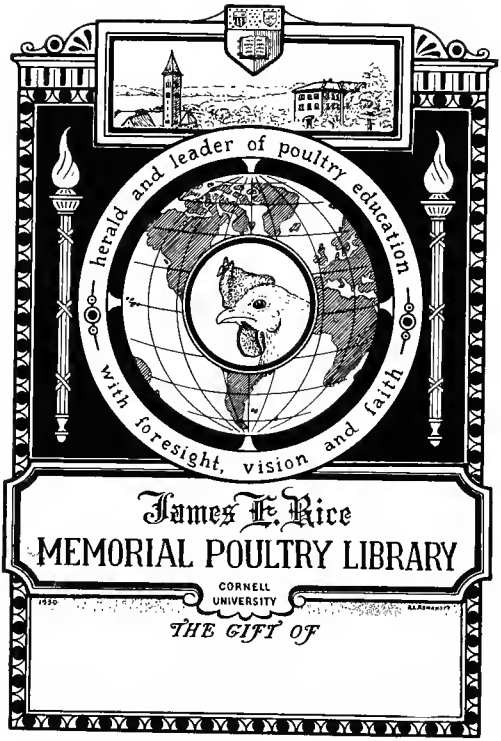
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THE A-B-C OF Breeding Poultry.

For Exhibition, Egg Production & Table Purposes

BY THE AUTHOR OF

"How to Make Money from Poultry"; "An Income from Backyard Fowls"; "Eggs all the Year Round"; "How to Win Prizes with Poultry"; "The Intensive System of Poultry-keeping"; "The Rudiments of Angling," etc., etc.

ILLUSTRATED.

Cowell Owen

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Proprietors of "The Poultry World."

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PREFACE.

FOR a long time now I have thought that there was an urgent need for a text book on the breeding of poultry, which has resulted in my placing the present handbook before the poultry public. Possibly I have not covered all the necessary ground, but this would mean a very great undertaking, as so much depends on environment and the extent of each individual concern. I trust, however, that after carefully reading the work through, the reader will be able to map out his plan of campaign according to the circumstances under which his hobby or business is being run.

In the matter of heavy egg-production I am convinced that more depends upon such problems as breeding, management, strain and feeding than on the " breed " selected.

I have endeavoured in the following pages to deal with the numerous subjects of breeding in short, pithy paragraphs, giving the latter general catch-lines and grouping them into sections. This arrangement, I trust, will enable the reader to refer to any subject with the minimum of trouble.

THE AUTHOR.

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The A.B.C. of Breeding Poultry.

Section I.

EXHIBITION STOCK.

THE FIRST ESSENTIALS.

NO matter whether we are breeding exhibition birds, layers or table birds we should be sure of vigor and stamina on both sides. Only by breeding from healthy and strong parents can we hope to see our matings successful. To the person with an ordinary amount of common-sense this would seem logical, but I am afraid that many poultry keepers do not trouble to weigh their stock birds in the balance. What different tales they would have to tell if they did. Instead of breeding inferior birds—as layers or exhibition birds—year after year they would have progeny that they could be proud of. An ailing bird cannot by any means be expected to breed good offspring, no matter how strong his or her mates may be. The laws of breeding are quite simple and no serious departures from them will bring successful results. Apart then from the selection of the birds for individual points we must first look to their health and by starting with vigorous stock we have fought our first battle with credit.

LIKE BEGETS LIKE.

We take a step further on after making sure that our stock birds are in health and bloom and look to what is required of the breeder in the selection of his breeding birds. Haphazard, trust-to-chance matings rarely produce progeny of quality. This is a well tried rule despite the fact that there may be exceptions here and there. "Like Begets Like" is an old maxim and even here

exceptions are to be met. Specimens that lack long and careful breeding cannot be expected to reproduce their like in every case, but where the fancier or utility man has bred his stock carefully for many successive years, it would be unreasonable to argue that like will not beget like in nine cases out of ten. Much will depend certainly on the breed, for in a new breed that has hardly been fixed, the progeny will be apt to throw back to former ancestors. By pedigree breeding, hereafter described, a pullet may not resemble her mother in as many points as her grandmother and the grandson may resemble his grandfather more than his father. This is only nature's way ; we see similar examples in human beings. A child may be like his grandfather or a daughter like her grandmother. By this line-breeding, the breeder is enabled to keep in his strain certain desirable points without losing them by outcrossing.

It is quite obvious then, that the breeder must take care in selecting his stock birds not to " breed-in " to a fault, provided it is a serious one. Where one bird fails in a certain point that fault should be corrected by excellence on the other side. By averaging the pen in this way we are more likely to breed away from any undesirable faults. No birds are perfect except when painted as " ideals " and so it behoves every breeder to correct the miscomings on the one side by the excellences on the other.

WHAT TO LOOK FOR IN THE MALE.

The male bird is undoubtedly the bigger half of the pen in more ways than one. A whole season's work may be affected—for better or for worse—by the selection of the " head " of the pen. The male bird usually imparts his colour to the progeny and it is advisable never to use bad coloured males. The colour of the eye, too, generally comes from the male, and when the father is strong in this respect, the progeny also excel. I have repeatedly noticed too, how the progeny take the head properties of the male. It is advisible therefore to see that the head of the pen does not fail in head points to any great extent. Especially do these remarks apply to the comb which must be watched from time to time. Breeders are too often persuaded to use immature or late-hatched cockerels as breeders as they excel in certain points. In many cases they can afford to do this for it matters little if they spoil such a bird as they have other specimens equally as good. Unless the breeder wishes to spoil his cockerels he should not use any bird till it is well matured for even if the results are satisfactory at the time they will " out " at some future date. In the spring months it may be answerable to use a late-hatched bird with old hens if he is well grown, but his use in the early season should be avoided. In all cases would I personally recommend the use of a fully matured, big framed male.

WHAT TO LOOK FOR IN THE FEMALE.

I am afraid that the female is not considered as she should be. Whilst the male is half the breeding pen—in a sense—it must not be supposed that the females do not play their part. Fanciers usually think they are safe if they have size and type on the male's side, paying but little heed to these points in the females. In any mating, size should be present in a marked degree on the female's side. It is an unwise rule to breed from small hens, no matter how large the male may be, for the progeny will invariably be small in frame. In breeds that are laced, pencilled or barred, the lacing, pencilling or barring respectively is taken more from the female and the ground colour from the male.

Bearing in mind the individual points for which we must rely on the male or female to a more or less degree we should, of course, endeavour to match our birds, giving preference as breeders to such birds that excel in the desired points. If a male therefore is of a very bad colour we know that no matter how good in colour his mates may be the progeny will, in many cases, come bad in colour or themselves breed had coloured specimens in the next generation. In like manner if a hen is very small she should be discarded for one that is large for the chances are, if she is used, the progeny will be small. As I have previously remarked, no two birds are perfect, but if we are to be successful in breeding we must look to the proper quarter—male or female—to secure certain points in the progeny. If we are compelled to breed from birds with certain faults let the latter be on the side that does not matter so much, taking care that they are strengthened in the other sex. The following is an example :—If the male bird is rather on the small side we may use it as size comes to a degree from the hens, but we must see that the latter excel in size and so on.

NUMBER OF HENS PER MALE.

It is a pity that no hard and fast rule can be laid down as regards the number of hens to place with the male. Early in the season less hens should be given him than later on and more hens can be given a male of the "Light" breeds than one of the "Heavy" breeds. Some male birds are more vigorous than others and perhaps it will be wise to leave the exact number to the breeder. As a hint only I would suggest for early season work *i.e.*, December and January, four or five hens per "Heavy" male and five or seven for males of the "Light" breeds. Later in the season the numbers may be increased.

As regards the age of the stock birds this will depend upon the seasons of the year, but in all cases I recommend the use of fully matured stock, knowing too well the results that lie behind the common practice of breeding from young immatured birds of either sex. It has long been the rule to mate a cock with pullets and a

cockerel with hens, the latter having the preference. Whatever can be said against these matings I am convinced that the best results accrue where age is on one side.

CARE DURING MATING.

During the mating season the breeder should see that the stock are kept quiet and not disturbed in any way. It is only natural that the birds like to be undisturbed. I have found it a good plan for the same person to feed and attend to the birds during the mating season with the above view in mind. Docile males make the best breeders and in cases where, owing to their unselfishness, the males refuse to eat with the hens they must be fed separately. All male birds will benefit by tit-bits fed from the hand and after a few lessons they will get quite knowing and run to meet the feeder. Spiteful males should not be given a place in the breeding pens if it can be helped.

With regard to the hens it is rather unwise to include in the pen at the time of mating any females that are not laying, such hens take no notice of the male's attentions with the result that arguments in the harem will follow ; although not generally known, this is very often the cause of unfertile eggs.

BREEDERS v. WINNERS.

Once we have in our possession first class specimens we must know how to look after them. To allow exhibition males to run with the hens during the whole year would naturally prove weakening. We must nurse the stamina of both sexes by separating male from females immediately the breeding season is over. Cockerel boxes are handy at this time and the surplus males can be placed therein when the breeding pens are " broken up." Then again there is that bug-bear " overshowing." The big man can afford to overshow his birds, at least so it would appear, for he has equally good birds at home. Not so with the small man or breeder who has not established his strain. In many cases I could quote, this overshowing would appear to be merely for the purpose of cup-hunting or prize-money getting and is to be deprecated. It is naturally a great mistake to overshow any specimens, especially if required for breeding purposes, and the good " sportsman " will be content to show his breeders but a few times in the year. If the owner is keen on showing, he will reserve a few of his tip-top birds for exhibiting only and not trouble to disorganise his breeding pens by showing any of the inmates during the breeding operations. This is as it should be.

A few outings prior to the breeding season will not do harm It is usually thought by the tyro that Fanciers continually exhibit their best birds. This is far from actual facts. The sporting

fancier usually has as good birds at home as those he is exhibiting, and this should be followed by those who would be successful in their breeding operations. Reserve a few " cracks " for exhibiting in order to keep before the public's eye.

WHAT IS SINGLE MATING?

In certain breeds the standard decrees that the characteristics of the male and female should be different, which necessitates double-mating, explained below. Where the standard for the two sexes is practically the same, then single mating is sufficient. By single mating I mean the breeding of both sexes as exhibition specimens from one mating or single pen of birds.

WHAT IS DOUBLE MATING?

Double-mating means the mating of two pens, one to produce exhibition cockerels and the other exhibition pullets. This process of breeding has done much to spoil many good old breeds, for few little men have accommodation sufficient to keep two pens. Many poultry fanciers give this double-mating question some hard knocks, but we have only the Club Standards to blame. When a new breed comes into being, the first desire of the faddists is to draw up a standard that is hard to breed to. They contend that it is better to have a breed that is difficult to obtain high-class specimens of, than where we can easily breed winners. As things are at present, double-mating is necessary in many breeds, and I leave it at that.

In the case of laced varieties, such as the beautiful Gold and Silver Laced Wyandottes, we have perforce to adopt the double-mating principles. If we mated the Palace winning Cock to the Palace winning Pullet we should breed birds that were of very inferior quality. By fitting up a cockerel-breeding pen and a pullet-breeding pen our chances are excellent. In the cockerel-breeding pen of any variety the male will be a tip-top show specimen and his mates females that are not show birds, but merely breeders likely to throw high-class cockerels when mated to the exhibition male. The pullets from this mating will, of course, be " duds " and not fit for show purposes. The females in the pullet-breeding pen will all be first-class exhibition birds and the male not a show bird, but a breeder most likely to breed tip-top exhibition pullets. The cockerels from this mating will be " duds " and unfit for the show bench. The whole *modus operandi* can be thinned down to this :—The cockerel-breeding male must possess all the necessary characteristics to breed exhibition cockerels, whilst the pullet-breeding male must boast of those characteristics that will go to breed exhibition pullets. The system is not so complicated as it would appear at first sight and is interesting to follow out, but there

must, of course, be many "wasters" in the progeny—whether male or female respectively. In many cases fanciers are satisfied with breeding one sex only and winning honours with same. They specialise in pullets or cockerels, keeping the pullet-breeders or cockerel-breeders only as the case may be. This naturally does not entail so much work as would be necessary if the two sorts were bred.

BREEDERS' OPINIONS ON DOUBLE MATING.

Opinions vary as to whether double-mating is necessary in some breeds, but in most self-coloured birds, or where the points are identical in both sexes, if double-mating is not encouraged that breed should have a good future. I will give a few opinions from leading exhibitors and judges respecting their pet breeds :—

Maj. H. M. Barnes (Ipswich) : "Double-mating is not necessary for Blue Langshans."

Mr. J. Eadson (Burnley) : "Re Anconas. cockerels and pullets can be bred from the same pen—double-mating is not necessary."

Mr. John Wharton (Hawes, Yorks), with regard to Partridge and S. Pencilled 'Dottes, writes : "Double-mating is absolutely necessary if we are to breed to present day standards."

Mr. Wm. Brent (Clampit, Callington) : "I have never considered the double-mating system desirable, or found it necessary in breeding winners of both sexes of Indian Game. I am confident that if the double system is practised to any great extent it would prove most injurious to this utility breed. My success during 30 years has been with the single system."

Mr. G. H. Procter (Flass House, Durham) : "I am pleased to hear the question of double and single mating has been taken up by prominent members of the Fancy. My opinion is that double-mating is the ruination of any breed. It certainly is not necessary in Buff, White or Black Cochins, as good coloured birds of both sexes can be bred from one pen. Out of my 70 Buff Cochin chickens of this season I cannot find a faulty coloured one, and I always succeed in producing good cockerels and pullets from the same pen."

Mr. G. Tyrwhitt-Drake (Maidstone) : "I never did consider double-mating absolutely necessary in breeding Cuckoo and Duckwing Leghorns. With regard to Duckwings it is commonly alleged that to breed good pullets a Silver cock is absolutely necessary. The best pullet I ever bred, and which was awarded,

among numerous prizes, silver medal for the best Leghorn at the Dairy Show, was bred from a Golden cock, and to show that she was not a fluke her sister practically whenever shown was second to her."

Mr. Alec. Hyslop (Llanymynech, N. Wales): "In reply to your inquiry—Is double or single mating absolutely necessary for Modern Langshans, all colours?—my experience of this most majestic bird dates back to 1883. I have no hesitation in saying that double-mating is absolutely unnecessary, the best of both sexes having repeatedly been bred from the same pen. The greatest danger in my mind after, of course, selecting for type, is to avoid having the colour too deep a metallic and brilliant. Should prefer this with the cock. With hens more of a soft shade, that is, slightly bronze. Especially does this show when the hen is wet. Having both sides too "sheeny" results in red feathers showing in the cockerel's hackles, etc., and sometimes a fine purple bar across the feathers in both sexes. I plump for single mating only in Modern Langshans."

Mrs. L. C. Prideaux: "I consider single mating is all that is necessary for Yokohamas and Y. Bantams."

Mr. Andrew MacLachlan: "Double-mating is not necessary as regards Andalusians, for on several occasions I have won at our leading shows with full brother and sister."

Mr. R. O. Ridley: "I do not think double-mating is necessary with Croad Langshans; in fact, I never practice it, and I always mate a cockerel to two or three year old hens, and a cock to pullets."

Mr. E. J. Francis-Davies, Hon. Sec., Pile and Duckwing Leghorn Club. "In the case of the Blue Leghorn double-mating is unnecessary."

