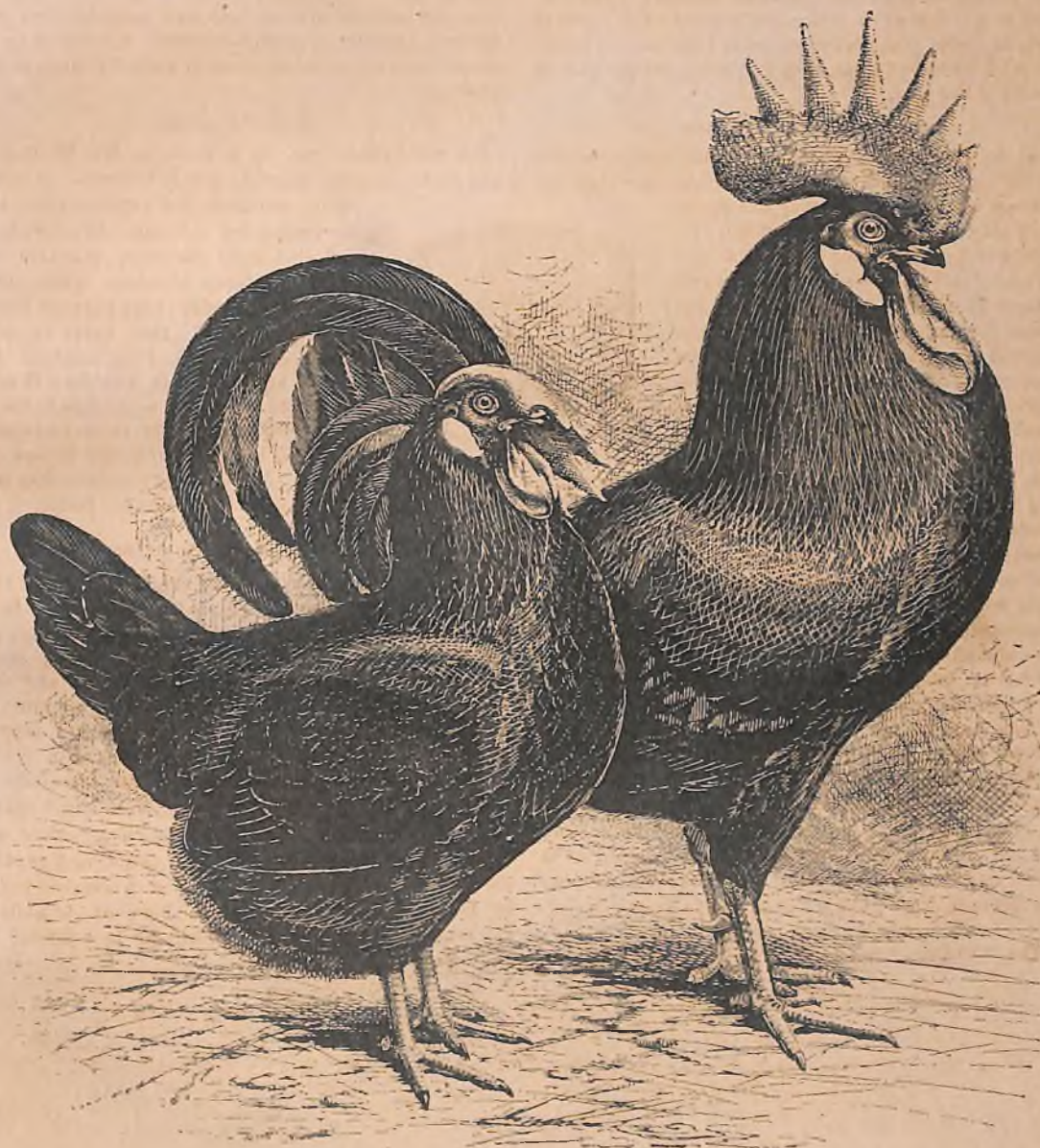


A Heating Cone. B Disc to throw heat to side of Cone. C Air Pipe. D Lamp. E Platform. F Regulator.

FIG. 30.—CALWAY'S REARER.

MANAGEMENT OF BROODERS.

When working brooders of any kind or make it is most essential to see that there is no overcrowding, that the temperature is not too high (to which there is considerable danger, causing many deaths), that absolute cleanliness is observed, and that fresh ground be given every day. Given attention to these various matters, we are sure a greater proportion of healthy chickens can be reared than under hens, and with less time necessary for attention to the birds. The chief trouble arises from overheating, and our experience has been that if chickens are coddled they become like hothouse plants, and rapidly die off when exposed. The heat of a chicken-house or brooder should never be so high as to tempt chickens to remain inside. Fresh air is essential to their growth.



BLACK MINORCAS.

CHAPTER XI.

THE FEEDING OF POULTRY.

WHAT IS FOOD?—WHAT FOOD DOES—VARIETY OF FOOD NEEDED—ELEMENTS OF FOOD—NATURAL FOOD—GRIT—GRAIN, MEAL, ETC.—HOW TO FEED—TIMES OF FEEDING—GREEN FOOD—WATER—OBJECT IN FEEDING.



HE subject of feeding is of very great importance, dealing as it does with the process of preparing food for human consumption. In connection with the question of feeding, the first question to be asked is, What is food, and what does it do? We cannot do better than here quote from Professor Atwater, who thus concisely says—"The body is a machine. Like other machines, it requires material to build up several parts, to repair them as they are worn out, and to serve as fuel. In some ways it uses this material like a machine—in others it does not. The steam-engine gets its power from fuel; the body does the same. In the one case wood or coal, in the other food, is consumed. But the body not only uses food, but its own substance also, for its fuel. When the fuel is burned in the furnace, only part of its latent energy is transformed into the mechanical power, which the engine uses for its work; the larger part is changed to heat, which the engine does not utilise. A large part of the potential energy of the food, and of its own substance, which the body consumes, is likewise transformed into heat, but this heat the body uses, and must have to keep it warm. And finally, metal from which an ordinary machine is built and repaired is very different from its fuel, but the same food which serves the body for fuel, also builds it up and repairs its wastes."

WHAT FOOD DOES.

From this we learn that the body is the machine, and food the fuel which provides its motive power. But food is more than this, for it repairs the waste of tissue, and restores that which is lost by elimination of heat. What this waste depends greatly upon the conditions under which an animal exists, and the work it has to perform. In a cold exposed climate there is a great loss of vital force through elimination of heat by the atmosphere. In a very warm climate elimination is due to perspiration, or loss of moisture through the pores of the

skin. A heavy worker expends muscle and force by exercise of physical powers, whereas an animal fed simply to form food for man, of whatsoever kind it may be, has no such demand upon it, and hence it is only the external conditions which reduce the material of its body.

We have learnt, therefore, that food is the fuel to repair waste of the body. The transformation of food into all those elements of which the body is formed is one of the great mysteries of nature. Give it in whatever form we will, it is taken into the stomach, and there divided up into various elements, some to repair the waste referred to, others to enlarge the body, yet more to expend itself in some cases in formation of eggs and of young. It is not necessary that we should here refer in detail to this process of food formation, as it is enough for our present purpose to know that it is regular and complete.

VARIETY OF FOOD NEEDED.

To rightly understand this subject it is necessary to remember the conditions under which fowls are kept, and the demands upon the system vary so much, so that one food will not do equally well under all circumstances. There is no perfect food for poultry—perfect, that is, in its suitability to all kinds of fowls wherever they may be. Such a food is an impossibility, but the great variety of food which can be found everywhere is a tribute to the variability of our needs. Nature does not work uselessly, and for all things there is some work to do. Animals themselves teach us by their actions that it is instinct to eat whatever the system needs. What is the right food to be given depends upon the conditions under which birds are kept, and the purpose for which they are destined. Food should vary according to the season of the year. A little Indian corn may do good in winter, but it is bad in warmer weather; and such foods as rice may be useful in summer, but would be useless in winter, in that they do not contain sufficient heat elements.

So when we desire eggs the food should not be flesh or fat forming more than sufficient to repair the daily waste of tissue and heat, but contain elements requisite for making albumen, fat, and phosphates, which form the principal materials in an egg. It will easily be seen that when the weather is cold, the material available for making of eggs is considerably reduced by elimination of heat from the body, and therefore if they are to be produced this loss must be made up. On the other hand, if flesh is to be formed, to give egg-making constituents would be waste of food, and fats are chiefly useful in this direction. And again, chickens require different food to adults, because of the necessity to build up the frame and form feathers. And in this connection it is necessary to say that as far as possible the food supplied should be well balanced, or there may be a great waste, and for the same reason there should not be too much or too little.

ELEMENTS OF FOOD.

Food has several distinct elements, the three principal ones being—

1. Albuminoids or nitrogenous compounds.
2. Carbo-hydrates, or heat-givers.
3. Fat, beyond what is consumed as heat. All these are necessary for fowls (except the carbo-hydrates), and are found largely in flesh and eggs.

NATURAL FOOD.

In calculating what food must be given, it is necessary to consider, first, that which is obtained naturally. Where fowls are absolutely in confinement everything must be supplied, but when at liberty they obtain an enormous quantity of natural food, by which is meant worms, slugs, seeds, and lime, and the amount of this must largely determine both the quantity and nature of that supplied. First, let us look at the question of worms, which is of primary importance. At one time it was thought that the best soil on which to keep poultry was sand or gravel, but this is an undoubted mistake. Gravel has certain elements which are very valuable indeed, but pure gravel is almost as deficient as sand in worms and other forms of lower life which are essential to success in poultry-keeping. Perhaps the perfect soil is substrata of clay, with a top layer of gravel and loam mixed. Failing that, heavy clay is better than sand or gravel. This may be heterodox, but it is truth nevertheless. Worms and slugs are essential to poultry-keeping, they being natural food for fowls. What is the opinion of poultry themselves on this matter can be seen by the way in which they seek after and struggle for worms; and one advantage of letting the birds out very early is that then can be obtained a plentiful supply. On French vineyards they follow the ploughs during the periodic upturning of soil on the vines, and every farmer ought to give the same privilege to his poultry. The advantage will be all his own, as they will obtain a large quantity of valuable food, to be obtained in no other way, and they will clean and manure the ground

GRIT.

We have already seen, in the chapter on "Formation of the Egg," what is necessary to make up an egg; but it has only been of late that the value of grit has been realised. As Mr. W. Cook wrote some time ago:—Fowls are not like animals which have teeth to masticate their food, but they are naturally dependent upon the substitute which must be provided for that purpose. Fowls in their natural state have instinct enough to know what they require for the purpose of digesting their food, but unfortunately they cannot always obtain it in many places unless it is given them. The food is digested in the fowl's gizzard, and that is so hard that it matters not how sharp the material is that goes into it, it will neither get out nor injure it in any way. Sharp pieces of glass or the steel blade of a penknife broken up will not affect it. Nothing hurts the gizzard except pins and needles, and these run into the gizzard, and in time they work out; sometimes it takes weeks before the pins get through. Sharp grit brings health and happiness to all the feathered tribes. There is much grit that is sold to poultry-keepers that is not of the slightest use to help the fowls to digest their food; in fact, it is only in the way, as it fills up the gizzard, and a few ordinary cinders are better than this even. The lack of sharp grit has been felt by our fowls very much; it is a comparatively new subject in the feeding of fowls. A few years ago people did not expect to get new-laid eggs in the winter months, and if their fowls did happen to lay, it would be quite unexpectedly to their owners. But now at the present day people who keep fowls expect to have eggs all the winter months. But, alas! many of them are often disappointed. It is in many cases, however, the owner's fault. Although they may not think it, the sharp grit is one of the most important articles in the poultry-yard, and yet the most neglected.*

If, therefore, there is not plenty of sharp flint grit in the soil—and very seldom is it so except on arable farms—it must be supplied. It can be purchased ready broken at a reasonable price, and the quantity fowls will consume is surprising.

GRAIN, MEAL, ETC.

The artificial foods, by which is meant those to be supplied, are grain, meal, meat, and vegetables, and, as already stated, there is no one food all sufficient, so that these must be varied according to circumstance. The principal foods are:—

Oats—the most perfect food for laying hens.

Barley should not be given alone, as it is excessive in heat-givers, but deficient in albuminoids. Barley-meal mixed with middlings makes an excellent soft food.

Wheat—slightly deficient in fat but strong in albuminoids and heat-givers; good for layers, but small wheat is the best.

Maize—very deficient in albuminoids, but excessive in carbo-hydrates and fat—a bad food.

Buckwheat—deficient in fat, otherwise good; suitable for layers and breeders.

* *Fanciers' Gazette*, April 4th 1890.

Rice—scarcely any fat; strong in albuminous compounds.

Potatoes—not a food so much as a vegetable; nearly all water, but useful to take up meals.

The result of this observation is to show that the best summer foods are oats, wheat, and buckwheat; and for winter, barley and buckwheat, with a very little maize. The best foods for laying hens are oats, wheat, buckwheat, and a portion of barley; and for fattening, barley and maize, whilst rice, if mixed with tallow scrap, is a grand food for this purpose. Good sound food pays best, and damaged grain should be avoided if possible. Fowls in confinement should not have maize or rice, as there is less elimination through limitation of exercise. We have not mentioned green food, assuming that it can be obtained in abundance, but it is very important. In winter, when grass or vegetables are deficient, roots form an excellent substitute.

HOW TO FEED.

It must be remembered—and this is what many poultry-keepers forget—that it is quite possible to give the right kind of food, and yet by the giving too much of it, arrive at the same undesirable end as if rich food were supplied. Some persons contend that the best way is to keep a constant supply of food before the fowls. We were recently upon a farm in the North of France where this was done, and the owner declared with good results. But as the majority of his birds are sold off ere they reach a year old, we do not regard this as a sufficient test of the system. The best method of feeding is to supply food twice a day, either on the ground in fine weather, or in troughs when the earth is soft and wet, and the removal of or ceasing to give more food when the fowls appear satisfied. Feeding to repletion is always bad, and as doctors tell us we should rise from the table with an appetite—*i.e.*, not actually hungry, but feeling that we *could* eat more if we wished—we should endeavour to apply the same rule to our fowls, and the doing so will be an effectual prevention of over-feeding, with its subsequent evils. Soft food should be given during cold or wet weather, when some such addition should be made as Brown's Aromatic Compound, Thorley's Food, or one of the many preparations sold for horses and cattle. This soft food should be given crumbly moist, never sloppy, and should always be mixed fresh. As a rule we have found that when the appetite of a fowl fails, the best method to remedy this is the withholding of food. It may be offered, and if not accepted taken away again. In a day or two Nature will right herself, and then plain food will be most welcome. But it is better to obviate all these troubles by forethought.

WATER.

Water is a most important part of the diet. A running stream solves the difficulty at once. Disease is often caused by impure water—disease of the most subtle and deadly character. Water should be often renewed in fountains, but if in open troughs these should not be exposed to the sun. Very often the water supply for

fowls is regarded as a minor consideration, but it has much more to do with their health than is generally supposed.

FEEDING CHICKENS.

The question of feeding young chickens is all-important, for upon its food must depend whether the bird will thrive well, die a premature death, or be stunted in its growth. It will be well to say here that more harm is done by over than by under feeding, especially amongst small amateurs. They like to give chicks dainty bits, to be constantly feeding them on rich morsels, with the result that they are often killed by kindness. The plainer the diet the better, and anything in the shape of forcing is sure to cause harm. Thousands of chicks die every year from no other cause than that they are over-fed or fed on too rich food. Where death does not result the seeds of disease are sown, and sooner or later these seeds are developed, and trouble is the result.

As soon as possible we believe in making hard grain their staple food, when it is intended to rear the fowls and not kill them at an early age. But judgment is needed to decide when this can be safely done. We have found that most chickens cannot take whole grain until they have turned three weeks old, and up to that time it is necessary to give them soft food. There is nothing better than the foods already mentioned, which have all the elements for successful chicken-rearing. When the birds are about sixteen or eighteen days old they may have a little *dari* or crushed buckwheat, which may be gradually increased until the soft food is only given once a day. Occasionally in cold or wet weather a little crushed or whole hemp-seed may be given, but this is very rich, and should be used very sparingly. Of course, when the chicks get to be six weeks old they may have small wheat and other grains that are not too large for them to swallow.

A word here as to the artificial foods sold will not be out of place. Spratts Poultry Meal we have used for many years with unvarying success, and upon it chickens thrive again, formed as it is of the very best elements, making a splendid combination for chicken rearing. We can also recommend Chamberlin and Smith's Canadian Meal, Calway's Meal, and Lambert's Cereal Meal for this purpose; and we have had excellent accounts of the Aylesbury Poultry Food. The preparation known as Liverine is invaluable for chickens in unfavourable seasons.

The true secret of feeding young chickens is to give a little plain food and often. All young life needs its nourishment to be frequently given, and chicks are like babies, they must be fed at short intervals. Unless this is done they are very apt to suffer and be stunted through hunger, and also to gorge themselves when the food is placed before them, the latter a state of things very likely to induce disease. The best chicken-raiser is the man or woman who can get up early in the morning, for birds require to have an early feed, as soon after daylight as possible. This feed should be a warm one. Young

chickens under a month old should have a feed last thing at night, say about ten o'clock. This will, of course, have to be given by lamplight, for only in the height of summer would there be daylight for the purpose. When the birds are over a month old it will be sufficient if they are fed about half an hour before sunset.

TIMES OF FEEDING.

The times of feeding may be briefly described as follows: When the chicks are less than a fortnight old they should be fed every two hours; for the next fortnight every three hours; and after that time until they are fully grown, say when four or five months old, four times a day. There are those breeders who always keep food before the birds, and this plan saves a great deal of trouble, but we have never adopted it. Only grain can be fed in this way, as soft food would go sour if left to stand. We think it better for all animals to have regular times of feeding, for picking is one of the worst things for children or chickens. And the plan we recommend is to cease giving the food as soon as the appetite is satisfied, which is especially necessary in the case of chickens. We always like to see birds ready for their meal when it is ready for them. That is a good sign of health.

SUBSTITUTES FOR WORMS.

Reference has already been made to the importance of insect and grub life for fowls. Where this kind of food is absent it must be artificially supplied. In the winter season there is nothing better than the prepared crissel sold by Spratts Patent or the prepared meat advertised by Mr. W. Cole, but at other seasons of the year it can be naturally provided. Dead fowls or other forms of flesh food can be used for this purpose, and may either be buried under the ground or hung up. In this manner a most important element in the feeding of fowls can be provided for. It is only desirable to state that under no circumstances should a diseased fowl be used in this way, as that would be the means of propagating disease, and it is also desirable that the supply of this kind of food be not excessive. If fowls are in a state of nature they have much more exercise than when in confinement, and this is always to be taken into account in making comparisons between food obtained under the two conditions.

GREEN FOOD.

No mention has been made of the importance of green food to the young chickens, but it must not be lost sight of. The sweet juices of young grasses or vegetables have a wonderful effect on the economy of fowls, and though we do not say that chickens cannot be reared without one or the other, we do not think that they can be so

reared with the same amount of success. Wherever a good grass run can be given it is desirable that the birds have the benefit thereof, but it cannot be regarded as essential where tender vegetables, especially lettuces, can be provided. Where fowls have been kept on ground for several years without its being renewed, the grass may be positively injurious instead of beneficial, but with lettuces this will not be so. The poultry-breeder will do well to grow as many of these succulent vegetables as he can, and freely give them to the chickens. Other kinds of vegetables may be used, and in winter-time roots are of great benefit, the latter being given mixed with the soft food. There are poultry-breeders who never give water to their chickens, and their experience shows that it is not essential, if sufficient moisture is given in the soft food. They say that it encourages gapes, but this must depend upon the water. We have never found it do so.

OBJECT IN FEEDING.

The remarks which have been made as to the feeding of chickens are intended specially to apply to such birds as are bred for layers or stock fowls. The object with these chickens is to secure a strong frame and good constitution, for which purpose the food must contain all elements for bone and muscle formation, as well as for the making of flesh. When chicks are being reared simply for the table, and will be killed off ere they are ten or twelve weeks old, a different method must be adopted in order to secure success. The object in this case is to secure the maximum of flesh with the minimum of bone and offal. Therefore it is necessary to feed with other foods than those already named, and in this case a little forcing is desirable, in order that the birds may be brought to maturity as speedily as possible. After the first fortnight of the chick's life, instead of using grain, soft food should be given as the staple, and in order to induce the birds to eat as much as possible their food should be well varied. One good food is a mixture of barley-meal, oat-meal, thirds, and Indian, or maize, meal, with some meat scraps and a little stimulating powder added, such as the aromatic compound. Then there is the common rice, known in this country as poultry rice. This if properly prepared, namely, slowly simmered by the side of a fire with plenty of water in the pan, makes a splendid food, as it contains flesh-forming elements to a large extent, and scarcely any bone-forming materials. The breeder should therefore know what he intends to do with the chickens, and in this way be guided as to his manner of feeding them. The entire question of fattening will be dealt with in a succeeding chapter.



CREVECŒURS.

BRED BY, AND THE PROPERTY OF, MR. J. AINSWORTH, HIGHBANK, DARWEN.
Winners of Cups and First Prizes at Darwen, Grantham, Liverpool, the Royal, &c., &c.

CHAPTER XII.

POULTRY FATTENING.

FATTENING A METHOD OF RIPENING—FOOD TO BE USED—CONDITIONS FOR FATTENING—FRENCH METHODS—FRENCH CRAMMING MACHINES—HEARSON'S CRAMMING MACHINE AND FATTENING PEN—FATTENING IN SUSSEX—A GERMAN POULTRY ESTABLISHMENT—RECORDED WEIGHTS.



FATTENING is really a method of ripening. Fat or oil laid upon the various tissues throughout the body softens and has the effect of making them more tender. This is the same process found working in all nature. Fruits fill out, and are plumpest and sweetest when they ripen. In both cases the ripening, if continued too long, tends to decay; but it is just as reasonable to say that grapes are not good to eat at their prime, because if allowed to hang longer they go bad, as it is to say that the fact of a fowl going back if fattened too long is a proof that fattening is a wrong system. We have also heard it stated that because fattened fowls are not fit for breeding, therefore no fowls should be fattened at all. This is a nonsensical argument. No one can be more opposed than we are to the over-feeding of breeding stock, for we believe that breeders and layers should be kept in rather poor condition, but at the same time we realise the value of fattening for fowls destined to immediate slaughter. This immediate slaughter is absolutely necessary when birds have been fed up in the way named, for the fat upon their tissues clogs them up and prevents the organs performing their functions properly, so that diseases of various kinds are soon generated. The great Liebig was accustomed to say that all fat is a disease, but this had reference to human beings, who are not intended for slaughter, and his dictum must not be regarded as applicable to the preparation of table fowls.

FATTENING.

In fattening poultry, or in fact any other animals, two things are absolutely necessary; first, that the food supplied shall tend to the production of flesh, and, second, the conditions under which fowls are kept shall eliminate as little of the oil or heat fuel as possible. And it may be well here to explain that although the term fattening is employed, we do not mean by it

mere laying on of an excessive quantity of fat or oil, such as was at one time the case with cattle and sheep, but the addition of just so much fat as is necessary, with as much flesh as can be obtained. Fat, as already explained, softens the flesh, ripens it, and herein its value consists.

FOOD TO BE USED.

Taking the food first of all, it will be seen that any system of feeding ordinarily employed will not answer for fattening; the object of the poultry-keeper is to keep his birds in that condition wherein they will breed or lay best. To this end he must give those foods which are of a somewhat stimulating character, and have as little as possible of the fatty element in them. Therefore, such grains as maize, rice, buckwheat, and barley should be employed, for in them the elements which go to make bone and feather and muscle are not so strongly present as in some others. Buckwheat and barley are of themselves the least valuable of these four cereals for fattening if given alone, but their lack can be overcome by the addition of a little fat, and in France some of the principal fatteners make buckwheat the principal article of food, whilst others use equal proportions of buckwheat and barley meals. Food for fattening poultry should always be given in the form of meal, as digestion of soft food is much easier than that of grain. Many French feeders mix the food with skim-milk. This has the effect of helping the process, for milk has all elements for development of fat, and also makes the skin a good colour. It is desirable to give food milk-warm, and the motto of the poultry-fattener should be, "Little and often." Regularity in feeding is an important matter, and food should not, under any circumstances, be permitted to stand over from one meal to the next.

The food chiefly used in France varies somewhat according to different districts, but the most general mixture is one-half barley meal, one-quarter maize meal,

and one-quarter buckwheat, with the addition of milk in greater or less quantities. The birds are crammed in two ways, but chiefly by making the food into pellets, about an inch and a half long, and three-quarters of an inch in diameter. In making the mixture for these pellets, water is used in just sufficient quantity to cause the meal to adhere together, and each pellet is dipped in milk before being inserted into the bird's mouth. The operator sits down, catches hold of the bird's legs between his or her knees, holds the bird's mouth open with the left hand, and puts the pellet in with the right; afterwards using the forefinger and the thumb of the right hand outside the bird's throat to gently press the pellet down into the crop. A little experience renders it easy to ascertain when the bird has had sufficient. The crop is just filled without being unduly distended, and the quantity given is less for the first few days, and gradually increased. This is the most usual method; but there is another which is largely used in the La Flèche district. In this case a funnel with a rounded nozzle, or covered with indiarubber, is inserted into the bird's throat, the head being held pretty much in the same way as when fed by pellets. The food is prepared of much the same constituents as already described, but is much more fluid in character, as it is poured by means of a ladle into the funnel, and the crop is thus filled.*

CONDITIONS FOR FATTENING.

The conditions under which fowls are kept have a most important influence upon the process. Fowls can be fattened if a number are kept together in a shed or run but never so successfully as when they are cooped up in single pens, and the process is longer and consequently more costly. The first matter is the temperature of the atmosphere which they breathe. When the temperature is either too hot or too cold, much of the natural heat in the body is eliminated, either by perspiration or evaporation. This elimination must be made up in food, and consequently so much of the food is really wasted. The object must be to secure an atmosphere which shall reduce this waste of force as far as possible; about 65 deg. will be found the right temperature.

Another most desirable and important matter is to prevent exercise on the part of the fowls. If the front of the pens be left open the inmates will pace up and down all the day long, striving to reach their neighbours, if there be any, or to escape out of the pen. This exercise causes elimination. It is also desirable that birds should be kept in the dark, for they are thus induced to sleep,

and sleep is very desirable for fattening fowls. Excitement in any form is a hindrance to fattening, and should be avoided. Absolute cleanliness is a most important matter, both as regards food-dishes, pens or cages, and the room in which they are kept. Sickness on the part of the fowls must be guarded against, and this is induced more by over-feeding and sour food than anything else. Fig. 31 shows a useful form of fattening-pen for small establishments, made by the Executors of Chas. Frazer, Norwich.

FRENCH METHODS.

France is the great home of the poultry fatterer, and fowls regularly seen at the Halles Centrales in Paris are a remarkable proof of the success of this system. There are birds that have been brought to a very perfection of plumpness, the quality of whose meat must be eaten in order to be appreciated. Certainly it is never equalled in this country, except, perhaps, in a few private establishments. Many of the birds sold there have been fattened for several weeks, and consequently are put on the market just when they are ready for killing.

It is true that the prices for these fowls are much higher than are usually paid for fowls in Britain, but the sums obtained in England for ducklings early in the year, and for geese and turkeys at the Christmas season, show there would be no difficulty in finding a market, if there was a supply.

FRENCH CRAMMING MACHINES.

There are now several machines made in France for cramming poultry, all of which, however, are

pretty much on the same principle. One of these is known as the *system picard*, and it can be worked by one person without removing the birds from their cages. Upon a strong wooden stand is fixed an iron rod with an arm at the top, elevated about seven feet above the ground. To this arm, by a pulley arrangement, is hung a metal tank or reservoir, with an open top and a spout at the bottom. To this spout is attached an indiarubber tube, and at the end of the tube is a brass mouthpiece, fitted with a spring tap. The stand is usually supplied with wheels, so that it can be easily moved about. The attendant, holding the nozzle of the tube in the right hand, seizes the bird's head with the left hand, deftly opening the mouth whilst doing so, and, having inserted the tube, presses the spring, when the food flows into the mouth, and the fowl is fed. The moment pressure is taken off the supply is stopped.

The other machine is an older one (Fig. 36), and scarcely so simple in its construction. It consists of a high stool with outspreading legs. Upon the stool is placed a tank, with

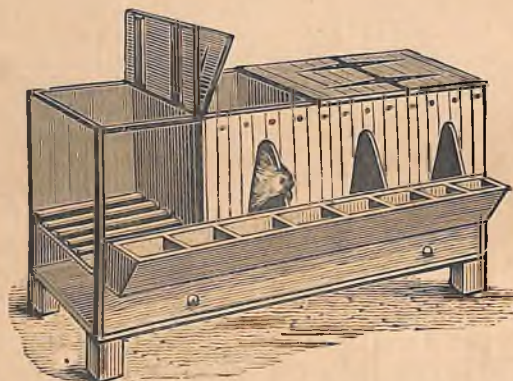


FIG. 31.—FRAZER'S FATTENING-PEN.

* "Live Stock Journal Almanac, 1887."

a valve arrangement inside, working by a piston-rod. Above the tank are arms holding the piston-rod, to one of which is attached a spring and a chain, and the latter communicates with a foot pedal. On the under side of the tank is a mouthpiece. The *modus operandi* is as follows:—The bird to be fed is brought to the machine, and the nozzle inserted in its mouth. Then the pedal being pressed, the valve comes into play, and the food is permitted to run into the fowl's crop. It will at once be seen that with this machine two men must be at work, one to bring the birds whilst the other feeds them, or the process will be comparatively slow. A modification is found in that wheels are often fixed to two of the legs. Of course, in both this and the apparatus previously described, the food has to be put in the tank in liquid

he simply turns the whole machine round, as it works easily on a pivot. The attendant holds the head of the bird with his left hand, at the same time opening the beak, and with the right hand he introduces into the throat a tin tube, something like the shape of a finger. This mouthpiece is connected by a flexible tube to a reservoir containing the soft food. By a single tread of the foot on the piston the food is injected into the stomach of the fowl. A dial indicates the exact quantity given to each. In this manner, and with this apparatus, 500 birds can be fed in one hour, which operation is repeated three times a day for three weeks, when the fowls are ready for market. The excrements fall down an inclined plane into the centre of the machine, and are thus easily removed." The food employed by Mons. Martin consists



FIG. 32.—FRENCH SALLE D'ENGRAISSEMENT (FATTENING ROOM).

form, so that it will run. Fig. 32 shows the interior of a French fattening room, published in the catalogue of Mons. J. Philippe, Fils, of Houdan (Seine-et-Oise), France.

