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Poultry Secrets



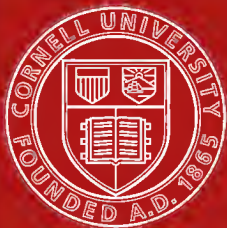
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POULTRY SECRETS

GATHERED, TESTED AND NOW
DISCLOSED

BY

MICHAEL K. BOYER

(Poultry Editor, Farm Journal)



PHILADELPHIA—1908
WILMER ATKINSON CO.

Price, 25 cents

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Publishers' Foreword

This work has been prepared by Michael K. Boyer, one of the foremost poultrymen of the United States. In its preparation he has drawn on his own great storehouse of experience, and on those of his many friends who are authorities on poultry. It is packed full of information not generally known to the average poultryman.

Permit us to say, however, that these "secrets"—like the majority of human secrets!—are probably not secrets to every person. Some people have had things whispered in their ear or have read occasional hints in papers, or perhaps they have paid five or ten dollars to some expert who furnished the information, or possibly they have bought some expensive book that contained one or two little-known facts. And so this so-called secret knowledge has spread, gradually and slowly, among a—so to speak—"select inner circle" of poultrymen who treasure it more or less carefully. Of course some of the secrets, like different kinds of molasses, have "leaked" faster than others, and therefore have become better known.

We do not believe that there is a single secret in this book which is not known to at least a few breeders of poultry. Nor do we assert that none of these secrets have ever before been put into print. But we say this: Some poultrymen have paid considerable money to learn only a few of these secrets; many poultrymen have lost money because they did *not* learn; and every poultryman now has the first chance ever offered, we think, to obtain in one book a summary of the most important of the secret knowledge, old or new, that exists to-day. This summary is as complete as money and experience can make it, and as fast as newer processes or methods are discovered we shall secure them promptly—see offer in the back of this book.

To sum up, we feel that this book should put money into the pockets of thousands of poultry keepers—men and women—who have not before had access to the partially-concealed knowledge which a few insiders have hitherto tried to monopolize.

WILMER ATKINSON CO.

INTRODUCTORY

The object of Poultry Secrets is to give to the reader information not generally found in books, and such as is kept more or less quiet by the veteran poultryman.

Some of the facts contained herein have cost years of experience and hundreds of dollars, and the originators have, in many instances, done their best to withhold the true facts from the public.

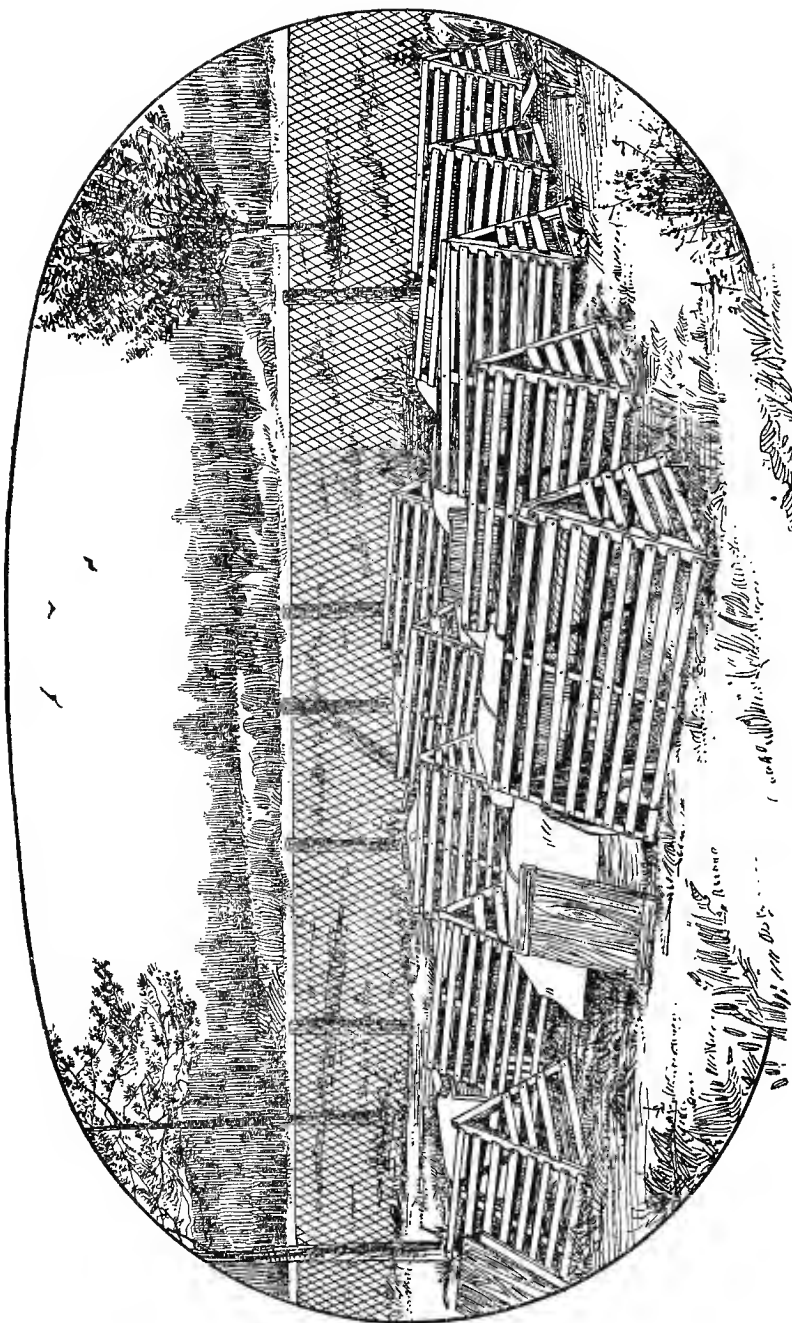
The writer feels that in publishing these secrets he is doing a good act and saving considerable money and time for the beginner.

It is his hope that this book will bring profit and satisfaction to the reader.

MICHAEL K. BOYER.

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NATURE'S BEST INCUBATOR

Outdoor barrel nests for sitting hens. About 3 inches of earth is excavated in which the barrel is laid on its side; waterproof paper placed over top. For a run 4-foot lath is used, made A-shaped. At night a board is placed in front of nest to keep out rats, cats, etc. The nest is made of a layer of earth, with straw on top.

Secrets of Fowl Breeding

There is no foundation for the theory or belief that certain varieties of fowls are more hardy than others. It is true, however, that not all the foreign varieties take kindly to our changeable climate; but if the breeding is right, we can build up a rugged race out of almost any known breed. Breeds are often condemned for lack of hardiness when the fault really lies at the door of the breeder who has used injudicious methods.

Properly to select and breed the stock is an important secret, and in this particular the writer hopes he will present information that will be useful to poultrymen.

In originally buying the stock it is important that it be obtained from a reliable party, out of a well-established "strain" of its class, noted for hardiness and good, strong utility qualities.

You must satisfy yourselves that the specimens purchased are not related, as, for instance, brothers and sisters. There is not so much danger if the chicks chosen are from eggs laid by different hens of the same variety, though bred to the same cock, but the chicks must be of a thrifty nature.

The more remote the actual relationship is, the better, as the offspring from birds bred too closely, in this respect, hardly ever prove so satisfactory as those secured from stock of both sexes that are not nearly allied in kin.

Burnham's Secret of Breeding

The important thing is to secure a reliable sire, and there will be more uniformity in chicks if he is a two-year-old and bred upon yearling hens or fully matured pullets. If we use two-year-old fowls of both hens and cock, we receive very good younglings. But, as a rule, a two-year-old male on twelve-month-old females will give the best results.

In selecting the cock bird, it should be done with a view to reproducing his superior form and stamina. He should possess these indicated qualities in full vigor.

By breeding the cock bird on the progeny thus secured, the better qualities of the strain will be retained.

In selecting hens, pick out the good layers, of generous size, stout constitution and good form.

The first few litters laid by the pullets are not so serviceable,

so sure, or so profitable for hatching, as are their later product. I have found the eggs of two-year-old hens, bred to a one-year-old cock, successful as a general thing. The most reliable breeding stock that can be mated together, as to age, are those of one sex or the other, one of which is a year the older.