Mr. S. W. Thomas: "Double-mating in breeding Brahmas is absolutely necessary in Dark Brahmas. Thirty years ago it was different, and as Mr. Lewis Wright has pointed out, had the judges at that time allowed a little ticking in the fluff of the dark cocks, no doubt it would have been quite possible to have bred, by careful selection, first-rate specimens from the same pen. Anyhow, it is quite certain that the winning cockerel and the winning pullet at the Palace in 1878 were bred practically the same way. The birds that bred the cock came from my yards, and I had at that time only the one strain. It is much easier to breed good cockerels and good pullets from different pens. The same remark applies to all the pencilled varieties."

Rev. J. N. Williams: "I am satisfied that in all the five varieties of Hamburghs double-mating has to be resorted to, to give creditable results, consequently anyone taking up the five varieties would require ten pens. Blacks are, I know, bred from one pen by many, but it will invariably be found that anyone so breeding will win, if using high-class breeding stock, in cockerels rather than pullets, or vice versa. The best breeders, I am convinced, use two separate pens for cockerel and pullet breeding—a show cockerel and pullets, or hens, intimately related to him, and show pullets with a cockerel solely from a pullet strain. In the Blacks it might be possible even now to get to the one mating system."

"Judges help the matter by the values they attach to coloration of the different sexes, till finally, double-mating is imperative. To cross the exhibition matings is to court the most serious disaster. The only way that I can see to get out of the dilemma is to make the cock-breeding pullet the standard for the sort of cock she breeds, or the pullet-breeding cockerel the standard for the kind of show cockerel he breeds. At some of the Hamburgh Club shows we do see classes arranged on this plan. But it is one that would at once nearly double the number of classes at a show, and against it is the fact that in the matter of coloration these "breeders," as I may term them, to distinguish them from the "show" birds, are poor-looking specimens.

"By double-mating we have got miles ahead, both for cocks and for pullets, in actual beauty, as derived from spangling, pencilling, lacing, barring, etc., than we ever should have done by single mating. If we had never seen these beautiful products, we might never have wanted them, but now they are an actuality nothing short of them will satisfy us."

"For one moment consider the Houdan and the Ancona. The Houdan breeder is content with quite a different form of excellence from the Ancona man, yet both started out with mottled birds. The Ancona man would never be satisfied with the almost black birds we see amongst grand Houdans, and the Houdan man does not yearn for the evenly disposed white tips on a black ground. Each has trained himself to a different ideal, each is content; but the Houdan man might not be if Houdans had been brought to the perfection of the best Anconas in the matter of tipping."

"In Campines, the old style of cockerel was merged into such a standard of coloration that he would breed the highest class cockerels and pullets from the same hens. And what a pleasure to think that every little chicken one looks at may develop a winner, irrespective of the sex it may happen to turn out to be. How disappointing, too, after a hard incubating time, to find you are breeding for cockerels, and three-quarters of your birds will have no chance whatever in the show pen! It is time the system

was done away with. In the Blue Wyandotte, it really was to the credit of all concerned that a stand in favour of single mating was made. That standard may not turn out to fulfil all that its promoters hoped for, but the idea of having a standard for both cockerel and pullet that could be striven for more successfully by using one mating than double was a great step in the progress of the Fancy for the future."

" In the formation of a standard the greatest care ought to be used, and the most strenuous efforts made not to wander away from it. Who would have thought that self-coloured birds, like Buffs and Blacks, would have required double-mating ? Yet I am sure some do use double pens."

As Mr. S. W. Thomas, the well-known Brahma fancier says it might have been different had breeders seen to it when the standards were drawn up. " It is never too late to mend " and there are new breeds still to come. The " Reds " and " Buttercups " were not anticipated years ago, perhaps the Butterflies will be the next invasion. It is generally supposed amongst Barred Rock enthusiasts that double-mating is a *sine qua non* in breeding exhibition specimens. The opinion of no less a Rock expert than Mr. Jas. Bateman will be comforting to would-be breeders of this pretty patterned fowl. He says :—"In breeding Barred Rocks I have for many years thrown aside the two-mating system I do not consider it necessary, and it is altogether an expensive and unnecessary luxury. What is more, if it should become necessary the breed would very soon be on the down grade. Plymouth Rocks have not lived for forty years as a first-class standard exhibition and utility fowl to have their days shortened by any such foolishness. The barrings on both male and female are as similar in character as is consistent with the plumage of the two sexes, and why some fanciers should go to extremes to obtain same passes my comprehension. I have seen in days gone by the funniest matings have good results, but I have always felt certain that the results have been *in spite* of them and not *because* of them, for " Blood will tell," and when the birds are well bred, although themselves outsiders, still their progeny have thrown back to their correct immediate ancestors. Waster black pullets and hens are probably less used to-day than ever before in breeding Barred Rocks, their days have gone as breeders. The idea was to get a better sheen on one side watered down by a washy male on the other side, the hoped-for result being the happy medium, but this is a long way round to get home, and why a straight road cannot be taken by using medium birds to get medium birds I have never been able to understand."

BREEDING FOR HEADGEAR.

In breeds where the standard requires the male's comb to be erect and firmly set, but that of the pullet to be over as in Minorcas, Leghorns, Andalusians, etc., we must breed for head-properties. Where cockerels are being bred the hens should possess combs that have an inclination to grow upright and firm at the base. If exhibition pullets are desired the comb of the male should show an inclination to fall over, but not, of course, from any physical weakness. By this method of balancing the headgear the breeder secures the standard combs in the progeny of the matings.

FIXING A TYPE.

Before touching on the general principles of line-breeding a few words are necessary concerning the fixing of a type. In breeding prize fowls it is impossible to expect to breed perfect specimens at once. Individual characteristics will all require fixing before they come true to any degree in the progeny. Doubtless the reader has noticed a peculiar characteristic in one man's exhibits. No matter what exhibits may be seen at the shows the exclamation "Mr. So and So's strain" will come forth. The expert man can tell at a glance the origin of certain birds merely by some characteristic. The reason is not far to seek for the owner has bred for a certain type generation after generation and that type—good or bad, according to individual taste—will be pronounced in any birds emanating from the original parent stock or their offspring. That is the method to adopt in breeding prize fowls. Set out for a certain characteristic, breed to it and if you keep your "ideal" ever before your eye you will sooner or later succeed in fixing it. Then is the time to perfect other points which will of themselves follow quite readily. It is the aimless breeder who works to no fixed methods who does not succeed in breeding winners. I admit that winners are not bred so easily as shelling peas, they *can* be bred when the *modus operandi* is already understood and followed *i.e.*, providing the stock are satisfactory and of the proper class.

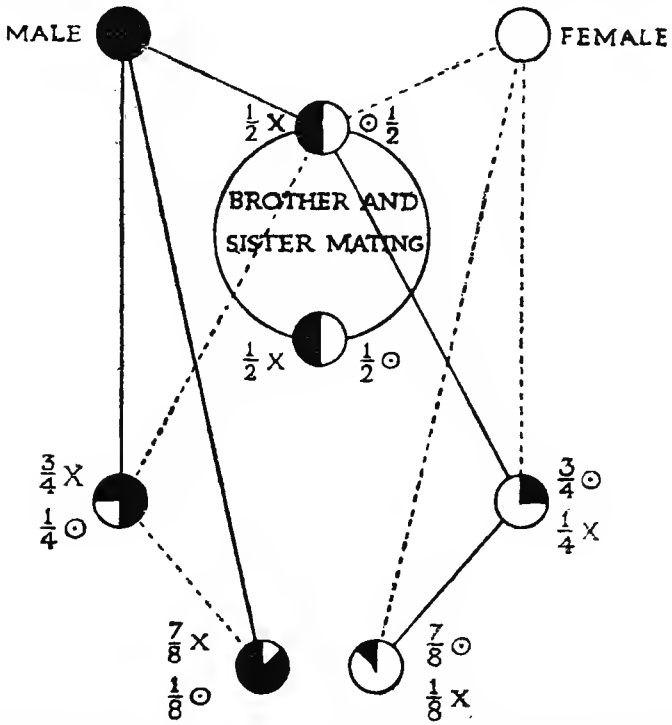
WHAT IS IN-BREEDING.

Novices are apt to be misled by the term "in-breed." To serve as an illustration I will deal with "in-breeding" and then "line-breeding." In-breeding *generally* speaking is the mating of brother and sister and is not to be recommended. Many fanciers do in-breed I know, but whilst this mating of brother and sister is likely to breed progeny possessing the qualities of each other, disease can easily follow in its train. This is amply proved if we mate a laying hen to her brother, for the result will more often than not be fewer eggs from the progeny. If we continue the in-breeding the next generation would be puny things and very inferior

layers. The same applies to in-breeding in exhibition birds ; if it is practiced it must not be overdone, but on the other hand kept well in check. To in-breed once in a way may be the means of fixing a certain quality that the breeder could not obtain from any other mating. All the other excellent points were in his birds with the exception of the one for which he in-bred. This as I have said may be all right within reason, but should not be encouraged too much. In such cases make sure that the birds being mated up are vigorous and healthy in every organ and limb ; this will assist matters.

THREE WAYS OF IN-BREEDING.

" In-breeding," says Mr. Harry R. Lewis, " commonly means the mating of individuals related for one generation. In-and-in breeding indicates those showing a longer period and closer degree of relationship. Three ways of in-breeding are :—



In-breeding chart showing distribution of inherited characters. The black denotes the blood lines of the male and the white those of the female. The solid black lines show that a male has been chosen from the group from which they start and the dotted lines a female

X—Male. ⊙—Female.

1. Breeding sire and daughter which produces ¼th blood like the mother.
2. Breeding son and mother which produces progeny with ¾ths blood of the mother.
3. Breeding brother and sister which gives progeny with blood lines from both sire and dam in equal proportions.

The latter (No. 3) is the mating referred to above as undesirable. It is often adopted by breeders of both Fancy stock and heavy egg-producers, but it must not be over done. He must be sure of the vigour of the parent stock, else this fault will be intensified in the progeny.

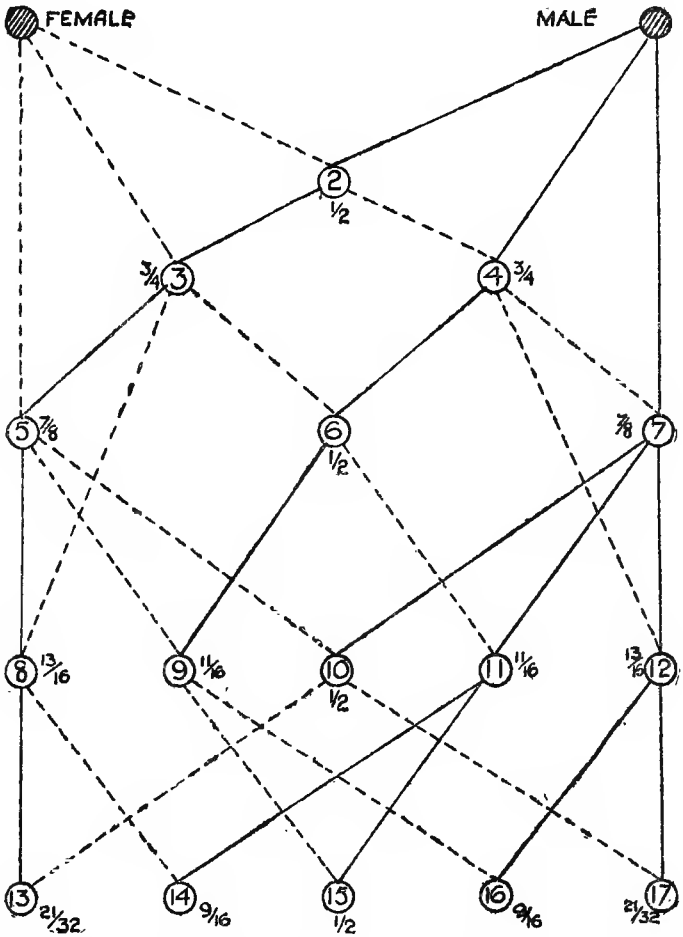
LINE BREEDING.

Line-breeding, whilst being closely akin to in-breeding is the proper method of breeding exhibition birds to adopt. Instead of mating brother and sister we mate father to daughter and mother to son and so on as the explanatory table will show. The whole object is, of course, to perfect the excellent points of the parent stock. This mating of offspring to parent is the proper thing, for then we have the parent mated back to the daughter and son, as the case may be, possessing one half blood of that parent. The breeding must be kept on strict lines and within limits, and may be adopted for years without an outside cross.

The system will be clearly understood from the accompanying chart. We commence operations with a male and female—both unrelated. Each dotted line represents a pullet and every black line a male. Where two such lines meet a circle is depicted showing the progeny of the mating and giving the fraction of the blood of the parents. On the left side is the female ; on the right is the male. Taking No. 2 circle we have the progeny or product of our first year's mating :—that of the female and male parents. This product is naturally half the blood of the male and half the blood of the female. The second year we mate the cockerel from group 2 to the original female (or one of them), and a pullet from group 2 to the male. These two matings produce groups 3 and 4, each of which possess three-fourths the blood of the parent on the side the circle or group appears. This is quite simple so far. Chickens of group 3 possess three-quarters the blood of the original female and one-quarter that of the original male ; the produce of the pullets (group 2), bred back to the original male, will be three-quarters the blood of the original male and one-quarter that of the female. To arrive at these figures take the original male as representing 1 and add ½ as representing the male's blood, in the

pullet from group 2 we have $1\frac{1}{2}$, which is to be divided by one-half, as the blood of the progeny must be $\frac{1}{2}$ as being from two parents only. We thus have three-quarters at circle 4, and circle 3 is arrived at in the same manner.

This same principle is carried out through the chart and the number near the circle denotes the fraction of blood of the parent



of whose side the circle is placed. In the third year we mate a cockerel from 4 to a pullet from circle or group 3, each of which contains three-quarters blood of the sire and dam respectively and the progeny of the mating as shown at circle 6 is half and half

blood again as at group 2. This is arrived at thus :—Add three-quarters the female's blood from group 3 to one-quarter the female's blood from group 4 and divide by 2 viz. $\frac{3}{4} + \frac{1}{4} \div 2 = \frac{1}{2}$. In like manner add three-quarters the male's blood from group 4 to one-quarter the male's blood from group 3 and divide by 2 viz. $\frac{3}{4} + \frac{1}{4} \div 2 = \frac{1}{2}$. This is the object of line-breeding, namely, to come back to this half and half blood, for as long as we do this we do not in-breed and we are breeding on each year without going outside the strain we are establishing for fresh blood.