A yet more elaborate machine is that invented by M. Odile Martin, exhibited at the Jardin d'Acclimatation, Paris, and at the great Mardi Gras Shows. Mons. Mégnin describes it thus:—"At the establishment of Mons. Odile Martin there are three large octagon machines, each containing compartments for 200 fowls. The machine is divided into five floors; each bird has a compartment or pen to itself, and is tied by the feet with shackles of hide. For feeding the attendant stands on the movable stage, which rises and descends by means of weights; he is thus able to bring himself level with each floor of the machine, and to get every bird in succession before him

of fine maize and barley-meal, mixed in about equal quantities; to this is added a portion of lard, and the whole is then mixed smoothly with milk, so thin as to be almost liquid. The greatest care is taken in regard to the quantity of food given, which is carefully regulated, both in Sussex and France, according to the period of fattening.

During the last two years Miss Gubbins, of Cork, has exhibited some of the finest specimens of fattened poultry ever seen in this country, with which she has won numerous prizes. These are fed under the direction of a French servant, from whom we learn that she has no specified rules made out by which she regulates the quantity of food supplied, acting entirely on her own judgment, and giving each bird what it will fully clear

from its crop from one time of feeding to the next. This is the whole secret of her success. The instructions as to quantity given with the machine she considers to be no guide whatever, so much depending on the condition and constitution of each individual bird. The food given is either very fine ground Indian cornflour or barley-meal, made into a moderately thick liquid with milk. It is given at first twice a day and then three times, as the birds show they can digest it. As a rule she keeps them eighteen to twenty-five days in the machine. The best age for fattening is about three and a half to four and a half months old.

HEARSON'S FATTENING APPARATUS.

Something on similar lines to the Martin machine is the Hearson Crammer (Fig. 33), which consists of a food reservoir, to the bottom of which is attached a small force-pump actuated by a lever and treadle worked by the foot of the operator. Communicating with the pump is an indiarubber tube with a nozzle, through which the food passes to the bird.

The following explains our illustration: A is the reservoir for the food; B the pump cylinder; C the piston; E the piston-rod; F the pump valves; G a tube conveying the food to the indiarubber tube H and nozzle K; L a thumbscrew for clamping the parts G and valves F to the upper end of the pump B; M is a weight clamped to the piston-rod E by a thumbscrew N; O is a lever and treadle which, on being depressed at the lettered end, causes the weight M, rod E, and piston C to move upwards, and eject the contents of the cylinder B along the tube H and out of the nozzle K. On relieving the pressure at O, the weight M, and the parts connected therewith, descend, and more food is drawn into the cylinder B, until the weight touches the shelf P, when the motion is stopped, and the cylinder now contains another charge of food, to be in like manner ejected by a force applied at O.

The amount of food which shall be ejected at each stroke of the piston may be modified to any extent desired by altering the position of weight M. To alter the stroke of the piston pressure should be applied at the

point O, and a portion of the contents of the cylinder ejected into the food reservoir. The screw N should be now released half a turn, when the weight will again drop on the shelf P, and the screw N being tightened afresh, the adjustment is made. At every subsequent stroke the piston will now move through a shorter distance, and hence the amount of food will be less at each movement of the treadle.

The method of operating is as follows:—Take the tube in the right hand and the bird's head in the left; then, with the assistance of the finger and thumb of the right hand, open the bird's mouth, and slip the forefinger of the left hand into it, and hold down the tongue, quickly insert the end of the tube, and push it down four or five inches (according to the size of the bird); at this moment depress the heel of the right foot (which up to this time has been resting on the treadle), and force the contents of the cylinder into the bird's crop. If the crop be full enough, the tube may now be withdrawn, taking care, however, to relieve the pressure on the treadle for a second or two before taking the tube out, otherwise a small quantity of food will continue to flow after the tube is removed. When not in use, hang the nozzle over the edge of the food reservoir.

With this can be supplied a rotary pen (Fig. 34), which facilitates the feeding of the birds, but is not absolutely necessary. In the absence of this appliance the birds should be kept in pens, as is more commonly the



FIG. 33.—HEARSON'S CRAMMING MACHINE.

case both in France and England.

SUSSEX CRAMMING.

The Sussex cramming machine (Fig. 35), used by some of the poultry fatteners in that county and Surrey, is a very cumbersome affair as compared with the Hearson or that used in France. The following description was given in the *Live Stock Journal Almanac* of 1887: The Sussex cramming machine can best be described as consisting of an iron cylinder not unlike a thin cannon or bomb, with a piston-rod working in it, and capable of being forced into it by a system of cog wheels. At the end of the crammer, opposite the piston-rod, is a funnel-shaped opening, to which is attached an indiarubber tube. This tube is inserted into the bird's throat when it is

being fed, and a turn of the handle forces sufficient food into the crop. The machine is worked by two men, one of whom takes the birds from the pens and inserts the tube into their mouths, while the other turns the handle which forces the food into the crop. Skilled feeders have been known to cram as many as thirty dozen chickens in an hour, but twenty dozen is reckoned to be good average work. The man who holds the fowl keeps one hand upon its crop, and directs the other feeder as to the quantity to be given. The food chiefly given in Sussex is ground oats, prepared in a way which is peculiar to the county. The husk is not removed, but husk and grain are ground together as finely as possible. The Sussex ground oats are mixed with milk, or, if milk is not procurable, with gruel made from flour, and when ready for use is just of such a consistency as can, without too great pressure, be driven through the cramming machine. During the last week of the fattening process, which usually occupies three weeks in all, mutton suet is added to the food in the proportion of 24 lb. of suet to 120 lb. of meal, or one-fifth suet.

The *Sussex Advertiser* some time ago, in a series of articles since published upon "Quaint Industries" of that county, dealt very fully with this question, and from its account we summarise the following facts, which are borne out by our own observations in the

Heathfield district. It says: The great fatting and higgling district has the beautiful and picturesque village of Heathfield for its centre, covering an area about fifteen miles in length, in which Heathfield, Warbleton, Waldron, Easthoathly, and Burwash are the principal parishes. It is probably the dry, sandy soil, showing its unmistakable proofs in hedges, plantations and fields, which first attracted poultry-breeding into this neighbourhood.

You cannot go far without observing that "chicken" is the great staple product of the district, to which everything else is made to yield. You see the coops standing by the wayside, the cackling hen chaperoning her growing brood about, across the road, through hedges, into fields, wherever instinct and the sight of tempting food may guide them. In the poorer fields, indeed, they can scarcely do much harm. In the better patches of land

fair hops are raised. Elsewhere little more is grown than oats—the favourite food, for many centuries back, in Sussex, for all sorts of living things. Arthur Young remarks upon the preference of Sussex farmers for ground oats as forcing food in the place of the barley and wheat so much more highly esteemed elsewhere. Before long, however, at any rate in some places, the hedges may require to be better seen to, and the poultry to be kept out of the fields, for fattening on so large a scale produces a fair quantity of highly concentrated and stimulating manure, which is gradually enriching the soil, and transforming it into a better quality.

If there are to be fat fowl there must be young chicken, and hence poultry-breeding is an indispensable prerequisite to cramming. Cramming has also raised the price for young chickens to such a figure as to make

it highly remunerative. Not as much is done in this respect as might be desired, and it would be well if the practice of breeding could be extended, more particularly among the labouring folk, who have not, as a rule, the command of sufficient space for cramming. Crammers declare that it is not they who make the largest profits, but the breeders; and some of the labourers' wives appear to manage their diminutive poultry-yards with so much success as to yield them handsome pocket-money.

We have heard of labourers selling £20 worth of chicken in the year, of which sum £10 is set down as profit. The only drawback is that, tempted by such good prices as 3s. 6d. or 3s. 8d. apiece for young chickens, they keep their old roosters too long. For the crammers it is an advantage to have the chickens on the spot, and as they cannot, as a rule, lay themselves out for much breeding, labourers find that a lucrative business.

But in any case, for fattening on so gigantic a scale, the supply of home-raised fowls could not suffice. Hence the fatters are compelled to employ "higglers," who go as far as fifty miles—to collect young chickens. These higgles are employed every one by a particular fatter—some fatters employ several; as a rule they are set a limit for buying, and allowed a commission of something like two shillings a dozen. The chickens are bought at from eight to thirteen weeks old, so as to answer the

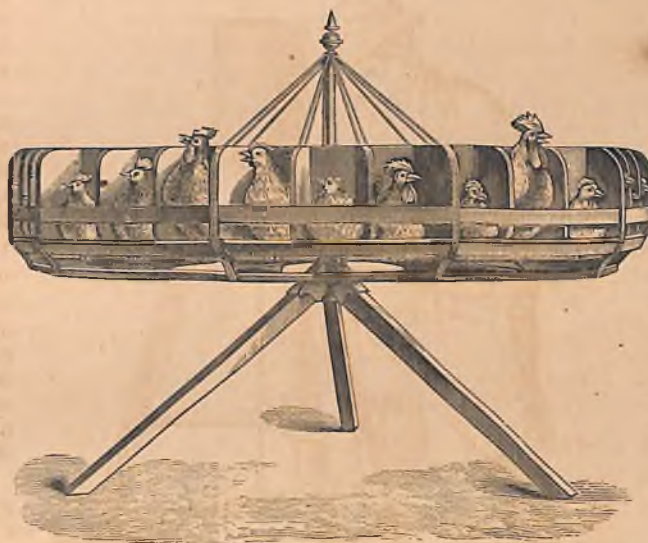


FIG. 34.—HEARSON'S FATTENING PEN.

varying requirements as to size. Some breeds are greater favourites than others. The chickens are cooped up in sixes, generally all coops in a row, at a height above the ground convenient for feeding and handling, and there they are fed out of a crib which runs alongside the coops. In some places you meet with several tiers of coops, one above the other. As a rule they are under shelter, in sheds—fowls liking warmth. But some very successful fatters have at any rate part of their birds sheltered by nothing but a roof and a wattle-screen, and they say that the fowls do as well there as in sheds, even in winter.* In the Heathfield district the usual food consists of ground oats, as *pièce de résistance*, suet, and milk—skimmed or unskimmed—to which sometimes a little linseed oil is added, especially in winter. At first chickens have to be fed carefully, if not charily. Their greediness is so intense that they are apt to choke or overfeed themselves, and then there is an end of fattening. Allowing them three weeks, they are as a rule kept on oatmeal (made into gruel) one week; then suet is added, and the last week they are crammed. Milk is highly valued as an addition to the ordinary diet, and Mr. Olliver has used as much as £10 worth a week, in addition to fifty sacks of oats, and fifty or sixty stone of suet.† But milk is not always to be had, and then the chickens must go without.

Since a considerable period machinery has been employed, and it is found to save time. The appliance in use is a sausage-making machine, to the mouth of which a gutta-percha tube is attached. This tube must be inserted in the crop—not too far, but just far enough. Were it to stop short of the crop it would choke the hapless victim; were it to be thrust in too far it would injure the crop. The machine is carried about. One man turns the wheel; another holds the chicken till the crop is filled. This is the work of an instant. In this manner the chickens have their crops filled twice a day. The sensation seems at first displeasing, even though this be merely owing to its novelty. But after a time we are told that the chickens get so used to it as actually to “look for” the matutinal and vespertine gorging with something like eagerness. This process is continued for about a week, supposing a preparatory course to have been gone through. After about a fortnight the food ceases to take effect, the fowls “go back,” and then fever is apt to set in, which kills them. So long as they are not kept beyond the proper

period it is surprising how few deaths occur in their ranks.

The result of the cramming described are fowls most tempting in their tenderness and succulence, and often of perfectly astounding size.

It is surprising what an amount of meat—good, juicy, tender meat—can be carved out of a Sussex “crammed” fowl, and hence the preferential price given in Leadenhall Market and at Smithfield is by no means paid without cause.

A GERMAN POULTRY ESTABLISHMENT.

Consequent upon the publication of an article in the *Royal Agricultural Society's Journal*,* descriptive of a poultry establishment near Metz, in Germany, we paid a visit to it in March, 1891, but were disappointed to find operations suspended through, it was stated, difficulties between the landlord and tenant. The following particulars were told to us, and are not the result of our own observation. Therefore we cannot vouch for more than the provision for and details of the process. But the Hon.

A. Cathcart, who wrote the article referred to, spent some weeks at the Schloss Walmunster, and he evidently wrote from what he saw. Since our visit that gentleman has informed us that he saw the process in operation personally, and can verify his descriptions.

“Twenty-four hours after the chickens are hatched,” we wrote,† “they are removed into cages, fitted in the various upper rooms of the schloss. These rooms, of which there are six, are on the top floor. The cages are

simple, having straight lattice fronts, which vary in space between bars according to the age of the birds. Sliding floors facilitate cleaning, and the cages vary in size, for as twenty birds are kept together, they need more space as they grow. Out of these cages they never go. Before them is a constant supply of food, made of maize meal and buckwheat meal mixed with milk, for several crows are kept on the farm. A little phosphate of lime is given, for bone and feather formation. Each room is warmed, and yet there is a constant supply of fresh air, but it must pass around the stove ere entering, so that the birds are kept in an even temperature. Treated in such a way, many chickens are ready for killing at six weeks old, whilst all meet their fate ere they attain two months. At this age many weigh 3 lb each, and the price per pound varies from 1s. 3d. to 11d., according to the season. They are killed on the spot, and despatched in various ways, the German Parcel Post being cheaper than ours, and so

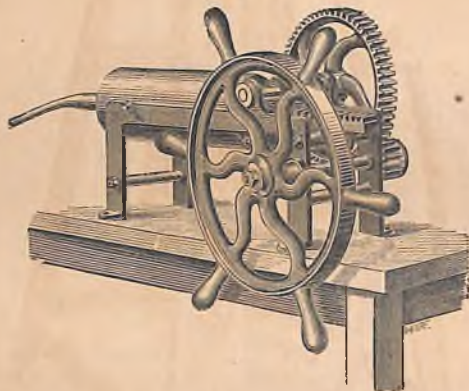


FIG. 35.—SUSSEX CRAMMER.

* This we are inclined to doubt, as it is against all reason and experience.

(*) *Royal Agricultural Society's Journal*, December, 1890.

(†) *FANCIERS' GAZETTE*, March 29th, 1891.

helps to develop business. In summer ice is used for packing. Last year 9,000 chickens were reared in this manner, in addition to nearly 1,000 sold alive at two or three days old. Several hundred fat fowls of four to five months were sold, but these are reared outside and fattened in cages, on the French plan, accommodation being provided for 300 birds in another building."

The statements here made have, together with the writer, been pretty everely attacked. One correspondent of the *Field* (April 4th, 1891) recorded experiments made forty years ago in order to disprove that chickens could be produced to the weight stated at eight weeks old. As well might we make comparison between dairying as conducted in the fifties with present day methods. Advance has been made, even though some there are who stand still and refuse to recognise the progress. We frankly say that to get chickens weighing 3 lb. at eight weeks seemed impossible, and we should prefer to have seen the thing for ourselves rather than be merely told that it was so. But to adopt the *non possumus* in these days, to say the least, foolish. Moreover, we have ourselves killed ducks under eight weeks old weighing 4 lb., and the possibilities in early development are far from

being exhausted. We should have thought our critics would have learnt by this time how risky it is to say anything cannot be, for they have had experience enough in this direction. We hope yet to see the German farm in active operation, so that the statements there made to us may either be verified or disproved. We would point out that the system of fattening described above is

altogether different from any other yet recorded, in that (1) the chicks are kept in cages from the first day of their birth; (2) the atmosphere is maintained at an even temperature, and there is consequently no loss by elimination; and (3) they are bred for, and fed throughout with, the sole object of attaining size and early maturity.

RECORDED WEIGHTS.

In order to ascertain as far as possible what weights can be attained by chickens, we have made inquiries of several breeders.

Sir Jacob Wilson, to whom we recommended the Indian Game-Dorking cross, which Lady Wilson adopted with remarkable results, informs us that these chickens at eleven weeks weighed 4 lb. each. Mr. W. S. Pinsent, of Newton Abbot, the well-known coloured Dorking breeder, writing on May 2nd, 1891, says that the weight of his chickens at eight weeks was 3 lb. 2 oz.; nine weeks, 3 lb. 12 oz.; and ten weeks, 4 lb. 10 oz. In neither of these instances was there any special feeding. Lady Wilson's chickens were reared in a Westmeria brooder, wherein they could feed at night by lamplight if they wished, and this probably will account for their rapid growth to some extent. Mr. Pinsent says:—"I never feed for size, or take much trouble with

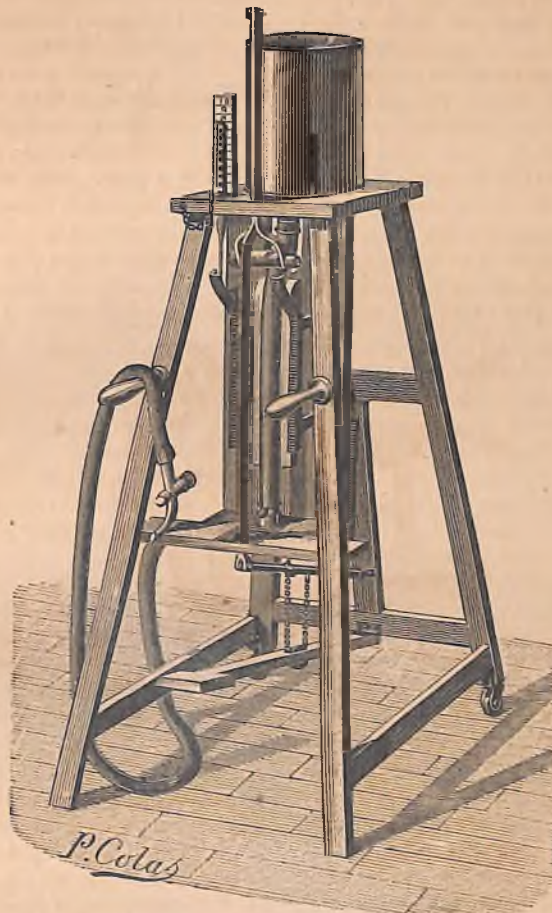


FIG. 36.—MONS. PHILIPPE'S CRAMMER.

them, nor do I ever feed on meal or any patent food. They get egg and breadcrumb, wheat, groats, and best rice boiled in milk, given hot, and a good grass run of three acres; plenty of clean water. This season I have out 124 chickens, finishing breeding three weeks ago, and do not on an average lose two chicks a season through sickness. I hatch under hens."

CHAPTER XIII.

KILLING, DRESSING, AND MARKETING POULTRY.

KILLING FOWLS—MR. TEGETMEIER'S METHOD—FRENCH SYSTEMS OF DRESSING AND SHAPING—THE LA BRESSE FOWLS—THE SUSSEX SYSTEM—VALUE OF TRADE DONE—MARKETING—CAPONISING.



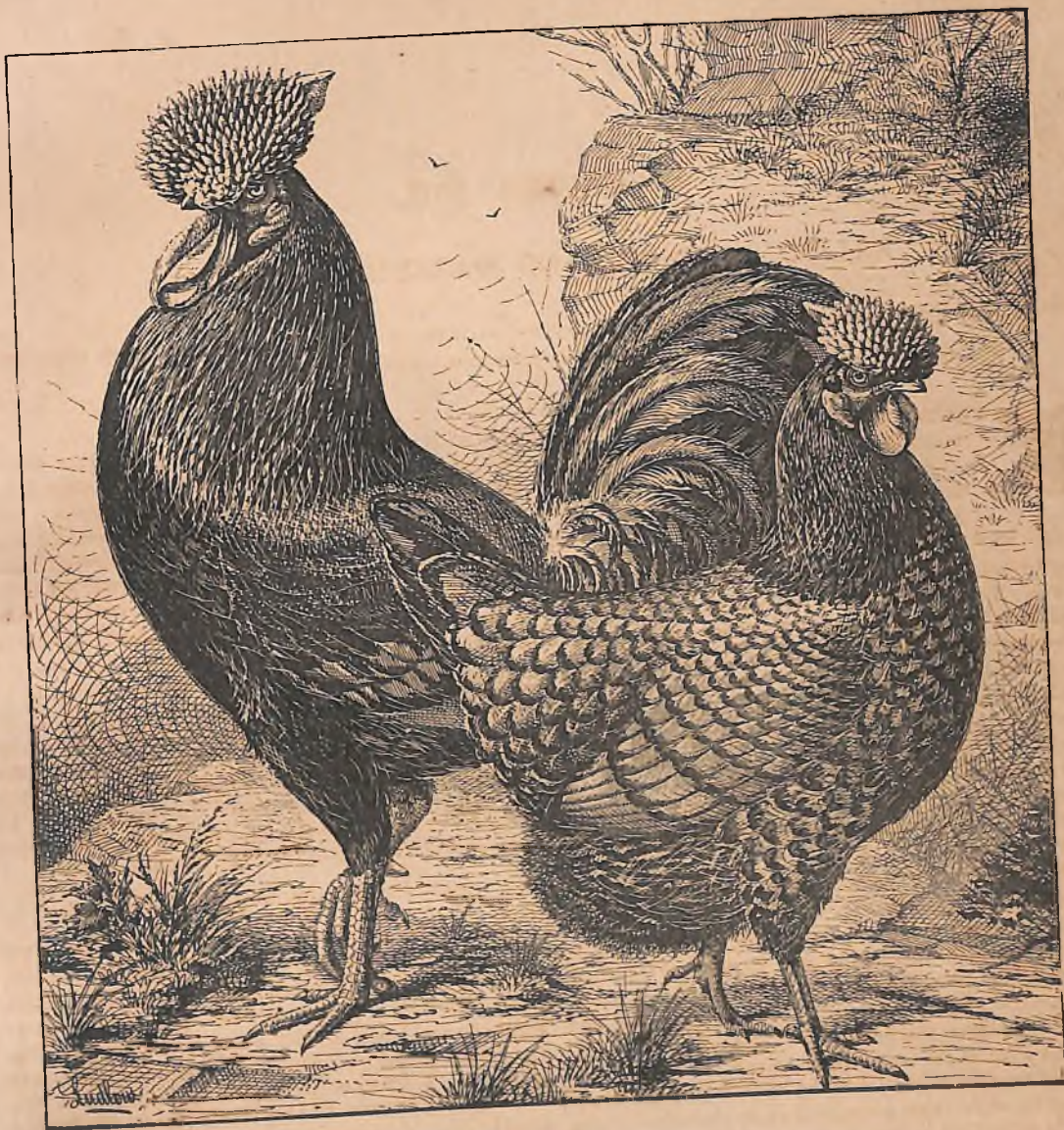
KILLING fowls is by no means difficult. The best method we know is to hang the birds up by the legs, and then thrust a pointed knife into the roof of their mouth, rather in a backward direction than to the top of the skull. This is in order to reach the brain, for then death ensues very speedily, and with very little pain to the victim. The birds should be allowed to hang until the blood has ceased running, and be plucked immediately, for, it is scarcely necessary to say, it is much easier to pluck a newly-killed fowl than one which has been killed for some time, and is consequently cold. In all cases where fowls are killed to be sent to market they should be plucked by the farmer, and the value of feathers he will obtain will more than repay the labour of plucking, though this is not its object. A special knife should be employed, and Spratts Patent sell a very suitable one for this purpose.

In a recent issue of the *Royal Agricultural Society's Journal*, Mr. Tegetmeier describes the method of killing usually adopted. "With regard to the mode of killing fowls intended for sale, the almost universal practice in England is to break their necks. This should be done by seizing the legs of the fowl in the left hand and the head in the right, the back of the bird being upwards, and the comb in the hollow of the hand. If the legs of the bird are then held against the left hip and the head against the right thigh near the knee, by strongly extending the fowl, and at the same time bending the head suddenly backwards, the latter is dislocated from the top of the neck, and death results instantaneously, all the large vessels being torn across and the blood escaping into the skin of the neck. Muscular contractions, however, remain for some minutes, during which time the fowl, if put down, knocks itself about, bruising the flesh; it should therefore be held in the hand or hung up by a string round the legs to a hook in the ceiling. The fowl having been killed should

be plucked whilst warm; in fact, the professional killers proceed to remove the feathers immediately after dislocating the neck, as they then come out very easily and the skin does not tear. There is no cruelty in doing this, even if it be before the muscular contractions have ceased, as the head of the fowl is removed from the body, being connected only by the skin, and all sensation is at an end. When carefully plucked the fowls should be placed on their backs, the hocks being tied together, the wings twisted behind the back, and the neck allowed to hang down, so that the fluid blood accumulates in it. Under no circumstances should the breast-bone be broken, as it deteriorates very much the value of the fowl. It is needless to say that the legs and feet, if they are sold, should be washed before the birds are sent to market." A bird should always be starved twelve hours before being killed, so as to empty the crop.

* FRENCH SYSTEMS OF DRESSING AND SHAPING.

Next to the feeding of the fowls the most important part of the French system is the shaping, for this has much to do with the appearance of the birds when offered for sale. There are two principal methods adopted; one, used almost solely in connection with La Bresse fowls, and the other that which is nearly universal. The former method, which is adopted to give the La Bresse fowls their peculiar shape, is, as has already been stated, almost entirely confined to that breed. As soon as the fowls are killed they are plucked, and whilst warm are wrapped, first in a fine linen cloth, and then in a coarse one, both of which are specially shaped. These cloths are drawn very tightly, and the outer one is stitched up and then damped. The birds are kept in these cloths for thirty-six hours, at the end of which time when taken out they are long in shape, with pointed ends, and are perfectly round, the legs and wings being pressed tightly into the sides of the body. The flesh of the La Bresse is very white, and the skin



REDCAPS.

BRED BY, AND THE PROPERTY OF, MR. ALBERT E. WRAGG, EDENSOR, BAKWELL.

thin and delicate, so that the dish, however peculiar it may appear, is very tempting indeed.

The other method, which is most generally used, utilises a shaping-board of a different construction to anything we have seen elsewhere. The board is about two feet in length and eight or nine inches in width, this size, of course, depending upon the fowls to be placed thereon. As soon as the fowl is killed it is quickly plucked, and the head, legs, and lower bowel most carefully washed. It is then laid back downwards on the board, and the breast pressed in with the hand, causing the ribs to crack slightly, and loosen them. Once this is done the fowl will not return to its normal shape. The object is to force the meat up on to the breast, and hence the greater amount of meat found on the breast of a French dressed fowl than on one prepared in the English fashion. This plan is

the wings through them, and the rump supported by a block of wood and the crop by a pad, a wet cloth is very tightly drawn over the back, and the tapes attached to it for the purpose tied down to nails on the sides of the shaping board. The whole is well drenched with cold water, and left to set. Such a system brings out all the best qualities of the fowls, and secures the meat just in the places where it can be most easily got at by the carver.

THE SUSSEX SYSTEM.

The system of shaping adopted by the Sussex fatteners is quite different to either of these. Immediately they are killed the fowls are plucked and placed breast downwards into a V-shaped wooden gutter, made of two boards about six inches wide, the angle at which they are joined being rather less than a right angle. The hock joint lies in the angle of the boards, and as

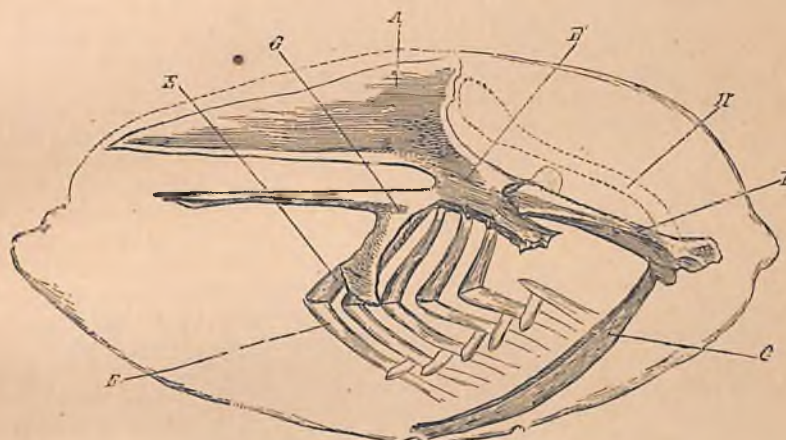


FIG. 37.—FRENCH SYSTEM OF SHAPING.

A, keel; B, body of breastbone; C, bladebone; D, crossbone; E, lower ribs; F, upper ribs; G, side of breastbone; H, meat, thought.

in every way superior to the English method of breaking the breast-bone, which very often spoils the slices and causes them to break. Not only has this pressing of the ribs the effect of forcing up the meat on to the breast, but it expels all air from the body, and the fact that French fowls keep longer after being killed may be attributed to the better method adopted. Fig. 37 (for which we are indebted to Messrs. Christy and Co., appearing in their work on Hydro-incubation) shows a fowl with perfect or unbroken keel, dressed in the French style, but with E and F, the upper and the lower ribs, bent together, thus producing the same effect as far as appearance goes, but without interfering with the carving of the fowl and producing a much more meaty breast. It is usual, we believe, in the case of old fowls which cannot be pressed down by the hand, to put them in a wooden press, and in this way crack the ribs. The bird is next turned back upwards, the hocks having already been tied with

soon as one of these boards is filled, a flat piece of wood is laid on the top, and heavily weighted. They remain in this position until quite cold and set, when they are packed in crates and sent to the London market. It is the board described which gives them the appearance they then have.