Two cocks should not be allowed in the same pen at the same time. The frequent contentious attentions of two males to the females, even if the cocks do not quarrel with each other, not only annoy the females but absolutely injure them. Besides, half the time this prevents the proper fertilization of the eggs.

Generally, one male with eight or ten hens is the best mating; but in the case of alternating males in the pens, as many as fourteen females will give equally as good results.

Deformed birds, such as "hump-backed," "wry tail," "hatchet-shaped" breast, stilty legs, a "hollow back," or weak hock-joints, should not be allowed in the breeding pen, and neither should birds that are so fat that they bag down behind. These infirmities are transmissible to the young, and from such stock good uniform chicks can never be secured.

The weights as given by the American Standard of Perfection are exhibition weights, and about a pound heavier than is advisable for breeding purposes. Never select a heavy male, that is, one that is equal to or beyond the standard weight. For example, a fifteen-pound Brahma cock no doubt would prove to be quite an attraction in a poultry yard, but it would be practically useless as a breeder. Males that are too greedy, or those that are so gallant that they will not eat until the hens have helped themselves, are likewise of little value in the breeding pen, as they will become overfed in the former case and underfed in the latter.

The term "blooded" animal, or fowl, is often used, but it has no reference to the natural crimson fluid that runs through the veins of the body. Instead it alludes to the fact that the pedigree is good. In other words, it means simply a fowl or animal of a clearly distinct variety or "strain," inheriting from prime original stock fixed and peculiar characteristics in style, form and stamina, which it can and does transmit to its young, in a similar marked degree.

Some poultrymen, after the breeding season, allow the different varieties to run together on a common range, and then remate when the hatching season again comes around. This is a serious mistake and spoils the guarantee of absolute purity. Burnham said that when a fowl or animal of any fixed breed has once been pregnant to another of a different variety and color, that fowl or animal is forever afterward crossed; and the original purity of the blood is lost.

Writing on this very subject, George P. Burnham, in 1877, said: We know that a white hen, for example, bred to a white cock for the whole or part of a season, and then bred with a black

male for a few weeks, will give us eggs that will hatch only speckled, patched, or black chickens, very soon after the change of cocks is made.

Now, if any considerable number of eggs are fertilized at a time (say with the first cock, in the outset, whose chickens from the white hen come regularly white, prior to the change of males), how does it occur that the spotted or black chickens make their appearance from this same hen's eggs, laid within a week after the exchange of cocks? Surely, no one will maintain that this white hen's eggs are fecundated twice—or first by one cock and then by the other!

Therefore, we are again confirmed in our judgment that but very few yolks are fertilized at a time; and these only after they pass out of the egg-sack into the oviduct, half or two-thirds grown in bulk, and prior to the gathering of the albumen around each yolk, which is found in or near the center of the lower tube, on its way downward to the vent.

But all this is an unsolved problem. And so we are compelled to accept what follows the connection of the selected male and females, and improve upon this product subsequently as best we can—while we may set this down as true: that if we remove the male bird altogether from the hens, after the third or fourth yolk is thus fertilized (and keep him away from them), any eggs laid subsequently to that third or fourth one will not produce chickens during the cock's absence, if set under the hen. This I have tried, over and over again, with almost unvarying results.

Return the cock to the hens, and the first two or three eggs that are immediately thereafter laid will not hatch. This has been determined by numerous experiments. This shows that it is the nearly perfect yolk that receives the impregnation; and that this occurs before the "white" or albumen forms around it, in the center of the oviduct.

This continual cropping out of spotted chicks from a white hen's eggs once bred to a colored cock, during her entire subsequent existence, follows as surely and as inevitably as that she continues to lay eggs in her future; and the contamination is never eradicated.

It may perhaps be appropriately stated here, that the most successful result in uniformity of production is realized in breeding from one strain or line of ancestry direct. Burnham says a prime, vigorous cock being selected (one possessing all or a majority of the fine qualities we seek to perpetuate), and this male being bred to a few hens of the same type and the best of their kind, will give us in the first progeny uniformly good chickens.

The pullets among this product, if bred back to the old cock, will also give us a majority of good chickens. The hens only, for a couple of years, should be bred to the original cock, or a cock in

the third remove from him. The cocks of the first result cannot be used advantageously with any of these hens or pullets.

If more hens are wanted, fresh female blood should be now introduced; and one or two of the best cocks from this last union may be bred back with the second hens (at two years old) to advantage. This plan avoids in-and-in breeding.

Only the best birds should be selected and mated, avoiding as much as possible the breeding together of cockerels and pullets of the same age, or those which come from eggs laid by the same hen.

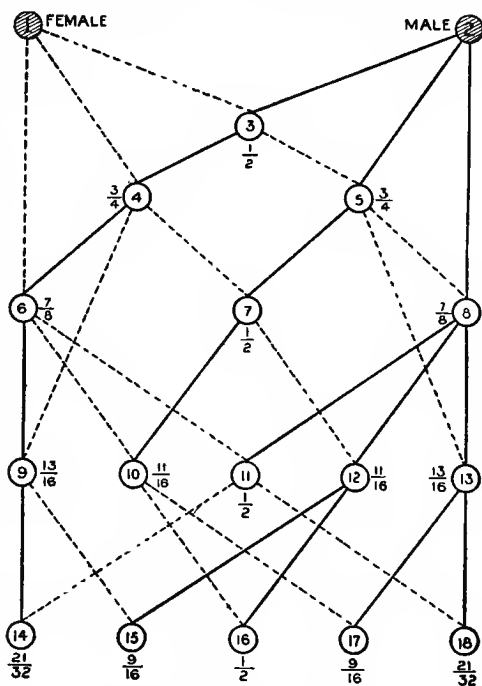
Felch's Secret of Mating

Isaac K. Felch, deservedly known as the "father of poultry culture in America," some years ago originated a breeding chart, which he termed "Arithmetic in Poultry Culture," by which method he produced thousands of chickens and three strains of blood from a single pair, in the vigor, size and color of the original pair. The illustration shows solid and dotted lines, the former representing the male, the latter the female. Each circle represents the progeny.

In explanation: Female No. 1 mated to male No. 2 will produce group No. 3, which is half the blood of the sire, and half that of the dam. Females from group No. 3, mated back to their own sire (No. 2), produce No. 5, which is three-fourths of the blood of the sire (No. 2) and one-fourth the blood of the dam (No. 1).

A male from group No. 3, mated back to his own dam (No. 1), produces group No. 4, which is three-fourths of the blood of the dam (No. 1) and one-fourth the blood of the sire (No. 2).

Again, select a cockerel from group No. 5, and a pullet from



FELCH'S BREEDING CHART

group No. 4, or vice versa, which will produce group No. 7, which is mathematically half the blood of each of the original pair, Nos. 1 and 2. This is a second step toward producing a new strain.

Females from No. 8 mated back to the original male (No. 2) produce a group that are seven-eighths the blood of No. 2, and a cockerel from No. 4, mated back to the original dam (No. 1) produces group No. 6, which is seven-eighths the blood of the original dam and only one-eighth the blood of the original sire.

Again, select a male from No. 8 and females from No. 6, and for a third time produce chicks (in group No. 11) that are half the blood of the original pair. This is the third step and the ninth mating in securing complete breeding of the new strain. In all this, the line of sires has not been broken, for every one has come from a group in which the preponderance of blood was that of the original sire. Nos. 2, 8, 13 and 18 are virtually the blood of No. 2.

The point is now reached where can be established a male line whose blood is virtually that of the original dam. If now a male is selected from No. 6 and mated with a female from No. 4, group No. 9 will be produced, which is $\frac{13}{16}$ ths the blood of the original dam (No. 1) and $\frac{3}{16}$ ths the blood of the original sire (No. 2).

Again, select a male from No. 9, and a female of the new strain (No. 11) and produce group No. 14, which becomes $\frac{21}{32}$ ds of the blood of the original dam, thus preserving her strain of blood.