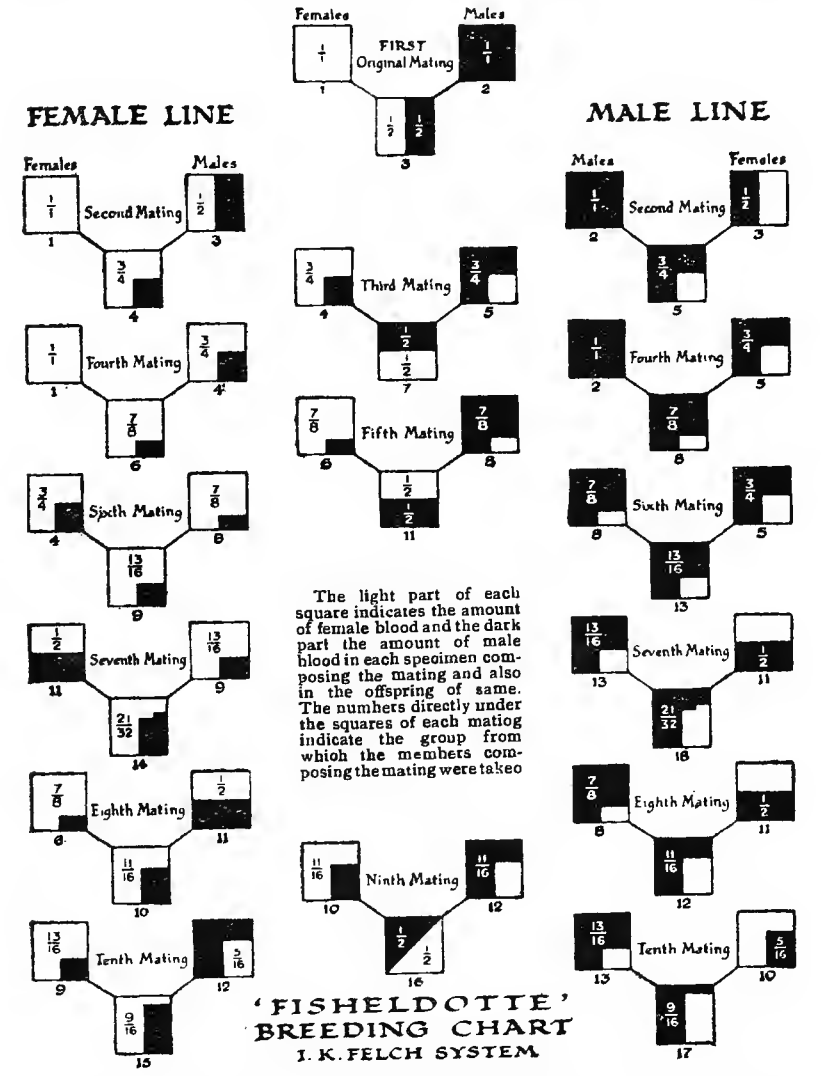
We now mate a cockerel from group 3 with the original female, resulting in group 5, which progeny possesses seven-eights (viz. $1 + \frac{3}{4} \div 2$) of the original female's blood and then mate pullets from group 4 to the original male, resulting in group 7, this progeny possessing seven-eights of the original male's blood and one-eighth of the female's. We also mate a cockerel from group 7 to pullets out of group 5 and we again come back to our half and half blood. The next generation will again come back to half and half blood at group 15 by mating a cockerel from group 11 and pullet from group 9. Groups 8 and 12, if mated together, would have also given us half and half blood.

This system does away with in-breeding and enables us to keep several strains of birds, the members of which are sufficiently related to enable us to retain and improve the excellent points of the parent stock without any harm.

This system is going to prove helpful to those who are forced to adopt double-mating. If we have pullet-breeders and require a cockerel that shall excel as a *pullet-breeder* we only have to mate a cockerel from group 5 and a pullet or pullets from group 3 and by this means we add three-quarters female blood to seven-eighths female blood. The cockerels would have a large percentage of female blood in their veins in just thirteen-sixteenths as at group 8. The same can be carried out for cockerel-breeders.

MALE AND FEMALE LINES.

To explain the female and male line respectively of line-breeding, the accompanying " Fisheldotte " line-breeding chart, I.K. Felch system, will prove more useful. The chart has been reproduced from the American Poultry Journal Year Book. Select from the off-spring of a pair of choice fowls the healthiest, strongest, and, in resemblance to the parent, most perfect cockerel, and mate him with his mother to start the " female " line. Mate the cock with those of his daughters that resemble him, to a certain extent in their make-up, to establish the " male " line. Mate the cockerels from this line with females from the female line and this mating at certain periods (see chart) with males from the male line, with females from the female line, can be carried on almost indefinitely without any injurious effects of in-breeding.



Designed by L. A. Stahmer.

1st original mating :—Female No. 1 to male No. 2.

2nd mating :—Female No. 1 to male No. 3 ; No. 2 to female No. 3.

3rd mating :—Females from No. 4 to male from No. 5.

4th mating :—Female No. 1 to male from No. 4 ; male from No. 2 to female from No. 5.

5th mating :—Male from No. 8 to female from No. 6.

6th mating :—Females from No. 4 to male No. 6 ; male from No. 8 to females from No. 5.

7th mating :—Females from No. 11 to male from No. 9 ; male from No. 13 to females from No. 11.

8th mating :—Females from No. 6 to male from No. 11 ; male from No. 8 to females from No. 11.

9th mating :—Females from No. 10 to male from No. 12.

10th mating :—Females from No. 9 to male from No. 12 ; male from No. 13 to females from No. 10.

The members of groups 3, 7, 11 and 16 each contain the ½ blood previously explained. Selective breeding must go hand in hand with line-breeding, the breeder aiming at the points he wishes most to establish.

ESTABLISHING A STRAIN.

Strain is another word for pedigree and if we start with two unrelated birds, build them up for successive generations so as to throw the points we desire, we have established a strain. In starting line-breeding we can commence with several hens or pullets as one of the units, but all should be related (sisters) and of the same breeding. It is best to get unrelated stock as the foundation *i.e.*, buy the male from one source and the female or females from a different breeder. We must select these original units for " like begets like " and as we go on each year certain points must be bred for and perfected. Unlike cannot beget like, for how could a White Dotte mated to a White Leghorn breed *pure* White Wyandottes ? My readers must not suppose that line-breeding solves the breeding-of-winners problem. By taking two medium quality White Wyandottes and line-breeding without selection of type, colour, etc., we shall be no nearer our goal in ten years' time. Line-breeding preserves the qualities in a strain ; if we start with tip-top birds we shall soon breed tip-top birds, if with inferior stock those that are inferior. Start with high-class original parents and select rigorously each mating for type, colour, etc. One thing can be said of such a system of line-breeding, and that is, that when a winner is once bred, it is bred, and other winners will follow.

INTRODUCING FRESH BLOOD.

If we fail to secure a certain characteristic in the strain we are at work upon, it may be necessary to introduce fresh blood from elsewhere. Now this is not an easy matter, for a mistake will undo many years of good breeding. It is not advisible to introduce a male for the fresh blood, as if a mistake occurred he would soon stamp his progeny and generations to come with any fault or taint. It is advisable to introduce fresh blood on the female side and this should be carefully done. Having selected a suitable hen, mate her up to the desired male and keep her eggs separate. Having watched the progeny carefully and decided that the chickens will work in with your own strain, you can then re-mate them back to your own birds.

Sometimes the breeder is desirous of introducing fresh blood for different reasons and the experienced breeder, as I have frequently found, seldom goes outside his own breeding, preferring to purchase a bird from an old customer. He then knows he is getting the right sort. There is another point the breeder must not forget, *i.e.*, the retaining of his most promising birds. If he is establishing a strain it is folly to dispose of all the birds bred, except those kept for breeding purposes. Anything may happen to his best breeder or breeders and he should have the equally high-class brothers or sisters close at hand.

THE NEED FOR A STUD BOOK.

There is no doubt that breeders, as a rule, neglect their accounts of breeding, etc. As account books are a *sine qua non* with the practical poultry-keeper, so is the stud book. No particulars should be omitted—no matter how small they may be. The moults, ailments, pedigree, matings, progeny of all stock birds should be kept and all will agree that such accounts help to keep the owner interested in his hobby or business. In this stud book the pedigree and age of all stock should be entered up in a methodical way.

MENDEL'S LAW.

According to Mendel's Law, when crossed forms or hybrids are bred together the opposing characters possessed by the original parents combine in definite proportion. The progeny from such hybrid individuals, A B will represent the algebraical form of $A^2 + 2\ A\ B + B^2$. In the formula, A represents one of the contrasting characters and B the opposite trait. To translate the formula, we shall, by crossing A and B have the following progeny out of every 100 chicks viz :—25 possessing the characters of A, 25 with the characters of B and 50 will boast a mixture of the

characters of both, *i.e.*, 2 A B. Mendel's Law also says that where two interesting characteristics are crossed together, one will be *dominant* over the other, the majority of the progeny possessing this dominant character. The other force is called *recessive*, for it recedes from view in the presence of the stronger or dominant character. A suitable example of a pair of contrasting characters would be single comb and rose comb. In algebraical form this part of Mendel's Law would read :—

$$\begin{array}{ccccc} D^2 & + & 2\,Dr & + & R^2 \\ \frac{1}{4} & + & \frac{1}{2} & + & \frac{1}{4} \end{array}$$

D, the *dominant* character will be present in $\frac{3}{4}$ths of the progeny and $\frac{1}{4}$th, *i.e.*, D^2 the character will be pure. In $\frac{1}{2}$ it will be mixed with the *recessive*. The other $\frac{1}{4}$th (R^2) will have only the *recessive* character. Birds from D^2 and R^2 can be bred together for they will be pure, and when individuals of the Dr group are bred together we shall have the same formula as in the first cross, viz :—

$$\begin{array}{ccccc} D^2 & + & 2\,Dr & + & R^2 \\ \frac{1}{4} & + & \frac{1}{2} & + & \frac{1}{4} \end{array}$$

MALE BIRDS TO DISCARD.

In selecting a male bird to head the breeding pen, no matter how good the bird may be, if it possesses any bad faults that can be handed down to the progeny it should be discarded. There are many serious faults that rule the male bird out of court and the breeder should use his knowledge and experience to the full in his selection of mates for the breeding pen.

TWO MALES PER PEN.

To ensure a greater percentage of fertile eggs and more vigorous chickens, many breeders run two males to each breeding pen. Male No. 1 is in charge of the harem on Monday, Wednesday and Friday, and male No. 2 on the other days of the week. When No. 1 male is not running with the hens he is confined for the day in a cockerel-box which is placed in the run. It is a good plan to follow especially early in the season. Many of my friends who adopt the system speak highly of the results.

BREEDING FOR EXPORT.

At the present time there is no universal standard of perfection in breeds of poultry which would apply equally to America and this country, or Africa and the British Isles. This has created very

much discussion and interest in recent years, seeing that the demand for English-bred birds is great across the Herring Pond. Whether we shall eventually see International Standards for all breeds, time alone will prove. As things stand at present, America in several breeds require paler-coloured birds than our English exhibition birds of the same variety, and so birds that would go cardless at our own shows are valuable for the American breeder.

Types too are different and so the English breeder who wishes to export poultry should primarily look up the standards in vogue in the country the birds are to be exported to. The breeder who satisfies his export customer can depend upon many fresh orders whether in eggs or stock birds. Any extra trouble then will be well repaid.

MAKING A NEW BREED.

Lest any of my readers should at some future date wish to bring out a new breed I append the rules for regulating the inclusion of new breeds and varieties in the Poultry Club Standard of Perfection :—

Rules for Regulating the Inclusion of New Breeds and Varieties in the Poultry Club Standard of Perfection.

1.—Before any breed or variety is eligible for inclusion in the Poultry Club of Perfection it must comply with the following requirements :—At least fifty per cent of its progeny must be true to type and colour, *i.e.*, they must possess the general characteristics of the breed. Specimens of the breed or variety must have been exhibited at such shows as Crystal Palace or Dairy, and both the male and female specimens of at least two generations must be forwarded to the Council at the time the breed or variety shall come up for admission to the Standard, in order that the members of the Council may inspect the specimens to determine whether or not they present thoroughbred characteristics. In the case of a new breed the fowls must possess distinct characteristics, and in the case of a new variety they must conform to the character of the breed of which they are a variety.

2.—The request for admission must be accompanied by a brief description of the breed or variety, together with particulars of its origin and breeding, set out in a sworn statement of the breeder, and this statement must contain a declaration of the percentage of specimens breeding true to type and colour. A suggested Standard for the breed or variety, must also be presented, and this shall be read at the meeting at which it is proposed to admit the breed or variety.

3.—If upon examination of the sworn statement and an inspection of the fowls, the Council is satisfied that the breed or variety has reached a pure-bred condition, a majority vote of at least two thirds of the members present, shall admit the breed or variety to the Standard.

ON PURCHASING STOCK.

Many novice breeders fail in the purchasing of stock in more ways than one. Where breeding on scientific lines is being followed one must be careful in mating any newly purchased birds with other stock birds. Where a fresh male is purchased it should be mated especially to one or two hens and not mixed with the other stock on the farm till the quality of the progeny has been established. If the mating proves satisfactory the breeder can go ahead very carefully. As mentioned elsewhere the line-breeder will find it the better plan to introduce fresh blood on the female side. Many a yard has been ruined for several years through the introduction into the yard of a cockerel of a different strain to the stock already on the farm. It may take years to get rid of the foreign blood and for things to become normal again.

There is another point I wish to touch on, that is, the purchase of a mated pen of high-class birds by a novice breeder. As a rule a splendid figure is paid for the pen, which breed some good birds the first year that win in hot competition. During the third year or thereabouts the fancier cannot understand why his youngsters are such wasters. I could quote many such instances where a novice after purchasing a mated pen of birds has won all before him the next year with the progeny, but a few years after his birds cannot get higher than a V.H.C. card. The reason for this is not far to see, for in the first place the birds have been put together by an experienced breeder, who knows his A.B.C. of breeding, but after passing out of his hands the novice has not followed the correct matings. Should you at any time purchase a trio of mated birds, ask advice of the breeder from whom the birds were originally purchased on every occasion when breeding pens are being mated up. It will pay you.

DON'T SELL THE BEST.

Many a novice breeder of exhibition stock has failed through his eagerness to dispose of high-class home-bred birds. We will suppose that a fancier having started with good quality birds suddenly finds himself the possessor of a champion bird—one of the best bred that year. Why is it that in nine cases out of every ten such a breeder would so readily take a fiver or ten pound note for the bird ?

Having once bred a tip-top bird the breeder should make every use of same in his after-matings and not be disposed to part with any bird till he is sure he has a better one at home. High prices for home-bred birds are naturally tempting, but is it wise to accept such when the breeder stands to lose so much?

It is easier to shell peas than breed champions and the fancier who follows out the above advice will not go wrong.

WHAT IS TOE-PUNCHING?

The average poultry-keeper is unaccustomed to the stock terms used by the fancier and this very word "toe-punching" is apt to mislead any one. Toe-punching is really web-punching and consists of punching small round holes in the web connecting the toes when the chicks are quite young. Its sole object is to mark the little ones as the progeny of such and such a pen. Some method of marking is imperative, else we would go on breeding and never know where we were. There is no pain attached to the operation and toe-punchers can be had quite cheaply of any appliance firm. Many possible variations of toe-punching exist and in the accompanying diagram will be found sixteen. We mark all the chicks from pen 3 by piercing one of the webs on the right foot and the chicks from pen 7 say by two punches on the left foot. In the stud book will be found the matings and the diagram of punches and the breeder cannot go wrong. Sometimes the hole in the web becomes clogged and it is advisable to watch this and repierce the hole. It may be advisable to use "circlets" or leg bands in conjunction with the toe-punch, but in any case particulars of such markings should be kept or the whole work will be spoilt.

LIST OF TOEPUNCH MARKS

Foot			Foot		
Right	Left	Pen No.	Right	Left	Pen No.
		1			9
		2			10
		3			11
		4			12
		5			13
		6			14
		7			15
		8			16

VALUE OF LEG-BANDS.