We again are indebted to the *Sussex Advertiser* reprint, referred to in the last chapter, which says:—Killing and preparing the fowls for the market are operations as important as cramming. Carriers send their carts round to the various farmhouses to collect what fowls are ready, and convey them to market, conducting the sale and bringing the proceeds home to the fatteners after paying themselves for carriage. The extension of cramming is in a measure due to the facilities and encouragement given by the principal carriers. In former times the carriers' vans used to take the fowls right into London, and "journeys" were restricted to one or two days a week. When the South-Eastern Railway was

built, Ticehurst became the collecting station, from which the chicken-crates were conveyed by rail. Since the opening of the new branch of the London, Brighton, and South Coast Railway, Heathfield has been made the headquarters of the traffic, and in order to accommodate customers the railway company have provided special cars, which do nothing but carry Sussex poultry. With very few exceptions this is sold at Leadenhall Market and in Smithfield. Mondays, Wednesdays, and Fridays are the principal days for delivery, but in the busy season—say from July to September—fatters kill and carriers carry every day. When the carriers come round to collect the fowls the latter must be fresh killed. Hence it is desirable that they should be killed quickly, and men acquire a peculiar knack of despatching them “as fast as you can hand them,” by a sudden wrench of the neck. Being dead, the fowls have to be divested of their feathers. A man can kill and pick about two dozen a day; an exceptionally good hand can manage three dozen. The next process is the “stubbing,” to remove the stumps remaining in the skin. This is done by women with a knife, at piece-work, about 4d. being paid for the dozen. After that the fowls have to be “pressed” to give them a good square shape. For this purpose the fowls are laid in rows in a crib-like frame, with a board placed over them, weighted at first with stones. As soon as the fowls are “set,” stones and covering are removed, and then, when the time comes near for the carriers to call, the birds are packed in crates, and in these they are carried to London. The yield of feathers is an item in the business, although not a very heavy one. A dozen fowls will yield on an average something under a pound of dry feathers, which sell at about 6d. a pound. In spring the yield is considerably less, in autumn more. The price of feathers varies according to the market. A good many are sold locally for beds, 60 lb. being reckoned to the bed. Before sale the feathers are dried in an oven, or else in an oast-house, like hops.

The economical value of the industry lies less in the *modus operandi*, however appropriate that may be, than in its comparatively large dimensions and its dispersion over a large number of farmhouses. Some time back it was calculated that in a year not less than £70,000 was realised by the sale of chickens in this small district.

The summary of the yearly balance-sheet, prepared previous to a dissolution of partnership by Mr. Bean, of Heathfield, and his late partner, shows that that firm in 1876 carried £24,130 17s. 10d. worth of chickens to market, receiving therefor £255 14s. 11d. for carriage, at the rate of 20s. a ton. Allowing one-eighth for packing-cases, the net weight conveyed is found to be 224 tons, representing something like 125,440 chickens, sold at 3s. 10d. a head on an average. This was the traffic of one firm only. Since 1876 the sale has increased. The price varies according to the market, and fatters complain that at times it sinks to so low a point as to leave them with a balance on the wrong side. The result is attributed to competition, not only from France, but

from Ireland also, which country appears to be increasing its exports of (naturally fed) fowls every year. The price of 3s. 10d. is, of course, an average one. Often 5s. is the normal price, and for particularly heavy specimens, which are generally sold according to weight, outside prices are asked. Fowls or chickens are fattened up to all weights, two pounds, or five, or eight, or more. Mr. Olliver once produced one weighing thirteen pounds. Fattening is also practised on all scales. There are farmers who lay themselves out for this as a speciality, fattening all the year round, and keeping their coops full. Among this class Mr. Joseph Olliver takes the lead, keeping about 200 dozen always in hand, and killing forty dozen at a time, in the busy season even six times a week. He uses nearly 700 sacks of oats a quarter, £130 worth of milk, and 700 stone of suet. He keeps six men constantly employed, and about 20 women. His fattening is all of a wholesale character, supplemented at times by thirty dozen or so of ducks. Other fatters, again, proceed on more modest lines, killing fifteen dozen a “journey.” Others fatten only when the market is favourable, a few dozen, or ten or twelve dozen, at a time. From a political economist’s and a philanthropist’s point of view, the latter is perhaps the most satisfactory practice; not that one would wish to discourage the fattening pursued as a business, but one naturally feels tempted to appreciate more highly the additional profits secured to “small folk” by thrift and industry. Tasty and palatable as crammed chickens are to ordinary mortals, in the eyes or the stomach of the crammer familiarity breeds contempt. Not that they do not look lovingly and carefully upon the growing birds which are to bring them in money, but their flesh becomes distasteful and even sickening to them, as quails did to the Israelites or sweetmeats do to the confectioner, according to the proverb, *toujours perdrix*.

The industry of which we have given an account is one which from every point of view deserves encouragement. It enriches the productiveness of the land; it stimulates exertion and enterprise; it provides that which we need above all things, food; and it places a means of profit within the reach of every one, even the smallest cottier. It has done excellent service already, and there is ample scope for it to do a great deal more. There is plenty of land where poultry-fattening might be practised with advantage; there are numbers of people to whom some additional pocket-money would be a boon, and who might well earn it by imitating the example of the Heathfield or Warbleton crammer, and, indeed, the industry might well be transplanted beyond the county, and help, along with other things, to set suffering agriculture on its legs again.

MARKETING.

There is another part of this question which ought not so be overlooked by those who have birds for sale, and that is, the way in which they are packed when sent to market. Of course, many poulterers kill fowls as they want them, and therefore the producers have not

any trouble in killing and dressing; but where they buy them dead a great deal will depend upon the way in which they are packed. We have sometimes seen packages opened, into which chickens have been put carelessly, with the result that they were all jumbled up, damaged here and there, so that their appearance was spoiled, and the return could only be a poor one. Whether the system of dressing we have recommended be adopted or not, the birds can be put in firmly and neatly, so as not to spoil them in any way. Hampers are best for this purpose, and should be lined out with a damp cloth, and also have the same between each row. The birds should be packed in rows, and as closely together as possible, as this will maintain their shape and rigidity. Even when birds are killed for home consumption it is worth the trouble of dressing in this manner, as they look and are so very much better on the table than when prepared in the old way.

Again we would repeat, that in order to obtain the best results chickens should be killed where they are fattened, otherwise the process will be of no avail. A fattened fowl will lose much of its weight if sent a journey alive; but in these days of refrigerating systems there is no difficulty in keeping dead poultry for several days, so as to prevent glutting the market.

CAPONISING.

Before leaving this subject it is important to deal with the question of caponising. There can be no question that the system of caponising is one that deserves considerably more attention than it has ever received in this country. If for no other cause, it would have been reasonably expected that pecuniary motives would have led farmers and large poultry-keepers to adopt the system, for cockerels caponised, and pullets made into poulardes, grow to a very much larger size than those not so treated, and in addition to which the quality of meat is much improved; not only so, but male birds which could not be kept together, without great danger of constant conflicts, will live in peace and amity. This latter reason would of itself be sufficient to warrant the adoption of caponising to a considerable extent, for the pain suffered by a bird is so infinitesimal, as compared with the result of a single fight, that the benefit altogether outweighs any objections on this score. But when there is the additional inducement of getting very much larger size in the fowls, with very little outlay—for the birds thrive better and lay on flesh more rapidly, not being so restless in temperament—it is most surprising that the plan has not been very largely adopted. In France capons are very numerous indeed, and as we have much to learn from that country in the way of poultry management, when we see that there a certain plan is adopted, it should have considerable weight with us, and lead us to give even more than a favourable consideration to it. We do not say for one moment that simply because a thing is done in France it should be adopted here. That would be foolishness; but when we see those who place economic considerations

first act in a certain manner, and be successful in it, then we should be prepared to try the matter fairly and fully. This, we claim, is a fair position to assume, and the only reasonable one.

Therefore, upon the ground of profit, it is strongly recommended that fowls intended for table should be caponised, because the surplus cockerels and pullets can thus be made the most of, and will realise for the breeder more than they otherwise would. When this position is accepted, there next comes the question of how it should be done, for probably the objection to what would appear to be a surgical operation is what weighs with many who have never adopted the system. They have a very right and proper objection to the giving of pain. So have we. And if it were not that we know the pain is momentary, when the operation is rightly performed, we should be the last to countenance, much less advocate, such a system. Granting, therefore, what we have been saying has been accepted by the reader, the next point is—How can the act of caponising be performed? In reply to which question we give the method which has been perhaps the most successful, namely, that introduced by Farmer Miles, an American, who was over in this country a few years ago, and who then explained his system. The instruments used are special ones, and can be bought from makers of surgical instruments. Spratts Patent advertise a set, which we have found all that is necessary.

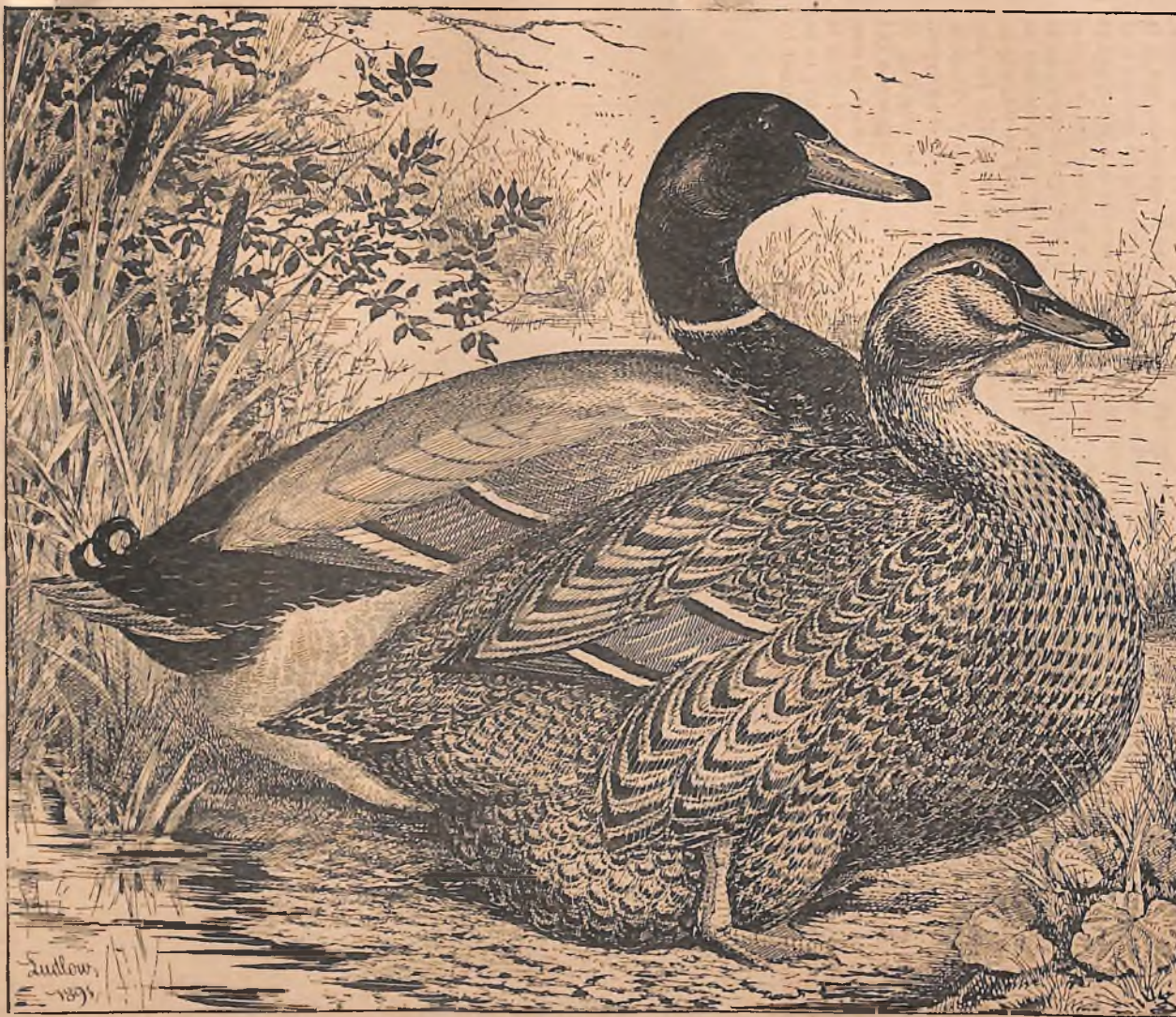
The best birds to operate upon are chickens which have never yet crowed; and when about three or four months old is the right age. They must be kept without food for thirty-six hours or more before being operated upon. A good light (sunshine if possible) should be chosen to operate in, and the full light should be allowed to shine into the chicken's side when opened. First take two good thick pieces of string, or thin cord, three feet long; to one end of each attach a weight, or any equivalent in the form of a brick or stone, fastening the other end of the string to the chicken's legs. Then lay the bird on its left side, and drop the weighted end of the string over one side of the operating table. Now tie the free end of the second string round the bird's wings near the body, and drop the weighted end of this string over the other side of the table. The chicken will thus be properly secured, and the operator must stand so that its back will be towards him. The small feathers from hip bone to ribs, over the last rib, must now be plucked off, and the ribs and feathers all round should be wetted with a sponge dipped in quite cold water, or ice can be used if preferred, as this wetting will serve to keep the feathers out of the operator's way, and will also numb the sensations of the fowl, so that he does not appear to feel the operator's knife. Stick the knife in half an inch deep between the first and second ribs from the hip bone, and cut downwards and forwards to the end of the ribs. Turn the knife, and cut nearly up to the backbone. Now put in the spreader, which is one of the instruments used, tempering the tension by a rubber

band provided for the purpose, to suit the size of the fowl, and with the spreader open the ribs, after which split the inside striffin that covers the bowels. The upper testicle will now be exposed, and should be grasped by the grippers, which should be given one entire turn over so as to separate the testicle from its attachments, except the spermatic cord, and pull the testicle out. Treat the lower testicle in the same way. It is necessary to be careful not to rupture the large vein under the testicles, and also to get the whole of the latter out. The bird may be untied and allowed to go without the incision being sewn up, but for a few days it should not be allowed to fly up to roost. Birds may in this manner be caponised in any number, and without loss of more than one or two per cent. Large breeds of poultry when caponised young and well fed until ten or eleven months old, and then fattened, will weigh 12 to 15 lb. each, and the meat on them will be found of the tenderest and most succulent description.

It is to be noted that the chief dangers found in practice with all systems of caponising is in tearing the

veins near the testicles, which results in the bird's bleeding to death, and in the losing of the testicles amongst the intestines, which latter is almost certain to cause inflammation and death. These seldom happen, except through want of care or inexperience, but it is important to have a good light, in order to prevent it as far as possible. The want of care can be avoided, and to overcome want of experience it is better for a novice to make his first experiments on a dead chicken, so as to learn exactly the position of the place to be cut, and of the testicles. A little study of anatomy in this way is highly useful; and, in fact, it would be cruelty for any novice to commence operations on a living bird. The first time must necessarily partake of the nature of an experiment, and therefore there should not be any risk of giving unnecessary pain. For all operations firmness and confidence are necessary, without which a bungle is sure to be made, and these are not to be had except there is actual knowledge of the subject, and of what has to be done. This actual knowledge can only be obtained by experience.





ROUEN DUCKS.

BRED BY, AND THE PROPERTY OF, MR. W. BYGOTT, RYEHILL FARM, ULCEBY, LINCOLNSHIRE.

Drake, winner of First Prizes at Royal Shows, 1888, 1889, and 1890. Duck, winner of First Prizes at Royal Shows, 1890 and 1891.

CHAPTER XIV.

MARKETING AND PRESERVING EGGS.

WHERE FOREIGN EGGS COME FROM—THE EGG TRADE—VALUE OF EGGS AS FOOD—QUALITIES OF EGGS—FLAVOURING EGGS—AGE OF EGGS—RAPID MARKETING ESSENTIAL—PACKING EGGS—SORTING—PRESERVATION OF EGGS—PRESERVATION BY LIME, SALT, ETC.—FRENCH METHODS—FREEZING EGGS—FERTILE OR NON-FERTILE EGGS.



WE have already given statistics to show the great increase of egg imports during the last generation, and it will be interesting to learn something of whence comes all the mass of food represented by these figures, and how it is consumed. There seems no limit to the demands of the English stomach. Since the St. Gothard tunnel was opened from Switzerland to Italy the traffic has been something astounding. The competition of routes led to a great reduction of rates, and eggs are brought from Northern Italy to London for much less than used to be charged from Northern France. Whilst the railways in the latter country were asleep, others have been awake, and the result was the French trade suffered. After a time French producers awoke, and, as we shall presently see, have risen to the occasion. A new outlet has been found for the farmers and cottagers of Northern Italy, and tons of eggs arrive daily in England brought by the St. Gothard route. Previous to the opening of the tunnel, the imports, though greater every year, had not risen by leaps and bounds, and those of us who are interested in the question began to think that this slower increase was due to the larger number of fowls kept at home. This may have been true in some measure, but not entirely so, for as soon as there is a more abundant supply, the whole of it is absorbed without any great reduction in price or glut in the market. Of late there have been vast imports from Russia. That there has been a great increase in the home production of eggs no one can deny, and the signs are that it will still more increase. If the home produce of eggs could be doubled at once there would even then be plenty of room for all the imports that now come. If the increase of people in all great centres of population continues, so will that of demand for eggs, from the recognition of their value as an article of diet, and we need a very large addition to imports or home

production every year. Great as is the consumption of poultry produce in Britain, it is overshadowed by that of America, where some time ago it was estimated that £50,000,000, or 250,000,000 dols., is annually spent on eggs and poultry alone.

THE EGG TRADE.

The demand for eggs is a varied one. First, there is that for domestic purposes, which is ever-increasing, the consumption of eggs growing year by year. They have come to be more and more regarded as a valuable article of diet, especially for children and invalids, containing as they do all elements necessary to sustain life and nourish growth. Eggs used for domestic purposes may be divided again. There are the new-laid eggs used for boiling and poaching, and in our great cities, especially London, the prices which these realise are very high. For guaranteed fresh eggs the retail prices range from 1s. 6d. to 3s. per dozen, according to the season of the year. These eggs, which are either English or French, are from one day to a week in age, and must be perfectly fresh, without the slightest sign of taint. In order to secure so important a consideration many means have been devised by the great London dairy companies, but they find it very difficult to discover a reliable method. That found most effective is to have every egg received marked, so that whence it has come from can be easily discovered. Then if there are many complaints of the eggs from one man, he is first warned, and if the same thing occurs again buying from him is stopped. In this way the interest of producers is made to be in honest fulfilment of their contract. As the best prices are paid, purchasers naturally insist upon receiving only really fresh eggs. Next to these stand cooking eggs, which are generally from Ireland and Denmark. These are not quite equal in flavour to new-laid eggs, and, whilst neither stale nor tainted, have not that fresh look or taste which

the others show. They are eaten by millions, but could not be put on the tables of those who know what a really fresh egg should be. In many houses these are used principally for cooking, and the retail price ranges from 1s. to 1s. 6d. per dozen. And finally there are the box eggs, themselves of various grades, which are eaten by our poorer classes, when they indulge in the luxury of an egg, but would not be accepted as fit for cooking, much less for eating, by many. These can at all seasons be bought at from 9d. to 1s. per dozen. The greater portion of the commoner qualities of box eggs are used for manufacturing purposes. Thousands of boxes are taken by leather-dressers, and there are several other trades that consume vast quantities of the eggs which figure in import returns. The prices of this class of eggs range from 5s. to 8s. per long hundred. The quantity used in this way is something incredible, and there will always be a large demand on cheap foreign eggs for this purpose. We have at times been astonished to see the piles of eggs in some of our great leather establishments, and if the numbers so used could be given, they would to some extent explain the enormous exports that come week by week into England.

VALUE OF EGGS AS FOOD.

It is generally accepted that weight for weight an egg contains more nutriment than any other kind of food. There is no bone, no gristle, no great amount of water, and the only portions which are not edible, the shell and outer membrane, are a very small percentage of the whole. Thus there is the very modicum of waste or refuse. Eggs, as a rule, average eight to the pound, and we believe that a dozen eggs, even though they cost two shillings, are cheaper as an article of diet than two pounds of beef steak. The two will weigh and cost alike, but in point of real nutriment we believe eggs have the advantage. Eggs can be served in scores of different ways, and can be presented in the most palatable forms. They enter into the composition of innumerable dishes, are relished equally by the invalid and the healthy; together with milk they should form the principal diet of children; and are, in brief, one of the most valuable of our foods. It is true they do not suit all stomachs. Those who are known as bilious subjects dare not eat many eggs, but apart from such people, there are few to whom a new-laid egg does not appeal with a great power of temptation.

QUALITIES OF EGGS.

It is often supposed that the more tinted the shell, the richer the egg. This may or may not be the case. We are inclined to think that the shell in some way is affected by such influences as enrich the yolk. Be that as it may, it is a certain fact that some eggs are much richer than others, and that some varieties lay better eggs than others. Common observation will show this. Eggs are selected by their size and smoothness of shell, when all are alike in point of freshness, whereas the real test ought to be the flavour and quality of their contents. To many people an egg is simply an egg, and nothing more; but there are eggs *and* eggs. There is really as

much difference between the flavour of a well-fed Langshan egg, and that from a black Spanish hen, as between the meat coming from these respective birds. The meat on the former is rich and well flavoured, that on the latter is dry and insipid, and the eggs are pretty much the same. If some of our scientists would go thoroughly into the subject, and tell us the quality of eggs produced by each variety of our domestic fowls, they would render an incalculable service to the community at large. Doctors would then be able to discriminate between one and the other, and, in ordering their patients these invaluable comestibles, could tell which to select. A bilious subject who dare not eat a Cochin or a Game egg might partake of a Minorca or a Spanish egg with less risk. Eggs can be influenced by the food consumed, and the whole question is full of possibilities. All eggs are not alike, they each have distinct qualities, and it should be the object of poultry-keepers to encourage the buying of eggs by their breeds, for in that way will the best qualities obtain top prices. Perhaps some day we shall see eggs in shops labelled according to their breed, as well as their freshness.

FLAVOURING EGGS.

A suggestion has been made that much might be done in the way of improving the flavour of eggs. We know that food must have a very great influence on the produce, and every poultry-keeper can realise the difference between his well-fed eggs and those which came from badly-fed fowls. But this suggestion goes farther. It is said that a new industry might be created in the raising of poultry and domestic animals upon certain kinds of food which will impart to their flesh new and palatable flavours. It is well known, for instance, that the exquisite flavour of the Canvas Back duck is due to the wild celery it feeds upon in the Southern marshes, and the delicious Congo chickens owe their superior excellence to the pineapples they eat. The grouse of the Far West plains is aromatic with the wild sage; wild ducks and other sea fowl have a fishy flavour; and the fish fed to swine may almost be said to be eaten over again by the consumer of their pork. Milk is especially affected by whatever is eaten, as every farmer can testify, whose cows give bitter milk when they eat the leaves of the burdock, etc.

Though this is from an American source, the suggestion is not to be dismissed as a piece of Western exaggeration and imagination, for it has sound theory at the back of it. The quality of both eggs and fowls is affected by the conditions under which they are kept, and the soil upon which they are placed, as well as the food they eat. Thus we find that the fowls of some districts are much better than those of others. Therefore it is quite possible to feed for flavour, though whether it is practicable from a commercial point of view must be left to the determination of practical experience. Of course, whatever food is used would have to be such as would not injure the fowls, or the harm done would more than counteract the gain secured. The limitations of this country do not permit

of the same scope as in some others, but as heather fed honey is so much superior to that produced by bees under cultivation, and as mountain mutton is so much richer and finer in flavour than that from fields and pastures, so there must be eggs and poultry which are the best of their kind because of the places where they are produced.

AGE OF EGGS.

The age of eggs can be told by their density, which decreases as they get older. Suppose that 4 oz. of common salt is dissolved in $1\frac{1}{2}$ pints of water; if a new-laid egg be put into this liquid it will sink to the bottom; an egg one day old will not go quite to the bottom; an egg three days old will be suspended in the liquid; beyond that age it will rise to the surface, and the older it is the more it will rise to the top.

RAPID MARKETING

ESSENTIAL.

The first consideration in marketing eggs is that they shall be placed on the consumer's table as speedily as possible, as they rapidly begin to deteriorate. This is a matter too often forgotten, and we have been in extensive egg-producing districts where they are only sent out once a week. When the producers themselves bring their eggs to market this will probably be the case always, as it is now in Britain and Ireland. But

the better system is that adopted in France, where egg dealers send men round daily, or every other day, and by this means secure the eggs perfectly fresh. It is possible for an egg laid in Normandy to be on the consumer's table in London within sixty hours. This regularity and systematic collection accounts for the favour in which French eggs are held and the high price they obtain. Few English eggs, even though they have to travel only a tithe the distance, are marketed so rapidly as three days after being laid, whilst the greater proportion are from a week to a fortnight old ere they reach the consumer. Our personal observations in France have shown us how well carried out is this system, and we believe that if egg dealers would collect eggs and not wait for them to be brought in by poultry-keepers, they would find a lucrative source of profit, and

at once lift up our home produce to a higher standard of excellence. Why does not an enterprising young man in each district take up this collection as a matter of business? That he would be able to make it pay we have no doubt, for producers would rather sell eggs at their own doors than carry them to market.

PACKING.

The methods of packing eggs adopted vary greatly. We are all more or less familiar with the large square Irish cases, and also the long, coffin-like foreign boxes. The former vary in capacity from 1,200 to 4,200 eggs. They are strongly made, and are usually sent back again as empties. The latter uniformly hold 1,200, and as they have a double division in the centre, any retailer desiring to buy 600 secures half a case without any need for re-packing, the box being sawn in two. There can be no

question that the latter is by far the more preferable plan, and these cases are being adopted by Irish packers, as they are more convenient, and there is no trouble with empties, for the boxes are not returned, and prevention of repacking pleases purchasers better than the old Irish method, which was wasteful and troublesome. Where eggs are sent short distances, and especially if forwarded direct to retailers, they are usually packed in

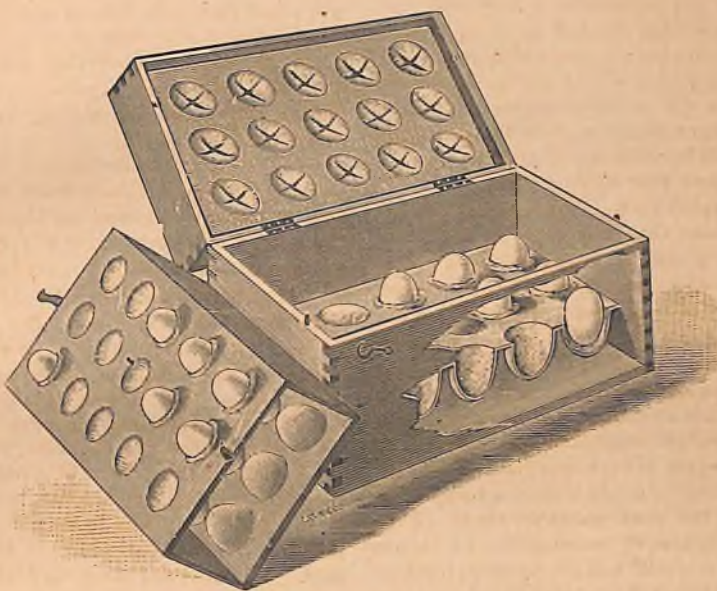


FIG. 38.—THE JERSEY EGG BOX.

large baskets holding about 1,200 or less. But when the quantities are comparatively small, and speed is imperative, there are now several forms of egg boxes which are simple and convenient. These boxes are usually fitted with springs, which hold the eggs in position, and prevent their jarring against each other. An excellent one is that known as the Jersey egg-box (Fig. 38), made by the Jersey Co., of Inchbrook, near Stroud. Messrs. Freeth and Pocock, of Wandsworth, sell egg boxes (Figs. 39 and 40), in which the partitions and layers are made of felt, and the canoning of eggs against each other is thus avoided. These are made in all sizes, and facilitate rapid packing and unpacking.

In all the commercial boxes, if we may so term them, the eggs are packed between layers of straw, sufficiently thick to keep each row separate. The eggs themselves

must be laid close, to prevent their rolling about, or breakages will certainly occur. And the box must be full, so that when it is nailed or screwed down it will be firm and compact. One most important matter is that the straw shall be clean and sweet. Eggs are very susceptible to external influences, and if they are packed in dirty or fusty straw they will assuredly be affected thereby. Inattention to this matter, and the sending out of dirty eggs, due to want of clean straw in the nests, has done much to injure Irish eggs in the eyes of English consumers. A large dealer in Yorkshire recently showed us the difference between a Danish case and an Irish box of eggs. In the former every egg was even in size, they were beautifully packed in clean straw, and the top layer was arranged with all the coloured shelled eggs in the centre, forming a diamond, whereas the Irish were carelessly packed, the straw was neither even or clean, and there were three or four sizes of eggs in the box.

SORTING.

One more matter needs to be emphasised, namely, the importance of sorting all eggs marketed. On the Continent this is regarded as a matter of course, and all eggs are graded. The process is to pass them through a



FIG. 39.—FREETH AND POCOCK'S PARCEL POST EGG BOX.

piece of board or card in which are three perforations, sufficiently large to allow different sized eggs to pass through. The advantage of such a plan must be obvious. All eggs sent out together are of the same size, and they are branded, according to their size, firsts, seconds, and thirds. Abnormally big eggs are discarded, very small ones are kept and sold at home. A single small egg will spoil the appearance of an entire box and depreciate its value, whilst a big egg will dwarf all others in the box, even though every one of them weighs more than two ounces. We are glad to know that in Ireland some merchants have already adopted this system, and we would strongly urge upon every producer of eggs that it will pay him better to keep the little and big eggs at home, and maintain an even standard for those sent out by him. An egg is certainly still the same, whether it weighs one or two ounces, but the customer neither wants to be annoyed by tiny eggs nor demoralised by large ones. The day may yet come when eggs will be sold by weight, as has been proposed in one American State, and that would be the fairest way; but a sufficient plan is to grade eggs, and obtain more for those that are large than an all-round price for big and little. Very often the price is fixed by

the smaller egg rather than the larger. There is, however, one exception to even such a rule as this. The winter laying breeds of poultry lay a smaller, though a richer, kind of egg, but they have tinted shells, and this makes up for lack of size. There are in all our large centres of population many purchasers who want a pretty-looking egg to form one dish on their table, and to them size is of secondary consideration. But as a rule size will always be taken into account to some extent.

THE PRESERVATION OF EGGS.

The fact that eggs are more plentiful at one season of the year than at another has led to the trial of many methods of preservation. It seems to promise a large profit if eggs can be kept from the time when they are plentiful and cheap, to be sold when they are dear, and it is small wonder that the means of making this augmented profit has been diligently sought for. We do not think that the result has been as satisfactory as could have been wished, but it is a fact that enormous numbers of eggs imported from the Continent during the winter season have been preserved, or pickled, as it is called.



FIG. 40.—FREETH AND POCOCK'S EGG BOX.

These too often are far from being what we should like to eat, but there are many people who are by no means fastidious in this matter. Perhaps they have something of the Chinese taste, for denizens of the Celestial Empire regard eggs as the more dainty when they are rotten. That, happily, is not the case with Western nations, who as a rule prefer to have them as fresh as possible. Though we think that the methods adopted for preservation of eggs are by no means as successful as could have been wished, yet there are ways in which they can be kept for a considerable period, and be good for culinary purposes, and not objectionable to many palates for eating in the ordinary way.