A male from No. 13, which is $\frac{13}{16}$ ths the blood of the original sire (No. 2), mated to females from No. 10, which are $\frac{5}{16}$ ths the blood of the original sire (No. 2) gives group No. 17, which is $\frac{9}{16}$ ths the blood of said sire.

Mr. Felch says: "While in No. 16 we have the new strain, and in No. 18 the strain of our original sire (No. 2), we have three distinct strains, and by and with this systematic use we can go on breeding for all time to come." Remember that each dotted line is a female selection, and each solid line the male selection.

Mendel's Secret of Heredity

Gregor Mendel, an Austrian monk, about forty years ago demonstrated that heredity was no mystery, but instead a natural phenomenon, subject to attack by the scientific method of observation and experiment.

Mendel experimented first with the vegetable kingdom, and the results were published in 1865, but his efforts were not regarded seriously until the dawn of the present century.

From that time on Mendel's results were confirmed again and again. While his early experiments were with plants, the same principles also held good with animals.

According to Mendel's theory we can take fowls—say the

Wyandottes—taking two distinct colors, the white and the black. We cross them; and, as a result, instead of being of an intermediate color, we find the offspring are all black, like the black parent. This proves that black is dominant to white, the latter being recessive.

Now, if we breed together the hybrid blacks, we shall have blacks and whites in the proportion of three of the former to one of the latter. The white so formed will breed true after that, and throw no blacks, notwithstanding their black ancestry.

Mendel tells us that there are two classes of blacks. The one might be termed pure dominants, which throw only blacks when mated with a white bird, and the other is classed as impure dominants which give results like the original hybrids when mated together, giving blacks and whites in the ratio of three to one. Such birds, crossed with whites, produce equal numbers of black and white.

The formation of a new individual, Mendel explains, is the result of the union of two germ-cells, of which one is provided by each parent, the spermatozoon or pollen given by the male, and the ovum or egg cell by the female.

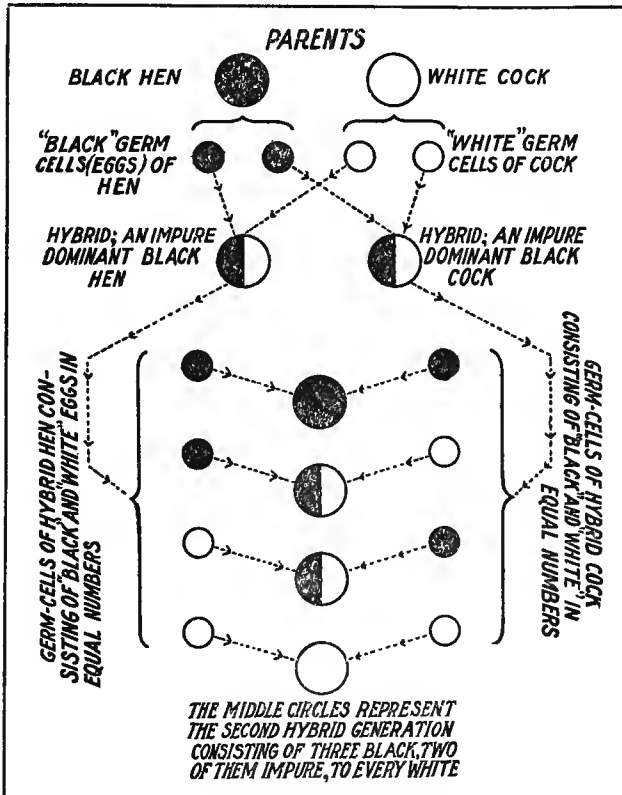
Going back to the crossing of the black and white Wyandotte, we have the inheritance of two alternative characters—black and white. The main idea is that any given germ-cell can contain only one of these alternative characters. Then, in the present instance every germ-cell must carry either black or white, but not both.

In other words, when a “black” germ meets another “black” germ, there will be a pure dominant black chicken, which itself can produce only black germs; when a “white” germ meets a “white” germ, a white chicken results, which can give rise to “white” germs only. Likewise, when a “black” germ meets a “white” germ, the resulting bird is in appearance a black, for the reason that blackness is dominant over whiteness. But when such a bird comes to form germ-cells, says Mendel, the black and the white characters separate from one another and pass singly into the germ-cells.

Therefore, a bird which has been formed by the union of a “black” and a “white” germ-cell does not form “gray” germ-cells, but forms equal numbers of “black” and of “white” germ-cells. The breeding together of the hybrids, therefore, means the coming together of two sets of germ-cells, each consisting of equal numbers of blacks and whites. There can be only one result coming from this—the creating of a number of offspring, of which one-quarter are formed by the union of two “black” germ-cells, one-quarter by union of two “white” germ-cells, and two-quarters by the union of a black and white. Like the original hybrids, these last will be black to the eye, for the reason that blackness is dominant to whiteness where both exist in the same individual.

Now, going to a further generation, we find that if the whites are bred together they will breed true, notwithstanding that both of their ancestors were black. There can be no blacks, as the black character has been split clean out of the germ-cells from which they arose.

There are two classes of the blacks, of which one is twice as numerous as the other. There are the hybrid blacks formed by the union of a "white" and a "black" germ-cell, and when bred together they act like the original hybrids in that a quarter of their



offspring are whites. The other class of blacks consists of those formed by the union of two black germ-cells. These breed as true to blackness as the original pure black grandparent. It is here that the great practical importance of Mendel's discovery lies. When a cross is made between two pure strains which differ from one another in respect of a single pair of characters only, the second generation will contain a definite proportion of individuals which breed as true to the characters they exhibit as did the original parents.

Hunter's Secret of Success

A. F. Hunter writes: The secret of success in poultry keeping lies in our ability to reproduce the laying stock; conversely, the cause of the great bulk of the failures of success with poultry is inability to reproduce the laying stock.

We use the term "failures of success" advisedly, because the majority of the so-called failures in the chicken business (and there are many of them), are merely failures of would-be poultrymen to get started in the business; there are a great many who make more or less promising attempts at starting, but fall down on the first or second season's work because the chicks fail to hatch at all well, or fail to grow well, and the beginner finds himself weighted down with small flocks of "weedy," indifferent pullets,—instead of having his houses full of well-matured, hardy layers, which would pay him goodly profits.

It has been demonstrated again and again that it is early-laying pullets, giving us a liberal egg-yield at the time of highest prices, that pay the big profits; and it is early-hatched chickens, kept growing so the pullets come to laying maturity in October, that give us the liberal egg-yield. It can be easily seen, then, that the key to successful work with poultry, lies in the early-hatched chickens, kept steadily growing so that the pullets reach laying maturity in October.

How can we get those early-hatched chickens? Back of the chicken is the egg, back of the egg is the breeding stock which produces the egg, and in the breeding stock lies the foundation upon which we may build success. The one great secret of success lies in the constitutional strength and vigor of the breeding stock. If that is all right, if the breeding stock is strong, sturdy, hardy and vigorous, the eggs will give us strong, snappy, "bound-to-live" chicks, and the pathway to success lies open before us. If, on the contrary, the breeding stock is weak, what few chicks we do hatch from the eggs will be weak, and "all the voyage of their life is bound in shallows and in miseries"! Not only is it the chicks' lives, but the "life" of the poultry keeper also abounds in shallows and miseries, and his failure of success is close at hand.

Look well, then, to the health, the strength, the constitutional vigor of the breeding stock,—for therein lies the secret of success. With that strength and vigor assured our success is certain; without it "failure" is knocking at the door!

Secret of Uniform Type and Color in Breeding

Mr. Felch says that in selecting a sire he should be well bred, and come from a line of "good ones"—and be a counterpart of his sire. This will give a double guarantee that he will control the offspring. As a rule, the offspring bred back to the grandsire, the sire and grandsire being alike, a start is made with an almost

certainty of success, if the mating is properly done. The selection having been made the rule must be enforced that no sires will be used for breeding but this one, or males of his get, and none of them that do not assume the likeness of the sire, thus establishing a line, or "strain of blood," which, in a single word, means uniformity.