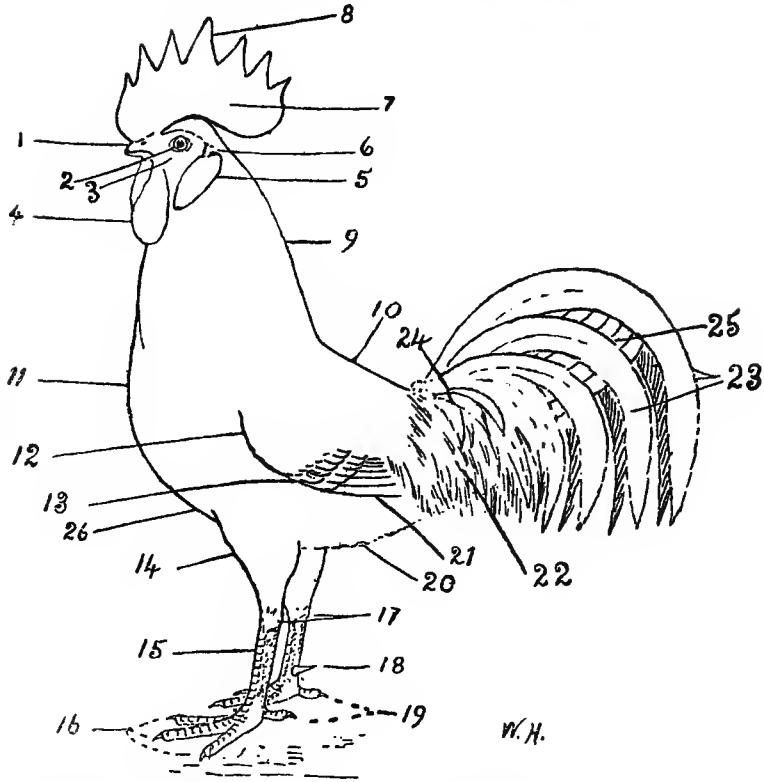
Those who are engaged in breeding exhibition fowls may deem it advisable to use leg-bands only or in conjunction with toe-punch holes. Some mark is necessary and is the only means of telling the pedigree of the chicks at a glance. If at the start we ring the original male with a blue circlet and the original female with a red one, the progeny will be rung with blue and red circlets and so on. What could be simpler? Old stock can be rung on the left leg; young stock on the right. Where double-mating is practiced, circlets or leg-bands will prove of great value. By ringing all the pullet-breeders with one colour and the cockerel-breeders with another no mistakes can crop up to spoil the breeding operations. If we adopt this method of ringing, in-breeding will be impossible, for directly we mate birds with the same coloured mark or circlet we shall know we are in-breeding. The chicks should be marked when quite young and in the case of circlets they will require very small ones to start with, but at a later age the sizes will be suitable for always. Another good example is to ring the male, say, with a blue circlet, the female with yellow and all the chickens green, remembering that yellow and blue make green. Mate one of those cockerels back to the hen as per the line-breeding chart and ring the product with yellow and green. We then know at a glance we have a greater proportion of female or "yellow" blood for half the green circlet is logically yellow. In like manner can the matings back to the original male be carried out.

BREEDING FOR SEX.

Opinions differ on the question of breeding for sexes and it is difficult to say whether or not we can mate to breed cockerels or pullets as desired. Whichever parent is the weaker, there will be, by a natural law, less of that sex in the offspring. In short, the stronger sex predominates in the progeny. Several years ago I purposely overfed six or seven females and mated a vigorous male with them. I had 90% cockerels in all hatches till I brought the hens back to their normal condition. Where a young vigorous cockerel is mated to pullets, the male sex will predominate and if the male is undermated the same will be the result. If I were desirous of securing more pullets than cockerels I would mate adult cocks to pullets. We have the seasons to consider and in the early season males are in the majority in any progeny, with the females in the majority later on, when I suppose the breeding male becomes weak and the breeding hens assert themselves. My rider is:—"Do not under or over mate and breed only from healthy vigorous stock."

In the case of young chickens a slight tap on the head will bring a sharp piercing note from the cockerels and a sweet whistle from the young females. This is a good plan of telling the sexes of young stock.

THE POINTS OF A FOWL



1. Beak and Mandible
2. Eye
3. Face
4. Wattle
5. Ear-lobe or deaf ear
6. Tuft covering the ear
7. Comb
8. Spike or serration
9. Neck hackle
10. Back or saddle
11. Breast
12. Wing bow
13. Wing bar or coverts
14. Thigh
15. Shank
16. Toes
17. Hocks
18. Spur
19. Back toes
20. Fluff
21. Wing bay or secondaries
*22. Saddle hackle
23. Sickles
24. Tail coverts or hangers
25. Stiff or hen tail [prominent
26. Keel, in varieties where this is

*In the hen, this part is termed the "Cushion."

BREEDING EXHIBITION BANTAMS.

The breeding of exhibition Bantams will always be full of excitement. As in big fowls we aim at size, in Bantams we strive for the reverse. Bantams must be midgets in every sense of the word. First and foremost in judging the wee-ones I would put size; no matter how excellent a specimen, if he were on the large size I would back-peg him. For this reason it is inadvisable to show specimens of a newly introduced breed with A.O.V. exhibits. Allowance may be made for the fact that it is a new breed and it may not, just as it suits a judge. Had the same exhibit been penned at a show where a class was provided for the breed, then the exhibits therein stand or fall by their size; the smallest bird all other points being nearly equal, should always win. In mating up a pen of Bantams with an object of securing small progeny, we must look to the male as well as the female. The male also influences style, colour, and the female shape, headpoints and contour and so we should rather aim at having both specimens small to secure our desired ends. If one is to be larger, as may very frequently happen, let it be the female. Hatching and feeding have much to do with breeding exhibition Bantams successfully. Whilst I do not advocate too late hatching I think that in such breeds that feather quickly, chickens may be hatched out late. It would be ridiculous, for instance, to hatch out late chicks in, say, a White Rosecomb, where wealth and flow of feather are a *sine qua non*. These must be hatched at a suitable time to allow for the growth of feather, etc. Line-breeding will help us out of the difficulty and a few years of careful selection, picking only the smallest and most compact, will work wonders in this respect. I will not take the Bantam Fancier further lest I trespass on Mr. House's domains. Those who are breeders of Bantams should read Mr. House's valuable book "Bantams and How to Keep Them."

Section II.

LAYING HENS.

WHAT IS A LAYING HEN?

IT requires but very little practice to pick out the likely looking layers from a flock of hens. If it were not possible, how could a judge satisfactorily adjudicate upon a class of "laying" hens when there is no club standard to assist him? It is not every poultry-keeper who has the time or money at his disposal to trap-nest all his layers; he requires some advice, therefore, on how to proceed with his own selection. On an up-to-date egg farm trap-nests will solve many riddles and no sensible man would condemn their use.

A good layer has a short, fine head; a long snakey and well arched neck and a keen intelligent looking eye. Even guided by the latter qualification alone the poultry-keeper can pick out the wheat from the husks. How different the bad layer looks with her thick head, dull looking eye and inactivity. The hen that is sprightly, ever on the look out for food, first to come out in the morning, and last to say "good-night," is the profitable hen to keep. Her frame too is rather small; body long and cone-shaped; pelvis broad, with abdomen large and pendulous, and well clothed with downy feathers. On either side of the abdomen is a cheek bone; when these are closed the hen is usually not producing eggs, but if the space between the bones is sufficient for two fingers to pass through, she is either laying or on the point of laying. Although this has been ridiculed by many writers—who ought to know better—I append it, knowing full well its value, even if only as a guide for the purchaser of "supposed" laying hens. Apply the test and discard those where the two bones nearly meet. Do not be deceived by the bright healthy colour of the headpoints of a hen, for a dab or two of vinegar will redden up the comb to last till the newly purchased birds are carried home.

SELECTING STOCK BIRDS.

Where egg-production is being specialised in, it must not be supposed that haphazard matings will furnish us with excellent laying stock. First and foremost comes the selection of the stock. It is imperative that we have strong, vigorous stock birds on both sides and we must make sure that the birds have been well-bred and trap-nested for generations. What a pity, for the sake of a few extra pounds, the would-be egg-farmer is content to purchase inferior stock. The best is always the cheapest, more so in laying hens than in anything else. My advice, based on many years experience is, go to the right man, select the right breed and pay good prices for the birds. So very much depends upon the qualities of the foundation stock that nobody will regret any additional outlay when he sees the results of same in years to come. Because a ten shilling hen took it into her head to lay 200 eggs in 12 months, it does not follow that 10 such hens will lay 2,000 in the same period. We must not overlook the fact that if we have 30 hens laying 150 to 180 eggs each per year, there may be another such number laying 80 or 100 each, thus reducing the profits from the superior layers. Now if we are to make an egg-farm pay we must make a good beginning and keep on selecting, breeding from the best as we go along. This is the only way of reaching our goal and keeping up the standard of high egg-production.

BREEDING HEAVY LAYERS.

To breed heavy layers we must keep one eye on the number of eggs each bird yields and also the quality of same. Our breeding must be right, as also our feeding and care of the stock. Generally speaking, hens are better than pullets to breed from. Not only do they lay larger eggs, but also are in better condition during the breeding season. The 200 egg hen is a well discussed factor and poultry-keepers are apt to suppose that given 200 egg hens, all pullets bred from them will lay 200 or more eggs per year. This assumption is quite natural, but it is not quite how it happens. Well-known experts have made exhaustive experiments in this direction and argue that it is possible for 200 egg hens to throw very inferior layers. Be this as it may, we require more data before saying one way or the other. It is certain that unless we do breed from our best we shall make very little headway. " Like begets like " all the world over, but then the stock must be carefully handled and selected. A great deal centres itself round the handling, feeding, breeding and care of our layers. Just as the line-breeder takes note of certain characteristics in his exhibition stock and perfects them, so must the utility man focus his mind on certain qualities in his hens and endeavour to improve them at each mating.

IMPORTANCE OF THE SIRE.

The sire plays a more important part in the breeding of prolific layers than some people will admit. It is the easiest thing in the world to spoil a pen of layers by using an inferior male as the mate. By inferior, I mean a bird that has been bred from a poor laying mother. The male bird has much to say in respect to the laying qualities of his progeny and unless we select as breeders, males that have good laying mothers on their side, we cannot hope to make headway. On an up-to-date egg farm the breeder will watch his matings and record them in a book.

In this stud book full particulars of the stock birds and matings will be kept. The pedigree of the male, and that of the females with egg records must be entered up. The quality and weight of the eggs will be included and then the breeder knows how he is progressing. The broodiness of each hen should be dotted down and a higher value placed upon the individuals laying most eggs in the winter months.

TRAP-NESTING THE HENS.

The system adopted for breeding heavy layers will depend to an extent on the time or accommodation at the disposal of the egg farmer. The trap-nest should play its part in any concern where egg-production is being specialised in. Trap-nesting has revealed to us the fact that there is the widest difference in the egg-producing qualities of hens of even the same breed. By its use the "culls" or "wasters" can be separated from the profitable hens and a few years of trap-nesting and breeding from the best layers will work wonders in any strain. That is provided both the males and females have been judiciously selected. Where the egg farmer cannot find the space or time to trap-nest all his stock, there is nothing to prevent him running his hens in large Intensive houses and trap-nesting the birds during their pullet year using the pick of the best—mated to a male from a good laying mother—as his breeders. Without the trap-nest, the utility man cannot expect to advance as quickly as his brother poultry-keeper, who follows his work on such a system. Those who are determined to establish a strain of egg-producers, should be very careful not to in-breed too much, as the sole object should be to keep up the stamina in the stock as well as to breed prolific layers. In-breeding must necessarily weaken the stock if persevered with too far. Line-breeding or pedigree breeding on the other hand must be adopted.

SINGLE TESTING OF LAYERS.

Mr. D. F. Laurie, the well-known S. Australian Government poultry expert and lecturer gives his reasons for discarding trap-nests :—

1. Although there are many good trap-nests, I have known of many serious injuries to hens and pullets.

2. Some hens will not enter trap-nests; others become very excited and the egg production is seriously affected.

3. The trap-nests require constant supervision. It is quite wrong to leave a hen confined for any length of time in the small space provided. From a commercial point of view, the cost of such attention is too great.

4. It is impossible to eliminate every source of error where trap-nests are used, and the records, though faithfully kept, are not reliable.

5. The poultry-owner who finds it necessary to apply a test to all his hens or pullets does not rank in my estimation as a breeder. It may happen that a breeder may yard his selected stock together and then trap-nest them.

6. The cost of trap-nests, either in cash or in time and labor, is more than is generally estimated, and there are constant repairs and renewals, of which we hear little.

My reasons for advocating the single pen system are—

1. There is no mechanical device to frighten or injure the fowl.

2. She is well-housed and has sufficient room for exercise.

3. All possible errors in identification are eliminated.

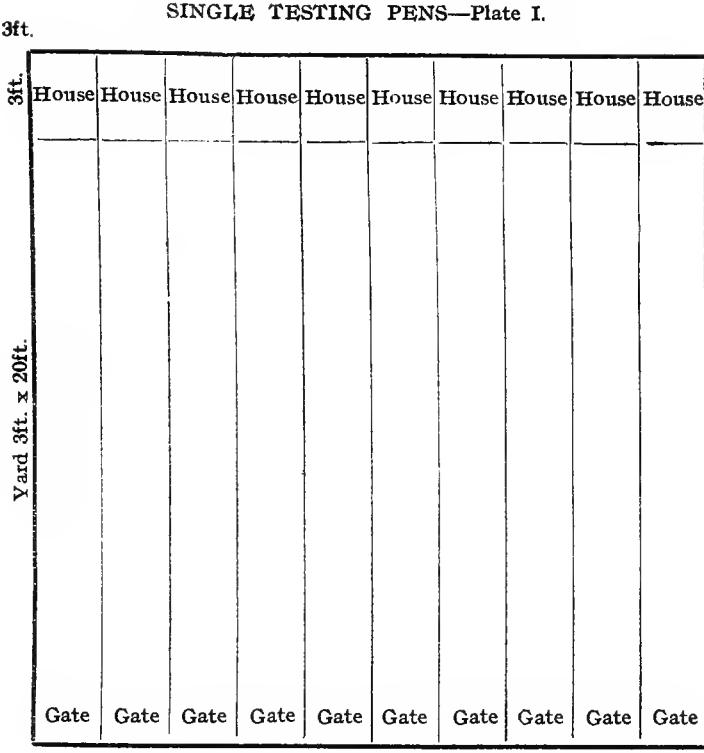
4. The general character of each fowl can be studied daily and without any trouble. This is, of course, a most important consideration.

5. You are in a position to control her food supply, and, by comparison with others undergoing the test, you accumulate valuable data.

6. By carefully studying the occupants of the various pens you will with greater certainty observe divergence from type, tendency to a general type, and other characteristics. This accumulated knowledge, especially if tabulated and recorded, with pedigree charts and photographs of the individuals tested, becomes an invaluable record.

Mr. Laurie's method is to single-test each layer, providing her with a run 20 ft. long by 3 ft. wide and a roosting and laying house 3 ft. square. One long continuous house is built and runs added, and by this means he does away with trap-nesting, yet at the same time is able to pick out his best breeders.

SINGLE TESTING PENS—Plate I.



Ground Plan—Ten Testing Yards and Houses.

FOUNDING A STRAIN.