LIME.

There are several methods of preservation adopted on the Continent, but the most commonly used is as follows: The eggs are placed in tubs or large vats as soon as possible after they are obtained from the poultry-keepers. Some vats hold hundreds of dozens, and are kept by dealers who buy them in from the fowl-owners. A preparation of lime and water is made

by mixing about twenty gallons of water with four gallons of fine slaked lime, into which a gallon of salt is also put. When the water appears to have taken into solution as much lime as it is capable of holding, it is then poured over the eggs so as to completely cover them, and it is usual not to pack the eggs quite up to the top of the vat, so that there may be two or three inches of water above the top layer. It is, however, found necessary to add from time to time a little more lime, or by keeping a cloth of lime on top touching the water, in order that as that in solution is absorbed, or loses its effect, more can be taken up. Unless this is done the preservation will not be successful, for water alone will not be sufficient to keep eggs in a fresh state. The same end can be secured by throwing a handful of the fine lime into the vat every few days, but this is a rougher method, which may lead to trouble if not very carefully done. We once knew a test made of this lime water process, but instead of putting the lime water only into the barrel, a thick sediment was allowed to remain at the bottom. When the time came to take out the eggs, the whole was a solid mass, and they would have had to be taken out with an ice hammer, if they had been got out at all. The great object, therefore, in preserving eggs by this method is to supply enough lime for the preservation, but no more. When eggs are taken out of the pickle they are carefully wiped and packed in straw. Properly preserved, it is difficult for anyone not accustomed to the buying and selling of eggs to know them from freshly-laid ones. They have not of course that bloom by which a fresh egg can always be known, but there are not ten persons in every thousand who know anything about the bloom.

SALT.

Eggs can be preserved in dry salt, and so preserved keep good for a very long time. Salt effectually keeps away the air, which is a most desirable thing with all eggs to be kept for long, and prevents mildew or the growth of fungi. There is a slight taste given to the egg when salt is used, but this is not at all objectionable. Mr. Tegetmeier some time ago recommended a plan of keeping eggs in salt, which deserves to be repeated here. He suggested that a wooden box should be used, with the bottom in one piece, fastened on with well-greased screws. A layer of salt, one inch deep, should be first placed in it, on which the eggs should be put on end, close but not touching. More salt should then be put in until the eggs are well covered. This must be well shaken down, and a second layer of eggs treated with the salt as before, and so on until the box is filled. The box when filled must be closely packed up to the top with dry salt, and fastened down. If put in a cool place the eggs will keep for weeks, and it is an advantage to be able to continue filling the box as long as is necessary, for the salt prevents air getting to the eggs. When they are to be used the bottom is unscrewed, and the oldest eggs can thus be used first. The only disadvantage which we know from the use of salt as a preservative is that it absorbs some of the mois-

ture in the egg. Thus it is that eggs so preserved are found to have their contents loose. For table use this would at once raise a prejudice, and it would be impossible to market such eggs, as it is generally supposed all that rattle inside are stale. But there can be no objection of this kind when they are only to be used for cooking purposes.

SULPHUR AND LAMPBLACK.

Some time ago we came across the following method, which the writer stated had been a perfect success with him. A mixture of sulphur and lampblack was made. A lot of eggs were placed within a common churn, one with a single hole in the side. On the top of the eggs was placed a saucer full of the sulphur and lampblack compound. This was set fire to by a match, the churn cover put on, and a sheet draped over the whole to keep in the fumes. Next morning when opened out the eggs were found to be entirely coated with black, but so effectually had they been preserved that six months afterwards they were quite fresh. Whether the fact of the shell being blackened would not be objectionable to many need not be here discussed, for it is not likely anyone would prepare eggs in this manner for marketing.

OTHER METHODS.

Experiments made during recent years have shown that there are several other ways of preserving eggs. At one of the competitions in connection with the Birmingham Show a lot of eggs won that had been preserved in the following manner:—Each egg was first wrapped in fine tissue paper, leaving a screw of the paper to hold by. A mixture is made of spermaceti and wax, or suet and wax, heated to 100 deg. Each egg is dipped in this, and then left to cool. When the first coat is dry the process is repeated. The eggs are kept in fine flour, and the result showed that they can be kept for two or three months in this way, though it is only right to say that at one of the London Dairy Shows eggs kept by this process were found to be unfit for eating. This must have been due either to some fault in the eggs, or the method of preserving had not been properly carried out. This process, however, like many others, may be adopted by those who have plenty of time at their disposal, and do not mind trouble, or who perhaps like it all the better because it is uncommon and involves trouble, but for the majority of poultry-keepers it would be of no use whatever. There are other ways of this kind, such as coating the eggs in wax or paraffin, but they are open to the same objection as that just named. For the great majority of readers any process which involves a great amount of trouble is simply out of the question.

FRENCH METHODS.

Mons. Cadet de Vaux suggested the plunging of eggs for twenty seconds in boiling water, in order to coagulate that portion of the albumen nearest the shell, and then to pack them in vessels half filled with sifted cinders; this process, by the way, has been well known in some parts of Scotland for many years, and yields excellent results, but if neglected for a second or two the eggs

are liable to harden. For home production the French peasantry have for ages preserved their eggs in a very simple fashion. They take a wooden case or a large barrel, and pack them in thick layers of sawdust, fine sand, chalk, bran, cinders, or coaldust, so that they do not touch each other. In the maritime provinces the peasants use layers of ashes, moistened with salt water. The late Dr. F. Grace-Calvert found by experiment the following results in the action of different substances in the preservation of eggs: In dry oxygen gas eggs are unaffected unless punctured; moist oxygen decomposes the eggs. In moist hydrogen or nitrogen eggs will keep three months. Eggs, pierced or whole, are perfectly preserved in carbolic acid, dry or moist. In chlorine water (1 to 500) eggs keep three months in a closed vessel; in a solution of dilute chloride of lime eggs would not keep two days; lime water and sulphate of lime keep them a little longer; carbolic acid (1 to 500) preserved them about six weeks. Eggs immersed in an iodine of calcium solution were, after a month, not to be distinguished by smell or taste from perfectly fresh eggs. M. Durand, a chemist at Blois, steeps them in a solution of silicate of potash. This being very viscous, is kept liquid by adding warm water. The eggs are placed in a vessel containing the silicate, and afterwards dried. Then the part upon which the eggs rested is covered, because the silicate may have fallen off at this place. When each egg is completely covered all over, the eggs are placed in any receptacle, and may be left for a year, if necessary, without any fear of their spoiling. Within recent years egg-powder has been produced, not a chemical combination, but the contents of eggs dried or condensed. It is stated that these are, for omelettes and other cooking purposes, quite equal to new-laid eggs.*

FREEZING.

Eggs can be kept in a cool place for a considerable period without any special preservative, and we have known eggs so kept quite good for cooking at the end of three months. But this system depends most of all upon the place, and it is not applicable to all. There can be no question that if anyone has an ice cellar, some portion of which can be given up to keeping eggs, they do not need any other preservative, and we believe that frozen eggs retain more of their original qualities than those kept by means of any of the preparations which have already been described. The reason for this is not far to seek. When an egg is frozen everything is held in suspension, and no process of change or decay goes on. Therefore we should advise those who have a cellar of this description to use the opportunities at their disposal, as they need not trouble themselves any more about the matter. All that will be needed is to fit up some shelves in which are perforated holes large enough for the eggs to stand up in, but not to go through. Or coarse wire

lattice may be used, of a mesh that will effect the same purpose. The disadvantage of this system is that if the eggs are not properly defrozen they crack, and it is often difficult to avoid their cracking in any case. They should be very gradually brought to their normal condition, first by placing them in an atmosphere but very few degrees warmer than the cellar, and after giving two or three hours there, gradually placing in yet warmer air until the ordinary temperature has been reached.

ORDINARY METHODS.

There are many poultry-keepers who only wish to preserve their surplus eggs for a few weeks, and in this case it is not necessary to use any preservative, or even to freeze them. All that is requisite is to have a cool cellar, larder, or closet fitted with the perforated shelves already described. The eggs should be placed broad end downwards on these shelves, but they may with advantage be turned about twice a week, keeping them, however, almost all of the time with the broad end downwards. The reason for this is that when so kept the air space does not increase in size, and the eggs seem to keep better. It is a very good plan to arrange eggs in uniform rows from front to back, so that those laid first can be used first. We once knew a poultry-keeper who had large stoneware jars for keeping his eggs in. These would each contain about a hundred, and the eggs were placed in regularly every day as they were laid; as soon as one was full it was emptied into another jar, so that the first laid were in that case at the top. This gentleman never appeared to take any special care in the matter, and yet his eggs were wonderfully fresh when three or four months old; but he had a very cool cellar where the jars were kept, and that is the explanation. Without a cool place it could not have done in such a free-and-easy fashion.

Claim has been made that eggs can be preserved if the air coming to them is first filtered, so as to remove all germs therefrom. In this way the eggs are packed in cotton-wool or wadding, and it is stated that this succeeds very well indeed. We have never tried this process, and therefore cannot speak of it, but are not inclined to place much reliance upon it, for the reason that it is not enough in egg preservation to keep germs away that are without, as in most eggs there are the germs of decay within the egg itself. Still, this is only theory, and we should be very glad to have some well-authenticated experiments recorded.

Gypsum is said to be a good preservative of eggs. They should be packed in finely pulverised gypsum, and the only experiment recorded shows that they were kept for six months. But this was in a cool place, and the cold air may have had just as much to do with effective preservation as the gypsum. In fact, it is most desirable that whatever process is adopted the storage should be a cold one. This we regard as of supreme importance, and to our mind it explains the reason why some processes succeed at one time and in one place, and fail in another.

* Mr. P. L. Simmonds, F.L.S., in *Journal of Society of Arts*, December 9th, 1887.

FERTILE OR INFERTILE EGGS.

In this matter of egg-preservation there is a consideration that has never yet had its due weight, namely, the fertility or infertility of the eggs to be preserved. We have only once seen it suggested that infertile eggs might keep much better than those which have the germ of life within them; but a little thought will show that this may be a most important matter. The idea was suggested to our mind by remembering the fact that infertile eggs never go rotten when sat upon by hens. They dry up and become fusty, but it is only the fertile egg that goes actually rotten. In the former there is no germ of life to die and become putrid. In the latter it is death of the living organism which causes rottenness. This germ must have actual life within it, for the life cannot be put there after the egg has been laid, and the presence of life gives all elements required for putridity. We have met with those who have declared they can tell whether an egg is fertile or not before it is sat upon, and several times the experiments have shown their test to turn out right. The way in which this is done is by placing the broad end of an egg into the mouth, and with the lips closed around it breathing thereon. If after doing so the egg does not seem cold, or, to put it in a better way, appears to give back warmth, then it is fertile. But if on the other hand it takes all the heat without giving back any, then it is infertile. Often have we proved this test to be correct, but we should scarcely like to depend entirely upon it in the case of valuable eggs. But whether there be any truth

in it or not, we do not feel that there need be any doubt that the preservation of eggs may depend greatly upon whether they are fertile or infertile. As already explained, the former have within them the germs of rottenness, and the latter have not. Therefore we should strongly advise those who intend putting eggs down for winter use to only use infertile ones. Though we cannot go so far as to lay down as a fixed rule that for which we have been here contending, there is so much of reason and of probability in it that we feel quite justified in going as far as we have done. There can in no case be any advantage in preserving fertile eggs, for they can never be used for hatching, and there is little or no difficulty in arranging that the eggs be infertile.

To summarise the methods of egg preservation, we should be inclined to place the lime water system first, as best for practical purposes, whether for home use or for sale. It involves the least expense and trouble. The egg is least changed when preserved in lime water, as there is little or no evaporation. Next to that we should be inclined to think that the freezing process would come, but it would not be suitable for those who produce eggs for the market on a small scale, as the expense would be too great if an ice chamber had to be specially erected; therefore it is only available in a very few instances. The other methods given can be adopted if preferred, but some of them at least are more interesting experiments than practical methods. We lay very great stress upon the question of fertility or non-fertility, for we believe that infertile eggs will keep where fertile ones will not.



CHAPTER XV.

PROFITABLE DUCK-KEEPING.

VARIETIES OF DUCKS—AYLESBURYS—ROUENS—PEKINS—CAYUGAS—EARLY BREEDING—SELECTION AND BREEDING—FEEDING
—WATER FOR DUCKS—GREEN FOOD—HOUSING—DUCKS AT AYLESBURY—REARING—FATTENING.



IF the many varieties of ducks the greater number are purely ornamental, and not more than four can be named which are to be recommended for practical purposes. Of these, one is not suitable, except for crossing, namely, the Cayuga, and the other three, that is, Aylesburys, Rouens, and Pekins, are all that a breeder for profit has offered for his choice. Each of these have individual qualities which make them very valuable. These qualities may be described as follows: for early maturity, Aylesburys; for great size and later development, Rouens; and for egg-production, Pekins.

AYLESBURY DUCKS.

The name is derived from the fact that this duck is chiefly bred in the Vale of Aylesbury, where it is supposed some quality in the soil is specially suitable to them. This is undoubtedly so, but it has also been abundantly proved that other places can produce as fine birds as this district of Buckinghamshire. No finer duck can be found than the Aylesbury, more especially as it matures with wonderful rapidity, for we have often killed ducklings weighing four pounds at eight weeks old and under. It is pure white in plumage, an excellent layer, and very hardy, with great richness of flesh. It is heavy in body and short in leg, the appearance being that of a boat, supported midway, or perhaps a little behind the centre; the bill is long, and in the best specimens of a delicate flesh-colour; the legs are of a deep orange, and the only difference between the drake and duck is that the former has two curled feathers in its tail, and is rather the larger; drakes will reach 10 lb., and ducks 8½ lb. when fully matured.

ROUEN DUCKS.

The name here given is a misomer, and it is now accepted as a corruption of "Roan" or of "Rowan," the latter term being used for fields kept up until after Michaelmas, in order that the corn may sprout for the stock. In plumage Rouens are almost identical with

the Mallard or Wild Duck, and the drake shows all that richness of colouring found in its wild progenitor during winter; for in summer both adopt a more homely garb. The Rouen grows to the largest size of any duck found in domestication, but for that reason it cannot be matured with equal rapidity to the Aylesbury. It is, therefore, more suitable for fattening in time for winter consumption. Specimens have been seen at Birmingham Show weighing 22 lb. 4 oz. the couple. It is an excellent layer, has very fine flesh, and is extremely hardy.

PEKIN DUCKS.

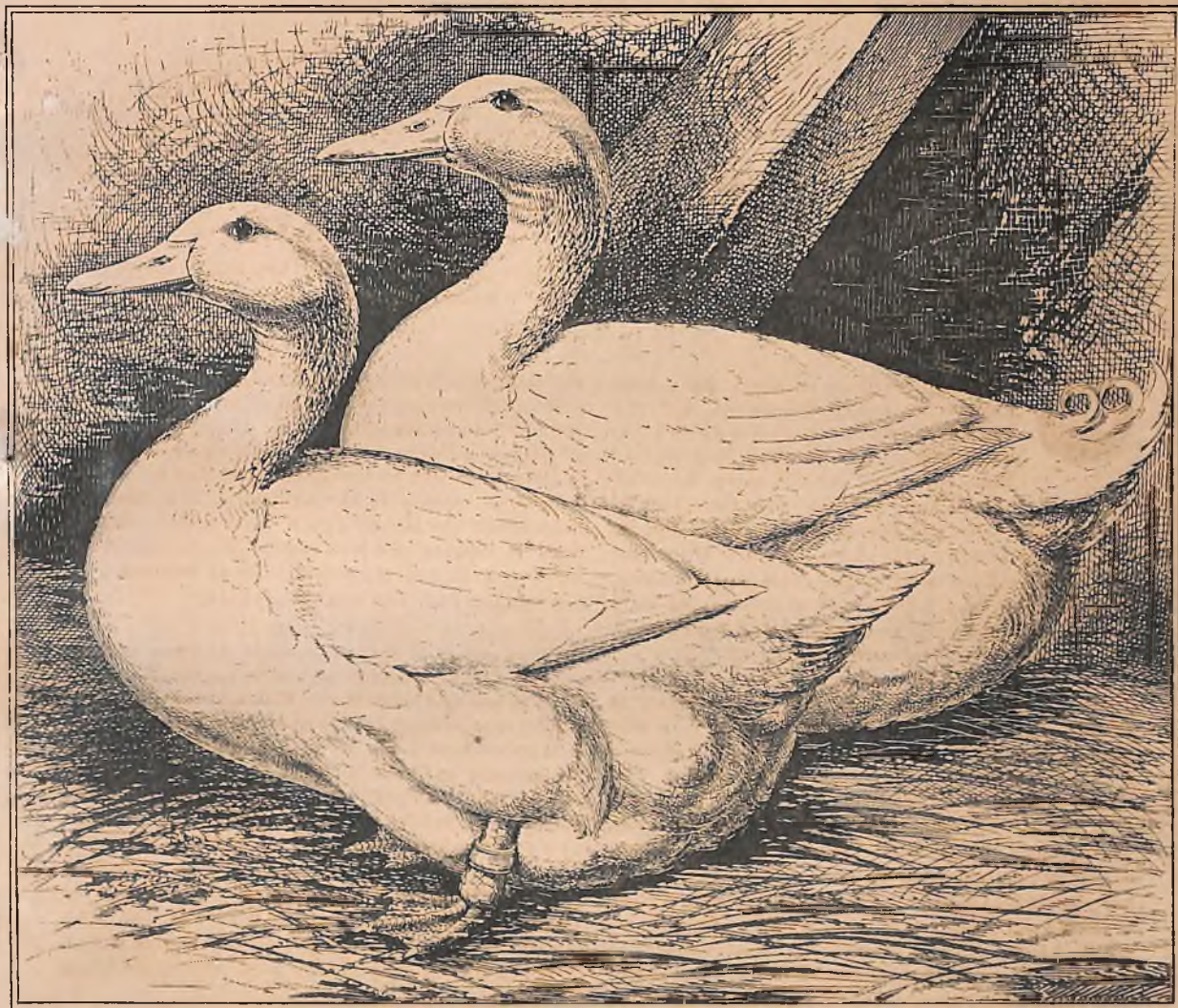
This variety is of Chinese origin, and has rendered service in giving a needed stamina to the varieties we had when it was first introduced. Whilst of itself it has no quality equal to those of the Aylesbury and Rouen, save that it is a somewhat better layer, it is very valuable indeed for crossing purposes, and the progeny mature more rapidly than will pure-bred Aylesburys, and grow to a larger size; herein its value consists. It is white, with a canary tinge in colour, has a deep orange bill and legs, and is readily distinguished from the English duck in that its legs are placed well back, giving it a somewhat penguin appearance. It matures fairly well, but never attains the size of those varieties already named, though in appearance it may do so, as it is very profusely feathered.

CAYUGA DUCKS.

This is a black duck, smaller than two of those referred to before, though it attains greater weight than does the Pekin. Its chief value is for crossing, as it gives a gamey flavour to the flesh which is greatly relished. A cross between Pekins and Cayugas produces a bird nearer allied to the Wild Duck in flesh than any other we know of reared in captivity. The crosses we recommend are either Pekin or Cayuga with the Aylesbury or Rouen.

EARLY BREEDING.

One of the most important matters in connection with duck-keeping is the securing of the best prices by having



CHAMPION AYLESBURY DUCKS.

BRED BY, AND THE PROPERTY OF, MR. HENRY DIGBY, BIRCHENCLIFFE, HUDDERSFIELD.
Winner of Challenge Cup and First Prizes at Crystal Palace, Liverpool, Lancaster, Manchester, &c., &c.

ducklings placed on the market early in the season. In order to do this they must be bred early, but with many duck-keepers the difficulty is to obtain eggs in late autumn and early winter. If ducks, or other fowls, are allowed to breed when they like, if the stock ducks are themselves late hatched, if they are fed carelessly, the probabilities are that eggs will not begin to appear before March, when it is altogether too late to hatch ducklings if we are to get good prices for the birds. Therefore those who desire to be successful in the production of ducklings for spring marketing should proceed to work in the autumn. That the business is a profitable one cannot be doubted. It is estimated that about £40,000 is annually paid to the duckers of the Aylesbury district for ducklings, and as ducks can be reared at small cost, are very hardy, and will thrive almost anywhere if they have a reasonable share of attention, and that 6s. to 10s. per couple are not uncommon prices in the great towns of Britain, there is a large margin of profit to the producer.

SELECTION AND BREEDING.

The first point to be regarded is selection of the stock birds, which is of great importance, not only with regard to breed, though that is a most necessary consideration, but also as to age and time of hatching. For early ducklings there is nothing better than the Aylesbury, as a pure breed, for it is a rapid grower and fatterer; but it is surpassed by a cross between the Aylesbury and Pekin, using a Pekin drake to Aylesbury ducks. One feeder in the South of Ireland informed us some time ago that he could obtain birds of this cross two pounds heavier at the same age than were pure-bred Aylesburys. It is better to obtain the ducks good and from an undoubted source, so that they may be pure. They should be large, well grown, and early hatched, because for securing spring ducklings it is necessary to use ducks of the year, or the eggs will not be laid early enough; therefore ducks hatched about March should be chosen. To them should be mated drakes of the previous year, and the doing so will in some degree counteract breeding from immature stock on the one side. Too early breeding is a great mistake when the production of stock or even laying birds is concerned; but when the produce are to be killed for table no harm is done, and it is the only way to obtain what is required. Whether ducks are selected from amongst the present stock or purchased, it is most important that they be well-grown, large-framed, and healthy. Any not coming up to these requirements should be rejected. The birds so chosen need not be mated until the end of October or beginning of November, and in this way, if the supply of eggs comes as expected, one or two broods may be hatched before Christmas, by which time a large number of eggs should be undergoing the process of incubation. Hatching may be either under hens or by means of an incubator; but as to this we speak anon.

FEEDING.

The treatment of ducks when mated is of great importance, for all preparations will be useless unless there

is a supply of eggs. Food given must be good and plentiful, but certainly not of a fattening nature, or the ovaries will become so clogged with fat that the birds will be unable to produce eggs; hence Indian corn should not on any account be used, except in very small quantities, because of its fattening quality. The staple food should be barley meal mixed with about half its bulk of thirds or pollard, if the barley meal be good and floury, but if it be of commoner quality then so much of the thirds need not be used. To this may be added a little oatmeal, but very little is necessary as it is too expensive for this purpose, and in order to obtain a supply of early eggs it is absolutely necessary to give meat in some form or other. Butchers' offal, liver, and scraps are all good, if well boiled, chopped fine, and mixed with the meal. But where these are not available, or in too limited quantities, there is nothing better than tallow greaves, or scrap-cake, as it is called in some places, being rich in the elements required. This should be broken up and boiled or simmered for a couple of hours, until it is quite soft, when it and the liquor in which it has been boiled should be mixed with the meal. Another excellent plan is to make a contract with hotels for taking all their waste scraps, and this can generally be done on satisfactory terms. Whatever is used in this way is better boiled and then mixed with the meal; but it is important to warn against use of diseased meat, which ought never to be employed. Some duck-raisers give boiled horseflesh to their birds, and if sound nothing can be better; but so many horses obtained in this way are diseased that it is necessary to utter a warning against their use. Of course meat given must not be too abundant, or the desired end will be missed, as the birds will become too fat; but if fed judiciously meat will give that necessary stimulus to the egg-organs that is needed in winter, and yields elements required for a constant supply of eggs. Before mixing the meal there should be added a small quantity of seasoning, and for this purpose the best article we know is called Aromatic Compound for Poultry, sold in small tins. The meal should be well and thoroughly mixed, adding as much boiling water as is required to make it into a crumbly mass, for on no consideration must it be given sloppy. It is better to feed from troughs, as this prevents waste of food, and what is left can be removed when the birds are satisfied. Stock ducks ought to be fed twice a day: first, as early as possible in the morning; and second, about an hour before they retire for the evening; the former should always be as soon after daylight as can be. It is an excellent plan to throw a handful or two of oats into the water in which the birds swim or bathe during the day.

WATER FOR DUCKS.

With regard to the question of water, we are firmly of opinion that in order to succeed in breeding ducks it is necessary to have water in which the stock can swim. Without this the young birds will never be strong or healthy, but it is not difficult to make a duck-pond if there be an insufficient supply of water naturally. There

can also be no question but that ducks which have a good pond do not cost nearly so much to keep as do those which have not this privilege. This can be seen by the time which ducks spend in scouring the bottom of their tank or pond, where they find worms galore, and other important elements in their natural food. When they are seen with their heads in the water and tails uppermost they are engaged in this work. Of course it is well known that many ducklings are bred whose parents have no water except perhaps a shallow tub; but the best birds are not to be produced in this way, and we strongly recommend a pond for the breeding stock.

GREEN FOOD.

In addition to what has already been stated with regard to the feeding of ducks, it must not be forgotten that they require plenty of green food. Of course if they have full liberty, and the land on which they are running is good, the probabilities are that they can obtain for themselves all they require in this respect. If not, it must be supplied, and it is always desirable to give ducks their full share of garden stuff available—cabbages, turnips, and tubers, the two latter to be cooked. Too often this question of supplying green food is neglected, and the result is unsatisfactory.

HOUSING.

The question of housing ducks is not nearly so important as that of providing for ordinary poultry and turkeys. They are by nature very hardy, are used to sleep by the side of streams, and seem able to resist cold very easily. Still if they are to lay in the winter season they must be comfortably housed. One *sine qua non* is that they shall have plenty of room in their sleeping place, and not be closely huddled together. In this respect they cannot be treated as may fowls, and it is essential that they be not overcrowded, and have plenty of fresh air. Therefore, a house that would easily accommodate fifty fowls should not have more than thirty to thirty-five ducks, and smaller houses in which are placed the breeding pens should be arranged accordingly. As they sleep on the ground, perches are not required, consequently there is not the same fear of draughts overhead. During the winter season an unused stable, shed, or barn is best to house ducks in, but they will do equally well in a hen house if provision be made for giving a supply of fresh air. Around the house, whatever kind it may be, must be arranged a run, so that the ducks can be confined without being actually imprisoned in the house. The reason for this is their persistent habit of laying away, which they will assuredly do if not kept within bounds. Under no circumstances should they be allowed out until nine or ten o'clock in the morning, by which time they will have laid. Many eggs are lost by inattention to this matter, as ducks lay on the water, and the eggs are lost. Both the house and the run should be well littered, and the litter is excellent as manure. At one time straw was always used for this purpose, but it is not nearly so cheap as peat moss litter, which keeps cleaner, and is equally valuable for manure.

In mating up the ducks, not more than three ducks should be allowed for each drake, and it may be well in the winter season to have two drakes for five ducks. If more are given there is great danger that the eggs will be infertile.

HATCHING.

In the great duck-rearing districts of England and France hens are almost exclusively used for the hatching of duck eggs, and very few indeed are given to the ducks themselves, except late in the season. Ducks are not very ardent sitters, and only seldom show the desire to incubate. Incubators are very little used for duck hatching, but why this should be so we have as yet not been able to understand. That duck eggs will hatch in an incubator equally as well as hens' eggs there can be no question, it being only necessary to give them sufficient moisture, and to sprinkle them daily to prevent the shell and outer membrane becoming dry and tough. One gentleman, who has experimented in this direction, writes us: "I am rather puzzled why the people in the Aylesbury district do not use incubators, because it seems to me that the incubator is eminently suitable for ducks on account of their (the ducklings) not requiring any brooding. I have raised ducks this year (1890) that were simply hatched out by the incubator and put in an old rabbit-hutch with a piece of carpet over a spar floor, no hen being used at all or any kind of foster mother employed. Out of six ducks treated in this way experimentally I raised the whole lot to a suitable size, but one of them has died. The other five are now large birds, and the only difficulty seemed to be in connection with the introduction of them to the general flock. We tried to put them among the other birds the other day, and they resented the intrusion of apparent strangers." This letter bears out the opinion already expressed as to incubators for ducks, but we should recommend that as far as possible hens' and ducks' eggs should not be placed in an incubator at the same time. They can be hatched together, for it has often been done; but as the latter need so much more moisture than the former, there will be too much for ordinary eggs. The reason why incubators have not been employed in the Aylesbury district is simply indisposition on the part of duckers to adopt new methods. They have been used to hatch under hens, they make a very good profit out of the business, and consequently they are indisposed to change or try anything new. The use of incubators would minimise their labour greatly in the winter season, when broody hens have to be sought for. But at all times of the year there is a supply of these natural incubators, for the poultry kept in the district is of the Asiatic and Dorking type, in the former of which especially the maternal instinct is very largely developed. But high prices have to be paid for broody hens in winter, and the cost of an incubator would speedily be repaid. As to the difficulty mentioned in the last sentence of the above correspondent's letter, this would not apply in the usual way, as ducklings would be added to the general stock at an early age. The

same trouble is found if ducks are hatched under hens and kept by themselves until fully grown. It should be mentioned that when ducks' eggs are hatched under hens they must be plentifully supplied with moisture. The ground below the nest should be kept damp, but in addition it is an excellent plan to dip the eggs daily in water warmed to about 102 degrees. During the earlier stages they must not be allowed to lie in the water, simply dipped in, but after the fifteenth day they may be left in the water for a minute or two. In this way moisture required by the egg is secured, and that drying and toughening of the shell which would effectually prevent the egress of the duckling is avoided. This is a most important matter to remember both with eggs under hens and in the incubator. When the ducks are allowed to hatch their own eggs they will usually have a swim at least once a day, and then they come back with feathers all wet, in addition to which they select a damp place for laying. We must, therefore, follow their example. With this exception the arrangements for hatching ducklings are the same as for hens' eggs, it being remembered that they take twenty-eight days. In winter it is desirable to place the nests in a warm position, so as to be affected by the external atmosphere as little as possible.

DUCKS AT AYLESBURY.

In Britain the Vale of Aylesbury is the great centre of duck breeding, and the following extract from an article by the writer details the methods of culture there:

"The great majority of the ducks reared for the market at Aylesbury come from the hands of the better class labourers, some of whom have raised themselves into a very comfortable position by their diligence and thrift. Operations are usually commenced in December, when the eggs for producing the earliest batches are 'set.' As a rule, the breeders do not keep the adult birds themselves, but on all the farms in the district flocks of ducks are kept, and contracts are made with their owners for a constant supply of eggs during the coming season. These are at a uniform price, but there is great variation if bought without such contract. In May two shillings per dozen would be a fair price for duck eggs, but in December twelve shillings per dozen might have to be paid. It is a matter of supply and demand, though the value of a duck egg in December is also measured by the fact that the possible duckling within it may be worth six or eight shillings in May, whereas the other would not realise more than a quarter that sum. The eggs are taken by breeders and set under hens, for ducks are very seldom employed for the purpose. Hens are found more reliable, and do not require the same amount of attention as do ducks. For this work artificial methods of incubation have not come into vogue, though there is no reason why they should not. It has been proved frequently that incubators can be made to hatch ducklings with the greatest certainty and regularity. Some day it may be found that 'old Biddy' has been dethroned in the Vale of Aylesbury.