In the hen, secure first, productiveness as to eggs; second, a robust constitution, coming from a long-lived race; third, color; lastly, symmetry; and from this mating select the large pullets that most resemble the sire, and breed them back to the sire. This second crop of birds will be three-fourths the blood of the sire selected as the foundation of the strain.

Now the more stubbornly the blood of the first dam gives up to the blood of the sire, the more good it will do when subjected properly to him.

Many select well-bred hens of a weakly constitution to make the first cross, for they assert, and truthfully, that the sire being so robust and strong, nearly all the chicks favor the sire. This is all true, but it is also true that the blood used in the hen is weak, and will fail in lasting quality. There should be strong blood; that which in the first cross seems to fight for the breeding influence; that which has got to be bred back to the strain desired, and the control given if only by a preponderance of blood. A lasting good is then secured from the cross. Constitution and vital force must come from the dam; form and color from the sire; and in all the matings, the introduction of new blood must be with a thought to that end.

Mr. Felch says the crossing of two well-bred strains oftentimes produces a distinct and new type which is very beautiful. To secure this new type (which is in itself a fact that the two elements producing were of equal strength, as neither controlled the breeding), and to perpetuate it, it would in that case be wise to select a dam of delicate though pure blood, thus giving the sire all the chance possible to stamp his offspring; then by breeding his pullet back, to concentrate his breeding in his grandchildren, they also being his children; then go on by selections of coarser or stronger dams for new blood for the strain.

There is but one way to reach uniformity in breeding, no matter whether it is horses, cattle, or fowls, and that is by "inbreeding," which, Felch says, like poison, may kill or cure, according to the good judgment displayed in its use.

Whenever new dams are introduced to a strain, breed their progeny back to the sire of the strain, and never use sires from this new introduction of blood until the blood has become thoroughly subjected to the strain.

In other words, if the chicks of the mating of the pullets to sires of the strain are not all in type like the strain, then breed back again, and not use a male as a stock bird until the desired affinity of the blood has been accomplished. As a rule, use no

male with less than seven-eighths of the blood of the strain, nor females with less than three-fourths of the blood of the strain as stock birds.

Mr. Felch says that if all the breeders would adopt this plan of breeding, and would keep a record, they would then see the importance of pedigree, and how beautifully all these things are governed by a natural law. The blood of birds can be mixed as easily as paints are mixed to get the different tints in color. By adhering to this mode, one breeder becomes of benefit to his neighbor breeder; for by crossing strains, the pullets become of equal value to each; each breeding back to his respective strain makes the blood of his neighbor's strain feed the blood of his own. When breeders learn this, and work together, they will all be better off, and may become founders of families in fowls, as now breeders of Shorthorns become in cattle.

Foreign Mating Secrets

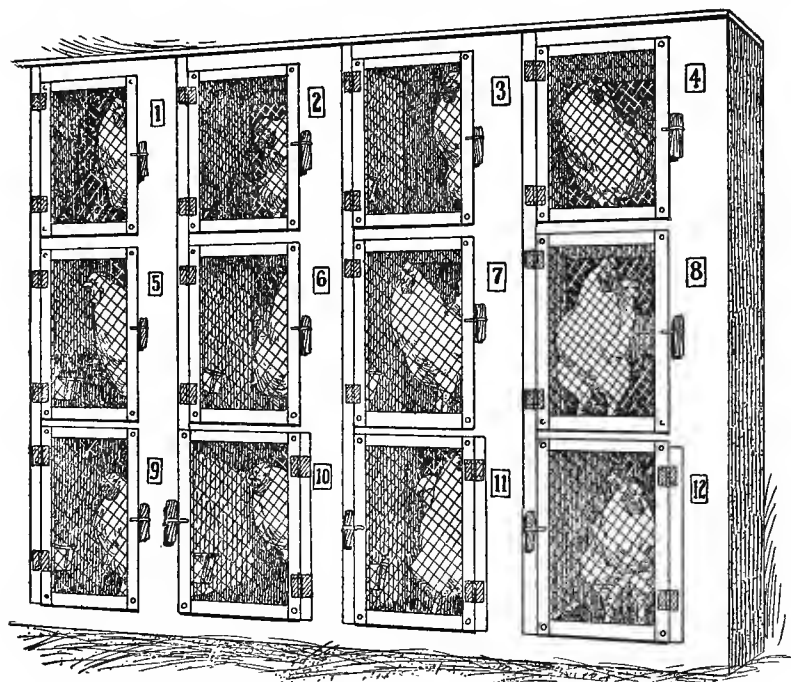
Among the earliest authorities we have on the subject of the breeding and management of poultry, is Columella. He was the greatest poultry expert of antiquity. In mating he allowed twelve hens to one cock. Bradley, another old-time authority, did not like matings larger than one cock with seven or eight hens. The same number is recommended by other English breeders. On the other hand, Parmentier, a French writer, assigns fifteen or even twenty hens to one cock, "provided he be young, vigorous, and healthy." Bosc, another French writer, says that it is only in Spring that a cock should have fewer than twenty hens. Nolan, of England, says that in order to secure a prime breed, a cock two years old should not have more than five hens. Breeders of game fowl for combat limit the number to four, or, at most, five; their object being the production of strong chickens. In winter, or in cold or damp weather, Mowbray says a cock should only have four hens.

"If you look to the production of eggs alone," says Mr. Richardson, "one cock—if a stout, young and lively bird—may have as many as twenty-four hens. If, however, you want to obtain strong and thriving chickens, you must restrict them to six at most. If your object be the improvement of a worn-out and degenerate breed, the fewer hens you allow to one cock the better; and you should not, under these circumstances, allow him more than three. But whatever the breed selected, or the object in view, the cock should be in perfect health."

Sherer, a later-day English authority, says, in reference to breeding, if the object in view be strength of constitution, it is a maxim with many, that there is nothing like breeding from two-year-old fowls on both sides; but if great weight is given to beauty and points, it is doubted whether it is not better to pair a year-old hen with an old bird.

Boyer's Secret of Alternating Males for Fertility

The writer breeds White Wyandottes, Light Brahmas and White Leghorns—covering the American, Asiatic and Mediterranean classes. In mating, fourteen females are quartered in each Wyandotte pen; ten in each Brahma pen; and twenty-four in each Leghorn pen. The male bird in each pen is changed each week. The plan adopted is as follows: Each house contains three pens, and four males (all brothers) are assigned to each house. The males go by Nos. 1, 2, 3 and 4 and the pens by Nos. 1, 2 and 3.



CAGES FOR BREEDING MALES

Each cage measures 2 x 2 feet, 2 feet high, with door made of one-inch wire netting
(See "Alternating males for fertility.")

In the start Cock No. 1 is placed in Pen No. 1; Cock No. 2 in Pen No. 2; Cock No. 3 in Pen No. 3; and Cock No. 4 in a cage in another building. At the end of the week, Cock No. 1 is taken to the aforesaid building and placed in a cage; Cock No. 2 takes his place in Pen No. 1; Cock No. 3 goes into Pen No. 2; and Cock No. 4 goes into Pen No. 3. So on each week the changes are made in regular order. This gives each male bird the advantage of three weeks with the hens and one week of rest each month.

Where male birds are continually in the same pen, they grow sluggish, and besides will have their favorite hens, paying no attention to the others. On the other hand, hens have their likes and dislikes, and will fight off certain males, and welcome others. But where there is a weekly change of males, there is considerable less chance for favoritism, and the eggs not only give a higher percentage of fertility, but the chicks are stronger.

Some writers advise changing males each night. Aside from the labor this plan necessitates, I have found that it is detrimental to a good hatch. In the first place this constant changing harasses the hens, besides in some males it means inattention, as they hardly have time to become acquainted with the females.

On the farm of the writer this changing of males is begun January 1st and kept up until June 1st. During June no changes are made, and on July 1st all the male birds are removed from the pens and placed in separate enclosures, where they remain until the following January. This gives both sexes a good chance to molt, and the eggs laid by the unmated hens will keep in a good condition twice as long as those that are fertilized. There used to be a belief that hens would not lay so well unmated as when mated, but this theory has been found to be incorrect. The presence of the male has no influence whatever on egg production. The mission of the male is to fertilize the eggs and right there his usefulness ends.