Mr. Laurie's method of founding a strain of layers is :—

First Year.—With due regard to the general principles enunciated, the breeding pen or pens should now be mated, and as large a number of chickens reared as can be properly accommodated without overcrowding. The difficulty in obtaining stock with a satisfactory and reliable pedigree renders it necessary to both "line-breed" and "in-breed" so as to have as many matings as possible. In working according to Mendel's law, the proper course is to breed the various generations *inter se* until segregation is definitely assured. This the breeder characterises as "inbreeding" and "undesirable." There is no more harm likely to result from this method if properly conducted than from any other method, less so, in fact. It is commonly asserted that change of blood is

necessary to maintain vigor, &c. The truth is that it is necessary to gloss over, in a happy-go-lucky way, the errors of the past due to a lack of proper conception of the importance of thorough selection. Never breed from the unsound or unfit and your work will progress, but if one parent be unsound no amount of fresh blood will give any definite improvement. Such a course may enable you to continue a faulty system not worthy of the name of "breeding."

Second Year.—Select from the progeny resulting from the first mating as follows, with due regard to type, constitution, activity, and main outward points generally characteristic of layers. Toe-punch all chickens when hatched. (See list of toe-punch marks). Place numbered legbands on each adult retained. Enter number and detail in a book kept specially as a record of the breeding from year to year. Put each pullet in a single testing pen, and take her record for 12 months. Put the cockerels in spare yards or pens, as far removed from the pens and pullets as possible. These cockerels will be wanted for breeding from in the second year. They may run with other hens not used in this scheme.

Third Year.—Select for the breeding pens all the pullets which gave a satisfactory yield in the single pens. 1. Mate some of these back to the old male bird. 2. Mate the rest with selected males of the same year and breeding. 3. Mate one selected cockerel to one-half of the original hens. 4. Mate one selected cockerel to the other half of the original hens. You will now have four groups, three of which are continuing the strain by line-breeding, and the other group, No. 2 (one or more pens), will continue the strain according to Mendel's law.

The Fourth Year.—Continue the line-breeding groups as far as desired, but the Mendel groups (in-bred) should have given you at least one line of fowls pure for high egg production. If all your methods have been accurate, this strain will prove of the highest value. It is hardly necessary to point out that it is infinitely preferable to single pen each hen in the breeding season and to let the male bird selected be with each hen for a given period. Fertility may be depended upon, and, in addition, you may discover cases of sexual antipathy from which no good results can be expected and re-mating must be resorted to. The upmost precision and accumulation of detail will give you certain results at an early date. Your work once done will be valuable and lasting. If otherwise you will always be at work with indefinite and even negative results.

HENS VERSUS PULLETS AS BREEDERS.

There is no doubt that hens make the best breeders. They are naturally vigorous if the stock has been well selected in the

previous year, whilst they will lay larger eggs. Eggs from pullets too are usually more or less unfertile compared with those from hens.

The best system to adopt in breeding for heavy egg production is to trap-nest all females in their pullet year and breed from the selected ones in their second and third year.

BREEDING FOR RECORD LAYING.

Just as I write I have been reading of the famous hen which under the watchful care of Prof. Jas. Dryden of the Oregon Experiment Station laid 300 eggs in 12 months. Her four sisters in the same yard too, averaged over 240 eggs, forty hens averaged over 200 eggs each, whilst the pullet that laid 291 eggs in the year is also related to this bird. Years ago the 200 egg hen was never dreamed of and now we read of the 300 egg hen. What will happen in 2014 I am afraid to predict. The fact remains however that wonderful results can be obtained by scientific breeding and trap-nesting, which are the only means of breeding record layers. The following table should be a good guide to the breeder of heavy egg producers :—

1. Breed from heavy layers.
2. ,, ,, layers of good big eggs.
3. ,, ,, layers of winter eggs.
4. ,, ,, matured birds.
5. ,, ,, late moulters.
6. ,, ,, good eaters.
7. ,, ,, healthy stock.
8. ,, ,, early producing pullets.
9. ,, ,, females not troublesome through broodiness.
10. ,, ,, early risers and late retirers.
11. Trap-nest the stock.
12. Practice line-breeding.

Even the small poultry-keeper can do much to increase his hens' egg-records by selection, setting the eggs from his best layer or layers. Care should be taken in selecting the male bird, however, to mate with the females. See that the former has a good pedigree behind him and is from a good laying mother.

INTENSIVE WORK.

Where hens are run in large Intensive houses trap-nesting necessarily entails much labour. Where a flock of 500 layers are kept in large Intensive houses it may be advisable to use trap-nests,

but for larger flocks I am afraid there would be too much work. "Corning," the great egg man, does not trap-nest his Intensive hens, and yet his layers average 145 eggs per year. The large Intensive houses in my opinion should solve the winter egg problem, and perhaps it would be a good plan to trap-nest the breeding stock in outside runs on the farm and draft the surplus pullets into the houses without trap-nesting them. This could easily be arranged, for the breeding stock could be kept quite separately. On the other hand, as previously mentioned, the egg farmer who cannot attend to too many trap-nests can well afford to adopt the Intensive system of large houses, and by trap-nesting the inmates be able to select creditable breeders. This plan would lessen his labour and yet help him to improve his layers. There is no doubt that there is ample room for improvements in the matter of egg production and those who begin to experiment now and work to a plan will find their egg-yields go on increasing. The plan of running 600 or so layers on a farm, without any method of breeding or selecting, cannot be recommended nowadays, although it might have answered years ago.

NUMBER OF EGGS PER HEN.

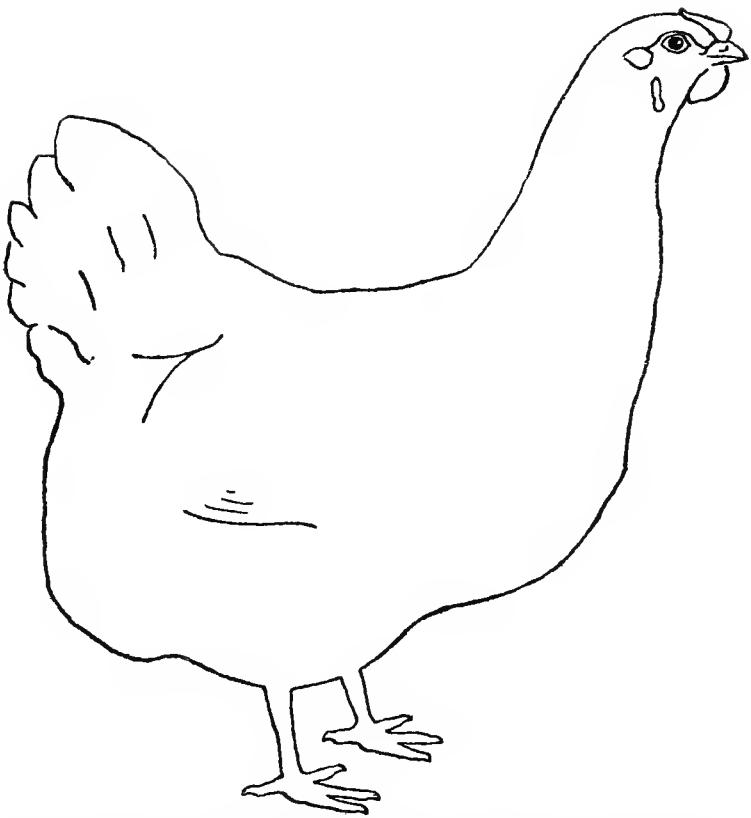
It would be a difficult problem to give the largest number of eggs any hen could lay in a year. That the 250 odd egg hen is a possibility there cannot be a shadow of doubt, but such birds are not *quite* so common as some people would have us believe. Back-yard poultry-keepers, here and there, usually possess some extra-ordinary prolific layers, due in a great measure, I contend, to the comfort such birds receive and the way they are handled or cared for. Feeding and management have much to do with the productiveness of the hen. Authorities are not agreed as to the number of primitive eggs within the ovary of the hen at her birth. Mr. Tegetmeier has remarked that they do not exceed 600, whilst other authorites have given the number as ranging from 1,500 to 3,000. Hens differ very much in the development of their ova, some developing the ova rather than using their food for muscle and fat, others grow muscle and fat instead of eggs. For this very reason feeding, breeding and surroundings will decide the number the hen will lay during her life-time. It is only natural to suppose that, with the eggs there inside the ovary, we must encourage the hen to lay them by feeding for egg production, breeding for egg production and housing for egg production.

ARE MALE BIRDS NECESSARY?

This question is one frequently asked by utility poultry-keepers. The general summing up is, that the male birds, when placed with layers, have no influence whatever on the egg-yields. With pullets I have found that when a male bird is running with

IDEAL EGG-TYPES.

1. White Wyandotte.



The above sketch taken from the report of the Utility P.C's. 12 months' laying contest, 1912—13, illustrates the type of Wyandotte that proved prolific during the competition.

them they will take to the nest earlier than when unmated. I mention this as pullets are very nervous prior to laying their first batch and, when under the guidance of Mr. Cockerel, they seem to be persuaded by him to visit the nest. The experiment can be tried by placing males with the pullets at the time the latter look ready to lay. Otherwise I do not think the male has any influence over the egg-yield and hens can well look after themselves if eggs for market alone are required.

THE BEST BREED?

Having decided to start an egg farm the tyro usually exclaims :— "which is the best breed?" Now there can be no best breed, provided the one selected will fit in with the soil of the farm. Strain, feeding and management all play their parts, even to a greater extent than the mere breed. Secure healthy stock, with some qualities behind them, and let the breed be a secondary consideration.

CROSS-BREDS AND FIRST-CROSSES.

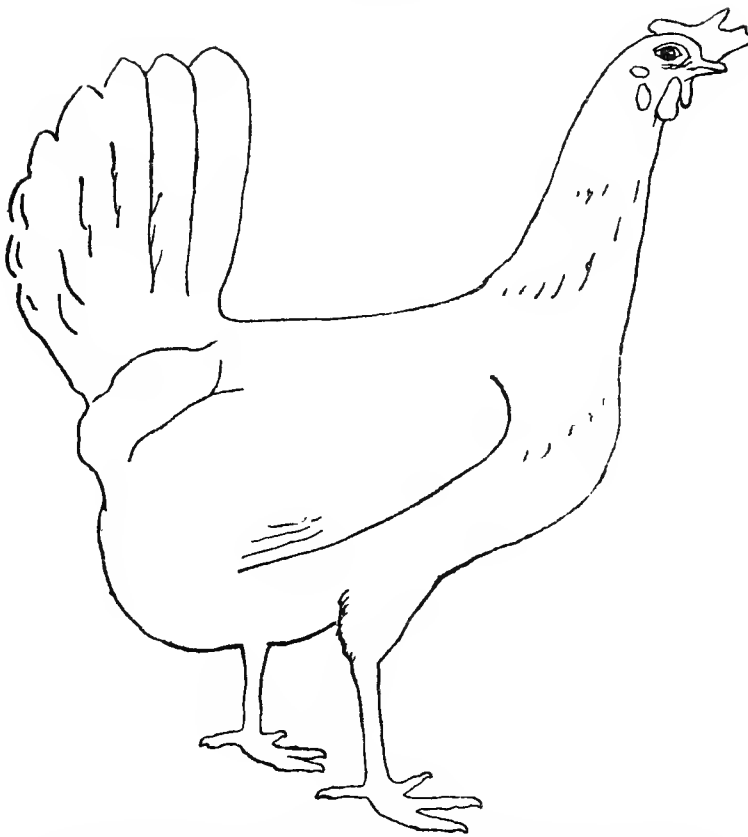
Novices too frequently mix up the words "cross-bred" with "first-cross." A cross-bred is practically a mongrel and an undesirable as far as egg-production goes. A first-cross on the other hand is a cross between two pure breeds, and is usually for the better. To improve the number and quality of the eggs a first-cross will sometimes be recommended. For my own part I am a great believer in first-crosses and think the White Leghorn—White Wyandotte admirable as layers. In mating up the first-crosses it is advisable to select the male from the white-egg breed and the female from the brown or tinted-egg variety, relying upon the hens to preserve the colour of the egg. When it is necessary to mate again, use the males of the two breeds in alternate years, first a White Dotte male then a White Leghorn male, or *vice versa*, and so on.

NON-SITTERS *versus* SITTERS.

Now as regards non-sitters versus sitters there can be little doubt that the egg specialist will do well if he stocks breeds of both. There are non-sitting breeds that not only perform their summer duties, but are not afraid of winter work. I know of no non-sitter to beat the Black Leghorn in this respect. I would advise the egg farmer to stock heavy and light breeds that will mate well together for egg production *i.e.*, as first-crosses for these should prove a useful second fiddle. White Wyandottes—White Leghorns go well together as do Black Leghorns—Croad Langshans, etc.

IDEAL EGG-TYPES.

2. White Leghorn.



This sketch illustrates the type of Leghorn which proved prolific in the Utility P.C's. 12 month's competition, 1912—13.

THE GENERAL FARMER'S PLAN.

I have frequently been told of the good results accruing from the breeding of chickens every month. This method is adopted by one of our leading egg specialists, who declares it is an excellent way of equalising the egg supply throughout the year. I have frequently recommended this system of hatching for general farm work and think that the ordinary farmer would benefit by adopting same instead of hatching in one or two months only. He would certainly have some birds laying, whilst others were moulting and so the " eggs-all-the-year-round " problem might in his case be solved.

STOCKING PULLETS ONLY.

Another method often adopted is to keep pullets only on the farm. It is considered that a layer will produce most eggs in her pullet year and so, to avoid keeping the birds on after they have stopped laying, just prior to the moult, they are marketed. By this time the young chickens, hatched in the previous March or April, are coming along to take their places. The majority of the layers on any egg farm, in my opinion, should be pullets, but I would always recommend at least one-fourth of the stock to be hens. The moult is a serious period with the ordinary farmer, who has a large flock of layers, as during this time few or no returns are coming in and this may last for a considerable time.

THE GENERAL FARMER AND MATING.

It is to be regretted that the general farmer works to no set plan as regards breeding for egg-production. As things are at present it would be impossible to persuade him to use trap-nests on the farm, but he could by the selection of his breeding birds increase the egg-yield from year to year.

He could commence by using pedigree-bred males with his hens and select the best birds as he went on.

BUYING A MALE BIRD.

In the breeding of females for heavy egg-production, how few are the breeders who trouble to consider the claims of the male bird. No matter if the breeder has scores of 200 egg hens, he will make no progress if he mates any kind of male birds to them. The prime essential in selecting a male bird with a view to producing progeny capable of heavy egg-production is to be sure of his pedigree. His mother must have been a tested layer, whilst it may be necessary to go back a generation further.

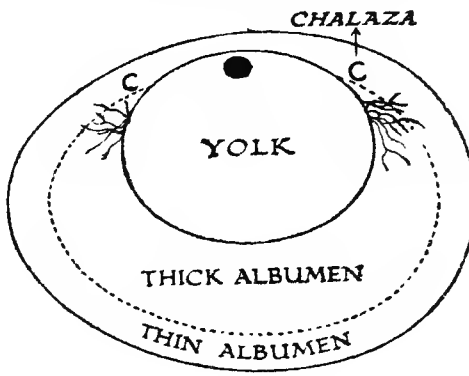
The male is a great factor in the successful breeding of laying hens, yet most breeders hate paying a good price for their male birds. A good price should always be paid for the male birds for the breeder should be guided by the results that will come from same.

Section III.

THE EGG.

THE EGG AND ITS STRUCTURE.