"The hatching hens are accommodated in outhouses

and sheds, and there is a cottage, which is, however, by no means singular, where 150 hens are at work on maternal duties at one time. Every day they are fed and the nests examined, but this is simple compared with the labour involved at the end of four weeks, when the young ducks begin to appear. Ducklings have one special characteristic in that they need no brooding, so that the progeny of half a dozen sitters can be placed under charge of one hen, and proud she will be of her large brood. From the very first the feeding has in view the development of flesh, and not bone. Consequently only those meals which are strongest in flesh and fat formers are used. For the first few days hard-boiled eggs, rice, and bread are given, after which barley meal, mixed with scrap or tallow-cake, grains, and toppings, form the staple diet. On such feeding as this the growth is simply marvellous. They can be seen to grow. Kept in batches of about fifty they are fed with the greatest regularity. And it must not be forgotten that in every pen is placed a trough of the famous grit found only in the Vale of Aylesbury, and for which almost miraculous powers are claimed. To it is attributed almost all the merits of the Aylesbury duck, the quality of its flesh, the rapidity of growth, and the delicate pink of the bill, which is one of its distinctive marks. The birds appreciate this grit, and duckers use large quantities of it. Some of the ducklings sent to market have never known what it is to be in water, but as a rule they are now and again permitted a bathe or a swim, and this gratification of their inherent instinct makes them more contented, and they thrive all the better for it. The pens in which they are kept are none too large, but there is reason in this, and fresh straw is supplied every day, their greatest enemy being cramp, to which they are very subject if exposed to draughts or the place be too damp.

"The skill of the feeder is exemplified by the rapidity with which he can have the ducklings ready for market. They are enormous eaters, and every day of life means a serious addition to the cost. Besides, the earlier they are ready the more certainty of securing the best market, and the vacating of space for other batches. The majority of the ducklings sent from Aylesbury are seven or eight weeks old, but it is possible to have them ready at six weeks. They must be killed as soon as they are ready, and not kept a day longer than the hour when they are ripe, or they will rapidly go back. Killing and plucking are carried on at great pressure, for it is no uncommon thing for a ton of ducklings to be despatched from this district in a single day. This would represent about 7,000 birds, and the annual amount paid to the district is estimated to be nearly £40,000. Some time ago upwards of 8,000 ducklings were seen in one Buckinghamshire village, and whilst there are no statistics obtainable as to the annual product those best qualified to judge say that the trade is steadily increasing. The duck which is almost alone reared in this district is known all over the world."*

* *Pall Mall Gazette*, May 16th, 1889.

REARING.

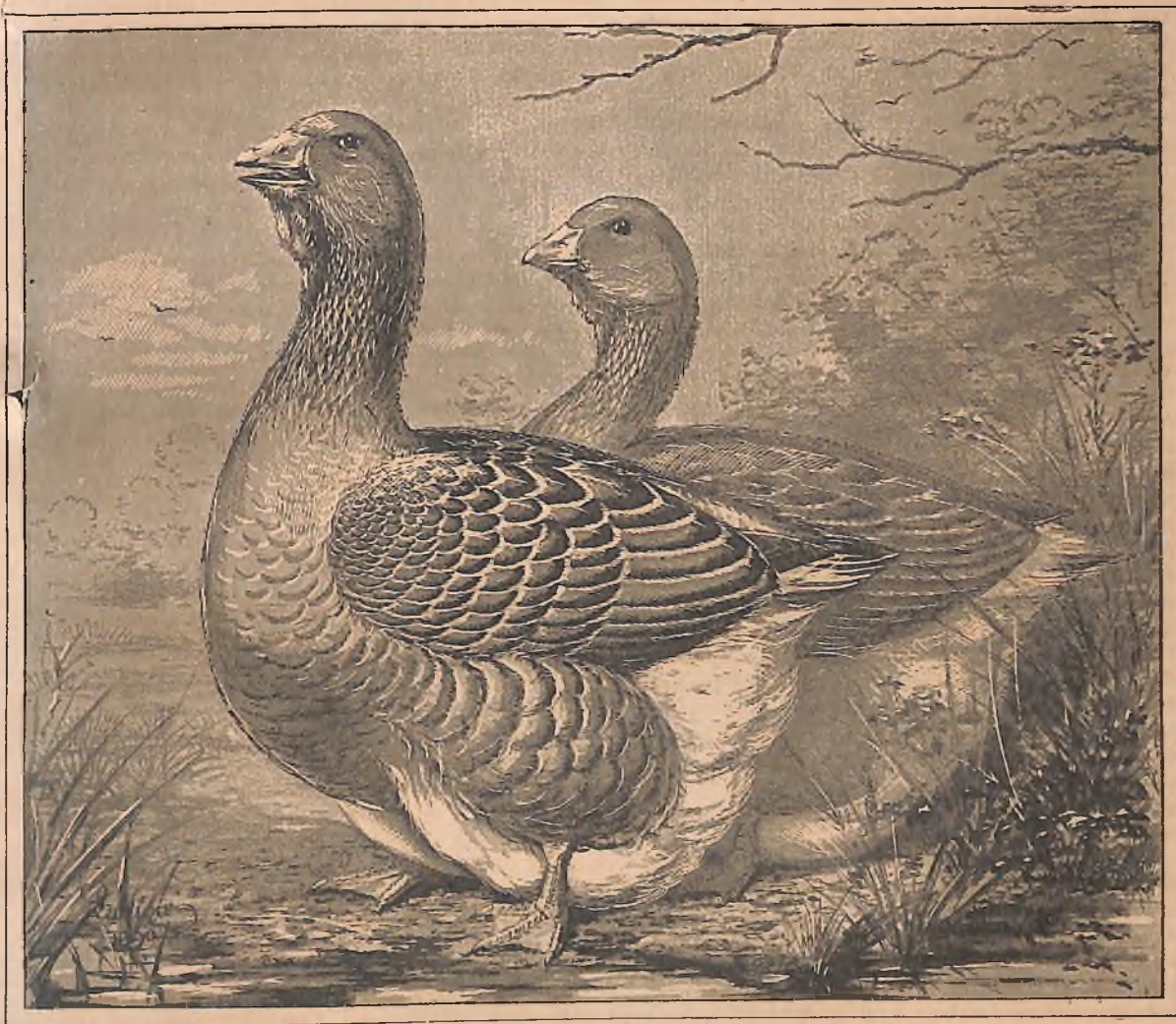
Rearing ducklings is one of the simplest processes in connection with poultry-keeping, for, as a rule, when they are once hatched they will thrive amain without any special care or attention. Ducklings need no brooding, and, in fact, are far better without it. After they are properly dry they should be placed in a shed for a day or two, and fed on chopped egg mixed with bread crumbs, and moistened with milk, varied with boiled rice. Often when so treated they will almost be seen to grow, but no attempt should be made to force them to eat until they are eighteen hours old. The egg food may be continued until they are a week old, if the weather is at all unfavourable, but in warm seasons may cease at the fifth day. After that such food as Spratts meal, oatmeal, rice, Indian meal, and barley meal may be given, with as much variation as possible for the first four or five weeks. The object is to grow the frame on which to lay flesh afterwards, and this can only be secured if the birds are kept growing. A stunted duckling is scarcely worth feeding. During the first five weeks the birds should have a reasonable amount of liberty, say, in a small run, which may either be gravel or grass. It will do no harm to allow them to bathe once a day in a tub or artificial pond, but they should not be permitted to spend their time on a large lake or pond, as this will expend their force and necessitate their eating more food to attain the same results. For the first few days it is an excellent plan to allow them to sleep under a board or canvas frame, to the under side of which is fixed short strips of flannel or felt, but after the first week this should be removed, for the birds will then be quite comfortable lying together, of course presuming that the house wherein they are kept is a good one. It is desirable not to allow them out too early in the morning, and certainly to shut them up before dusk. Absolute cleanliness is imperative if disease is to be avoided, and care must be taken that they have plenty of fresh air, for a close, reeking atmosphere is fatal to them. Food dishes and water-troughs must be regularly cleaned out, and all food not consumed after each meal should be removed. There is nothing better for the birds to sleep on than peat moss litter.

The manner of treatment here described should be continued till the ducklings are five weeks old, by which time they should have grown to a large size. Now a different plan must be adopted, for the frame thus built up must be covered with the flesh, and feeding must be to that end. Further the period of semi-liberty has come to an end, and the ducklings should be divided into flocks of about twenty each, as near as may be alike in age and size, each of which should be placed in a pen 4 ft. or 5 ft. square in a roomy shed, where they can have plenty of fresh air, and yet be kept warm and comfortable. These pens should be bedded out with peat moss litter to a thickness of 5 in. or 6 in. In the Aylesbury district straw is used almost exclusively; but probably in process of time this will be discarded for peat moss litter, especially as straw is yearly becoming more valuable. If it is possible,

these pens should be ranged round the sides of a yard, or in a building adjoining a paved yard, into which the ducklings can be allowed out twice or thrice a day for feeding, as it would not do to place the food in their pens. The best manner is to feed the birds from long wooden or metal troughs, of which there should be a sufficient number to allow every duck to find a place. The quantity of food can only be gauged by the appetites of the ducklings, and the attendant will soon find out how much is necessary without allowing any waste. It is a great deal better to be rather short than permit them to sicken themselves. No water must be supplied until they have eaten, and then only in small quantities; and when once the final process of fattening has commenced, they should not be allowed to swim until a day or so before they are to be killed, when a bath will clean their plumage.

FATTENING.

The food supplied during the final three weeks should be of a fattening nature, and, as already stated, at Aylesbury large quantities of greaves, or scrap-cake, is used for this purpose. Whilst there should be variety in the food, so as to tempt the appetite, we believe that rice, properly prepared, is the finest of all for this purpose, as it is cooling to the blood, lays on flesh without bone, and is easy of digestion. The best rice for feeding is the coarse kind with its husks, called in some places "paddy" rice. It can often be purchased at 10s. to 11s. per cwt., or less, and at that price is a cheap food for fattening. The method of preparation is important, as it must never be given uncooked, and can easily be spoiled in the preparation. If the proportion of one quart of rice be taken, three quarts of water should be added, and a pound of broken greaves, with a little seasoning powder. The whole should then be placed in a pan or copper, and allowed to simmer (not boil) until the rice has swollen and absorbed all the water, which it will do in two or three hours. The rice should be then broken up, and given to the birds when it has cooled down somewhat. For variation Indian meal mixed with thirds or pollard may be used. In this case the greaves, or meat scraps, should be boiled, and then, with its liquor, mixed in the meal, all making a crumbly, friable mass. Too often the importance of green food during the process of fattening is forgotten, but a supply of such as may be available should be given every day. Fresh lettuces are the best, but they are not to be obtained at some periods of the year, and then cabbage should be substituted. Green food is cooling to the blood, and tends to keep the birds healthy. Another most important matter is that of supplying grit, for without it the ducklings will be unable to digest their food properly. The quantity they will consume is proof of its value, and a boxful should always be within their reach. The best kind is made from fine granite, and it should be broken to the size of wheat. If what are known as road scrapings can be secured, nothing can be better for this purpose, as they contain an abundance of grit.



TOULOUSE GEESE.

CHAPTER XVI.

GEESE.

GEESE MOST PROFITABLE—TOULOUSE—EMBDEN—PLACES FOR GESE—HATCHING—REARING—FEEDING GOSLINGS—THE TRADE IN GESE—NORFOLK GESE—FATTENING—KILLING AND DRESSING—GESE IN FRANCE—ARTIFICIAL HATCHING AND REARING.



AMONGST the most profitable fowls which the farmer can keep are geese, as they cost little or nothing to maintain after the first month or two. They are excellent foragers, and do not leave much that is edible for any stock that comes after them. They are especially useful on the stubbles, and in some parts of Britain are employed in "stubbling" the farms. It is only necessary to keep them away from fresh pastures, as they will nip off young grass closer than will sheep. It has been frequently stated that cattle will not feed on a pasturage that has been overrun with geese, but we have yet to learn that this is by any means a universal experience. On waste ground or open lands geese can be kept for a mere nothing, and as they bring a good price during the later months of the year, they can be reared and fed very profitably. They are not of so rambling a nature as are ducks, nor do they eat the garbage which those fowls delight in, but when kept in large numbers it is desirable to have someone to watch them.

Whilst there are several varieties of the goose, it will be sufficient for our purpose to name only those two breeds which are found to be most serviceable for profitable purposes, namely, the Toulouse or grey, and the Embden or white, each of which have special qualities, and are therefore serviceable for various periods of the year.

TOULOUSE GESE.

As already stated, this variety is often called the "grey" goose, and it is most common. Large numbers are sent to market annually. Both male and female should be very massive in proportions, with deep, perfectly divided double breast, touching the ground and extending well in front of the legs. This gives the bird, when standing at ease, a square appearance. The head and bill are very strong, joining with a curve which imparts to the head a pleasing and uniform expression; the throat is "dewlapt"; the colour of bill and feet is a

dark orange; the head, neck, back, and thighs are a dark-shaded brown grey, the outer edges of each feather distinctly and boldly laced with a very light, almost white shade of grey; the breast is of the same colour, but descending even lighter between the legs, from which to the tail is perfectly white; the tail is white, with broad grey band across centre of top; the wing flights are a very dark shaded self-coloured grey.

Toulouse geese are, as a rule, non-sitters, but wonderfully good layers. As to their other qualities, a large breeder some time ago wrote that "Toulouse goslings grow bone very fast, and being loose in skin they soon fill the eye. But they are very deceptive weighers when young and raw; even under very favourable circumstances many strains will not gather flesh and fat until fully matured, when they can be fed to an enormous size and weight, unsurpassed or unequalled by any other variety. They are, therefore, not so well adapted for early maturity, and are seldom fit for the table before Christmas, previous to which they dress very loose and blue in appearance, and are quite out of season as green or Michaelmas geese. Used, however, as a cross with any other variety of geese, the produce mature and fatten very rapidly." Specimens of this breed have been exhibited at Birmingham Show weighing 50lb. 9oz. the pair, and 20lb is a common weight for birds two years old.

EMBDEN GESE.

This variety is entirely white in plumage, with flesh-coloured bill, and orange-coloured legs and feet. It is not quite so squat in appearance as the Toulouse, and somewhat more erect, but in other respects is very similar. In consequence of the colour of plumage, it is necessary to give the Embden more water than is required by the Toulouse. The Embden does not attain the same weight as its rival by several pounds, but matures much more rapidly, and is consequently of greater service for the autumn demand, being almost entirely used,

either pure or as a cross, for green geese. Allowed to mature, it attains to nearly the same weight as does the Toulouse, for in the year when the weights enumerated above were recorded, a pair of Embdens scaled 48lb. 12oz. The quality of flesh in both varieties is very equal. One advantage possessed by this breed is that its feathers are more valuable, being pure white, and where there are enough birds kept to make their feathers worthy of regard this is an important consideration. Unlike the Toulouse, the Embden is an excellent sitter and mother.

PLACES FOR GEESSE.

The best places for keeping and breeding geese are on the borders of commons, moors, or waste lands, and there is an abundance of places in all parts of the country where flocks might be kept, thus utilising ground of no value at present, and by providing profitable labour for farmers and cottagers increase their income. All they will need for food, except when fattening up, will be a little corn or meal first thing in a morning, and they will forage for the rest; but it is better if the number kept is sufficient to let a boy drive them to their feeding-ground and tend them during the day. They should be under cover at night in a comfortable shed, and with good straw bedding. A pond or stream is by no means imperatively needed, but when it can be given is conducive to their well-being.

HATCHING.

Young geese commence laying about the middle or end of February, and, although it is much better to breed from more mature birds, yet if early broods are required the latter cannot be waited for, as they are considerably later in commencing to lay. When the strain is a good one—strong, and not at all in-bred—then the eggs from young birds can be taken without fear, and will hatch out well, the only drawback being that they do not grow quite so fast as those from older stock. In the case of white geese, if the eggs are left in the nest, as soon as about fifteen are laid the mother will show a desire to sit; but if they are removed regularly, she will probably lay nearly twice as many before desiring to do so. The latter is the plan usually adopted, and half the eggs are generally set under ordinary hens, such as Cochins or Brahmas, giving four to each. Some breeders never allow a goose to sit at all, considering that they are not safe to trust, being so heavy and clumsy. If this plan is adopted the eggs must be regularly sprinkled in the nest, as the shells are very hard and thick, or otherwise the young birds will not be able to break through. Some geese lay two clutches of eggs in one season, but they have to be early bred and from a good strain to do this.

The time of incubation for geese is thirty days, and it is better not to disturb the nest during the time, except in case of accident, as the mother is very spiteful and pugilistic. Should her mate be near it may even be dangerous to do so, as they have great power in their wings, and can deal a tremendous blow. A regular attendant, however, soon becomes familiar to them, and he need not be so careful.

REARING.

As soon as hatching is over plenty of food and water should be placed near the goose, so that she may satisfy her own appetite, and then both her mate and herself will attend to the little goslings. It is well known that the management and food during the first few weeks of any animal's existence determine very largely its future size and the rapidity of its growth. Of course there are great variations in breeds as to their capacity for putting on flesh freely and rapidly, but very much can be and is determined by early treatment and management. No bird that is neglected and half fed during the earlier stages of its existence can possibly thrive, and it is essential to begin from the first with proper feeding. Goslings are about the easiest of all domestic poultry to rear, and when once hatched require very little looking after. They are unlike chickens, in that they do not require brooding. When hatched, place them in a roomy coop or crate, but it is better not to give a large run at first. The coop must be situated in a sheltered position, as the sun's rays are very fatal to young goslings. Of course, if there are plenty of bushes or trees about, this is very simple, for the coop can be placed under their lee; but if the situation is open and bare, some shelter should be improvised. The coop can then be made with a large eaved roof, but in addition hurdles, in which has been interlaced furze, should be provided, and if freely scattered about these will be welcomed by the goslings. It is an excellent plan to cover the coop with furze, as that keeps it cool. In all cases the coop should be bottomless, for the goslings are unable to hold their feet on a wooden floor, and are very apt to injure themselves by slipping about. It is not necessary to go to much expense in the making of a coop, for they can be built at a very reasonable cost, as it is not necessary to build them very strong. Goslings are not usually hatched until the weather is open and mild, and are not delicate by nature; but the coop should be made roomy, as the youngsters grow very fast. When about ten days old they can be liberated from the run, and will prove splendid foragers.

FEEDING GOSLINGS.

The early feeding must all be in the direction of building up a frame on which the flesh may be laid. The best food from the first is wheat and oatmeal, or barley-meal and wheat. The whole grain should be scalded and dried up with meal. Variations may be made by giving ground oats, or by boiling potatoes and drying them up with the meal. When about two months old the birds may be fed on raw grain and sliced potatoes, and these will suffice until the time for fattening arrives. They are also very fond of young grass, green onions, chickweed, and an early cabbage hung within their reach in the run will be highly appreciated. No other special provision is necessary except the giving of water, which must not be forgotten.

Young goslings, if the fields are clear of their crops, should be allowed to wander about most of the day when the weather is at all fine, but they ought to be

placed under the care of a lad so as to prevent their wandering away too far and over-running themselves. A lad can easily keep them in order and bring them home at night. Before going out in the morning they should have a feed of barley-meal made into a paste, and at night another feed, but this time of whole oats steeped in water. This, with cut grass, cabbage leaves, turnip tops, or other green food of a similar nature, will be all they need in the way of food; and as for water, unless there is a running stream, a tub or trough sunk in the ground is as much as they need have. They must be kept under cover at night, and an empty barn, dry shed, or large outhouse littered with straw is best. In bad weather they need not be let out at all.

THE TRADE IN GEESSE.

In this country geese are amongst the most profitable of poultry, and during certain seasons of the year there is a large and unfailing demand for them. It is true that turkeys have taken the first place which was once occupied by geese, and are preferred by many for great festive seasons, but commensurate with this change there has been a great increase in population and in wealth, and this has much more than compensated for the change. Green geese are regarded as a great delicacy, and at the Christmas season vast quantities of fattened birds are sold. The finest of these are home-grown, principally the product of the Eastern Counties of England, and of Cumberland, very fine ones coming from Ireland. We have also supplies from France and some other parts of the Continent of Europe, and of late years large shipments have come from Canada. Consequently the prices for inferior qualities, such as we receive from abroad, have been very low through flooding the markets, and geese can generally be bought at sixpence or sevenpence per pound. These lack the flavour of our home-grown geese, and are evidently not very carefully fattened. The lesson to be learnt is that in order to succeed the very best should be produced, for which there is always a good demand. The trade done in them is very great, and one Leeds poulterer has informed us that he received 2,500 Irish geese for his Christmas trade last year (1890).

NORFOLK GEESSE.

If we look to the great geese-raising district of England, we shall learn something of the method adopted where the best specimens are bred. In Norfolk the trade resolves itself into two great branches—green geese and the Michaelmas, the Christmas trade being really a continuation of the latter. Farmers, as a rule, do not attempt fattening, which process is left to the dealers, who lay themselves out for it. In March and April dealers begin to get in their gosling supplies from the farmers, or cottagers near the commons, and as a rule these goslings are about five or six weeks old, and very thin. They are fed for six or seven weeks under stages on barley-meal, maize, wheat tailings, and brewers' grains mixed, which food soon makes them ready for the

green geese market. These stages or pens give them sufficient room to move about, but not too much, and they are kept there for all the period, being allowed out now and again for a bath and for cleaning the pen. Michaelmas geese take their places under the stages in August, and the endeavour is made to have them ready for market before the Irish and Dutch supplies begin to arrive. On turnips geese are found to be capital substitutes for sheep, and when a dealer has a turnip field he not unfrequently hurdles off a portion and eats it off with them. They first eat the tops, and then the bulbs of softer turnips; but when they are put upon swedes, the man in attendance gives each turnip a chop. Geese will eat a field cleaner than sheep, and their manure is equally good. When fed in this way they need nothing more than a trough of water, and the finishing process consists in putting them under stages for a month, and feeding them on brewers' grains and meal. Gravel or grit should always be supplied as an assistance to digestion. Mr. H. Digby, whose success as a breeder of exhibition geese has been very great, speaks in the highest terms of Spratts Patent poultry-meal for giving goslings a good start.

In the autumn large numbers of young geese are offered for sale in nearly every market town, and at reasonable prices. These have been sold by breeders to dealers, the former having in many cases no accommodation for fattening, and farmers whose grain is off the land will do well to purchase a number of these birds, which can be put out upon the fields, where they will pick up a great proportion of food required by them for the next few weeks. After roots, also, they can be put on the land. There are many opportunities which the farmer possesses of keeping these birds, and they need as little care as almost any kind of farm stock.

FATTENING.

Geese are altogether different to ordinary fowls or even ducks, in one respect, and a mistake is sometimes made in the final fattening off, by putting each bird into a separate compartment. Geese never thrive in this way, and instead of getting fatter actually pine away. They appear to be miserable without company, and each lot should be killed together, or the one left behind rapidly loses flesh. Some birds fatten quicker than others, and as they are seen to get into ripe condition, which can best be decided by the state of their appetites, they had better be killed off. As soon as they are as fat as they will get, the desire for food begins to slacken, and then it is that they should be despatched, or they will lose flesh instead of gaining it. We have known goslings fed up to fifteen and eighteen pounds in weight, but these have been exceptional, and a dozen pounds is nearer the mark, so that all must not be expected to turn out exactly the same. To go on feeding in the expectation of increasing the weight after the fowl has shown the symptoms already mentioned, would be found a losing game.

When the system suggested is regularly carried out

year by year, arrangements can be made with breeders to supply goslings in the autumn. In buying we prefer the grey variety, as they fatten better than do the others; but the chief thing is to pick tall, healthy-looking birds, those with big frames capable of supporting a lot of flesh. Never mind if they are thin and lanky, those are faults which can soon be remedied, but avoid any that have the least appearance of being stunted in their growth, for such do not thrive well, never attain any size, though they may eat nearly as much as the others; and as size has all to do with the matter of the price at which they can afterwards be sold, hence the importance of choosing large-framed birds. Goslings may be bought at about half-a-crown each, or even less in quantities, and six or eight weeks' fattening, at a cost of sixpence per week, will bring them up to a dozen pounds weight and upwards, according to the length of time they are so fed. Thus it will be seen that the margin to pay for trouble, and as profit, is a sufficient one.

KILLING AND DRESSING.

Mr. J. S. Rawson, a well-known breeder of geese, thus describes the best methods of killing and dressing* :—
 "Before killing a goose, it must be kept without food for at least twelve hours, though fifteen or eighteen hours will do no harm; this clears the crop of all food, a very necessary point to be attained. Having fasted the goose for the time required, the next part of the business is to kill it as expeditiously and in as painless a manner as possible. There are two or three ways of accomplishing this, but the best is by piercing the brain with a knife. Secure the bird's legs with a piece of twine, and then feel for the correct spot at which to insert the knife. At the base of the skull, and at the point where the head is joined to the neck, will be found a hollow place without any bone to protect it; here is the vulnerable point. Now hold up the bird by the legs, and with a stick or short piece of wood, give it a smart blow at the back of the head, thereby rendering it unconscious. It must now be held between the knees, the head being grasped in the left hand, bill down, and neck somewhat bent, so as to get a better chance of finding the base of the skull. This having been done, a sharp-pointed and strong pen-knife is inserted in the hollow place before mentioned, and a quick stab or cut given. If this is properly done, one of the chief arteries is severed, and the bird quickly bleeds to death; care being taken that in the meantime it is firmly held, and prevented from throwing the blood over its feathers or the clothes of the operator. As to the time for plucking, that is a matter on which opinions differ, some people preferring to do it at once, whilst others aver that it is better policy to let the bird grow quite cold before it is taken in hand. In the former case the feathers will be found to come out much more readily, and the time occupied in plucking thereby very considerably diminished; but, on the other hand, the skin and flesh being more tender, greater care

is required during the operation to prevent the membrane being torn. The usual plan is to leave the head unplucked, and thus let it act as a sign-board to tell the nationality of the bird, whether it be a large duck or a small goose. Care should be taken of the feathers, and these ought to be separated into three lots, the first containing down only, the second small and fine feathers, and the third division strong quills. The latter may be peeled and the feathers afterwards mixed with those of the second division.

"If the poulterer requires the geese *ready trussed*, as is not unfrequently the case, the following is the method to be observed:—

"After plucking the goose, it must be carefully singed, drawn, and wiped out with a damp cloth. Then cut off the neck as near the back as can be done, leaving the skin long enough to draw over the stump. Next cut off the feet at the first joint, and do the same with the wing pinions. To make the bird look plump, press in the breast bone, and run a small skewer through the lower part of each wing. Now draw up the legs, and skewer them through the centre, into the body; when this is done, two more small skewers are needed to complete operations by fixing the shank of each leg to the side bones. It is now in proper shape for the spit, the only thing that requires doing being to cut off the vent and make a hole large enough to pass the rump through, in order to keep in the seasoning when served at table. The goose should now be laid upon a stone or marble slab, and if the dressing has been done shortly after killing, it will be necessary to allow it to stiffen and cool before packing for market. To improve the colour of the flesh, it is a good plan to wrap it in a cloth which has been dipped in old milk, and afterwards wrung nearly dry. Geese, and in fact every kind of poultry, ought to be killed at least twenty-four hours before they are packed to go away, and great care should be exercised in the latter operation, in order to prevent bruises, or disfigurement of any sort. In following out the above directions, the giblets must not be overlooked. These delicacies should be put on one side, together with the liver and gizzard, and sent along with the goose to the poulterers."

GESE IN FRANCE.

We give the following extract from a French poultry journal, which, in the form of questions and answers, will inculcate many lessons which will be of service to our readers:

"Is it possible to have a flock of geese (say from 100 to 150) at liberty on a large estate, returning home every evening, and intended as egg producers, or whether is it indispensable to isolate each productive family, as it is said the males fight furiously? In any case, how many females are to be associated with the male?" Geese in flocks live in perfect harmony during the rearing period, but such agglomeration would be profitless at the breeding season; worse than that, for it would expose one to a thorough disappointment. To insure success the

* *Fowls*, June 12th, 1890.

goose requires quiet and to be made comfortable. The ganders that live happily together during the whole of the summer and autumn become very quarrelsome at the first cold weather, and are always fighting most viciously during the laying season. The result of this fighting is non-fecundity of the eggs. We maintain that with a flock of 100 geese and twenty ganders the production would be far inferior to that of two or three little lots separate and kept in proper manner. A running stream appears to us indispensable during the laying season, without which the majority of the eggs would be clear. On a sheet of water a gander can serve five geese, otherwise he could only have three at most. A goose of a good breed may lay thirty to thirty-five eggs, most of which would be fertile if kept in a healthy condition, that is, if she has a good grass run, good corn, and good water. Construct four runs separate from each other, with five geese and a gander in each. You will then be able to rely on a sufficient number of goslings to make a fine flock for the following season. Mind you do not work your young ganders: they must be two years old, otherwise almost all the eggs would be clear.

"Is it possible to distinguish by any outward signs the gander from the goose when young?"—In the common breeds, not cross with the Toulouse, the male is always white, and is known as soon as his feathers begin to grow, but the female is not completely white. In the Toulouse breed, the male and female are exactly alike; it is only by their gait they are recognised, and even then it is when they are almost adults.

ARTIFICIAL HATCHING AND REARING.

"In the artificial incubation of the eggs of geese are not their special points to be noticed, such as an average heat less than that employed for hen eggs or any special care at the time of hatching?"—"The artificial hatching of the eggs of geese is easy and regular. One condition is necessary, viz., the eggs must be very fresh, and must not have travelled. The hatching takes place without the least difficulty or special care. Notwithstanding this, our advice is not to hatch the eggs of geese artificially; there will be no advantage whatever; you cannot forward the hatching as with hens' eggs, the goose only lays at her season, she sits naturally and generally well, and rears her young with a care quite remarkable. The gosling requires to roam in the fields from its birth. Under these circumstances the artificial mother would be less useful than its natural mother. In incubating artificially, one is prone to believe that an early second laying is anticipated; not so—whether the goose is free or brings up a troop of goslings the time of her second laying will not vary. Artificial incubation is necessary, we may even say indispensable, for a surplus of eggs, or at the time of hatching when certain over-hatching mothers stifle the young ones at their birth; but, as far as the eggs of geese are concerned, we consider artificial incubation quite useless. Upon the whole, the rearing of geese, with all the advantages of land and water, extent of common, and in proximity of cornfields at harvest time, is one of the most profitable that can be undertaken."