The Secret of the Philo System

Wide-awake poultrymen may have noticed in many of the leading journals of the country an advertisement telling of a system capable of producing \$200.00 in six months from twenty hens, and with other startling headlines. This is the advertising of the Philo system developed by E. W. Philo, editor and publisher of the "Poultry Review" of Elmira, N. Y.

The secret of the Philo system is to crowd much in little space and yet have the stock do well. A. F. Hunter, editor of the "American Poultry Advocate," investigated the claims made for the Philo system, and expressed himself as pleased with the showing. Although he does not delve into the innermost secrets of the system, he makes some pointers that are worth reproducing. He says the keynote to the Philo system, so far as there can be said to be a dominating note, is small numbers together. A few eggs together in the incubator (just as there are but a few under the hen), a few chicks together in a brooder, a few youngsters together in a colony coop, a few layers in a small house. The development of the system has brought about the adoption of this foundation principle, and upon this foundation the great success of the system is based.

Mr. Philo says the more frequently the eggs are turned in the

incubator, the better the hatch, other conditions being right. He recommends to turn the eggs three times a day, instead of twice as is generally recommended, and he says there will be no cripples in consequence.

He broods the chicks, winter and summer alike, in the brooder without heat of any kind, the theory being that with the right device the natural heat of the chick is ample for all purposes.

The tiny houses, or "colony coops," in which Mr. Philo keeps six head of layers, are most interesting, and they fully illustrate the "small units" basis of the Philo system. They are but three feet wide each, by six feet long, and although but four feet high to the eaves (five feet to gable) they are two stories; the upper floor is the roosting-laying-feeding apartment; the ground floor is, literally, a "ground floor," and is the exercising room.

Mr. Philo doesn't feed green cut bone or beef scraps, believing he gets just as good an egg yield and more hatchable eggs without scraps, and says "you cannot get good, hatchable eggs when feeding green cut bone."

Mr. Hunter says the eminent success of the system as a whole is shown there on the little back-yard plant, where Mr. Philo now has the sixth generation of birds hatched, reared and kept by it, all on the tiniest plots of ground, and as sturdy-healthy birds as one can see anywhere. The summer coop covers thirty square feet of ground, and sixteen birds have a little less than two square feet of ground space each.

Secrets of Feeding

There is more in the feed than in the breed. To secure the proper results you must give the right amount of food, of the right kind, at the right time. You must closely watch the appetites of the fowls so that you can properly cater to them. Just what would be right for one flock might be wrong for another.

Fowls in a wild state live on seeds, green stuff and bugs and worms. In the state of domestication these articles must be supplied in some form or other.

Just before it matures is about the most hungry period in a bird's life. It can eat more than at any other time, and if it does not get all it can eat, more harm is done than can be repaired during the rest of its life.

If you will go to the trouble of examining the crops of the fowls at night while they are on the roost, it can be pretty well determined whether they are getting enough or not. If the crop is distended and hard, too much is being fed; if nearly empty, too little is given. The grain in the crop should fill it comfortably full, yet the skin ought not to be as tight as a drum, but rather loose and yielding. The healthy hen is a hearty eater.

The poultryman who studies the appetites of his flocks, and feeds accordingly, never fails in putting his feed to the best advantage. It is always well to have the fowls partially hungry. This will induce them to scratch in the hope of finding some more. Scratching is the best exercise hens can get.

To be continually changing the bill of fare rather hurts than benefits egg production. Have one system of feeding, but let that system contain as much variety as possible. Purity of food is important.

The hungry hen is seldom choice in the selection of her food. To feed properly conditions must be studied. The amount and quality of food that would keep a Wyandotte in good condition would likely overfatten a Plymouth Rock.

Overfeeding is not feeding well. It is what a hen is able to digest and assimilate, and not what it eats, that makes both eggs and flesh. The principal requirement of a hen is a balanced ration and regular feeding. "A feast to-day and a famine to-morrow" will upset the best of layers. If the stock is doing well under the present system of feeding, it is a mistake to make a change in the bill of fare.

Careful calculations show that a fowl will eat, on an average,

three ounces of the morning mash ; two ounces of grain at noon ; and four ounces of grain at night. There can be no set rules for feeding. Like human beings, fowls vary in appetite. We must approximate the amount. The quality must be determined according to the object in view.

The plan adopted by the writer is to give a large iron spoonful of mash in the morning for every two fowls in the pen. The spoonful means about as much as one would be able to pick up with the hand. At night, a full handful of mixed grains for every fowl in the pen is about all they can eat, and that amount will carry them over in comfort until the next morning. But when it is noticed that they do not readily clean up the allowance, the next day the amount should be cut down, and continued so until the appetite is again fully restored. Some fowls can exist, and be prolific, on almost half what would be needed for others. When this is noticed in a pen, it is advisable to cut down their allowance to meet the demand.

Sudden changes in the bill of fare very often throw fowls off their appetite. I had a little experience in that line some time ago. A fellow poultryman purchased a lot of sweepings from the grain elevators. These sweepings contained wheat, corn, flaxseed, bran, middlings, etc. The fowls did not take kindly to the mixture, and the result was, there was a general decline in the egg crop. Just as soon as the old bill of fare was resumed, the egg yield increased, and gave a good record. While the articles contained in that mixture were substantial egg foods, they were not rightly balanced, and there was too much waste.

As a general thing, more fowls are overfed than underfed, especially where small flocks, or a limited number, are kept. While overfeeding has its bad effects, underfeeding is equally as bad. An underfed hen may receive sufficient food to sustain the body, but there is a lack of material for egg making. It should be known that the first food a fowl takes goes toward the building up of waste tissues, and the overplus to the making of eggs or fat, according to the quality of food given.

Feeding Grains

The carcass of a hen consists of fat, lean meat, and bone ; and, in making a comparison, Professor James E. Rice says if we examine the food that a hen eats we discover, in wheat for example, that it contains starch and oil (the carbohydrates or fat-forming material), which is the fat of the grain and which, when eaten by the animal, goes to make heat, energy and fat. We see also little grains of gluten, which might be called the lean of the grain, and which, when utilized by the animal, makes the lean meat. We further find the mineral matter (the ash), which might be called the bone of the wheat, and which, when assimi-

lated by the animal, makes bone and egg-shell. Therefore it is easy to understand why it is that when food is deficient in lime and other mineral matter the eggs are soft-shelled; why a ration deficient in protein produces weak, spindling chickens, or a ration containing an excess of easily digestible carbohydrate matter causes the fowl to become excessively fat. Thus we see the necessity of having properly balanced rations; which simply means that there must be a properly balanced relationship between the food nutrients in the ration in order to produce a perfect animal or a perfect egg.

If hens are fed their grain feed in such way that they have to exercise vigorously to get their daily feed, they are much more apt to lay than if fed plenty of prepared feed in troughs, allowing them to remain idle.

The value of grains for poultry feeding are about in this order: Wheat, oats, corn, barley and buckwheat. Corn makes fat and furnishes fuel. It should never be the exclusive grain diet. The cry of "cholera" comes mainly from sections of the country where corn is principally fed to fowls. Strictly speaking, these "cholera" cases are indigestion. Indian corn should always be fed in conjunction with some protein food like wheat. Both barley and buckwheat are fattening. Too much of the latter has a tendency to produce costiveness; it also will whiten the flesh of the carcass if fed liberally.

For the purpose of producing white flesh, the Canadian Experiment Station feeds oats, buckwheat and skim milk; and to produce yellow flesh feeds boiled pumpkins, turnips and yellow corn.

Beans, being highly nitrogenous, are excellent as a variety in the bill of fare. Pop corn contains more nitrogen and phosphates than the regular Indian corn. In feeding grain at night, it should be given an hour before dusk, so that the fowls can well fill their crops before going to roost.

The majority of fowls get far too much grain, such as corn, oats, wheat, bran, etc., to the exclusion of animal substances and green or vegetable foods, such as clover rowen, grass, cabbages, beets, turnips, etc. Grain is a very heavy, hearty, heating and concentrating staple of diet, and was never intended to be fed stock without other addition.