WHEN we ask for the salt and begin to devour our breakfast egg we do not trouble to think what a curious and interesting little thing it is. How wonderful it really is. In the first place we have the shell to which is attached (inside) a thin membrane or skin; next to this comes a second membrane terminating so cleverly in the air space, which latter will contain sufficient air for the chick to breathe, whilst he awaits his release on the 21st day. Next to this second membrane is a thin layer of albumen or white which is a very thin fluid.



Surrounding the yolk is a second layer of albumen which is very thick. The yolk is undoubtedly attached to this albumen by means of the chalazae, which act as buffers to keep the yolk and germ in their places. These chalazae are thick chord-like ends and there is one at either extremity of the yolk. They are sometimes mistaken for the germ, but this is, of course, ridiculous. If we take an egg and cut a circle out of the top, when held length ways, we can watch the chalazae at work manipulating every movement

of the yolk. No matter how much you may turn the egg round, the germ, which is usually near the top of the yolk, but a little to one side, will always be kept uppermost. This is for the very reason that it must be nearest the hen's body as she sits upon the eggs.

ABNORMAL EGGS; EGGS FOR SITTING, ETC.

The average weight of a "standard" new laid egg is usually taken as 2ozs., but some hens lay smaller eggs and others larger ones. It often happens that a hen will lay an abnormally small egg weighing but a few grains or an extra large egg weighing 4, 5, or even 6 ozs. I have had sent me for examination eggs that much resembled a hedge sparrow's in size and shape, whilst others have scaled 6 ozs., and over, and contained 2 and even 3 yolks. There seems no limit to freak eggs and it will be found that such eggs are laid at the beginning or end of a batch. After a hen has passed a very large egg it is advisable to give her a pick-me-up and keep her quiet by herself. She will then recover from the strain. I have often been asked if double-yolked eggs will hatch. Whilst cases have been quoted from time to time of 2 and 3 chickens hatching from one and the same egg it is advisable not to set any freak egg whether abnormally small or large. Eggs that are perfect in shape, good in colour, sound in shell, with the latter a good thickness, should be selected for sitting purposes. The egg will tell its own story and also that of its layer and should be as good a guide as the trap-nest. In the case of the utility man, his hens should not only be trap-nested, but their eggs should be recorded with the weight and colour of each. Some hens will always lay small eggs even in their second and third year and, of course, no benefit will accrue from sitting them. In improving a laying strain, my advice is :—

1. Trap-nest the layers.
2. Record the weight of every egg.
3. Set the "standard" eggs laid by those pullets or hens that have showed their merits as *winter* layers. Whilst aiming at *quantity* do not overlook *quality*.

SEX OF AN EGG.

How profitable it would be if we could tell the sex of an egg before it was incubated. Theories have been advanced from time to time, but it is impossible to predict safely the sexes of the future chicks before the eggs are placed in an incubator or under a hen. The expert can tell the sex of the chicks with a certain amount of accuracy at a day old, but the "novice" must wait till the

cockerels begin to show their red combs. The head-points of the male birds usually brighten up before those of the young females, whilst in many cases the former are rather backward in feathering. The latest solution is to take the chick in the hand keeping it on its back with its head away from you. Then blow gently to part the fluff and obtain a clear sight of the vent. If the thicker edge or lip of the latter is nearest the head the chick is a male and if nearest the tail then the chick is a female. The egg is a wonderful piece of nature and the man who can invent a means of telling the sex of it without any single mistake will be embraced by all his confreres.

COLLECTING THE EGGS.

It is a bad policy to allow eggs to remain in the nest too long, as they may be set on by a chance broody and thus get slighty "turned." In the winter, the eggs should be collected from the nests at very frequent intervals, as the very cold weather will often crack the shells or even render the eggs unfertile.

In collecting the eggs the breeder should be careful how he handles them. An egg is a delicate piece of mechanism and a sudden jar or shaking will do harm.

OBTAINING GOOD SHELLED EGGS.

For an egg to hatch satisfactorily it must be coated with a good shell. This can only be ensured where the birds are given regular supplies of grit. Any kind of grit will not do; the sharper and more sided the grit the better. For this reason flint grit is to be preferred to ordinary shell or oyster grit.

In the winter, the grit boxes must be watched. When the ground is hard from frost, the poor hens will need plenty of grit and the boxes should never be allowed to become empty. When in the boxes, too, the grit is apt to get frozen together so that the birds cannot get a supply. Keep a watchful eye on the grit boxes, well stirring the contents in frosty weather.

STORING EGGS FOR SITTING.

Much care must be taken as regards storing eggs intended for sitting purposes. They must be handled judiciously and not shaken up or the contents will intermingle. It is best to store the eggs in cabinets placing them on their sides—the only natural way—using sawdust as a bottom layer. Eggs should be stored in a fairly cool room or cellar.

The question of how long eggs intended for sitting can be safely stored is a common one. I am not a believer in stale eggs as I know too well that the fresher the eggs the better the results.

Eggs can be safely stored for two or three weeks if turned each day, but it is not the policy I recommend. The best results will be obtained from eggs two or three days old, although any up to a week old will not be too stale. In any case the daily turning of the eggs is essential, as otherwise the contents will stick to the shell and thus prevent any chicks from hatching out. Where the breeder has fifty eggs or so ready for his 100 egg size incubator he will find it profitable not to wait for the full complement of eggs unless these can be obtained under the week. Rather run 50 fresh eggs in a machine than 100 stale ones.

Another point occurs to me just now and that is in regard to the purchase of settings of eggs. Where the eggs arrive by rail or through the post, they should be allowed to "settle down" before being placed in the incubator or under the broody hen. For the same reason, eggs should not be set directly they are gathered from the nest, but allowed to settle down for 24 hours.

EGG CABINETS; BREEDING TRAYS.

Where breeding on certain specified lines is adopted the breeder—fancier or utilitarian—must mark all eggs laid to know from which hens or pens they come. An egg cabinet will be found most useful and owing to the importance of the work, some responsible person should mark the eggs to avoid any mistakes.

When the eggs are placed in the incubator it may be necessary to keep certain eggs separate from the others. It is not always a good plan to trust to judgment when the chicks hatch out, although this might be done where the eggs set were from a white and black breed respectively. A good plan is to put the eggs in small muslin bags or partition the special groups off by means of wire netting. This system will enable the breeder to tell accurately the pedigree of the chickens when hatched. He can then toe-punch or circlet them according to which method he adopts.

CAUSES OF SMALL EGGS.

Small eggs are very common, but may be considered useless both from a hatching point of view and for sale purposes. Small eggs may result from many causes. First and foremost we can blame the poultry-keeper who allows his pullets to lay before they are matured. Poor feeding will also result in small eggs. A man who knows how to manage and feed his stock however need not worry about small eggs.

CAUSES OF UNFERTILE EGGS.

Unfertile eggs may be attributed to many causes, a few of which I append below.—

1. Use of immature stock birds.
2. Use of aged stock birds.
3. Insufficient exercise.
4. Lack of fresh water and succulent green food.
5. Careless mating.
6. Use of weak breeding stock.
7. Unsuitable environment.
8. Bad feeding.
9. Bad management.
10. Use of stimulants.

There are many other causes, but as a rule the breeder is at fault. A common fault lies in the feeding of the stock birds. Feeding for eggs for sitting purposes should be slightly different to feeding for eggs for table purposes, yet few breeders recognise this. Breeding stock must not be force-fed in any way. Poultry-keepers who are troubled with dead-in-shell, etc., will (in nine cases out of ten) find the cause to be one of the above ten. An egg that is full of substance and well shelled should turn out a good chick.

EGG TESTING.

The value of egg testing is under-estimated. It is silly to place a sitting of eggs under a hen and be determined not to touch them till they are hatched. If they should be unfertile the services of the broody are wasted. On a farm it will be an advantage to set many hens and by testing the eggs at a given day the fertiles can be handed over to other hens (after the " clears " or unfertiles have been removed) to allow each of them a full batch. Egg testing is quite simple and whilst the expert can pick out the unfertiles after the eggs have been incubating but a few days, the " novice " had better leave the operation till the 7th, 10th, or even 12th day. A powerful light is needed and the egg should be held up to it and its contents noted. If a thick piece of cardboard is taken and a hole slightly smaller than an average sized egg cut therein this will enable the tester to see the contents quite clearly. Place the cardboard near a strong light (an acetylene bicycle lamp will do nicely) and hold the egg to the aperture in the cardboard. A fertile egg will resemble a spider with blood vessels all round and looks dark and sound. A bad egg will appear to contain a watery mass whilst an unfertile will be as clear as an ordinary new-laid. If you have bought the setting of eggs on condition that all unfertiles are replaced, do not break these, but retain them till the hatch is over and return them whole, for many breeders will not replace them on the strength of your statement as to the mere

number of fertiles. It is unwise to allow bad eggs to remain in the nest throughout the sitting as the poisonous gases from same will seriously affect the good ones, the shell of an egg being porous. For this reason many fanciers test their eggs twice during the period of hatching, on the 7th, and 14th day respectively. Do not waste the unfertile eggs, as these can be boiled hard for the chicks when they arrive and chopped up finely with breadcrumbs. Records should be taken of the hatches something after the following manner :—

Number of incubator.
Name of incubator.
Number of pen.
Number of eggs set.
Variety or breed.
Date set.
Date due.
Per cent. fertile.
Per cent. hatched.
Per cent. hatched to number set.
Per cent. of chickens reared.
Temperature in both room and incubator (3 times a day).
Moisture in incubator (taken occasionally).

SUMMER AND WINTER EGGS.

In the summer months people argue that eggs are not worth troubling about as they are so low in price. These cheap summer eggs should be preserved and sold at remunerative prices in the winter as " preserveds " or used in the house whilst the new-laids are sold in the winter. The winter egg is the thing we want and yet how difficult it is to obtain. So many poultry-keepers will have us believe. Let us bear the following in mind and eggs should be forthcoming when " eggs is eggs." Non-sitters should be hatched in April, May and June and sitters or " heavy " breeds, in February, March and April. The pullets should lay, with careful handling, by the middle of October or beginning of November. Those that lay earlier *i.e.*, before they are fully matured should be stopped. This can be done by not feeding on any stimulating foods for a time and changing the pullets to fresh quarters. Do not boast if your pullets lay at five months, this is unnatural and harmful to them. Do not hatch late in the season ; separate the sexes at an early age, allowing the pullets to have all available space ; do not overcrowd ; push the youngsters on from the beginning, not allowing them to look back. Pullets are but very little creatures and need careful handling.

WHITE v. BROWN EGGS.

White eggs are laid by "Light" breeds or non-sitters and brown eggs by "Heavy" breeds or sitters. Although there is no difference in the values of the different coloured eggs from a dietary standpoint, still, the public will purchase the brown in preference to the white and even offer higher prices. To put it briefly, it is merely a fad. White eggs are often dipped in coffee or in water slightly coloured with a few flakes of permanganate of potash to make them brown.

FIRST CROSSES FOR EGGS.

First crosses are often resorted to in order to increase the size and quality of the egg and the stamina of the birds. There is a lot of difference between a cross-bred or "mongrel" fowl and a "first-cross." The latter is a selected cross between two pure breeds such as Leghorn and Wyandotte, whilst the former is a cross where no two definite breeds are concerned and is not to be recommended. In crossing it is best to rely on the female for the colour of the egg, selecting the male from the non-sitting or white egg laying breed.

THE MOULT AND WINTER EGG.

If we are to secure a goodly number of eggs during the winter we must help the hens through the moult. The latter takes place about the end of July and should last roughly about six weeks. If the hens are neglected during this time they will still be casting their feathers when the cold winter snaps come on and so not lay till after Christmas. The moulters must therefore be watched and carefully nursed. As a rule the highest producers moult late so that they require more attention than the early moulters. A quick and successful moult is wanted and the feeding and management will have to be slightly altered. In the first place we must have the birds in good health in good time before the moult comes on. They should be given a tonic each week and housed warmly. Sunflower seeds are useful during the moult and the fowls must not be overfed. Clean up the feathers from the run daily, and so remove the "cause" of feather-eating. Where the reader is dealing with flocks of laying hens he will find it profitable to run the birds in warm houses, in, say, flocks of twenty or thirty until the majority commence to shed their coat. They can then be transferred to the grass runs. Feed the fowls sparingly at first and then, as they begin to cast their feathers, give a more liberal diet.

HANDLING THE EGGS.

All eggs intended for sitting should be handled with care. They should be taken from the nest almost as soon as they are laid in the cold winter months, and when packed away must be

turned every day. The best way to store them is in a box of sawdust, laying the eggs in their natural pose, *i.e.*, lengthwise. Do not jerk or shake them, remembering at all times that each egg contains (or *should* do) a live germ.

PERIODS OF HATCHING.

The times of incubation for eggs are roughly as follows :—

	Days		Days		Days		Days
Hen	21	Goose	30	Guinea Fowl	28	Ostrich	42
Duck	28	Turkey	28	Bantam	19-21	Emu	42
Pheasant	24	Pea Fowl	28	Swan	42		

In setting a hen, select one that has an abundance of feathers and fluff, and do not give her too many eggs. The hen turns her eggs each day, and an uncovered egg to-day will be warm to-morrow with a different egg out in the cold. In this way the eggs are each spoilt in their turn. It is safer to entrust ducks' eggs to the hen than the duck, the latter being an uncertain sitter, although, of course, there are exceptions. In the case of Bantam eggs, a small hen must be selected, as a large hen would soon smash the eggs. Bantam fanciers usually give their choice to a Silkie X Wyandotte broody. In many breeds the Bantam hen herself will make a good broody when she is so disposed.

In the winter months less eggs should be given a hen than in the summer months, in all cases rather give the broody an egg less than she can cover than one more. Where the turkey hen is sitting on her own eggs, keep the gobbler or male turkey away from her, as he is usually pugnacious, and will even devour the eggs. The common hen can of course be used for turkey eggs, only a few being given her. The records of all broody hens should be kept, especially on an extensive farm, and the " cream " should be kept on till old enough to be pensioned off. A good and reliable broody is worth her weight in gold. It is always advisable to damp the eggs slightly a day or so before they are due to hatch. This process will help the chick to break the shell of the egg owing to the steaming from the heat of the hen's body. It is sometimes necessary to help a chick out, and I can certainly recommend such a process where imperative, but care should be taken to see that there is no bleeding. Should an egg get cracked, merely cover the hole with stamp paper, and it will hatch successfully nine times out of ten. In signing for a sitting of eggs that has arrived by rail, do not sign the receipt note in haste ; first examine the eggs, sign for those that are sound, and then claim damages for the " brokens." If you sign for the consignment without examining the contents, you will have a difficulty with any claim you may put in.

TO SECURE FERTILE EGGS.

Every fancier desires fertile eggs, and quite naturally, but if the hatches are bad, the fancier as a rule must blame himself. In such cases look round for any flaw in management, feeding or stock birds. To secure fertile eggs the stock must be healthy, the male bird must be fed separately if he will not eat, and the birds must be kept free from insects. The birds, too, must be mated correctly. Dead-in-shell, weak germs and the like can all be traced to mismanagement or unhealthy stock. Need more be said? Where heavy combed males are used, it is the practice to cut or dub the comb, and in such cases I think the fancier is doing a kindness to the bird instead of being cruel. Many times have I saved the lives of Minorcas with large heavy combs by dubbing them, and in many instances by the fraction of a minute. By this means greater fertility is ensured. In heavily feathered breeds such as the Brahma, Cochin, etc., the fluff around the abdomen is best cut off during the breeding season in both cocks and hens, otherwise unfertile eggs will be plentiful. Foot-feathers in those breeds possessing same are also best clipped off, whilst crests should also be trimmed to avoid unfertile eggs. These remarks apply to Bantams as well as large fowls. This trimming can of course only be done with birds especially reserved for breeding purposes, and not for show during the breeding season.