CHAPTER XVII.

TURKEYS.

VALUE OF TURKEYS—VARIETIES—CAMBRIDGE—NORFOLK—AMERICAN BRONZE—CONDITIONS FOR KEEPING—HOUSING—IMPORTANCE OF SIZE—BREEDING—HATCHING—REARING—TURKEYS IN NORFOLK—KILLING AND DRESSING.



It is no doubt a fact that the turkey is more difficult to rear than any other class of domestic poultry, but the result, with a fair amount of success, is always most satisfactory, because of the price which can be obtained for well-developed specimens. They are always expensive to buy, and, in spite of a large number imported from abroad, the prices realised for these birds is maintained at a high figure. There is no class of meat, save game, which is so uniformly dear as the turkey, and consequently raisers find them repay the care which they undoubtedly need during the early stages of their growth, when they entail considerable trouble. Past this stage they are as hardy as any of our domestic poultry.

There are three principal varieties of the turkey, namely, the Cambridge, the Norfolk (or black), and the American Bronze.

CAMBRIDGE TURKEYS.

This variety is very extensively bred in East Anglia, and most farms there produce a flock during the year. The Cambridge is larger than the Norfolk, for which reason it is preferred for Christmas marketing, and as it partakes of the Bronze in colour it is not unreasonable to suppose that size has been secured by crossing with the American Bronze, more especially as the turkeys were at one time grey in plumage. The Cambridge turkey is very handsome indeed, has a good, upright carriage, a commanding appearance, a full tail, and a broad, well-fleshed breast. They grow well on suitable places and attain to a large size.

NORFOLK, OR BLACK, TURKEYS.

The variety known by this name is entirely black in plumage, and is certainly very handsome. It has similar characteristics to the Cambridge, but is not quite so large in size. It is often spoken of as being finer in flavour, but it is usually more delicate, and great care has to

be exercised during the early stages of the young turkey's growth. Perhaps want of crossing, which has given both size and stamina to Cambridge turkeys, is sufficient to account for this delicacy.

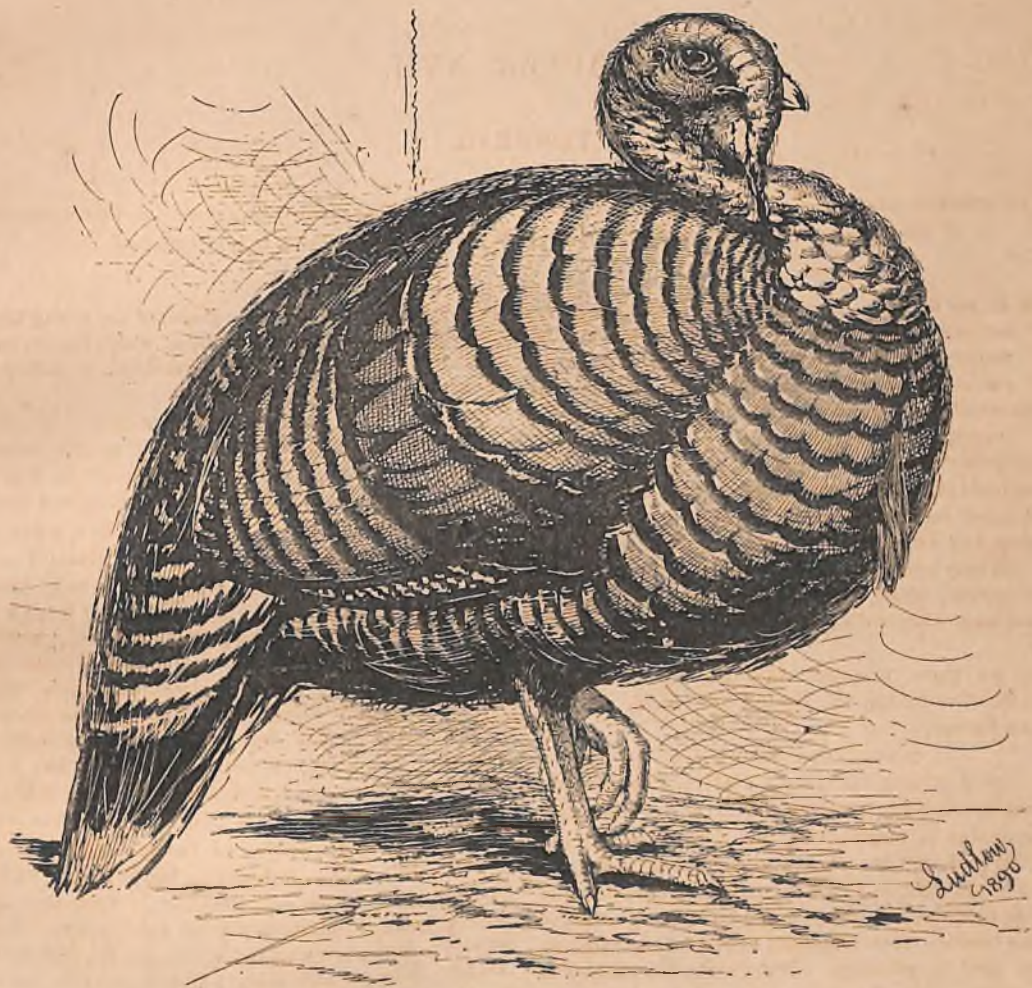
AMERICAN BRONZE TURKEYS.

This is our handsomest, as well as the largest of turkeys, and many have been introduced in Europe of late years. They are characterised by both vast size and beautiful plumage, but they have not so fine a flavour as our English breeds. They have a long, graceful neck, a broad and full breast, a deep, well-rounded body, drooping wings, and a large fan-like tail, the colour being a dark, lustrous bronze on the back, neck, and tail, with deep black breast and body, which is pencilled with white. The cock turkey is very much larger than the hen, and the sexes usually weigh about 27lbs. for the males and 16lbs. for the females, but as high as 50lbs. have been reached. The object in using this variety has been to attain size, for a specimen weighing 30lbs. will realise several pence per lb. more than one half that weight. This is merely a question of fancy, for we prefer one which is 12 to 15lbs., rather than bigger birds. Still, this demand is one which pays producers. Some time ago we saw a London poulterer's prize list, in which turkeys from 7 to 10lbs. were quoted at 10d. per lb., increasing to 1s. 3d. per lb. for 16lb. birds, but as high as 2s. was asked for big specimens at Christmas.

On the Continent white turkeys are largely bred, but they are not kept much in Britain, and cannot be recommended to farmers, as they are usually small in size.

CONDITIONS FOR KEEPING.

For successful turkey breeding it is requisite that the soil shall be a dry one, and unless that is the case, it is of no use whatever embarking in this branch of poultry farming. A cold or damp, heavy soil, is fatal, and no amount of drainage will make it fit for the purpose. We



BRONZE TURKEY COCK.
Winner of Special, Dairy Show, 1890.

must, at the outset, warn those who have not a light dry soil against trying turkey breeding, for they will only entail loss and trouble on themselves; nor should the run given to the young birds have too long grass, but it is better to have it short and kept so.

HOUSING.

A good dry house is absolutely necessary, and it is better to have this separated from the regular fowl house, for turkeys are aristocrats, and refuse to associate with their smaller brethren, upon whom they look with contempt as altogether beneath them. Being strong and powerful, they do not fail to harass the ordinary fowls if they have an opportunity of doing so. There need be no division of runs, for outside the hens can look after themselves, but separate houses are certainly needed. Here we must caution the breeder against overcrowding, and, if possible, in stronger terms than we have before, for turkeys suffer very greatly if not given plenty of room. Better by far have too few than too many.

IMPORTANCE OF SIZE.

The great point to be aimed at in turkey breeding is large size, for the larger the size the more per pound can be obtained when killed, and, therefore, in selecting breeding stock, the chief considerations are good frame, bone, and substance. Small birds are dear at a gift, and should not be accepted at all. It may be that desire for excessive weight has tended to make turkeys delicate, but if so this can be overcome by keeping large-boned birds only, as these will be better able to bear a large amount of flesh. A turkey hen at six months should weigh nine or ten pounds, and, if purchasing, we would not buy under this weight. A healthy bird can easily be known, as the gills and head are of a bright red colour, and the habits are very active. Do not buy old birds, whose legs are very scaly, or if the tuft of wiry hair in front on the breast is very bushy, as it will not be of much service.

BREEDING.

The turkey does not attain its full maturity until the third year, and, of course, it is better to breed from full-grown birds than from young ones, but the latter lay very much earlier than the former, and consequently are used on that account. If these are good strong birds, they may be bred from, and the produce will come in useful for early sale. It is best to change the male bird every season, and the cock bought in the early spring can be fattened and killed off the following Christmas, when it will be no worse for its service, and probably will bring almost as much as was given for it. If this plan is adopted, some of the young hens can be kept for breeding purposes, whereas if no change in the cock is made, this cannot be done. The farmer should never use a cock of his own breeding for stock, if in the least related to the hens, for turkeys are delicate to begin with, and in-breeding will make them more so. Eight hens are sufficient

to give to one cock, and it is to be noted that one service will fertilise a whole clutch of eggs.

HATCHING.

About the beginning of March the hens will begin to lay, and it is necessary to watch them closely, or they will lay in strange places. Take the eggs out daily, only leaving a dummy in the nest, and keep them packed in bran in a cool place until the hen is ready, which can easily be known by her persistently remaining on the nest. Some people prefer to let the turkey sit where she likes, but we think it better to keep her in a safe place, and no better plan can be adopted than making a large sitting box and treating her in the same fashion as sitting hens. It may be necessary to lift her off every day, but turkeys are comparatively gentle birds, and will bear handling. The time of hatching for turkeys is twenty-eight days, and it is better not to interfere much with the eggs, except to examine them on the tenth day by candle light.

REARING.

When the young birds are hatched, leave them overnight without removal. Next morning lift the mother gently, and place her in a large, dry and comfortable coop, and her brood can then be put with her. See that the old bird has plenty of food and water, and feed the young ones on hard-boiled egg chopped fine, with boiled rice and soaked food, which must be given to them five or six times in the day, the first feed to be as soon as possible after daylight, and the last about six o'clock in the evening. When a week or ten days old, begin to throw down a little dari or buckwheat, and, most important of all, plenty of young onions chopped fine. Any kind of tender green food is useful, but onions are absolutely necessary. The great requisites for successful turkey rearing are—(1) a dry, comfortable house and run, and (2) good and proper feeding. On cold or wet days, mix a little aromatic compound in the soft food, and give every day for the first three months a little chopped meat or Spratt's crissel. Bone meal should be mixed with the food, and there should be a plentiful supply of grit. It is necessary to move the coop every day or the ground will become tainted. When the young birds are about a fortnight old, let the hen out of the coop for about an hour a day, which may be gradually extended in time, but do not let her take the chicks among long grass, nor give her too wide a run, or she will tire them out.

The following hints on rearing are by Mr. W. Willis Harris, author of "How to Breed and Rear successfully the Turkey," and are of an eminently practical nature:—

The cause of the great mortality amongst turkey chickens—and that is what disheartens so many—is due in ninety-nine cases out of a hundred to their owners neglecting them during the first two months of their chickenhood, and to a want of knowledge of the true habits of the birds.

The chief things to be remembered in rearing young

birds until they are eight or ten weeks old, or twelve if late hatched, may be roughly classified as follows:—(1) climatic, (2) physiological, and (3) sanitary conditions.

1. The climate should not be of too humid a nature, and a clayey soil should be avoided. Turkeys do best, *ceteris paribus*, when reared upon a soil of a gravelly or sandy nature, as they require abundance of sharp grit to assist digestion. Clay is not only cold and damp, but if birds be brought up on it, sand must be provided and scattered about the rearing ground in the vicinity of the coops for the young chicks, and after the first year it will also be necessary to supply the adult birds with sharp grit. Until the young birds have "shot the red" they must be protected from rain and wind, a slight shower or boisterous gale proving fatal, and it is equally necessary to shade them also from direct rays of the sun during very hot weather.

2. The chicks having very small crops, it is absolutely necessary to feed them very frequently, *i.e.*, every two or three hours from sunrise to sunset. The first meal, after emerging from the shell, should consist of raw eggs beaten up with milk, boiled to a custard, or the eggs boiled hard, and either chopped up fine or pressed through a piece of an old wire blind. This food should be given them for at least a week, and then dandelion, minced up with the egg, and varied with biscuit meal, should form their diet for another fortnight. They also do well upon Indian corn bread, mixed with egg before baking. After three weeks the egg food may be discontinued, and the five meals a day may consist of (1) oatmeal porridge, (2) biscuit meal, (3) maize (cooked the same as hominy), (4) boiled rice, and (5) a mixture of small grain, such as *dari*, groats, canary, millet, and hemp seed, given for their last meal at night. As the birds grow older they may be fed less frequently, ground oats and middlings taking the place of the other meals, and wheat, barley, oats, and maize substituted for the smaller grain. Dandelion, mustard, lettuce, young nettles, and clivers should be given *ad libitum*, and when the chicks are cooped with the hen, insect food or a substitute must be provided—either Spratt's crissel, bullock's liver, boiled or raw, passed through a sausage machine, or ants' eggs, the *sine qua non* of successful turkey rearing being a continual supply of animal food in abundance when the birds are young. Dandelion acts as a prophylactic against liver disease, which young turkeys are more liable to than the chicks of ordinary poultry; nettles keep their blood in order; hempseed given when the heavy feathers are coming assist their plumage; rice given occasionally prevents or checks diarrhoea; and insect food, being the natural, is therefore the best stimulant they can have. If fed on moist food the first three weeks they require no water, obtaining sufficient from the dew off the grass if allowed full liberty. Until three months old the poults should not be allowed to perch, but kept bedded down upon straw, and when first allowed to roost it is better to cover the perches—which should be

flat, and about six or seven inches wide—with pieces of old sacking stuffed with straw or hay, so as to prevent the heavy cockerels having crooked breasts. To fatten turkeys they should be allowed full liberty, and fed with as much ground oats as they will eat three times a day, the gobblers being separated from the pullets, as the latter fatten much quicker. If the birds have been kept going from the first, two to three weeks' good feeding is sufficient for the pullets, but the gobblers require about another fortnight longer.

3. Turkeys, both young and old, require plenty of pure fresh air, and should never be kept in a close building. The coops for the chicks, if shut up at night, must be well ventilated and kept scrupulously clean. Water must always be fresh, clean, and kept in the shade, and if given to the chicks should be renewed several times a day.*

TURKEYS IN NORFOLK.

The Norfolk method of treatment was well described some years ago by Mr. R. B. Sapwell,† from whose article the following notes are quoted.

The food for the newly-hatched birds should be principally hard-boiled egg, with dandelion, lettuce, onions, or nettles chopped up, with a little bread-crumbs; to this may be added a little rice boiled in skim milk (if quite sweet), a little suet or greaves, and in wet and cold weather a little cayenne pepper, with grain of all sorts as the birds grow older. A fresh site for the coop every morning is a *sine qua non*, and a little exercise if the mother is a turkey—but not if she is a fussy old hen—is also advantageous as the chicks get on. A good sign is to see the young turkeys catching flies. In order to get fresh untainted ground, it is a good plan to hurdle off a part of a field—a new ley, if handy, for the coops, and the grass should be kept mown closely to the ground.

Turkeys will take to any young turkeys, whether hatched by themselves or not; so when our young birds get fairly strong, we generally transfer those hatched under hens to the turkeys. One has to be careful that the chicks do not perch on the rails of the hurdles or the tops of the coops; crooked breasts would be the inevitable result; they should be induced to sit on the ground as long as possible, and then taught to perch in low bushes and trees, and until they are shut up for fattening they are better to have never entered the fowl-house. Having reached the age of two or three months, June has arrived, and the birds are perfectly hardy, requiring little care but generous feeding. A more economical food is now desirable, and barley-meal, with, perhaps, a little scrapecake, maize, barley, and small wheat, is the usual food.

Turkeys for Christmas should be shut up in a light, dry, and roomy house the first week in November; troughs with as much maize and good barley as they can eat should be always by them, with two good meals a day of just as much barley-meal, mixed with flat milk,

* "Fanciers' Gazette," Summer Number, 1891.

† "East Anglian Handbook."

as they can eat, and milk to drink. Sliced mangel, turnips, and swedes, and cabbage are useful and necessary, and plenty of sand, lime, ashes, and brick-dust should be in the corners of their house. Let the troughs be well cleaned every morning; all surplus food removed; on a farm there are plenty of other fowls glad to clean up after turkeys.

KILLING AND DRESSING.

The usual method of killing a turkey is to first fasten the legs and wings with soft string, which must be strong enough to bear their weight. By means of that fastening suspend them to a beam, head downwards, so that the head will fall about midway on the operator's body. Pass the left arm around the turkey's body, so that its tail will point behind. Take its head in the right hand, with fingers under the throat, and thumb at the base of the skull; now give a sharp, sudden, strong jerk downwards, and a sharp twist upwards and sideways, and death will be instantaneous, though there may be considerable muscular exertion for a time. If it is thought desirable to bleed, it can be secured by cutting the throat, but this must be done at once. Turkeys can also be killed in the same way as fowls, already described.

Mr. Sapwell thus speaks of killing and dressing in Norfolk:—Norfolk has for many years had a great reputation for the quality of the turkeys it produces, and to obtain the highest price in the London market it is essential that the birds be dressed in the Norfolk style. The Norfolk style is that the turkey should be killed by having its neck broken; it should be rough-plucked, but not drawn, the feathers left on the back of the wings and on the top of the rump; the wings are then crossed on the turkey's back, and the feathers left form two pads, on which the bird rests on the poulterer's shop-board. The birds should never be killed until after a day's fast, and a handful of barley meal rubbed over the skin while it is warm adds to the white appearance which is so much desired.

AMERICAN EXPERIENCE.

"A Farmer's Daughter" writing in the *Albany Cultivator*, says:—"After the young turkeys are old enough to take a wide range they are fed twice daily, having a generous breakfast and supper of bread and milk with some sort of dry grain as dessert. This ration is continued until the turkeys are about four months of age, when, as they seem to prefer the grain, once a day only, in the morning, are they given soft food. This now

consists of boiled cracked corn or stale bread moistened with sweet milk, and the whole made stiff with one-third wheat bran. If the sweet milk be heated to the boiling point they cannot devour the mess fast enough, for there is no flavour more delicious to a turkey's palate than that of boiled milk. As a grain food they are very partial to sorghum seed, and I have never had any bad results follow its liberal use; and once a day after the frost comes, they should have some sort of green food, as cabbage, turnips, or specked apples, of which they can manage a large quantity without detriment, or rather to the improvement of their health. If I want to make them perfectly happy on a chilly morning when the ground is white with frost, I give them a troughful of porridge made of sweet skimmed milk boiled and thickened with fine corn meal. This is so very much to their taste that their morning meal must be offered first, else it will be left untouched,

"After four months of age, growing turkeys may be allowed all the corn, wheat or oats, (equal quantities of each being preferred), that they will pick up *with avidity* twice daily; but they should be compelled between times to take a wide range and gather for themselves that variety of green food and 'roughness' without which they cannot be healthy.

"The severe frosts have, I know, destroyed all tender vegetation, but in their rambles over the pastures and grass lots the flock will be able to find tender blades of grass and clover, of which they are especially fond, sufficient for their needs. Unlike chickens, turkeys thrive best when deprived of meat, being allowed instead an unlimited quantity of butter-milk.

"At this age the young turkeys are growing tall very rapidly; the gobblers, in fact, look as though they might be on stilts, being mostly legs. Their appetite is simply insatiable, prompting them to make away with a large quantity, as well as a great variety of food; for being busily engaged in making bone, muscle, flesh and feathers, all at the same time, a liberal supply of material must be stored away for selection.

"When properly cared for, I have had turkeys of five months to weigh—the gobblers 19½ and the hens 14 lbs.; and at nine or ten months of age they weigh respectively—the gobblers from 25 to 30 lbs., and the hens from 16 to 18 lbs."

CHAPTER XVIII.

DISEASES AND GENERAL MANAGEMENT.

DISEASES—"PREVENTION BETTER THAN CURE"—APPETITE—INTRODUCTION OF FRESH STOCK—CLEANLINESS—DIVISION OF DISEASES—COLD—ROUP—LIVER DISEASE—DIARRHŒA—GAPES—LEG WEAKNESS—CRAMP—DIPHTHERIA—CHOLERA—SCROFULA—EGG BOUND—CROPOBOUND—DISEASES OF THE COMB—SCALY LEGS—WORMS—VALUE OF HOSPITAL—EGG EATING—FEATHER EATING—MOULTING—COLD WEATHER—POULTRY MANURE—FEATHERS—ACCOUNTS.



HIS chapter must take the form of an *omnium gatherum*, dealing not only with the question of disease, but also with several subjects which could scarcely be included before, yet these are of great importance to all poultry keepers, dealing as they do with those details which are essential to success.

First is the question of

DISEASES.

One of the most remarkable features of modern poultry keeping is the great development of diseases in various forms. This is shown by the great number of questions asked in the various specialist poultry papers every week. It is true that this fact in itself would scarcely show so great an increase in disease, for at one time when a fowl took ill it either had its neck wrung or was treated with some such mixture as soot and butter, or with a dose of castor oil. There was little or no attempt made to define the disease, to discover its nature, and thus to find a successful method of treatment; consequently the result was seldom satisfactory. It is not, therefore, to be assumed because this definition of diseases has been attempted, and, through means of publicity, made known, that disease is more prevalent. But still from careful watching of poultry matters for many years, we have little doubt but there has been a great development of disease. There are now some forty complaints and diseases to which fowls are subject, some of which can only be successfully treated when properly diagnosed. With all of these we do not pretend to deal, but will touch chiefly upon those which are most common.

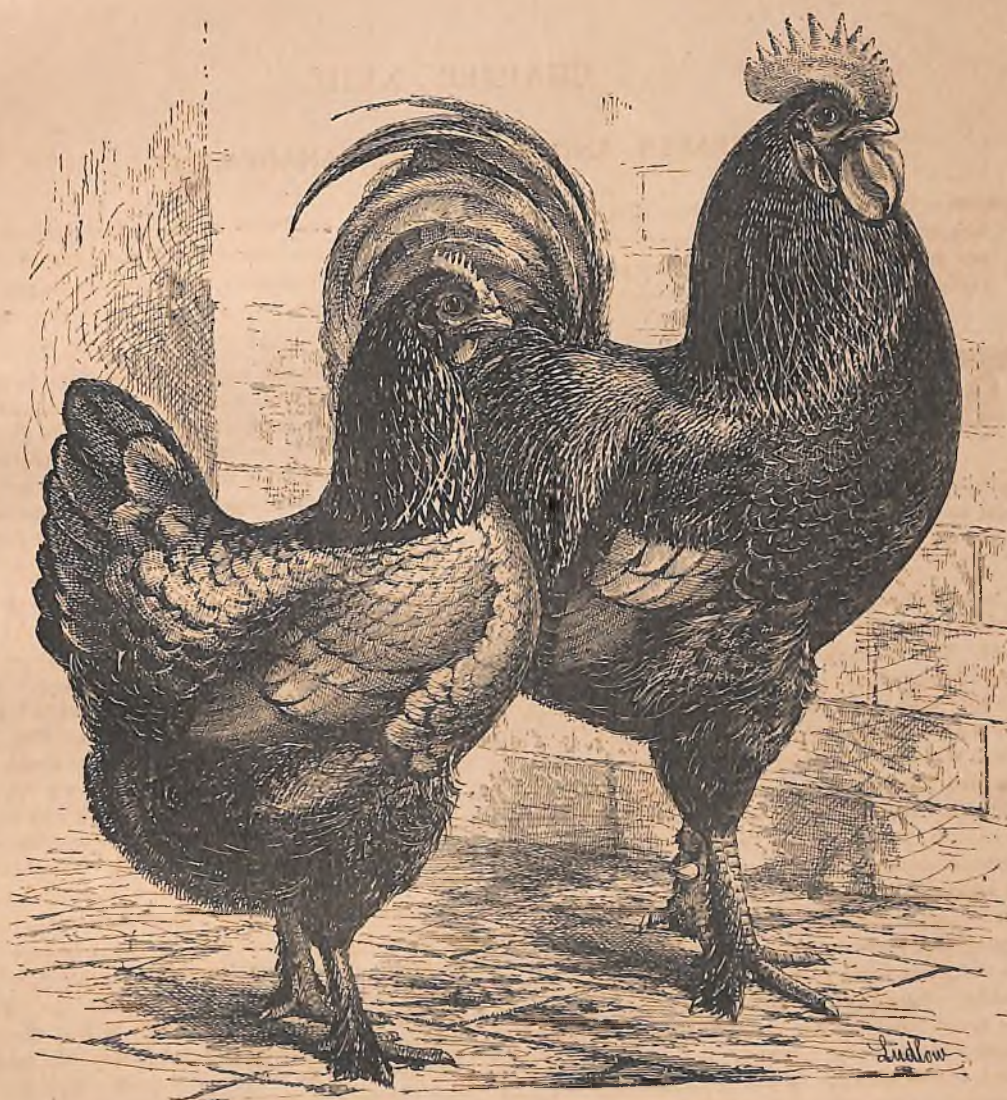
It is not a very pleasant thing to think of disease being so prevalent, and too much thinking of it would not help us in egg or fowl-eating. It is true that many diseases are not hereditary, and these the more prevalent. But there are many diseases which are hereditary, and it is

by no means certain what effect upon the human frame eggs from such birds have. Whether the matter which contains the disease germ is in the embryo or in the egg itself is yet to be settled, but is of the greatest importance. If the former then no harm would result, as it is always taken out of eggs by cooks, but if the latter, then the consumption of uncooked eggs would be dangerous.

"PREVENTION BETTER THAN CURE."

Our object in saying this is to point out how desirable it is that fowls should be kept healthy, not only for their own sakes, but for the sake of those who consume their produce. We do not say much about the birds themselves, as they are always cooked before eaten, and if there was any apparent disease they would be rejected. It is quite true some diseases would not have their injurious effect destroyed by cooking, but these are very seldom met with in poultry. Only seldom has there been a poultry epidemic, and it is this form of disease that would be most to fear. But this much can be said for an epidemic, that the disease soon runs its course, and thus it is reduced to a minimum. Still under any circumstances it is desirable that fowls be kept in a state of health, and we put this forth as the object towards which all poultry keepers should strive. As "prevention is better than cure," health should be well attended to.

The first care should be to select perfectly healthy birds for breeders. No matter how good a bird may be (and this applies equally to cocks and hens) in other respects, unless it is sound and healthy it should not be used for breeding. The temptation to neglect this is greatest amongst fancy poultry, but there is no excuse for it whatever with fowls kept for economic reasons. With them stamina is of the first consideration, and we advise the killing of those birds which show the slightest taint of any disease that is chronic in its nature. Of course, it would be folly to destroy a good hen because she had a



LANGSHANS.

bad cold, or a touch of indigestion. These can be cured, and are not structural in their effect. But when there are signs of actual disease of lungs, or liver, or other vital organs, or if the blood is impure, then as a mere matter of pecuniary interest, to kill is the cheapest as well as the best method.

The vast majority of diseases in poultry are due to bad management, which may be divided into three sections; (1) bad housing, including cold, damp and ill-ventilated houses; (2) over-feeding, rich feeding, and impure water; and (3) want of exercise, combined with an improper system of feeding. Each of these three parts of management have been previously dealt with, and they are of very great importance to every poultry keeper. As we have already stated, the great majority of diseases in domestic poultry are the result of one or other of these causes. And if we take from the list of birds with diseases transmitted to them by their parents, due in the first instance to the same incitements, it will be seen that nearly the whole of the ailments of poultry are the result of bad management in one form or another. That all can be prevented is undoubted, but so long as the system of feeding on rich food in large quantities, of keeping birds in small, ill-ventilated houses, upon foul or damp ground, and in confined runs, is continued, so long will diseases be generated and propagated, but if healthy stock only be used for breeding, and proper attention paid to management, disease will be exceptional.

APPETITE.

The appetite is an unfailing guide to the state of a fowl, as it is to that of any animal. In health it should be even, regular, not capricious or fitful, varying in the frequency of its return only according to the habitual period for meals. As an indication of disease we find the appetite deficient or absent, excessive and irregular, fitful and capricious, with craving after unnatural substances, and absolute repugnance to proper food. Absence of appetite may be attributed (1) to organic derangement of the stomach or to weakened digestion, but (2) more frequently to overcharge of the stomach, or pressure of injurious or indigestible substances, even in moderate or small quantities; (3) to fevers of various kinds, which can be determined by heat of the body; and (4) to emotional or other exciting causes. Excess of appetite frequently attends nervous complaints, and is often attendant on worms in the intestines. It may also be a sign of poverty in the blood, and is usually associated under these conditions with vomiting or continued relaxation of the bowels, owing to the deficient distribution of nourishment. It should be the object of every poultry keeper to have the appetite of his fowls as even and regular as possible, as that is a sign of perfect health.

INTRODUCTION OF FRESH STOCK.

In connection with this subject of disease prevention it is most important to speak as to the introduction of fresh stock birds, by which a previously healthy poultry yard

may be decimated. Additions to the poultry yard should be made with the greatest care, both as to the choice of birds to be introduced, so far as their breeding and characteristics are concerned, and as to their state of health. As to the latter consideration, it is to be pointed out that frequently a strange bird has been the means of introducing disease into a previously healthy yard, disease that has taken months to eradicate. The system adopted by careful breeders is to keep purchased fowls by themselves for two or three weeks, so that any incipient disease may have time to declare itself, and that the condition of the bird may be fully observed. The time thus apparently lost by keeping a fowl apart from the others will be well spent by the security afforded.

CLEANLINESS, &c.

It is only necessary to mention how important is absolute cleanliness in houses, coops, and every form of appliance. Labour expended in this way will repay itself a hundredfold in preventing disease. Such preparations as Jeyes' Purifier or Calvert's Carbolic preparations are invaluable, not to cover up filth, but to sweeten the atmosphere, and by killing germs prevent disease. We have previously referred to the importance of a dust bath for all fowls, but it is desirable to mention it again.