English authorities say we American poultry raisers feed entirely too much maize (corn), and I believe that this is so. We do not, as a rule, give enough variety. The farmer seems to think that all the hens need is enough corn so that they can help themselves at will, and the reason they assign for poor winter laying is that it is unnatural for a hen to lay at that season. As one "expert" asserted: "It takes the warm suns of spring to thaw open the ovaries."

Dr. Sanborn says that nearly every grain can be used at some time to some advantage. Wheat stands first as a well-balanced

food, followed by barley. Corn and buckwheat are quite fattening, and should be used sparingly, with discretion. Feeding a single grain exclusively is sure to cause severe cases of bowel troubles. Therefore the better the variety and the more balanced the ration, the better will be the results.

An English writer says: "Fowls are blessed with capital appetites, as every breeder can prove by his bill at the corn-dealer's." (All grain in England is known as corn, while what we call corn is there termed maize.) "The plan of feeding which used to be followed by almost all poultry keepers and which is still followed by some, was to give the fowls plenty of barley, and nothing else. This is neither good for them nor for their owners. Fowls do not thrive on it, and are constantly ravenous."

It was proved by the elaborate experiments of M. Reaumer, that each fowl will eat a quarter of a pint of grain per day, when fed on barley only. But objection was made to it as being the most expensive kind of feeding.

Mr. Bement, an old-time American writer, found that eight Poland fowls consumed a peck of Indian corn in eleven days; a peck of oats in six days; a peck of barley in seven days; a peck of wheat in ten days; a peck of millet in eight days; and a peck of wheat screenings in seven days. During the experiment the fowls had only a few boiled potatoes in addition.

Linseed Meal

Oil cake meal is linseed meal. It is the product of linseed oil factories. It is rich in albumen. Properly fed it promotes general health and keeps the fowls in proper condition. During the molting period it is especially beneficial.

Some writers claim that a teaspoonful of linseed meal is a good allowance for a hen. I find that five pounds mixed with one hundred pounds of ground grain is about the right proportion to feed.

Linseed meal is very fattening, and therefore must not be fed too strongly. Being of a highly nitrogenous order, it should not be fed heavier than at the ratio of about a pound for fifty hens, twice a week. An over amount is pretty sure to bring on cases of looseness of the bowels.

Thos. F. Rigg says that he uses linseed meal in the soft food for both breeding stock and growing chicks. He uses it in the proportion of about 1 to 10,—that is, one part linseed to ten parts mixture of cornmeal, wheat bran and ground oats. This he feeds to the chicks once each day, the mixture being thoroughly cooked. Oil meal regulates the bowels and thus keeps the chicks in a healthy condition.

Meat

Animal food is a necessity, but too much of it is apt to cause digestive troubles. There is more albumen in a pound of meat than in a bushel of corn.

The American Stock-Keeper said some years ago that a meat diet, judiciously fed, will materially increase the egg supply. Nearly all breeders are aware of the value of animal food; but, though considered necessary to make up for the lack of insect food, it should be fed sparingly and not too often to the young fowls, for too much animal food is worse than none at all, and is one of the principal causes of all the disastrous diseases which are hard to cure.

Meat scraps must be kept in a cool place.

Of the commercial meat scraps on the market, those guaranteed to be pure beef scraps are best. Dried blood, such as is sold for fertilizer, is dangerous to use for poultry.

Some feed horse meat. I would not, knowingly, feed horse meat to fowls. The meat of a healthy horse, killed on account of some accident, would be good, but the bulk of horse meat comes from horses that have died or been killed on account of ailment or old age.

Green cut bone, when it can be had fresh, and fed as soon as cut, is excellent. It is not a stimulant, and consequently there is no unhealthful reaction from its use. But it should be fed judiciously, as a too liberal feeding is apt to produce worms in fowls. An ounce, per hen, two or three times a week, is sufficient. In fact, it should be the limit. Feed separately in a trough, and not mixed with the mash.

Salt

A proper amount of salt aids digestion. It has a tendency to ward off disease by keeping the fowls strong and vigorous. An authority says that salt is necessary for the purpose of forming gastric juice, but if given to excess will produce inflammation of the mucous membrane. An excess, too, is apt to cause bowel troubles and loss of feathers.

Salt keeps the whole system in good working order, freeing the blood of impurities, thus avoiding colds, canker, or roup. Salt also has a tendency to expel those miserable wiry gizzard-worms often found in fowls.

It is generally conceded that an ounce of salt is sufficient for the soft food of one hundred fowls. The best way to salt the food is thoroughly to dissolve sufficient salt in the hot water with which the mash is to be moistened. This will more evenly distribute it.

Brackenbury's Secret of Scalded Oats

George H. Brackenbury says that a good way to feed scalded oats is to season each feed of oats with salt at the rate of a good large tablespoonful to each eight or ten quarts of the oats. Sprinkle the salt over the top of the oats, and then pour boiling water over them, being careful to use no more water than the oats will readily absorb. Stir or mix them up well. Let the pail in which the oats are scalded be covered while they remain in it.

Proctor's Salt Secret

F. W. Proctor says that during several seasons when he mixed salt with the feed, about as would suit the human palate, he found no difficulty in maintaining a good egg yield until cold weather. Last season he omitted salt, and his fowls took to molting all through the early and late fall. He is impressed with the value of salt as a means of prolonging the life of the feather.

Charcoal

Charcoal is not only a great corrective of the evils of injudicious overfeeding, but is also a good remedy in bowel disorders of poultry.

As it has wonderful absorbent powers, especially for gases, it should be kept in a thoroughly dry vessel with a close-fitting cover, so as to exclude the air.

It is a good plan to mix powdered charcoal twice a week in the mash.

It is said that if charcoal is well heated before given to the poultry, it will have a tendency to drive off impurities which may have become absorbed, and will be equal to fresh charcoal.

Grit

Grit must be hard and sharp. Oyster shells are too soft to serve this purpose.

The supply of grit should never run out. It is best kept in a small box constantly within reach of the fowls so that they can help themselves at will.

Oyster Shells

The hens must partake of a certain amount of lime in some form other than that found in the different articles of food. This lime is needed for the formation of egg shells, and where there is a lack of it, soft-shelled eggs are the result.

Green Feed

Fowls seem to relish green food best in the morning, and it will be noticed that if given some cabbage or other winter greens the first thing upon opening up the houses, they will pitch into the stuff to the exclusion of any grain that might be within reach. It seems to act as a sort of "bracer," "eye-opener" or "tonic."

Cabbage, raw potatoes, beets, turnips, and other roots chopped up about the size of whole corn, are all keenly relished, and do a lot of good.

A very good substitute for green food is cooked or steamed cut clover hay or alfalfa. This can be mixed with an equal quantity of ground grain. Laying hens, especially, should be regularly fed cut hay during winter, as it is bulky food and contains considerable lime and other ingredients that go to making eggs.

Boiled vegetables are relished, but care must be taken that they are not too freely fed, as they have a tendency to overfatten, and are apt to cause bowel troubles.

The Secret of Feed at 15 Cents per Bushel

The following article is clipped from the September, 1908, issue of "Farm Journal" and is well worth noting:

"The value of green food for poultry, both as an egg food and a ration for maintaining a healthful condition, has been known for years, but it is only of late that a method for producing sprouted oats feed has become generally known.

"Some years ago the 'Reliable Poultry Journal' published an account of how oats are sprouted in boxes for growing stock in Ireland, and recently Jesse B. Upson, in 'Rural New-Yorker,' said that he obtained the same idea from the Chinese in San Francisco, in 1870.

"Mr. Upson says that the oats are placed in a water-tight vessel and covered with warm water, and allowed to stand twenty-four hours, when they are emptied into a box that will allow the water to drain off freely. Oats are left in this box, and wetted twice a day with warm water until the oats have sprouted a quarter of an inch long, when they are spread in boxes about an inch deep. The sprinkling is continued until the oats are as large as desired, which is generally four or five inches in length. The hens will consume roots as well as tops.