It often happens that chickens hatch out a different colour to that of the original breed, and this fact has caused many a novice to write an insulting letter to the breeder. The baby fluff is not a sure guide, although the rearer can roughly judge the colour of the chicks when the chicken feathers come.

DURATION OF MALE INFLUENCE.

How long before eggs are wanted for sitting should a pen be mated up? This is a general question always turning up. Accounts vary, some alleging that from three to seven days are sufficient. There is no doubt that a male will fertilise a batch of eggs at one alliance, and this batch may be anything from a dozen upwards. If, therefore, we mate our birds up a fortnight or so before we require the eggs, we may be sure that many of the eggs will be fertile when set. If the male bird is removed, all the eggs in the batch under process of development at the time of the alliance will be fertile. Where a male bird flies over into another pen, it is best to allow a fortnight or so to elapse before relying upon the eggs laid by the hens thus crossed. It is generally supposed that once a hen has had an alliance with a male, she is stamped for ever with his peculiarities, and should a male of another breed

accidently get into the wrong pen, those hens he treads will be "lined," and the progeny will be marked for ever with his qualities—good or bad. This is not so, for the male influence only asserts itself with the batch of eggs that follow the alliance. Copulation does not fertilise the egg laid on the same day. A study of the ovaries proves that the egg laid to-day is already fully shelled some twelve hours before it is laid.

Section IV.

MANAGEMENT OF EXHIBITION STOCK.

BREEDER VERSUS REARER.

CONSIDERABLE doubt exists at the present moment with regard to who is the breeder of a prize-winning bird, if it was sold as a day-old chick or hatched from eggs. The problem is whether (1) the person who mated up the breeding pen that produced the winning bird or (2) the purchaser who reared the said bird—is the actual breeder. For my own part I am entirely in sympathy with the person who rears the bird from the shell or chickenhood to maturity. At the same time, however, the claims of the fancier who has brought all his experience and judgment to bear on the mating of the pen must be considered. If one half of the credit is awarded the "mater-up," and the other half apportioned to the rearer, this would be a fair division.

The point I wish to drive home is this, that the art of breeding high-class exhibition birds lies more in the rearing of the birds to maturity than most people imagine. Of what use would it be for a fancier to hatch out a dozen chickens from a dozen eggs if he could only manage to rear two or three of this number to a matured age? From the very moment that the prize-bred chicken "pips" the shell, the rearer must bring into play all the knowledge he possesses.

THE EARLY-HATCHED CHICK.

As is well-known, many a poultry fancier has made his *mark* through early-hatched chickens. The enterprising fancier who hatches out his chickens in January, giving them all care and attention whilst they are growing, will always succeed against his brother, who is content to wait till broodies are plentiful and the weather more congenial. Artificial incubation and rearing have been so perfected that there can be no excuse for late-hatching. At the summer shows competition is not over brisk, and even the veriest novice may find himself the possessor of several valuable trophies before the winter show season sets in—and all through early-hatching. Try as hard as one might, however, it would be

impossible to impress upon some breeders the importance of getting our early exhibition chickens. The same remarks might be aimed at the majority of rearers of table chickens, who seem to fight shy of early-hatched chickens, despite the fact that these in the spring make the best prices of the whole year. Is this lack of foresight due to laziness or unwillingness to take advice? To say the least it is a difficult question to answer.

With early-hatched chicks the exhibitor must carefully study the feeding, as the little ones must be well fed to enable them to withstand the attacks of all kinds of unfavourable weather. The breeder may find it necessary to rear the little chicks indoors or place the foster-mothers containing them inside the scratching sheds or shelter. The morning feed must be given very early, whilst a late meal—by lamp light—must be given at night to help the chicks through the long cold nights. This extra care and attention to detail will resemble so many hours of pleasure to the *willing worker*, for he will have all his heart and soul in the business he is engaged in.

THE IMPORTANCE OF SIZE.

In an exhibition bird *size* may determine whether its value to the breeder is 40/- or £20, for a good big one will always beat a good little 'un. For this reason the exhibition chick must be kept growing from the time it is hatched out, an item in itself, which amply proves that the breeder's task does not end after the breeding pens have been mated. Lack of size may be attributed to several causes, chief amongst which are improper feeding or management, and the breeding from immature parent stock. Where too much grain is fed, for instance, the chicks will be small in body. This must be guarded against.

In feeding young chicks, the main object should be first to feed for a framework, and then for flesh or fat. If the chick is given a good framework during its early days, it will be able to take all the flesh the breeder can grow by suitable feeding. Such foodstuffs that produce bone should be included regularly in the dietary, with grit and green food provided *ad lib.* A tonic if given occasionally will prove beneficial.

SEPARATING THE SEXES.

With the chicks thus thriving, the time will come when the sexes must be separated. Whether the youngsters are for stock, exhibition or laying purposes, it is a mistaken policy to allow the cockerels to run with the pullets too long. The best time to separate the sexes is directly the breeder can safely tell the males from the females. Young cockerels are very greedy and spiteful, and eat up most of the food that should go the way of the pullets.

If this separation of the sexes takes place as advised, the pullets will have every chance of growing into good-sized birds, which would be impossible under the other circumstances. Always try to avoid overcrowding.

TAINTED GROUND.

Exhibition youngsters should be kept growing all the time, and must not be allowed to lay at too early an age, as growth naturally stops with the commencement of laying. All ailing chicks must be treated directly they are noticed to be suffering, and treated without delay. Every up-to-date establishment should be equipped with a "Hospital" where the invalids should be removed for immediate treatment. The necessary "stock" medicines should be kept handy. Most of the mortality in chicks would be avoided if ailments were taken in hand during the early stages and not allowed to get a firm hand on the sufferers.

It is an unwise policy to allow chickens to run through high grass that is wet with dew. For this reason my reader will be well advised to cut the grass near the coop quite short.

Then again, there is the question of tainted ground which will soon bring disaster in its train. The fancier will find it quite a good policy to have fresh rearing ground each year. The land that is being rested should meanwhile be sown with lucerne or clover. The same treatment is advisable in cases of tainted ground, as lucerne and clover are quick growers. It is a good plan, too, to have a spare run or two for the breeding pens, so that each grass-run can have its rest in turn.

CARE OF THE HEADPOINTS.

We are now faced with the problem of caring for the head-gear of such breeds as Minorcas, Leghorns, etc. With such breeds that possess large upstanding combs, the chicks must not be with the broody hen too long. Directly they begin to shoot their combs, they should be removed from the hen, or her weight will compel the combs to grow on one side, which would be disastrous with the cockerels for instance.

Later on, the headpoints will again require attention. In the case of the Wyandotte, for instance, where the leader of the comb must follow the arch of the neck, the use of a comb-guard may be advisable. Comb-guards of a different shape will also be useful for other breeds. In large-combed varieties meat must be given to bring out the headpoints, whilst there is nothing like heat to make a comb grow. Large-combed pullets are usually confined in a heated shed to promote the growth of the combs, whilst vaseline is rubbed thereon every other day, and the comb worked (with the thumb and finger) from the base to the serrations. Nothing looks

worse than a Minorca or Leghorn pullet with an undeveloped comb that is out of proportion to the size of its body. I am not a believer in monstrosities as regards headgear, but I like to see a comb in keeping with the body and shape. As regards the cockerels of large-combed varieties, they require no special treatment, except as regards nourishing foods, with meat scraps included in the dietary.

As birds of the Minorca type grow, the lobes will require extra attention, and these will be increased in size if sponged in warm water, dried, and afterwards worked with glycerine and the thumb and finger. If a white lobe becomes blushed, *i.e.*, streaked with red, house the bird in a warm but fairly dark compartment, sponging the lobes each day with warm milk, afterwards drying off and applying powdered zinc. If a red lobe becomes partly white, place the bird in a well-lighted house and provide it with plenty of scratching exercise. A little meat should also be given.

Young chicks should be well-housed, and not be overcrowded. Ground-roosting should not be encouraged too long or the bird's plumage and tail will be damaged. It is a bad plan, however, to allow birds to perch too early, as they are then liable to suffer from crooked breasts.

NEED FOR SHADING.

Most varieties require shading from the hot rays of the sun when the youngsters are growing. The sun will turn white plumage yellow, black plumage brown and buff plumage a lighter shade, whilst it will have a bad effect on lobes. On many exhibition farms the youngsters are not allowed out till late afternoon or evening when the sun has lost its power. The need for shading is noticed chiefly when the permanent feathers begin to appear. If the rearing-ground is well studded with shrubbery, this is an advantage, but many breeders keep their exhibition youngsters confined as mentioned above. Canvas screens are also fitted to the houses. During the moult the same case of shading must be observed, and special cockerel boxes should be employed for the use of males. A tonic at such times will greatly benefit the birds.

ON COLOUR-FEEDING.

Many years ago the poultry fancy was up in arms against the colour-feeding of exhibition birds, and nothing definite can be traced. Opinions on colour-feeding greatly differ, some maintaining that it is impossible, others that it can and is being done by many leading fanciers. I am certain, personally, that many exhibitors colour-feed their birds, and I will give the opinions held by many of my fancier friends. One of the best canary judges we have, and a good all-round judge of poultry, is a great believer in tasteless pepper for buff-plumaged fowls. As this cannot be

added in the soft food to take effect, it is given in capsule or pill form morning and evening immediately after the birds have had their usual meals. Thus given, the colouring matter is digested and its colour constituents absorbed and assimilated at the same time as the ordinary food. In this way the tone of the buff plumage is "levelled up." Red lentils are also recommended.

Maize as a colour food is much discussed. Some argue that yellow maize, whilst being given with advantage to buff fowls, should not be given to white-plumaged birds, the white maize taking its place. . Others argue that white-plumaged birds will not take harm by having yellow maize. Personally, I agree with the former opinion, and am sure that yellow maize will tinge the lobes of white-lobed varieties. It is a pity that so many fanciers are ready to cry against the possibilities of the colour-feeding of fowls without making any experiments, and so having proof ; many, too, argue that hemp-seed will darken the ground-colour in Brahma hens. We could well do with some official trials and results on this score.

There is no doubt in my opinion that, during the moult especially, the colour of plumage can be improved. With exhibition birds a quick moult is essential to secure a level tone of colour in the plumage, whilst a good supply of green-stuff during the shedding of the feathers will greatly help in this direction. As the new feathers are shot, the birds must be shaded or the plumage will end up by being patchy. Some kind of iron should be given, and Saccharated Carbonate of Iron will help to preserve the body colour of the birds during the moult. Especially is this recommended for such varieties as the Black Orpington, Black Leghorn and Black Wyandotte.

BRASSINESS AND CREAMINESS.

Brassiness is a common failing with many breeds, such as the Silver Wyandotte cock (top colour), Columbian Wyandotte, Barred Rock, etc. It may be caused by several things, such as by the distribution of black pigment in slatey under-colour breeds, or those with dark stripes in the hackles. Such brassiness is entirely due to breeding, and can be bred out by selection. The giving of too much fat-producing foods, such as maize or maize meal will also cause brassiness or creaminess of plumage, whilst the same defect will accrue through the birds getting in the sun. We have heard a lot about the bleaching of white fowls to remove brassiness, but I sincerely think that such a practice is impossible. If a bird has been bred right from generation to generation, sappiness should not show itself. As a breeder of Silver Laced Wyandottes many years ago, I had much trouble in persuading the brassy top colour in one of my best cocks to disappear entirely.

By shading, I was able to keep it away for periods, but at length I got rather disgusted and relegated the bird to one of my utility pens. The problem before me then was to secure another male, and I was bent on securing a white-topped bird. I had several down on approval from well-known exhibitors, and selected what looked to me to be the best natural top-coloured bird. This one I retained, and as luck would have it, I was fortunate in my choice. I shaded the bird during the time I wanted it for show, but it went all through the breeding season out in the sun and was never brassy on top. For this reason I have always remained firm to my opinion that a bird bred white will remain white. I might add to this by saying that one of our most popular fanciers who in his business, is dealing every day with chemicals and dyes, declares it is impossible to bleach the plumage of fowls. He keeps white fowls, too, and should know !

EFFECT OF SOIL ON SHANKS.

Certain soils, owing to the presence of alkalies, make it impossible to retain the desired colouring of the shanks of some breeds. Yellow-legged breeds mostly suffer, and the fancier is faced with the problem of either changing the breed or confining his birds.

Section V.

MANAGEMENT OF HEAVY LAYERS.

CHICKEN-HOOD.

THE rearing of chickens eventually intended for egg-production is a veritable art, and the rearer brings into play all he knows. Unless he works on certain definite lines, he can never hope to turn his chicks into heavy egg-producers. The cockerels must be separated from the pullets directly the sexes can be ascertained, so that the pullets may be kept on the grow from the date of birth to maturity. There must be no coddling or overcrowding at any period, whilst tainted land must be avoided. We will take it for granted that the breeder has, very wisely, mated up his pens using strong, healthy and vigorous parent stock only, also that he has so fed the stock birds to enable them to produce " hatchable eggs." The management of heavy layers would then be after the method recommended in this chapter or section.

WHEN TO HATCH.

The main object of the owner of heavy layers will be to secure full egg baskets during the winter. To attain this end the chicks must be out of the shell at the right time or they will eventually turn out failures. In the case of heavy breeds the chicks should be hatched out in March and April, whilst April and May will be suitable months for chicks of the non-sitters to see daylight. Guided by these months the owner should mate up his pens in good time, else a year's work may be thrown away. This matter of hatching at the right time is not studied by the majority of novices, and well they know it when the empty egg baskets during the following winter months tell their tale. The cause of late-hatching is often put down to the scarcity of broodies, but the enterprising poultry-keeper will not let this hinder him in any way. I have walked miles and miles for a broody early in the season, visiting all the farmers I came across until my object was accomplished.

Hatching in January and February, *i.e.*, with the heavy breeds, also has its advantages, for pullets hatched out then will fill the gap as regards egg-production during the autumn months when the other birds are moulting. The cockerels, too, will be useful for the following year's breeding pens.

GRADING UP THE STOCK.

The average utility poultry-keeper does not trouble to grade up his young stock, an item that should never be neglected. In all hatches there will be some youngsters that will not get along so well as their sisters of the same age. If they are left with their bigger sisters they will begin to drop back owing to the fact that they cannot secure their proper proportion of food. By grading up the stock into sizes, this will be avoided to the benefit of the pullets concerned. By backward pullets I do not mean *weaklings*, for I do not believe in coddling these, as the " survival of the fittest " means so much in heavy egg-production.

We will suppose that the poultry-keeper has 600 or so pullets running about on the farm, all of different ages and sizes. The cockerels have already been separated from the females, and the latter toe-punched or rung with circlets. At three months old the system of grading can commence by the smaller pullets from batch A., being first relegated to batch B., where some of the chickens (perhaps hatched later) are about their own size. The larger ones from batch B., can now be moved up to batch A., to take the place of those moved down. The grading can be carried out throughout the whole 600 or so pullets, and all will have a better chance of making growth. At the end of the fifth or sixth month a second " grading-up " can be made.

ON THE POINT OF LAYING.