DIVISION OF DISEASES.

As a rule diseases range themselves under three heads:—First, affections of the respiratory organs; second, digestive disorders; and, third, those of a zymotic character. But we may say that as yet poultry diseases have not, with two exceptions—chicken cholera and gapes—been enquired into thoroughly by scientists, so that there is much yet to learn in this direction. The following are the principal diseases a poultry keeper has to fear.

COLD.

Common cold, known by a slightly feverish condition and running at the nostrils, can generally be cured by removing the sufferer to a warm shed, and giving any good roup pill, or mixing some homœopathic tincture of aconite in the drinking water.

ROUP.

Roup is one of the most troublesome diseases with which the poultry keeper has to contend. It is really a combination of diseases, as it embraces a cold in the head and derangement of the digestive system, or, as is more often the case, scrofula in the system. In many instances the scrofula or stomach derangement has been previously quiescent, but cold having been induced by a sudden change in the weather or from exposure, disease is developed and takes the form of roup. Externally there are all the symptoms as in common cold, namely, running at the nostrils, sneezing, or cough, and in many cases a puffing up or swelling around the eyes, in the worst forms there being a cheesy substance below the eyelid, sometimes entirely covering the eye. In yet other instances there is nothing but running at the nostrils to indicate the presence of roup, and the

heavy, mopey appearance of the fowl. But it is very easy to distinguish between common cold and roup, for in the latter case the mucus is thickened, and together with the breath is very offensive. In order to cure the disease it is necessary not only to get rid of the cold, which can generally be done by the treatment named for cold, and keeping in a warm place from draughts, but it is also necessary to deal with the scrofula. This needs patient treatment, as it is in the blood; doses of iodide of potassium may be given, and sulphur in one form or the other.

LIVER DISEASE.

Perhaps the most troublesome complaint—one which generally follows the use of Indian corn—and at the same time the most insidious disease that affects fowls, is liver disease, of which there has been a very great development during the last few years. The worst feature in connection with it is that it may be existent for a long time without its presence being at all suspected. Very often the first sign is only noticed a few days before the bird succumbs, when it is seen to be rather dull and listless. This may not appear to increase, but within two or three days it is found dead in the house. The most certain sign is when the bird mopes about, and instead of having a bright red coral face, which is the best indication of health, it is rather yellowish. As soon as these indications are noticed, the food should be reduced in quantity and quality, avoiding everything of a rich or fatty nature. The best things to feed on will be whole barley or wheat in small quantities. It will also be as well to give some aperient medicine, preceded by a couple of grains of calomel every other day. The object is to reduce the system at once, or the disease will speedily be aggravated. Should any of the birds die it will be better to examine them and see if liver disease is present, which can very easily be discovered, as that organ will be soft and very easily broken, or have cheesy lumps upon it.

When the nature of the disease has been discovered steps must be taken to prevent its development, and the poultry breeder must try to eradicate it from his stock. As liver disease is hereditary, fowls with any suspicion of it must never be bred from, no matter how good they may be in other respects. This rule must not be deviated from under any circumstances, and, except for show birds, it will be much better to kill them if not speedily cured, as it cannot be a pleasant idea to eat eggs from fowls so affected. When taken in time there is no doubt that the disease can be removed, but if neglected it becomes chronic. There are many things which can be done to prevent the birds becoming affected at all, one or two of which we have already indicated, namely, feeding, and the giving of exercise. But, perhaps, the most prolific cause of disease is overcrowding, and consequent tainting of the ground. Of course upon large farms, where there is an abundance of room, liver disease need not be feared, unless the feeding is very bad.

DIARRHŒA.

The exciting causes of this complaint are very numerous indeed, and it is impossible to enumerate them all. But fortunately the thing itself is so apparent that no one who takes the slightest interest in his stock can fail to discern it at once. The most frequent causes are improper feeding, cold, or the presence in the intestines of some irritant. It is, however, well to note here that the slight looseness by means of which nature sometimes corrects herself, should not be stopped. This is often the preventive of a serious disease, and the use of a strong astringent would be productive of very great harm. Unless, therefore, the diarrhœa continues and increases, it is not advisable to stop it. We should first suggest the use of bone meal mixed with the soft food. This is not only useful as a cure, but is a great preventive of diarrhœa, especially with chickens, and it should always be mixed with the soft food given to them. Boiled rice, in which some powdered chalk has been mixed, is also very useful in the earlier stages. If neither of these are successful, stronger measures are necessary. We have been most successful with chlorodyne, giving two drops in a teaspoonful of water twice or thrice a day. This is usually effective in stopping the progress of the complaint. Failing that, a pill may be given composed of a grain of opium and five grains of rhubarb. The fowl should be fed entirely on soft food, and have very little green meat after the diarrhœa has passed away.

GAPES.

At one time gapes was a great scourge in poultry yards, the worms lodging in the throats of chickens, destroying thousands every year. But it has now been successfully combated. Gapes can be prevented by anointing the heads of young chicks with an ointment made as follows:—Mercurial ointment 1oz., pure lard 1oz., flour of sulphur ½oz., crude petroleum ½oz. This is mixed together and applied. Another successful cure is to pour some carbolic acid into a metal spoon or saucer, and place this over a stove or lamp until fumes begin to arise, when the chicks affected are held in the fumes until they are nearly suffocated; or the chicks may be put in a wooden box or garden frame with the heated carbolic acid, but if this latter plan is adopted care must be taken or they will die. The fumes of carbolic acid kill the worms in the throats of the birds, and when properly applied this is an infallible remedy. Several preparations have been introduced which are a perfect cure for this disease, notably Chamberlin and Smyth's Kaylde, Gilbertson and Page's Camlin, and Thos. Atkyns and Co.'s Anti-Vermine, armed with which poultry rearers need fear gapes no longer.

LEG WEAKNESS.

Young birds, especially of the heavier varieties, are often troubled with a failure of the legs, which prevents their moving about freely. Usually it takes the form of squatting on the ground by the bird. If allowed to develop the joints become stiff, the toes curl up, and when

the sufferer does try to walk it can only do so on its elbow, or first leg joint, which soon, from the friction, becomes enlarged, and has the skin worn off on the outer side. The weakness may be caused in various ways. Very often it is simply due to a more rapid growth of the frame than the legs are able to bear, and when this is the case no one can be blamed for it, as climatic influences may have been at work that could not have been foreseen. But too frequently it is the result of forcing, or of a wrong system of feeding. The first step should be to at once cease giving all food that has the slightest tendency to increase flesh, and to give that which will go in the direction of bone formation. Hence rice, Indian corn, and milk should not on any account be used. It will help, in case the fowl is fat, if an aperient is administered, but not if it has already been reduced in bulk by the complaint. Bone meal is one of the best things that can be given in the soft food. As we have before mentioned, this useful article should always be used for growing chickens, and its use would go far to prevent leg weakness. A tonic will do much, and for the purpose there is nothing better than capsules of cod liver oil with quinine, or Parrish's Chemical Food. To increase circulation the legs should be rubbed with turpentine, and the directions followed that are given under the head of cramp.

CRAMP.

This is also a complaint that chiefly troubles young chickens, and is seldom found affecting adult birds. It can at first be distinguished by a somewhat awkward walking on the part of the chicken. Toes, instead of being spread out, as is usually the case, begin to draw together, and unless steps are at once taken to remedy the trouble they become useless, and the bird cannot walk. The cause of cramp is damp and want of proper exercise, the remedy for which is obvious. To cure present cases a tonic should be administered with nutritious food, and the feet may be rubbed with turpentine after they have been bathed in warm water. If the complaint is treated early very often the mere removal to a wooden floor for a few days will put all right, though this is generally when it is due to the chicks being reared on a clay or heavy soil.

DIPHTHERIA.

This disease has at times run rampant, taking the form of an epidemic, destroying vast numbers of fowls, as it is highly contagious. It is essentially a blood disease, characterised by the formation of a false membrane of the mouth and throat. It generally commences with headache in the human subject, with sickness, diarrhoea, and chilliness, and is soon followed by great prostration and the formation of dirty whitish patches on the back of the mouth, at first small, but soon coalescing so as to form a membrane whose appearance has been compared to that of "damp, dirty, washed leather." When this membrane begins to peel off there is a most offensive odour, and frequently there is an inability to swallow.

As in all diseases of this nature, what is effectual in one case utterly fails in another. We propose to give the various remedies which have been successful. In this way the poultry keeper will be better prepared than if he had only one remedy at hand.

The first is from a French source. In this case turpentine and tar are mixed together, and the whole is burnt in a well-closed house, where the victims of the disease are roosting. Immediately a thick, black smoke fills the place, converting the inmates into regular sweeps, and shortly after the most favourable symptoms appear, namely, detachment of the spurious membranes, moistening of the mucous, and the result is a perfect cure in the majority of cases. This treatment was first tried on a poultry-yard that had been invaded by diphtheria, and from the moment it was adopted all the fowls which were not ill were safe from infection, and the epidemic ceased.

A medical gentleman some time ago wrote to one of our English poultry journals respecting this cure:—"I was induced to try it upon some fowls, having previously tried all kinds of reputed remedies without effect. The result was marvellous in cases not too far advanced. In these latter I applied to the cankered part pure cresolene (an American preparation, a product of coal-tar) till the affected part sloughed away. I also washed out the mouth with the following lotion:—Cresolene 10 drops, water one pint. I apply the pure cresolene by dipping the end of a straw in the fluid and touching the cankered part. I afterwards throw on a pinch of flowers of sulphur."

Some years ago Professor Walley, principal of the Dick Veterinary College, at Edinburgh, made a most valuable contribution to the solution of the subject. This was in a paper read before the Lincolnshire Veterinary Medical Society. For the treatment of fowls and pigeons suffering from diphtheria, he specially recommended carbolic acid. A feather dipped in a tolerably strong solution of it might be swept round the whole of the mouth, extending down to the throat, without doing any harm. The professor acknowledged that this might be thought a heroic remedy, but he stated that although carbolic acid is poison, it is a fact that a strong application of it can be used with much greater freedom than a diluted one. In applying it in this way to the mouth, the bird would at first be a little sick from pain; but this would be followed by a little salivation, and that would be the end of it. The bird would afterwards be as lively as before. When the nose is affected, one of the best things is to place the thumb or a finger in the mouth, and by pressing on the part affected force out as much mucus as possible; then syringe out the nose with a milder solution of carbolic acid, or carbolic acid and iodine. By following out this treatment Professor Walley stated that he had been very successful. As to measures of prevention, he suggested that the grass should be thoroughly dressed with quick lime; and the house either burnt

down, or the birds at least removed to a fresh place to permit the houses being thoroughly disinfected, which must be done to prevent the outbreak occurring again. He also recommended hyposulphite of soda and a little iron in the water. The professor gave it as his opinion that the disease can be carried about by eggs, and might even be propagated by chickens.

CHOLERA.

One of the most dreaded of all the diseases to which fowls are subject is that known as fowl cholera, and it does not appear that any country is free from it. So serious has its ravages been upon the Continent of Europe that such great scientists as Pasteur and Koch have given a considerable amount of attention to it. In America it has been at various times epidemic, while occasionally in the United Kingdom it has swept off vast numbers of poultry, and recently it was very prevalent in several districts of Ireland, where the wretched fowls kept and the conditions under which they live make them specially favourable subjects to it. Fowls affected with cholera speedily succumb, showing all the symptoms of high fever and rapid emaciation.

The causes of this dreadful disease are many and various, and there can be no question that it is terribly contagious, the epidemic spreading like wildfire when once it has been admitted into a stock of poultry, and the chances of stopping it are very few indeed. We have known it introduced by the purchase of a fowl suffering from cholera. But the important thing for every poultry keeper to remember is that even cholera is powerless if the birds are perfectly healthy. The causes which may be said to engender chicken cholera are foul water, rotten food, fetid earth, and impure air, in fact—those conditions which always engender disease of one form or another. Its greatest ravages have been among very highly bred and highly fed exhibition poultry, and the poor, in-bred, miserable fowls which are to be found in Ireland. Some French writers seem to think that the healthiest birds go off first, but we do not think that this opinion is borne out by the facts of the case.

So far as curative measures are concerned, unfortunately very little can be done. The period is so short, and the disease runs its course so rapidly, that the fowl is dead sometimes within a few hours, and generally within two or three days. The only really efficacious medicine is chlorodyne and carbolic acid, and upon these we should almost entirely depend, but it is right to say that the chances of cure are few and far between, and very seldom can a cure be effected—so seldom that it is best at the very first appearance of the disease to ruthlessly use the knife. The appearance of chicken cholera should be taken as a sign that the methods of feeding or management are wrong, and attention will need to be given towards prevention of its spreading.

M. Pasteur advocates the practice of inoculation as a preventive against chicken cholera, and it has been proved very effective indeed. The French savant's method of operating is a little complex, but an American

writer some time ago described a very much simpler method. In this he says that a hen should be vaccinated with the cholera, and in eight days her system will be thoroughly inoculated. Then cut off her head and catch all the blood in some vessel, pouring it afterwards upon paper to dry. A half drop of this dried blood is sufficient to vaccinate a fowl. Catch the fowl to be operated upon, and with a pin or knife make a little scratch on the thigh, just enough to draw blood. Upon this place a bit of the paper upon which the virus has dried, and let the chicken run.

SCROFULA.

Scrofula consists of minute corpuscles intermixed throughout the blood. These may remain dormant for a considerable period. When from any cause there is the congregation of these corpuscles in a certain portion of the body, in that part is formed a scrofulous deposit which sooner or later develops into an acute type, and either itself kills, or induces another disease which does the work for it. There are few means of discovering the process of development, for, as a rule, little or nothing is known until the trouble is fast running its course to a fatal issue. In this way scrofula is the progenitor of consumption, or liver disease, or roup, or canker, or skin diseases in various forms, and of many other complaints. In each of these cases the corpuscles find a weak spot and there deposit themselves.

The causes of scrofula are many. It is undoubtedly hereditary. Predisposing causes are impure air, resulting from bad ventilation in the poultry-houses, or want of cleanliness, from wrong feeding, the giving of rich food especially acting as an inducement to the formation of corpuscles in the blood, and it has also been thought snow, ice, and impure water have a very decided influence in causing scrofula.

As may well be imagined, the cure of such a disease as this is necessarily attended with very great difficulty, and we do not hesitate to say the attempt will fail in many instances. When scrofula pure and simple is discovered, wood charcoal, iron, phosphorus, or iodide of potassium should be employed. These must be given in small doses, say, twice a day, and the cure, if success is attained, must not be looked for very rapidly. The food must not be of a stimulating nature, and be limited in quantity. The greatest attention as to housing and sanitary arrangements is absolutely necessary, and if the place is at all damp it should be drained. Sulphur is a very useful thing for mixing in the soft food whenever scrofula is present, but if charcoal is employed this is not necessary.

EGG-BOUND.

Sometimes a hen is unable to lay her egg, which blocks up the passage. This may be caused by contraction of the passage, or by an abnormal size of the egg. The noticeable symptoms are—a frequent visiting of the nest without any result, and a depression of the tail and wings, the poor bird also showing signs of distress. If the egg is very large, it is not often diffi-

cult to find a remedy, but if of the regular size then it betokens a contraction of the passage, which is much more serious. In the former case the first step to take is to oil the vent with pure salad oil, and if the first-named treatment is not effectual, to inject an ounce of the same oil an hour afterwards. In making an injection the greatest care must be taken not to break the egg, as that would most probably be fatal to the hen. In more obstinate cases much good will be derived from the use of warm treacle in which some chopped groundsel has been mixed. This should be given in doses of a tablespoonful at a time, at intervals of an hour, until the necessary relief has been effected. Or small doses of castor oil may be given instead, but they must be small. In very obstinate cases holding the vent over a jug of boiling water so as to well steam the organ has been known to do good. If there is a contraction of the egg passage, which will be indicated by the egg being of a normal size, then it is probable that there is some inflammation. But it is necessary to state that stoppage of the egg passage generally causes inflammation—how much will depend on the length of time the egg has been there. This will need no more treatment than a fomentation of the part with a weak solution of arnica, but laying should be stopped in order to give perfect rest to the part. The food must be given with that end in view.

CROPOUND.

This is perhaps the commonest form of crop trouble, and is generally caused by careless feeding. If green food be withheld for some time and then given in unlimited quantities, the fowl will eat to repletion, and as the crop cannot get rid of this mass of undigested food all at once, it becomes hard, and not only cannot itself pass into the stomach, but effectively bars the way into the stomach. The same may be caused by giving new grain, which, swelling in the crop, become a solid mass. Or on the other hand cropbound is often caused by an obstruction of the outlet, such as a twig or some indigestible substance that has been swallowed by the fowl. The proof of a bound crop is purely external, but is, fortunately, very easily discernible. It is seen to hang down like a bag, and on being felt there is found to be inside a lump or ball of food. This does not hurt, or in any way, until it has grown very large, incommode the bird, who often seems to eat more than usual, for the reason that the food it is eating is not feeding it, but going to increase the mass in its crop. If the trouble is discovered early, cure is very easy. The first step is to pour some salad oil or melted lard down the throat, and then to work gently with the hand the mass in the crop. This, if properly and effectively done, will soon cause the food and the fluid to mix, and when the mass has been well broken up, it will in the course of a few hours pass away. The length of time necessary to break up the mass will depend upon its nature, and we have known an hour required to do it. When the mass has been got rid of, great care is required in order to prevent a recurrence of the same trouble, which would almost certainly result if food was immediately given without stint. After distension like this, the crop

is naturally in a somewhat inflamed condition, and very susceptible to any strain upon it. The food, therefore, should for a few days be very limited in quantity, and be of the very lightest kind.

When the kneading process is ineffectual, then an operation becomes requisite, but no one need fear the performing of this operation, as it is a very simple one and needs no great skill. Nor is there any danger involved in it. The object is to remove the mass of impermeable stuff gathered there, for without that is taken away recovery is impossible, and the bird must soon die from absolute starvation. Make an incision lengthwise in the upper part of the crop, about an inch or an inch and a half in length. This should be very cleanly done with a sharp lancet or penknife. Through this incision the contents of the crop may be removed, using for that purpose a small egg-spoon. Sometimes the mass is so hard that it cannot pass through the aperture, and in that case it must be broken up, which can be accomplished by care and patience. This mass is usually very offensive indeed, and to remove any contaminating matter from the crop the organ should be washed out with Condy's fluid, or a similar non-poisonous disinfectant. It is also desirable to pass the finger, well pared and oiled, into the orifice so as to be certain that there is no obstruction there, for if so the whole process may have to be gone over again. This done, the incision must be sewn up, and for this a small bent needle is best, as by it the skin can be most easily gathered together, and horsehair, not thread. We prefer to sew the under skin first, and then the outer one. Three stitches will be needed in each skin, and it is preferable to tie each stitch separate. The food must be limited in quantity, and be composed either of sopped bread or Spratt's food. No water must be supplied until the suture has completely healed up. For a time it is advisable to keep a strict watch on a fowl that has been cropbound, as there will be a tendency to a recurrence of it.

DISEASES OF THE COMB.

The comb is not subject to many diseases in that it is formed of hard flesh, but it is frequently affected by other and internal complaints. A fowl in health has a bright red comb, and when it is dull the cause should be sought for. *Whitecomb*.—This is generally due to over crowding, to bad feeding, and the absence of green food. The comb becomes covered with scurf, which if not checked in process of time extends down the neck, and the feathers fall off. It is really a form of scurvy. When white comb appears there should be immediate attention to the food, and a wholesale and liberal diet, pure water, grit for the assistance of digestion, and an abundance of vegetables should be given, with strict regard to cleanliness. A good aperient should be given two or three times, and some sulphur mixed with soft food. The comb should be anointed with a little vaseline. Afterwards the birds, when cured, should have a good tonic. *Sores*.—When eruptions break out on the comb, the treatment must be chiefly internal, though the sores should be touched daily with a little olive oil in which a few drops of carbolic acid

have been mixed. The internal treatment should consist of first an aperient and then sulphur of charcoal in some form, mixed with the food being the easiest way, though made up into pills is perhaps the most effective.

SCALY LEGS.

Yellow-legged birds are very subject to a form of elephantiasis, to which the name of scaly legs is commonly given. There are two forms of it. The one is due to the presence of a small insect on the legs, and this kind is very contagious. The other arises from a deficiency of the oily secretion, thus causing the skin to dry up and split into divisions like scales. Both are easy of cure. For the parasitic form the remedy is, after washing the legs and scrubbing them with a nail brush, to apply sulphur ointment or Forster's leg ointment. These persevered in, will effect a cure. For the other kind a preparation made of equal parts of vaseline and zinc ointment, and applied daily, will be the best remedy.

WORMS.

Very often when birds are troubled with worms it is very difficult to discover what is the matter with them, the chief, or perhaps the only thing noticed, is that they mope or hang about. When worms are present the safest and best proof is by an examination of the droppings, in which worms will generally be seen if the bird is so troubled. The cure is happily not a very difficult one. The best remedy, so far as our experience goes, is capsules of turpentine, one or two of which, followed in twelve hours by a dose of castor oil, has always been sufficient to expel the troublesome parasites from the system; or Anti-Vermin, already spoken of, is a certain preventive.

Another troublesome form which parasites often take is that of insects amongst the feathers. An examination of the birds will soon prove what the birds are really suffering from, and if worms are found the birds had better be anointed with the mercurial ointment recommended under Gapes.

VALUE OF HOSPITAL.

These comprise all the commoner forms of diseases, and it may be mentioned that we are always ready to give advice in specific cases through the *Fanciers' Gazette*. It is an excellent plan to have a room prepared where affected birds can be kept, for their own sakes, and in order to prevent spreading the disease, if it be infectious. A supply of simple remedies, such as those named above or as prepared by Spratts Patent, Chamberlin and Smith, E. T. Brown and Son, W. Walker, and W. H. Lakin, will often save pounds in treatment or prevention of loss.

EGG EATING.

The cause of egg eating is sometimes difficult to determine, but usually it is simply a bad habit. A blown egg should be filled with a strong mixture of mustard and cayenne pepper, closing up the ends with gummed paper. Leave this in the nest, and if the hen tries to eat it she will obtain a dose she does not like, which may prove a detriment. Sometimes the habit is due to want of shell-forming materials, a supply of which will stop the trouble. If these fail the only other way is to make a

nest, in which the eggs will roll down to a lower compartment so soon as laid. Take a box about eighteen inches square, with sides about eight inches high, but no top. In this nest the bottom must be made slightly convex, so that whatever is put therein will roll to the sides. Around the sides within the box, and about half way up, place a shelf about three inches broad, so that when an egg is laid it will roll beneath this shelf, and out of the hen's reach. It is best to fix a dummy egg in the apex of the bottom, and the sides where the eggs roll should be well padded.

FEATHER EATING.

Feather-eating is one of the most annoying things that trouble the poultry keeper, and is both difficult to account for and difficult to cure. It arises no doubt from the want of something which the hens require, and which they are able to find for themselves in a natural state, for fowls with a wide range never show it. The want may be lime, or flesh food, such as worms and grubs, or the habit may be encouraged by the presence of insects in the feathers, which latter is best prevented by a dust bath. Those hens which are usually the culprits had better be removed at once, as the habit will scarcely be broken off if kept with the cock. Pluck the stumps of the feathers out of the cock, and wash the bare places well; then rub on vaseline or olive oil, mixed with a tenth part of carbolic acid. Give the birds plenty of exercise by burying the corn and letting them work for it, and also hang a piece of meat or a cabbage by a string just where they can touch it, and so that it will swing about. Some bone meal should also be given in the soft food.

MOULTING.

The moulting of birds is an operation which usually takes place every year, and is casting one set of feathers and replacing them by entirely new ones. There is a constant change of and growth in the feathers all the year round, but only during the moulting season is there anything like regularity in the process. Moulting makes a considerable demand upon the system. Chickens hatched during the first four or five months of the year obtain their adult plumage about September or October, but this cannot be called a moult, and the first one takes place about the following September. Every year this becomes later and more protracted. Hence the plan we have advocated for laying fowls, namely, killing off birds before their first or second moult, when they are still good for table purposes, and before they have to be kept without any profit.

The time during which birds are moulting is a somewhat critical period, its nature depending very much upon the stamina and constitution of the breed. There is a considerable amount of difference in the way which the various breeds come through the moult. Some of the hardier varieties pass through it both rapidly and easily, whilst others find it most protracted and difficult. The usual period of moulting for a strong bird in its first or second year, is six to eight weeks, in which time the old feathers are completely cast, and new ones take their place, but it is no uncommon

thing to find weak or old birds taking three months, with the result that winter arrives before they get through it, and they do not recommence laying until the following spring, so that several months are lost, and just when the produce is most valuable. This is an important consideration, on which account a little study of the question is advisable, as it may have much to do with the profit or loss of the birds. One egg in the winter is worth more than two in the summer. All that is necessary for healthy birds is to give warm food once a day, mixing a little aromatic compound in it, with a little grain, sand, buckwheat and hempseed in the middle of the day. In the drinking water put a little sulphate of iron and sulphuric acid, say two pieces of the former, the size of nuts, and ten drops of the latter to a gallon of water, and of course this must be renewed every day, as fresh water is most important.

COLD WEATHER.

The treatment of fowls in cold weather is a matter which requires the consideration of every poultry keeper, not only that he may obtain eggs from his fowls, but also that they may not be injured in health. Birds in a state of nature seek and find, as a rule, shelter for themselves; but when they are prevented from so looking after themselves they must be protected artificially. There is all the more reason for this when it is remembered that fowls in confinement cannot stand the cold as can those more exposed. We do not agree with heating poultry houses, as the birds are weakened, and more liable to take cold. Food must be of a better, that is, containing more heat giving properties than in summer, and during cold weather a little Indian corn or maize may be safely used. The most important thing in connection with feeding is to give a good feed of meal, mixed with boiling water, and given hot, first thing in the morning, with a similar feed during the day. We all know how a cup of hot coffee warms us on a cold day, and a feed such as is here suggested has a similar effect on the fowls. If the houses are portable they should be placed where they will be sheltered from the cold winds, for it is in these two directions that the most good can be done in protecting the fowls during the prevalence of cold weather.

POULTRY MANURE.

The value of poultry droppings as a manure upon the land has been acknowledged for many years, but there has been undoubtedly a very strong prejudice against it. When we consider that Peruvian Guano is simply the deposits of wild birds, we fail to see any reason for the prejudice against those of our own domesticated fowls, but that it exists no one can gainsay. Analysis has proved it to contain many of the elements in which the best guano most excels. It can be guaranteed pure, which is not always the case with artificial fertilisers, and even considering the amount of water it contains when in a fresh state, about half or two-thirds of what is given for the other would be deemed a high price for it. Yet in spite of all these considerations, those who keep poultry have the greatest difficulty in disposing of the droppings, and in many cases they have absolutely to give them away in

order to get rid of the accumulations. Farmers have a very strong objection—at least many of them have—to pay anything for this kind of manure, although they will incur without hesitation a heavy bill for guano, or, if near large towns, send their carts all over seeking the ordinary stable dung, which, though apparently cheap, is not always so in the end. Of late years, however, there has been a change for the better, slight though it may be. The prejudice does not exist in the minds of those farmers who keep poultry extensively, as they have realised the value of their fowls to them. Many instances could be given where a farmer has found that his poultry would have been almost worth their keep if they had not been productive in other ways. In addition to those droppings which fall upon the fields when the fowls are upon them, there is a large quantity made by the fowls in their houses, which, if it has to be used, must be preserved until the proper season. This can be done in various ways, either by drying and keeping in barrels under cover, or, what we may think to be the better plan, by putting a thick layer of fine soil upon a hard bed of earth, brick, or cement, and then layer by layer of droppings and soil, always making the latter uppermost. By this means the value of the manure will be completely preserved, all unpleasant odour prevented, and the soil will gradually absorb much of the nature of the dung, until the whole will be a mass of the most valuable manure, ready for use at any time.

FEATHERS.

Except on large farms, or where fattening is being carried on, and the birds are killed upon the spot, the feathers obtained will not be an important item. But they should be sorted, and if well kept will always command a fair price. It is wonderful how great a quantity will accumulate if they are carefully gathered. Every item should be regarded, every detail attended to in order to obtain complete success.

ACCOUNTS.

In conclusion we would strongly urge that complete accounts of their operations be kept by all poultry keepers, not merely for the satisfaction of knowing whether there has been a profit and loss—though that is very desirable—but also as an inducement to economy. There are several poultry account books sold which may be used, or a plain ruled book can be made to serve the purpose. At the beginning of the year all birds and appliances should be valued and recorded. Next all items of receipt and expenditure should be set down regularly and methodically; then the number of eggs laid, and how they are disposed of—whether consumed, sold, used for sitting, or for the chickens; and, finally, a hatching record, showing the dates and number of eggs set, how many hatched, and the number reared. At the year end there will have to be another valuation, and the debit side will show the valuation at the beginning of the year, and expenditure, whilst the credit side will give receipts, allowance for eggs and chickens consumed, and a final valuation. The balance between one side and the other will determine the profit or the loss, whichever has resulted.

CHAPTER XIX.

CONCLUSION.

POULTRY CLASSES—OBJECT OF SHOWS—SECTIONS—CLASSIFICATION—VILLAGE POULTRY SOCIETIES.

ONSIDERABLE discussion has taken place from time to time as to poultry classes at agricultural shows, and it has been advocated that only a few dead poultry classes should be given, with one or two other breeds which are best suited for market fowls. It may be well to consider the entire question, and to show the lines upon which agricultural and other societies, who have a desire to encourage poultry keeping, should arrange their classification. It is needless to devote any lengthy space to the remarks in question, for the writers evidently look at the matter from merely one standpoint, and even then fail to see the fuller necessities of the case. But it may be said that in their advocacy of table poultry alone they are dealing with the lesser, and neglecting the greater, part of the poultry industry. Market poultry ought to be encouraged in every possible way, and whatever is done in that direction has our warmest support, but from the return of imports into the United Kingdom we find that last year those of poultry and game amounted to £497,858—a large sum truly—whereas the imports of eggs reached the enormous total of £3,428,802. Of course these figures do not include the amounts paid to Ireland for her produce. The increase in the imports of eggs alone during 1890 over 1889 amounted to more than £300,000, the increase of imports in poultry and game being about £25,000. These figures at once show the greater importance of the egg trade, and that in all our efforts to improve the industry, production of eggs ought to be regarded as of chiefest concern. To make, therefore, as has been suggested, the poultry section of our agricultural shows purely in the interests of table fowls, ignoring eggs altogether, would be foolishness indeed, fishing for sprats when there are mackerel in our net. Not for one moment do we advocate neglecting the table poultry trade, which we hope to see enormously developed and improved, but in point of demand it is but one-seventh as important as is the egg trade.