"With a temperature of 60°, ten days will bring this result, so that after the first start this green feed can be provided for each day. Chicks a week old will eat the oats, and, in fact, leave all other feed for them. Fowls prefer sprouted oats to lawn clippings.

“The green color can be given to the oats by one day's exposure to the light. They grow as freely in the dark, and the boxes can be stacked over one another if short of room.

“L. E. Keyser gives this method: Place the grain to be sprouted in a tub and cover with water (warm water is best) and allow it to soak for twenty-four hours. Pour off the water and let them drain for half a day, then cover the racks with old sacking, single thickness, and spread the grain upon the racks to the depth of about two inches. If space is limited, the racks may be piled one upon another, and if out-of-doors a cover should be made for them that will turn rain.

“Night and morning the racks are taken down and the grain sprinkled with hot water, the hotter the better, using a hand watering pot. The racks can then be replaced. It does not matter if the water in the upper racks drains down into those beneath, as it will all run off in time.

“When in proper condition for feeding, the sod will be three or four inches thick, and the growth of top will be four to six inches high. When feeding, give a block about a foot square to fifty hens. Each rack holds about a bushel and a half of grain before sprouting, and will make sixteen feeds for fifty hens. It will answer the purpose of one grain feed and green food.

“The racks referred to are made as follows: A frame of 1x3 inch stuff, set edgewise, 4x4 feet, with a partition in the center, is first made. To this frame securely nail lath, placing them from one-eighth to one-quarter inch apart. This makes a box 4x4 feet, three inches deep, with a slatted bottom and a partition in the middle. The center partition is only for the purpose of strengthening the lath. The lath should be soaked in water over night, so that they will not split when nailing.”

The Sprouted Barley Secret

A Connecticut poultry raiser writes me that barley is the best grain for sprouting. He says: “To get green poultry feed barley is the best grain. Cover as much as you need with very warm water and let it remain for twenty-four hours. Then draw off the water, emptying the grain into a shallow box having holes in the bottom. Keep it quite moist with warm water and turn frequently so it will sprout evenly. Set in a sunny or warm place, covering with sacks, and in a few days it will germinate and start growing. Then when healthy, green sprouts show, use as feed. Have a number of boxes in the work to keep a supply.”

Other Green Feed Supplies

The writer has a double run to each house, as shown in the illustration. While the fowls are occupying the one run, in spring and summer, the vacant run is planted to some vegetable crop. As soon as this crop is gathered, the fowls are turned into the plot and they find considerable green stuff as well as worms

and insects. The former lot is then planted to rye, and by fall, and even during early winter and spring, a quantity of green food is secured by each day mowing down sufficient for that day's feeding.

Rape is another valuable green food, and should be planted each year.

50 FT.	BACK YARD TO PEN NO.1	BACK YARD TO PEN NO.2	BACK YARD TO PEN NO.3	50 FT.
10 FT.	PEN NO.1	PEN NO.2	PEN NO.3	10 FT.
50 FT.	FRONT YARD TO PEN NO.1	FRONT YARD TO PEN NO.2	FRONT YARD TO PEN NO.3	50 FT.
16 FT.		16 FT.		16 FT.

DOUBLE YARD TO EACH BREEDING PEN

While the one yard is occupied the other is sown to a green crop.

Miscellaneous Feed Pointers

The laying hen is a hard drinker. She will consume about a half-pint of water a day, and it must never be left out of the bill of fare. It is the rule on the farm of the writer to water the fowls about a half-hour after feeding the morning mash. They will not suffer by being compelled to wait for the water in the early morning, and they are not so apt to chill when they have first taken food in the crop.

A pound of cornmeal will measure about one and one-half pints; middlings, one quart; ground oats, two and one-half pints; wheat bran, three pints; clover meal, two quarts.

"Shorts," according to Webster, is the bran and coarse part of meal, in mixture. In some sections of this country bran is known as "shorts," and in other places middlings bear that term.

Brewers' grains are said to contain about four pounds ash (lime, etc.), five pounds fat, twenty-five pounds protein (flesh and albumen formers), and about fifty pounds of starchy matter in one hundred pounds—the balance being water.

In this country, poultrymen generally claim that there is no saving in boiling the food, says "Iowa Homestead," notwithstanding the increase in bulk, as they say that there seems to be a corresponding lessening of its sufficing properties; and that "seven pints of boiled oats will be consumed in the same time and by the same number of fowls as four pints of the dry grain." But still I believe that there is economy in feeding the boiled grain in fattening, as it has been proved beyond a doubt that the fowls will fatten more readily with the latter.

The bones of the neck, and along the back are the easiest to cut in a bone cutter. The bone itself is full of animal matter, as well as lime and phosphates, for the making of greater bone in the chick, and adding to the feather growth, and for the making of the egg shell. The gristle, the scraps of meat adhering to the bone, with the blood, make a kind of "worst meat" mass, of which the chickens will eat every bit. The small bits of bone through the mass make the ideal grit supply also.

The crate-fed bird has a better appearance than a pen-fed one, and it is not a flabby fat, but has nice solid flesh.

A. F. Hunter says that soft roasters fed in houses show more average gain than when fed in crates. Forty birds are put in a house 7x20 feet, with a yard 10x15 feet.

In crate feeding, if a bird will not accumulate fat during the first ten days it is shut up in the crate, it is very much wiser to take it out. When you put them in the crate you should starve them for the first day or so.

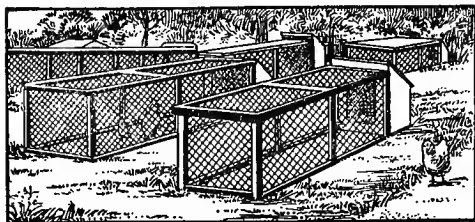
Some birds can be put in a crate for two weeks, and fed three times a day, and money will be lost on them. On the other hand, some birds can be fed in that way for five weeks and still make a profit. Some birds are ready in ten days and others after being fed for two weeks will commence to go back in weight.

Chick Feed Secrets

According to the New York Agricultural Experiment Station, the cost of food, per chick, to weigh one pound, is three cents for ground grain; or three and seven-tenths cents on whole grain.

An easily-prepared chick food: Six pounds cracked wheat; two pounds finely cracked corn; one pound rolled oats, or pin-head oatmeal; one pound millet seed; half-pound broken rice; two pounds fine granulated beef scrap; half-pound granulated bone; six pounds pearl grit.

Robert J. Terry gives this formula for chick food, to be given after the young are a day or two old (before that time dried bread



PROTECTED CHICK RUNS

Measure: 2 feet wide and 2 feet high, 12 to 16 feet in length, covered with one-inch wire netting. Should be moved to new ground every two weeks. Used by hen and her brood.

crumbs should be given): Cracked wheat, twenty-five parts; hulled or cut oats, fifteen parts; white millet seed, twelve parts; small cracked corn, ten parts; small cracked peas, six parts; broken rice, two parts; rape seed, one part; small grit, ten parts. Rolled oats can be used in

place of hulled oats. The food is fed dry.

Gowell's Fattening Secret

If chickens intended for market, weighing one and a quarter to one and a half pounds, are placed by themselves in a house with a yard say twelve feet square, and fed on a porridge three times a day, they can be gotten ready for market in very short order.

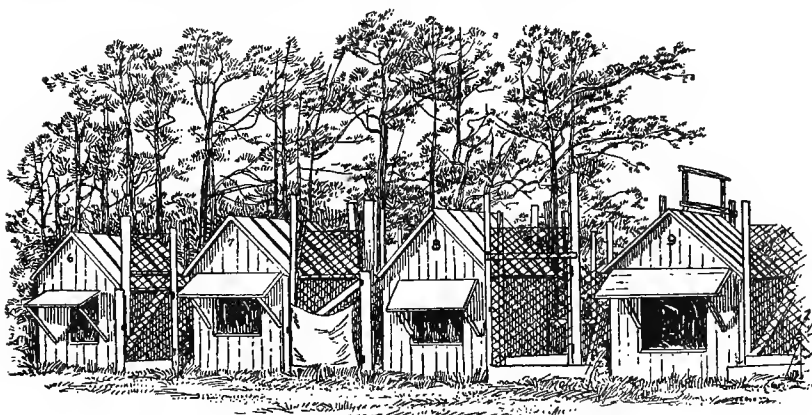
The porridge is made of six parts cornmeal, two parts middlings, one-half part linseed meal and two parts beef scraps, by weight, and mixed with milk or tepid water.