As the pullets get older, their period of laying will approach and they must be carefully handled. Many a poultry-keeper sticks his chest out when he receives his first pullet-egg, especially if the bird is but five or six months old. These early layers will never make a show as winter layers, for after they have laid a few eggs, they will go on strike when the cold weather sets in and not lay again till the following January or February. No pullet should be allowed to lay before she has fully matured, or in other words, finished her growth, not only for this reason, but also because the eggs will be small. To check this early laying the owner should remove the birds to different quarters and feed them for a little time solely on grain, even withholding the morning mash for same.

Young pullets are very nervous when on the point of laying, and wlil show a disinclination to enter the nest-boxes if the latter are too much in the light. A dark cosy corner of the house should

be selected for the nests, a few pot or nest-eggs being placed in the latter. I have found it a good plan to run a hen that is in lay with the pullets when the latter are on the point of laying. The old dame will not be long in schooling the youngsters in the A B C of laying in the right place. I may well add the last four words, for pullets are very apt to drop their first few eggs from the perch at night, or even in the daytime, and this practice will soon teach them that troublesome vice called egg-eating.

At this time, too, the nest-boxes should be well lined with clean, warm nesting material as they will then look inviting. The nesting material should be renewed frequently. The flocks can again be graded just when the pullets are well on the way to start their winter egg output, and it is a good plan to get them into their winter quarters as early as possible so that they need not be disturbed just when they are ready to commence laying.

TRAP-NESTING THE PULLETS.

If the pullets have been hatched at the proper time and had proper feeding, management and environment, they should show their appreciation by scoring very high on the winter egg records. Trap-nesting during the pullet year is essential and due regard should be taken not only of the number of eggs laid, but also of the time of the year. Winter eggs are certainly equal to two, or even three summer eggs.

VALUE OF SCRATCHING EXERCISE.

Scratching exercise is essential for heavy layers, as the more a hen scratches the more eggs she will lay. Sand or sifted soil, with rye or wheat straw on top will make a good litter, and it is best to let the hens chaff the straw up. The deeper the litter, the better. Scratching exercise promotes health, and where it is encouraged the medicine chest will not often have to be opened.

THE MOULT.

During the pullet year the moult will not trouble the layers, as the shedding of the feathers is hardly noticeable. Second season hens, however, must be well handled during the moult, as if the latter is not normal the layers will be late in starting work again. During the moult, the birds should be warmly housed and well cared for, whilst a tonic given all round will be appreciated by the birds. The males should be separated from the hens during this period and it is best to house each separately in cockerel boxes or similar small compartments. Cockerel boxes are most useful appliances on the farm. The moult usually takes place, roughly, about July.

SUMMER AND WINTER MANAGEMENT.

Various seasons of the year call for different management and feeding, and such must be allowed for. Thus, in the winter the houses must be made warmer than during the summer months, when plenty of ventilation will be necessary. Ventilation, however, should be provided without any draughts, the latter being very injurious to fowls. Summer feeding too will be much different to that in vogue during the winter months, when foods of a heat-producing nature must be given.

In the winter green-stuff will not be over plentiful, and a substitute will have to be provided. Clover hay or sprouted oats must be included in the menus. During cold snaps, maize can be added to the evening grain food twice or thrice a week.

USE OF SHELTERS.

Hens dislike taking to their houses on cold days, but will readily run under shelters on the approach of a storm. Useful shelters can quickly be made, only a few hurdles—thatched on top—being necessary for their construction. Yet they are so handy and should be on every farm. Fowls seem stupid creatures, and on our general farms may be always seen moping about outside their houses on rainy days. This exposure to wind and rain is not conducive to heavy egg-production.

Section VI.

GENERAL NOTES.

IF we are to have healthy progeny, it is absolutely necessary that unhealthy stock birds should not be used for breeding. If weaklings are killed when young, the breeder will be taking a step in the right direction.

WHEN PURCHASING BIRDS.

When purchasing birds great care should be taken to see that they are healthy. Many novices do not trouble about such matters, with the result that the unhealthy purchases soon cause havoc in the poultry yard. When a bird is being purchased, the purchaser should take stock of the following. If the bird displays unnatural breathing, several ailments may be counted on. Examine the mouth, eyes and nostrils of any birds being purchased. The mouth of a healthy bird should be clean and the breath sweet. There should be no watery matter about the eyes or nostrils of a healthy specimen.

Newly-purchased birds should be kept apart from the other stock for a few days and their excrement watched. If this should be exceedingly white, kidney disease may be expected, and if greenish or yellowish, liver complaint in minor and more advanced stages respectively.

Exhibition birds on their return from a show should also be housed separately from the other stock for a few days, and carefully watched to see that they have contracted no ailment whilst at the show.

CLEAN APPLIANCES.

To keep ailments from the poultry yard, the appliances should be kept scrupulously clean. The perches should be frequently scrubbed with carbolic soap and warm water, whilst the nest-boxes should be similarly treated at frequent intervals. The nesting material, too, as previously mentioned, must be renewed when necessary. Where the internal fittings of the houses are movable, as they should be, this will facilitate the cleaning. Insects and

other pests must be guarded against and all houses whitewashed inside and tarred or painted outside once or more each season. During the moulting time the feathers should be collected from the run daily if possible, whilst movable dropping boards should be fitted under the roosts to catch the droppings.

DANGERS OF CONDIMENTS.

The mistake of giving hens condiments and stimulants in excess cannot be over-estimated. Such are given with the idea of forcing heavy egg-production, but they are bound to have an ill-effect on the health of the birds. A spoonful of mustard (for every twelve birds) given two or three times a week will prove beneficial in the winter months, but condiments must be used with care. A tonic given now and then will be quite the thing, and birds will benefit by same at such times as the following :—1, during the moult ; 2, after the moult ; 3, on the return of any bird from a show ; 4, half way through the breeding season ; 5, at the end of the breeding operations ; 6, half way through the winter laying season ; 7, at the end of the winter laying season.

A good " stock " medicine to have handy is the much-boomed " Douglas Mixture." It can be made quite cheaply as follows :— Put 8ozs. of sulphate of iron into a gallon of water—using a bottle, jug or similar container. Directly the iron has dissolved, add half fluid oz. of sulphuric acid and allow the mixture to clear. Then securely bottle it away and it is ready for use. A teaspoonful of the mixture should be added to each pint of drinking water.

Section VII.

ON KEEPING RECORDS.

OBJECTS OF RECORDING DETAILS.

IN any business we might name, a person would be all at sea unless he took the trouble to keep account of every little detail. The business of poultry farming is no exception, and it is very long odds that the systematic worker will triumph over his brother who works on a haphazard, trust-to-luck plan. No matter how small the poultry establishment may be, the strict recording of details connected therewith is absolutely necessary. I append a *few* of the reasons for the keeping of accounts :—

1. The true side of the business is shown on the screen.
2. The records if kept will point out to the owner his mistakes of the previous year or earlier if necessary.
3. Any branches that show a loss can be shelved.
4. They will create such an interest in the work of the poultry farm that may turn failure into success.
5. They prevent the poultry farmer from stopping still and so making no progress.
6. They show the results of experiments and selection.
7. They teach the correct way to mate up the breeding pens.

THE STUD REGISTER.

Where scientific breeding is to be undertaken, a stud register will be necessary, whether the owner is engaged in the breeding of exhibition birds or high-class layers. In conjunction with the system of line-breeding explained earlier in the book, this stud register will be a very interesting and most useful document. Line-breeding in the true sense has as its object the retaining in the progeny of the good points of the parent stock. The line-breeder must not be content with this, for his parent stock may have one or two faults. Supposing in this instance the parent hen is a layer of rather small eggs but plenty of them, the main object of the line-breeder will be to improve this failing in any after-matings

by *selection*. This is where the stud register will prove helpful, for under the section of "general remarks," the outstanding points of the various birds will be seen at a glance.

A page of the stud book would be ruled off something like the following :—1, number of legband (or colour of circlet) ; 2, breed ; 3, sex ; 4, when hatched ; 5, pedigree ; 6, general points and remarks. In the matter of sex a simple plan is to represent the males by a X (cross), and the females by a O (circle). A specimen page of the stud register then would be as follows :—

Legband No or Colour	Breed	Sex	Hatched	Pedigree	General Remarks
21 or Yellow and Green	White Dotte	X	Feb. 1914	X4 x O 8	Good type and colour, always very healthy and vigorous. **Notes**: **Excellent** points, grand front, leader and size
18 or Green and Red	White Dotte	O	March 1914	X9 x O 7	Nice laying type, active and healthy, good, medium size. **Notes**: Laid 242 eggs in pullet year, broody for three days only in pullet year, eggs weigh 2¼ ozs. Grandmother on father's side, laid 250 eggs in pullet year.

RECORDING BROODINESS.

The breeder of fancy stock will not be troubled with all the details that will come the way of the breeder of heavy layers. The former will be dealing more or less with special fancy points in his endeavour to improve them by line-breeding and selection. The utility man on the other hand must keep strict accounts of numerous good and bad points, and so will find it necessary to supplement his ordinary stud register by notes on such points. He will find it necessary to record the egg output of each hen, the weight and colour of her eggs, when laid—for the winter egg naturally counts far more than the summer one, etc.

As the male is a good proportion of the mating, the number of eggs laid by his mother in her pullet year must also be recorded. Then again, a bird must not be broody too often if she is to prove an egg-record breaker, and so this failing must be gradually wiped out by selection. It is a well-known fact that although most breeders of pedigree laying stock keep sitting varieties their strains are practically free from the curse of broodiness.

ON EGG-RECORDING.

There are many different ways of recording eggs, and much will depend on the objects of the breeder. Where the trap-nest is employed, the eggs will be dotted down to the individual layers on the spot as the recording cards are nailed up in the house. Apart from individual egg-recording, the breeder must know exactly where he is in the matter of profit, and the following plan is a good one to adopt :—

SUMMARY OF RESULTS.

Number of pen.....
Number of hens.....
Breed and pedigree .....
Total number of eggs laid.....
,, value of eggs laid.....
,, cost of feeding.....
Profit over feeding .....
Average number of eggs per hen.....
Highest number of eggs for one hen.....
Lowest ,, ,, ,, ...
Notes .....

Where the breeder has no time to make out monthly records as above, he can write out his summary at the end of the year. The sheets for the winter months will naturally call for more importance than those for any other months.

MATING AND OTHER RECORDS.

The breeder will be well advised to keep mating records. The results from all matings should be noted, and the records kept up to date. Monthly pen records should be used, and these can be nailed up in the respective poultry houses. In the case of mating records, accounts should be taken of the age of the breeding stock, pedigree, number of eggs fertilised, mortality, if any, amongst the progeny. In the case of monthly pen records, such items as number, weight, value and colour of eggs laid, cost of feeding and broodiness can be adopted. Other special records might include—1, advertising record ; 2, incubating record ; 3, feeding record ; 4, show record.

SIMPLE RECORDS BEST.

It would be impossible to recommend any standard system or systems of recording for every farm, as many concerns are widely different to others in character and extent. Accounts of a "general" nature can be adopted on all poultry farms, but the owner knowing his aims and objects best must use his own discretion in recording the details in connection with his particular business.

All records should be simple and easy to turn up when required, Single sheet records for this very purpose are admirable. but they should be safely filed away at the end of the year for future reference. An easy system of egg-recording, for instance, is arrived at by ruling off very small squares throughout the month —one square for each day—the depth depending upon the number of lines required for the flock of birds whose egg-records are being taken. Then, instead of writing the figure 1 in each square, the square can be inked over to record the laying of an egg. By deducting the number of white squares from the number of days in the particular month, the egg total for the month can be quickly ascertained.

After a little experience in recording details, the poultry-keeper will soon find out the shortest cut to arrive at the necessary results. In making out records, space should be left for the breeder's "notes," as these will prove of interest and importance at a future date.

Section VIII.

BREEDING TABLE POULTRY.

WHAT THE STANDARD REQUIRES.

THE present work would certainly be imcomplete without any reference to the breeding of table poultry. A well-known firm in Leadenhall Market pays close on £20,000 a year for table chickens to senders in Surrey, Kent and Sussex alone, so that this branch is one of the best for the poultry farmer to cater for. The table poultry industry is very much booming just now, and in the first instance I propose giving the standard for table poultry :—

1. Size and quality ... ... 25 points.
2. Youth, quantity, and quality of breast meat ... ... 30 points.
3. Straightness of keel, fineness of bone, absence of offal and surplus fat ... ... 25 points.
4. General marketable appearance, colour of skin, etc. ... ... 20 points.

A study of the standard will show the breeder of high-class table poultry what his aims and objects should be. The points that stand out and count for so much are :—Straightness of keel, fineness of bone, breast meat, size and quality. Thus, we want a big bird, but not a coarse one ; we want a bird with the meat or table qualities *in the right place.*

THE GENERAL FARMER'S STOCK.

The general farmer is the man who neglects the rearing of table chickens. With the large number of acres at his disposal, he should find it very profitable to mate up pens of big-framed birds for rearing high-class table chickens. As he is able to move the poultry houses to fresh ground once a week owing to the land being at his command, I would recommend in his particular case the keeping of his stock birds in small flocks. He could conveniently run his table birds in flocks of 25 and 30, and give each flock a separate field to roam over.

In the general farmer's case he can well afford to go in for dual-purpose varieties, as the surplus males can be run with the other fowls on the farm to improve their quality. Large Buff Orpington pullets mated to a deep fronted Faverolles cock will produce high-class, quickly growing table chickens.

PURE-BREDS OR CROSSES, WHICH?

The main object in raising table chickens is to see that a quick growing breed is selected. It is useless to stock a breed that is noted for its slow growth, no matter how big the bird may ultimately turn out. As regards the question of whether pure-breds or crosses should be kept so much really depends upon the soil and circumstances. My advice to the table poultry specialist is for him to experiment the first year with several known table breeds and crosses and hit upon those that give the best returns. The white-legged breeds are usually preferred.

The Dorking is undoubtedly the king of table breeds, and after I would take the Sussex, Buff Orpington and Faverolles, whilst the Jubilee Orpington runs them closely. The Buff Orpington lends itself in an admirable manner to crossing, as do the Old English Game, Indian Game and Faverolles. The following crosses are well-known for breeding high-class table progeny. Indian Game—Dorking, Dorking—Buff Orpington, Indian Game—Buff Orpington, Faverolles—Buff Orpington, Indian Game—Houdans, Old English Game—Dorking, Old English Game—Buff Orpingtons, Old English Game—Houdans, Sussex—Orpingtons, Old English Game—Sussex.

MATING FOR TABLE POINTS.

In breeding table chickens, the seasons for marketing the produce must be studied and the chicks hatched out at the right moment to be marketed when the prices are best. During the spring prices run very high for table chickens, and these must be

hatched out in the preceding December. With this early-hatching the chicks must be well cared for, owing to the indifferent weather that will be experienced during the time they are being reared.

For December hatching, eggs must be plentiful just then, which will necessitate the stocking of an all-round breed like the Buff Orpington or Sussex. In mating up breeding pens for meat purposes, the birds must be healthy and vigorous. Size is of the utmost importance, and birds possessing large frames, well covered with flesh in the right places, should be selected. Birds free from sharp angles are usually the best breeders of table chickens. Large framed progeny are naturally capable of carrying more flesh than puny youngsters. Thus it will be seen that care in mating and selection stands for much in the rearing of table chickens.

F. Robinson & Co., The Library Press, Lowestoft.