OBJECT OF SHOWS.

The object of every society which attempts to encourage poultry keeping ought to be clearly defined, and on understandable lines. To-day it is folly advocating cross-bred stock of any kind as the best. It is true that often we find the best milkers and the best layers amongst cross-bred cows and birds, but their qualities are derived from pure-bred parents, and without these latter we should never have so great a result. It is an essential, therefore, that we adhere to pure-bred stock, using them in the way which seems best to us. That pure-breeds are better than mongrels no one who knows anything of the subject will for a moment deny, and it ought to be the object of every person of influence and of all societies to develop these as much as possible. To do so in the most effective manner it is necessary to know what breeds are really useful, and in what direction their qualities may be looked for. If this is done a poultry show may assume a highly educative influence, and do much to prevent serious mistakes in the selecting of breeds by those who have not studied the question. Although it is not usually so assumed, there is as much variety, nay, a much greater, than can be found in horses or cattle, and the breeds of fowls have as great a divergence in point of qualities as is to be found in any other section of our domesticated animals.

SECTIONS TO BE PROVIDED.

Leaving on one side altogether the purely ornamental varieties of fowls, a show should be divided into five sections, and if this division can be indicated in the catalogue it will be of great service to visitors. These have been named before (Chapter IV.), but may be repeated:—

- 1.—Generally Useful Breeds, *i.e.*, varieties not characterised by any special quality, but of average value all-round, fair layers and table fowl, sitters and mothers. As a rule upon this class we depend for winter layers, and they are without exception very hardy.

2.—Non-Sitting Breeds, *i.e.*, those in which the maternal instinct has been suspended. They are the heaviest layers, but are, as a rule, hardy and excellent foragers.

3.—Table Breeds, *i.e.*, varieties in which the table qualities have been largely developed. Some of these are very hardy, whilst others are delicate, and require to be kept under favourable conditions. They are as a rule only moderate layers.

4.—Waterfowl and Turkeys.

5.—Dressed Poultry.

Of course where such a section was desired, another could be added for ornamental breeds, and this would make a complete series, but in purely agricultural shows this is undesirable, except it be to secure a better attendance of the public, for many of the ornamental breeds are very popular. Such a consideration as this is important, for shows must pay their way in one direction or the other, unless there are funds available which make them independent of expenditure.

CLASSIFICATION.

It is now our purpose to show several lists of classes which will provide for the needs of shows of various dimensions. In the first place will be given a schedule embracing all the breeds under the five headings already given, but omitting such as have never had, or have lost, economic qualities.

NO. 1 (COMPLETE LIST).

Generally Useful Breeds	Brahmas, dark, " light, Cochins, buff, " partridge, Langshangs, Orpingtons, Plymouth Rocks, Wyandottes.
Non-Sitting Breeds ..	Andalusians, Hamburgs, black, " pencilled, " spangled, Houdans, Leghorns, brown, " white, Minorcas, black, Polish, Redcaps, Scotch Grays, Spanish, black.
Table Breeds	Dorkings, dark or coloured, " silver grey, " white, French, Game, brown-red, " black-red, Indian Game, Malays,
Waterfowl and Turkeys	Aylesbury ducks,

Cayuga ducks,
Pekin "
Rouen "
Emmden geese,
Toulouse "
Bronze or Black Turkeys,
Cambridge Turkeys.
Dorkings,
French,
Game or Indian Game,
Any other pure breed,
Crosses with Dorkings,
" " Game or Indian
Game,
" " French.
Ducks,
Geese,
Turkeys.

The above list would require forty-six classes as given here, but it can easily be extended by dividing some of the colours put together, and can be doubled by making separate classes for the sexes, which is necessary at certain seasons of the year, and advisable always.

NO. 2 LIST (MEDIUM).

Generally Useful Breeds	Brahmas, Cochins, Langshangs, Orpingtons, Plymouth Rocks, Wyandottes.
Non-Sitting Breeds ..	Andalusians. Hamburgs, Houdans, Leghorns, Minorcas, Redcaps Scotch Greys.
Table Breeds	Dorkings, French, Game, Indian Game.
Waterfowl and Turkeys	Aylesbury or Pekin ducks, Rouen ducks, Geese, Turkeys.
Dressed Poultry.. ..	Dorkings, Game or Indian Game, Any other pure breed, Any cross bred fowls, Ducks, Geese and Turkeys.

As will be seen, this list embraces twenty-seven classes, or forty-eight classes if for live birds, if shown singly, and all the varieties represented therein are more or less valuable for economic purposes.

NO. 3 LIST (SMALL).

Generally Useful Breeds	Langshangs, Orpingtons,
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Generally Useful Breeds	Plymouth Rocks, Wyandottes.
Non-Sitting Breeds ..	Houdans, Leghorns, Minorcas, Scotch Greys.
Table Breeds	Dorkings, Indian Game.
Waterfowl and Turkeys	Ducks, Geese, Turkeys.
Dressed Poultry ..	Any Pure Breed, Any Cross Breed.

This list embraces only those which are of the most valuable of all breeds of domestic poultry, and makes fifteen classes if in pairs, or twenty-eight classes for single birds, below which it would be undesirable to go.

VILLAGE POULTRY SOCIETIES.

Much can be done to develop interest in poultry keeping by means of local societies, as those who have opportunities for taking up this industry can have the matter brought home to their own door. On this subject we cannot do better than repeat an article which we wrote for the *Live Stock Journal and Fanciers' Gazette* some years ago, and which aroused some interest at the time.

Societies in villages are by no means uncommon, and it is not our purpose, therefore, to advocate the establishment of some new thing. But, as a rule, they exist for one purpose only, namely, the holding of a show. All the meetings are with that end in view, and except for a few weeks previous to and after the show they are practically non-existent, so far as any work they perform. This may be and is a very practical purpose, and a praiseworthy one too, as there can be little doubt but that local societies do a great amount of good in the stimulation of interest in poultry keeping by holding of shows. No one but those who have witnessed it can believe how great this stimulus is. But we feel that there is much more that might be done by the same organisation with very little additional effort. The preparations for a show are a welcome break in the level run of country life, and the meetings in connection therewith offer an opportunity for some very pleasant social intercourse. But we do not see why these should not spread their influence over many more months of the year. To do this it is necessary to have a defined object in view, and there does not appear to us any difficulty in finding such an object.

Shows are usually held in summer or between the 1st

of October and the 31st of January, save in comparatively few instances, and we may allow that during the weeks immediately before and after the show it absorbs all the time and thought. This is fortunate for the suggestion we have to make, namely, that during the spring the meetings of the societies be continued at such intervals, as may be thought fit, for the discussion of the many matters which are discussable in connection with all branches of the fancy. A meeting even once a month would be of service, when papers could be read by the various members. During the hatching season, operations connected with breeding and management of the sitting hen could be discussed, and a little later on rearing, both natural and artificial, could be dealt with. If any special disease became prevalent it would present a suitable topic, and if a new breed was introduced its claim to notice and its merits could be descanted upon. And in their proper season such themes as fattening and preparation for the table would be both of interest and service, whilst the results arrived at from various experiments could be compared. There is really no limit to the questions presenting themselves, and with an interchange of opinions and experiences, the benefit to all who attended such meetings would be very great indeed. The first halting steps of a young breeder would be strengthened, he would know where to apply for help and advice, mistaken notions of young and older poultry keepers would be criticised and corrected, and there would come a better knowledge of the whole subject than is now found. In short, poultry societies would become educational centres of great influence, and help to solve that question which is now more than ever forcing itself forward. It is in our immediate circles that we may hope to influence mankind, and we each must do what we can just where we can; the rings will soon join, and all be affected thereby. Existing societies can do this work very easily. It may be a little difficult at first to find those who are willing to expose themselves to the fire of adverse criticism, but that will pass away. It is not often no one can be found who has not something worth, or what he regards as worth, the telling; and once the ice is broken all will be well. Clergymen and other country residents will do a good work in giving encouragement to this movement, taking part in it themselves whenever possible. We hope ere many years are over to find every cottager a poultry keeper, and every farmer doing his best to supply the British markets with British laid eggs and British hatched chickens. To that end education is necessary, and the form of education we have here suggested seems to us one of the best.

INDEX.

	PAGE		PAGE
Aberdeen, Countess of, on Poultry Keeping	11	Breeds, Leghorns, White	25, 28, 29, 30, 31
Accounts	131	" Malays	28
Age of Eggs	97	" Minorcas, Black	28, 29, 30, 31
Agricultural and Dairy School's	24	" Old English Game	29, 30
American Bronze Turkeys	116	" Orpingtons	31
Andalusians	28, 29, 30	" Plymouth Rocks	28, 29, 30, 31
Annett's, Mr. J. W., Poultry Establishment	25	" " White	28, 30, 31
Appearance of Fertile Eggs	48	" Polish, Spangled	30
Appetite of Fowls	124	" Polish, White-crested	28
Arthur Young's Reports	16	" Redcaps	31
Artificial Hatching and Rearing	67, 115	" Scotch-greys	28, 29, 30, 31
Atwater, Professor, on Food	73	" Wyandottes	28, 29, 30, 31
Aylesbury Ducks	29, 102	Breeds of Ducks	102
Aylesbury, Duck Rearing at	107	" Aylesburys	102
		" Cayugas	102
		" Pekins	102
		" Rouens	102
Barbezien	28, 29, 30	Breeds of Geese	111
Better Prices for Poultry Produce	23	" Embden	111
Birmingham Show, Table Poultry at	23	" Toulouse	111
Black Hamburgs	28, 31	Breeds of Turkeys	116
" La Bresse	28, 29, 30	" American Bronze	116
Bone, Weight of	30	" Cambridge	116
Bordeaux Market, Poultry in	19	" Norfolk	116
Brahmas	28, 29, 30, 31	Breeding Turkeys	119
Breeds, Description of	30	Brooders	69, 70
" Choice of	32	Brown Leghorns	28, 29, 30, 31
" Classification of	31	Brown-red Game	28, 29, 30, 31
Breeds of Poultry	27	Buckinghamshire, Poultry Keeping in	13, 16
" Andalusians	28, 29, 30	Buff Cochins	28, 29, 30
" Bantams, Game	28		
" Barbezien	28, 29, 30	Cambridge Turkeys	116
" Brahmas	28, 29, 30, 31	Caponising	91
" Cochins, Buff	28, 29, 30	Cayuga Ducks	102
" Cochins, Partridge	28, 30	Chicken, Formation of	47
" Courtes Pattes	28, 29, 30	" Houses	43, 44, 60, 65, 66
" Crèveœur	28, 29, 30, 31	Choice of Breeds	32
" Dorkings, Dark	28, 30, 31	Cholera	128
" Dorkings, Silver-grey	28, 29, 30, 31	Classification at Shows	133
" Du Mans	28, 29, 30	Cleanliness	64, 125
" Game, Brown-red	28, 29, 30, 31	Cold	125
" Hamburgs, Black	28, 31	Cold Weather, Poultry in	131
" Hamburgs, Pencilled	28, 29, 30, 31	Collection of Eggs in France	20
" " Spangled	28, 29, 30, 31	Colour of Flesh and Skin	29
" Houdans	28, 29, 30, 31	Comb, Diseases	129
" Indian Game	29, 30, 31	Conditions for Fattening	80
" La Bresse, Black	28, 29, 30	" for Keeping Turkeys	116
" " Grey	28, 29, 30	Consumption of Eggs and Poultry in Britain	14, 15
" La Fleche	28, 29, 30, 31	" " France	16
" Langshans	28, 29, 30, 31	Consumption of Food	30
" Leghorns, Brown	28, 29, 30, 31	Co-operation in Poultry Keeping	10
" " Cuckoo	28, 29, 30, 31		

	PAGE		PAGE
Coops	60, 63	Eggs, Marketing	97
Cottager's Poultry Houses	42	" Packing	97
County Councils	9, 24	" Preservation of	98
Courtes Pattes	28, 29, 30	" Qualities of	96
Cramming Machines	80, 81, 82, 83, 84	" Size of	47
Cramp	127	" Sold by Number	29
Crève-cœur	28, 29, 30, 31	" Sorting	97
Crop-bound	129	" Tinted Shelled	29
Cross Breeding	34, 37	" Value as Food	96
Cuckoo Leghorns	28, 29, 30, 31	" Weight of	28
Dairy Show, Table Poultry at	23	Elements in Hatching	55
Damp and Dirt	40	" of Food	74
Dark (or Coloured) Dorkings	28, 30, 31	Emden Geese	29, 111
Dark-fleshed Fowls	30	Essentials to Success in Hatching	55
Dark Legs	30	External Characteristics, Value of	27
Description of Breeds	30	Farm Poultry in England and France	16
Devon and Cornwall, Poultry Keeping in	13, 16, 24	Farmers Compelled to look in New Directions	23
Diarrhoea	126	" Clubs and Poultry	24
Diphtheria	127	" Poultry Houses	40
Directions for Improvement	24	Fattening Poultry	79
Diseases and General Management	122	" Ducks	108
" Cholera	128	" Geese	113
" Cold	125	" Turkeys	120
" Comb	129	" in Sussex	83
" Cramp	127	Feather Eating	130
" Crop-bound	129	Feathers	131
" Diarrhoea	126	Feeding of Poultry	73, 74, 75, 76
" Diphtheria	127	" Chickens	64, 75
" Division of	125	" Ducks	105
" Egg Bound	127	" Goslings	112
" Gapes	126	" Turkeys	119
" Leg Weakness	126	Female, Influence of	34
" Liver Disease	126	Fertile or Infertile Eggs	101
" Roup	125	Flavouring Eggs	95
" Scaly Legs	130	Flesh, Colour of	29
" Scrofula	128	Food, What it is	73
" Worms	130	" Consumption of	30
Disposal of Produce	14, 25	" to be used in Fattening	79, 81
Division of the Sexes	65	Foreign Eggs, Where they come from	92
Domestication, Effects of	52	Formation of the Egg and Chicken	45
Dressing	86	Fowls in Nature	39
" Turkeys	121	France, Poultry Keeping in	16, 19, 20
Duck Keeping	102	" Geese in	114
Ducks, Aylesbury	29, 102	Freeman's Journal Enquiry	14
" Pekin	29, 102	French Breeds of Poultry	20
" Rouen	29, 102	" Cramming Machines	80
Du Mans, Fowl	28, 29, 30	" Methods of Fattening	80
Early Breeding of Ducks	102	" Ministry of Agriculture and Poultry	16
Early days of Chickenhood	63	" Systems of Dressing and Shaping	86
East Anglia, Poultry Keeping in	16	Functions of Yolk-bag	51
Effects of Greater Comfort and Travel	23	Game Bantams	28
Egg, Appearance of Fertile	48	Gapes	126
" Albumen or White	46	Geese as Profitable Stock	111
" Bound	128	Geese in France	114
" Boxes	97, 98	Geese, Emden	29, 111
" Eating	130	" Toulouse	29, 111
" Fertilisation of	47	General Hints on Incubators	69
" How Formed	45	" Purpose Varieties	31
" Membranes of	46	German Poultry Establishment	84
" Process of Production	46	Gladstone, Right Hon. W. E., on Poultry	11, 24
" Production	26, 27	Grain, Meal, &c.	74
" Shape of Shell	46	Green Food	75, 76
" Trade	92	" for Ducks	106
" What is an	45	Grit	74, 108
" Yolk	46	Grey La Bresse	28, 29, 30
Eggs, Age of	97	Hart-Dyke, Sir W., Bart., M.P., on Poultry Keeping	11
" Consumption of	14, 15	Hatching	55, 56, 57, 58
" Flavouring	96	" Boxes	55, 56
" Imports of	14		

	PAGE		PAGE
Hatching by Turkeys	58	Nests	41, 57
" Ducks	106	Norfolk Geese	113
" Geese	112	" or Black, Turkeys	116
" Process of	47	Northumberland, Poultry Keeping in	25, 26
" Rooms	56	North Western France	20
" Turkeys	119	Number of Hens with the Cock	55
Healthy Birds, Importance of	122	Object of Shows	131
Hearson's Cramming Machine	82	Old English Game	29, 30
" Incubator	67	Orpingtons	31
" Rotary Pen	83	Over Crowding, Danger of	39
Home Production of Eggs and Poultry	14	Packing Eggs	97
Hospital, Value of	130	Partridge Cochins	28, 30
Houdans	28, 29, 30, 31	Pekin Ducks	29, 102
Houses for Poultry	30, 40, 41, 42, 43	Pencilled Hamburgs... ..	28, 29, 30, 31
" " Ducks	106	Perches	41
" " Geese	112	Permanent Buildings	40
" " Turkeys	119	Pests in the Chicken House	65
How an Egg is Formed	45, 46	Places for Geese	112
How to Cross	37	" " Hatching	55
How to Feed	75	Plymouth Rocks	28, 29, 30, 31
Imports of Eggs and Poultry	14	Polish, Spangled	30
Importance of Size in Turkeys	119	Portable Poultry Houses	41
Improvement of Present Stocks	33	Poultry, a Neglected quantity	16
Incubators	67, 68, 69	" at Agricultural Shows	131
Indian Game	29, 30, 31	" Consumption of	14
Infertility, Causes of	52	" Farming an Accessory	13
Influence of Male	33	" " What is	13
" Female	34	" Imports of	14
Introduction of Fresh Stock	124	Poultry Keeping in Buckinghamshire	13, 16
Ireland, Poultry Keeping in	16	" " Devon and Cornwall	13, 16, 24
Irish Supplies	14	" " East Anglia	16
Italian Egg Trade	92	" " France	16, 19, 20
Jenkins, the late H. M. (Sec. R.A.S.E.), on Poultry Keeping	13	" " Ireland	16
Judging in England and France	34	" " Lincolnshire	16
Killing Fowls	86	" " Northumberland	25, 26
" and Dressing Geese	114	" " Surrey and Sussex	13, 16, 82, 89
" Turkeys	121	Preservation of Eggs	97
La Fleche	28, 29, 30, 31	Prevention Better than Cure	122
Landes Fowls	19	Prices of Fowls and Eggs in France	19
Langshans	28, 29, 30, 31	Process of Egg Production	46
Laying (or non-sitting) Varieties	31	Profitable Duck Keeping	102
" of Various Breeds	25, 28	Protection against Marauders	42
" Statistics	25	Pure Bred Stock v. Mongrels	27
Leg Weakness	125	Qualities of Eggs	95
Legs, Colour of	30	Rapidity of Marketing French Eggs	20
Lemoine's, Mons., Tables	28, 29, 30	Rearing Chickens	60, 63, 64, 65
Lincolnshire, Poultry Keeping in	16	" Ducks	108
Lining a Fowl	32	" Geese	112
Liver Disease	126	" Turkeys	119
Macdonald, Mr. J., on Poultry	11	Recent Attempts at Improvement	23
Making the Nest	56	Redcaps	31
Malays	28	Ripening, Fattening a Process of	79
Male, Influence of	33	Rouen Ducks	29, 102
" Bird not necessary for Egg Production	45	Roup	124
Management of Breeding Stock and Sitting Hen	52	Royal Agricultural Society and Poultry	23
" " Brooders	70	Salle d'Engraissement	81
Manure, Poultry	131	Sapwell, Mr. R. B., on Turkeys	119
Mardi Gras Show, Paris	16	Scaly Legs	130
Marketing	90	Scotch Greys	28, 29, 30, 31
Meat, Weight of	30	Scrofula	128
Minorcas	28, 29, 30, 31	Selection of Stock	32
Mongrels v. Pure Bred Stock	27	Shaping	86, 89
Mouling	130	Shows	131
Natural Food	74	" Classification at	132
		" Influence of	24
		" Judging at	34

	PAGE		PAGE
Shows, Object of	131	United Kingdom a Great Breeding Centre ..	27
" Sections at	131	Value of Eggs as Food	96
Silver Grey Dorkings	28, 29, 30, 31	" " External Characteristics	27
Simmonds, Mr. P. L., F.L.S., on Eggs ..	45	" " Fattening Trade in Sussex	90
Size of Houses	40	" " Hospital	130
Skin, Colour of	29	" " Poultry Produce in France	16
Societies, Village Poultry	133	Variety of Food Needed	73, 76
Soil for Fowls	74	Various Crosses	37
Sorting Eggs	98	Ventilation in Houses	40
Space for Chickens	64	Village Poultry Societies	134
Spangled Hamburgs	28, 29, 30, 31	Vineyards, Poultry on French	19
Substitutes for Worms	76	Water for Fowls	75
Surrey and Sussex, Poultry Keeping in ...	13, 16, 82, 89	" " Ducks	105
Sussex Cramming	82	" " Geese	112
" System of Shaping	89	Weights of Chickens	85
Table Poultry at Birmingham Show	23	" " Eggs	28
" " Dairy Show	23	" " Meat, Bone, &c.	30
" Properties of Fowls	29	White-Dorkings	28, 30, 31
" Varieties	31	" fleshed Fowls	30
Testing the Eggs	58, 59	" Leghorns	25, 28, 29, 30, 31
Times of Feeding	75	" Legs	30
Toulouse Geese	29, 111	" crested Polish	28
Trade in Geese	113	Willis Harris, Mr. W., on Turkeys	119
Turkeys, Hatching by	58	Worms	130
" in Norfolk	120	Wyandottes	28, 29, 30, 31
" Prices of	116	Yellow-fleshed Fowls	30
" Value of	116	Yellow Legs	30
" Varieties of	116	Yolk-bag, Functions of	51
Type of General Purpose Fowl	33		
" " Laying Fowl	33		
" " Table Fowl	33		

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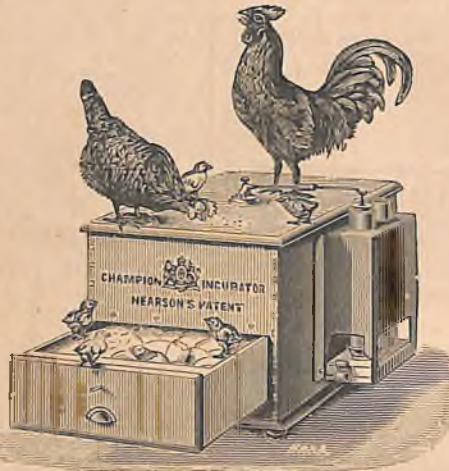
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See Illustration on page 77.

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Breeder and Exhibitor of PLYMOUTH ROCKS and GOLDEN WYANDOTTES.

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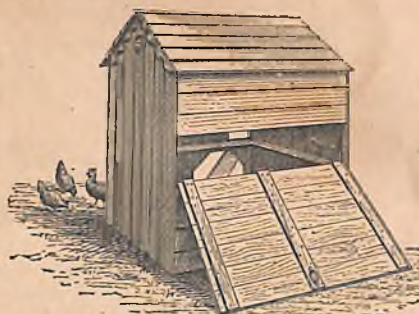


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(See Illustration, page 53).

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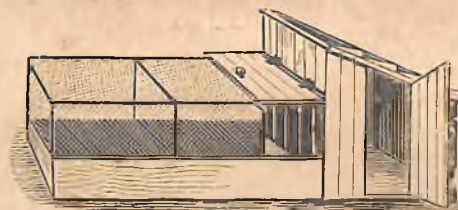
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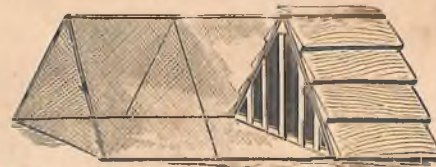


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Sleeping Saloons by the night trains between London and Liverpool, London and Manchester, London and Holyhead, London and Edinburgh, Glasgow, Stranraer, and Perth; extra charge 5s. for each Berth, in addition to the ordinary 1st class fare.

Dining Saloons for First Class Passengers between London and Manchester, London and Liverpool, and London and Glasgow. Hot Dinners 3s. 6d. each.

Hotel Accommodation.—LONDON (Euston Hotel), LIVERPOOL (North Western Hotel), BIRMINGHAM (Queen's Hotel), PRESTON (Park Hotel), CREWE (Crewe Arms), GLASGOW (Central Station Hotel), DUBLIN (North Western Hotel), HOLYHEAD (Station Hotel), GREENORE, BLECHLEY, BLAENAU FESTINIOG (North Western Hotel). The accommodation provided at these Hotels is of the highest standard, and the charges will be found reasonable.

Hot or Cold Luncheons supplied in Baskets at the principal Stations, 3s., including Beer or Wine, and 2s. 6d. without.

Tourist Arrangements, 1891.—1st, 2nd and 3rd Class Tourist Tickets are issued during the season (May 1st to October 31st) from the Company's principal Stations to Scotland, the English Lake District, Ireland, North, South and Central Wales, Malvern, Buxton, Stratford-on-Avon, Scarborough, Harrogate, Southport, Blackpool, Morecambe, Isle of Man, Isle of Wight, Jersey and Guernsey.

Every information as to Trains and Fares can be obtained on application to Mr. G. P. Neele, Superintendent of the Line, Euston Station, London, N.W.

Euston Station, 1891.

G. FINDLAY, General Manager.

GREAT NORTHERN RAILWAY.

THE "EXPRESS" ROUTE to Scotland, Cambridge, Nottingham, Sheffield, Manchester, Liverpool, Leeds, Bradford, Hull, York, Scarborough, Newcastle, &c., &c., is from the

King's Cross Station, London.

SHORTEST ROUTE between London and Edinburgh, Dundee, Aberdeen, Perth, Inverness and the North of Scotland.

LONDON (King's Cross) and **EDINBURGH**, 8 hrs. 25 min.; Glasgow, 8 hrs. 55 min.; Perth, 9 hrs. 37 min.; Dundee, 9 hrs. 47 min.; Aberdeen, 11 hrs. 45 min.; Inverness, 15 hrs. 5 min.

THE FORTH BRIDGE is open for the through Express trains of the East Coast Companies. The Express train service by the East Coast route has been much accelerated and generally improved. Through Express trains between England and Perth, and the Highland Railway, run via the Forth Bridge, Loch Leven and the new Glenfarg Railway. Express trains for Dundee, Arbroath, Montrose, Aberdeen, Ballater, and the Great North of Scotland Railway system run via the Forth Bridge and the Tay Bridge.

1st, 2nd and 3rd CLASS PASSENGERS are conveyed by all trains between London (King's Cross) and Scotland.

PULLMAN CARS and **SLEEPING CARRIAGES** are attached to night trains.

LONDON (King's Cross) and **Leeds**, 3 hrs. 50 min.; Bradford, 4 hrs. 3 min.; Sheffield, 3 hrs. 10 min.; Manchester, 4 hrs. 15 min. 1st, 2nd and 3rd CLASS PASSENGERS are conveyed by all trains.

SALOON, LUNCHEON and **DINING CARS** are attached to certain of the trains between London (King's Cross) and Leeds, Bradford, Sheffield and Manchester.

For further particulars see the Company's time books and notices, which can be obtained at the Town Parcels Receiving Offices and Stations.

HENRY OAKLEY, Gen. Manager.

London, King's Cross, Sept., 1891.



Our Works are in the Country, close to a Railway in the Midland Counties within easy reach of the principal timber ports, and by the aid of powerful Sawing, Planing, and other Machinery we can defy any Maker on Earth to compete with us for Lowness of Price and High Quality.

Testimonials.

Laureston Vicarage, Tavistock, Feb. 5th. 1891.

DEAR SIR,—I am much pleased with the Rabbitry (consisting of 24 hutches), and Cavy House you have sent me, and think them well worth the money I have paid for them. You will hear from me again when I want anything of the kind.—Yours faithfully, J. H. W.

Walsall, Jan. 6th. 1891.

DEAR SIR,—I have to acknowledge receipt of Fowl House and Rabbit Hutch, and have to express my utmost appreciation of the quality of your goods, and as an old Rabbit Fancier to say that I have never seen anything so nearly approach perfection as the Hutch you have sent me. I would thank you to send me as early as possible two more Hutches, &c.—Yours faithfully, C. T.

E. C. WALTON'S Fowl Houses

Are complete with window and slide, nest boxes, perches, ladder, door for attendant, with lock and key, ventilator, and a thoroughly watertight roof. If they are not as represented, are returnable. They are made in sections, to pack flat for travelling, and can be put together in a few minutes.

No.	Size	Height.	Length.	Width.	Price.	ext.
No. 5.	For 10 to 14 Fowls.	5ft.	3ft.	4ft.	15/-	3/-
" 1.	" 12 to 20 "	6ft.	4ft.	4ft.	21/-	4/-
" 2.	" 20 to 30 "	6ft.	6ft.	4ft.	27/-	6/-
" 3.	" 30 to 40 "	6ft.	6ft.	5ft.	30/-	8/-
" 4.	" 50 to 60 "	7ft.	8ft.	6ft.	40/-	10/-

N.B.—These houses are not rubbish, but good sound dwellings. Catalogue and Testimonials of Houses, Bee Appliances, Rabbit and Ferret Hutches, free.

E. C. WALTON, MUSKHAM, NEWARK.

NEW PORTABLE FOWLS' HOUSE, No. 11.

For about 50 Fowls.



This House is made in sections, easily fixed by anyone, and fitted together with bolts and nuts. The framework is clad with well-seasoned match boarding, grooved and tongued, to prevent draught, painted outside, and lime-washed inside: the roof is covered outside with galvanized iron, and lined inside with wood or felt to prevent extremes of heat and cold. The door for attendant and door for collecting eggs from outside are both fitted with locks and joints. An improved glass ventilator is provided, which admits both light and air without draught, and nest boxes, perches, and loose floor, &c., fitted complete. The floor being raised 2 ft. from ground affords ample room for shade and shelter during the day.

Size, 8 ft. long, 6 ft. wide, 6 ft. to eaves, 7 ft. 6 in. to ridge.

Price, complete, £6 17s. 6d.

Send for Illustrated Catalogue of Poultry Requisites to

T. GRAY,

Despatch Works, Ocean Place, HULL.



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THE CERTAIN CURE FOR
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Sold in 2s. 6d. Tins, postage paid.

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GILBERTSON and PAGE,
Game & Poultry Food Manufacturers, HERTFORD.



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Hundreds of Testimonials testifying to the
most gratifying results by its use.

The Liverine Co., Grimsby

17/- cwt., 9/- ½ cwt., 5/- ¼ cwt.

Sample Bag, 1/- ALL FREE.