Feed all they will eat in one-half hour, when the troughs must be removed and cleaned. Keep the yard clean by covering with sand, straw or hay. The birds will stand this feeding for two or three weeks with good appetites. When they commence taking less they are ready to be dressed for market, and should weigh two and a quarter pounds dressed. (Note: Two years ago Prof. G. M. Gowell, of the Maine Experiment Station, imparted to me this secret plan for quickly fattening for market and I have used it with great success.)

Secrets of Housing and Care

A poultry plant should be planned with a view to saving steps. This extra labor costs money, for which there is no equivalent. Besides, houses built on the colony plan are far more expensive than if in one continuous line. By bringing them together, one end of each house is saved. This will mean quite an item in lumber. The colony houses, too, are much colder than a continuous house.

High ceilings in houses are expensive, and cold. They should be built as low as possible without danger of bumping heads. Low houses are kept comfortable by the animal heat thrown off by the fowls.



COLONY CHICK COOPS

Measure 4 x 4 feet, ground floor, and 4 feet high to peak of roof. Yards 125 running feet. Large enough to start 50 chicks, decreasing number of chicks as they mature.

The working unit in building a hen house is the floor and air space required for each hen. Prof. Rice says that a safe working rule is about five to six square feet floor space, and eight to ten square feet air space for every fowl. The lighter breeds, because they are more active and restless, require about as much room as larger breeds.

There is a great difference of opinion as to the best method of calculating the number of fowls a poultry house will accommodate. The common method of calculation is based upon floor space, the height being considered immaterial. Houses built on

this principle are low, and consequently the least expensive that can be constructed. Another method of calculation is based upon the amount of perch room, while the third is based upon the volume or cubic contents. Various poultrymen recommend six, eight and ten cubic feet of space per fowl.

In view of the widely divergent views on this subject, and the lack of definite knowledge, K. J. J. Mackenzie and C. S. Orwin of the Southeastern Agricultural College of England, undertook a series of experiments to determine more definitely the amount of air space required by poultry. They studied the frequency and rate of respiration in fowls, the amount of carbon dioxid thrown off, the amount of vitiation of the air which the fowls could stand without injury, and examined different types of poultry houses with reference to their suitability for furnishing proper conditions of ventilation.

Assuming that the air of poultry houses should not contain more than nine parts of carbon dioxid per 10,000 of air, they estimated that each fowl must be supplied with about forty cubic feet of air per hour, the requirements of small fowls being practically the same as of large.

In wooden poultry houses with ventilation at the top the air apparently changes about four times per hour. Each bird must, therefore, have ten or more cubic feet allotted to it.

The number of birds a house will hold depends on its volume and not on the floor space or perch room. The maximum number is found by dividing the volume expressed as cubic feet by ten. I prefer to keep within this number.

The greatest capacity can be most economically obtained from a given amount of timber if the house is cubical in shape. This cannot be quite realized in practise owing to the necessity for a sloping roof, but the nearer one gets to it the better.

In building long, continuous houses, the pens should be divided by tight partitions, either cloth or boards (the latter preferred), to avoid draughts. Otherwise cold and dangerous air currents will be formed whenever windows, doors or ventilators are open.

Prof. Rice says that when air is warmed it expands and rises; cooling has the opposite effect. He further says: Provide the houses with good ventilation. Pure air is as necessary to good egg production as pure food and pure water. Damp air may be removed by ventilators, which will necessarily make the house a little cooler. Warm air rises.

But I contend that the scratching-shed houses do not need ventilators. They are self-acting in that respect. If the curtains are drawn up each morning, the fresh air will quickly enter, and the pens will receive the very best airing. On the farm of the writer, no ventilators are placed on the houses, but the scratching-shed plan is used. The result is that the houses never have a foul

odor, and the fowls get the benefit of the outside air without being compelled to face rain or snowstorms, or heavy winds.

On this point Jacobs some years ago made a very sensible argument. He said that it is a very difficult matter to ventilate a poultry house without causing draughts of air on the fowls at night. The proper mode, he said, is to keep the poultry house clean, leave the doors open during the day, and shut the house at night, allowing no ventilation at all. That was written long before the present popular scratching-shed plan was adopted. By the latter method, we can better air our houses than we could with the old-style houses, and by simply leaving the door open during the day time.

The roof is practically the most expensive part of a house. It is important that the best attention be paid to it. Some poultrymen prefer shingles, and some heavy roofing-paper. There are advantages and disadvantages in both. Frost will gather on the shingle roof, inside the house, unless the roof is ceiled. This makes an additional cost. Shingles, too, are apt to warp in time, causing leaks in the roof. But a shingle roof, well put on,—using No. 3 eighteen-inch cedar shingles, and giving the roof a coat of paint, will be better. One gallon of paint will cover 250 square feet of shingle roofing. Some of the earlier roofing papers did very well until there was a break in the paper, and then the first good, strong windstorm would quickly tear it all off. But to-day we have roofing that is strong and durable, looking very much like tar roofing, but which contains no tar. Tar roofing contracts and expands with the weather, but this new roofing does not. The roofing is put on with tin caps, and then the seams are cemented, and the entire roof coated with a graphite paint. The writer has such roofs on his hen houses, and has had them for quite a number of years. They are as good to-day as the day they were put on. There must be more of a pitch to roofs that are shingled than those upon which paper is used.

There seems to be quite a difference in opinions regarding the proper flooring for poultry houses. Some writers claim that board floors, heavily covered with sand, are the best, arguing the point that they are more dry. Others prefer concrete cement, for the reason that it is rat-proof and easily cleaned. I have always advocated and always used the natural earth. If there is a brick foundation around the hen house, and the floor is filled up a foot with earth, making it that much higher than the level of the outside ground, the floor will not only be dry and rat-proof, but the hens will find more comfort in it, and will not only have something to scratch in but will be able to wallow in it, taking a needed dust bath.

The perches in the houses should be not over two feet from the ground floor, and about six inches under these perches there should be placed a solid board platform to catch the droppings.

All perches should be on a level. The best perch is a 2x3 inch scantling, planed and the edges rounded. It should be placed so that the fowls will roost on the two-inch side. These broad roosts give a fowl the chance to spread its feet, so that it will not be compelled to cramp them to hold itself, as is the case with the old-style round perches.

The nests should be movable. This is so even where trap nests are used. This gives a good chance to take them outdoors and give a good cleaning, which should be done at least every spring and fall. The best way to place nests is to have a board platform upon which to set them. This platform should be about two feet from the floor, and broad enough so that there would be from eight to ten inches on the platform, in front of the nests, for the hens to walk. Never nail up nests so that the hens must fly up on them. Trap nests should never be placed on the floor, as the hens are apt to scratch dirt in them, often clogging them so they will not work accurately. Hens prefer semi-darkened nests to those out in the open light.

In heavy-soil countries dust-boxes should be placed in each pen, so that the fowls can wallow in the dirt. In light-soil sections, and especially when the houses have scratching sheds attached to them, no dust-boxes need be provided, as the fowls can dust themselves with the loose dirt on the floor of the shed.

Fencing is another important matter to consider. After trying all or nearly all of the styles of wire-netting fencing, I have gone back to the old Climax mesh, which has proved to be not only cheaper in price, but more durable. As it is galvanized after being woven, it seldom ever rusts. Some of the new styles are galvanized before weaving, and the result is that they sooner or later rust and break. I have in use Climax wire netting that has now stood the test for nearly fifteen years, and practically is as good as the day it was first put up. The Climax wire netting can be purchased from any dealer in poultry supplies.

In putting up fencing, no top rail should be used. By having the posts eight feet apart, the wire can be stretched by hand, and if carefully done will not sag.

Yarding vs. Free Range

Experiments have proved that for best results in egg production yarding is better than free range. They have also shown that for tenderness of flesh in market chickens, yarding is preferable. On the other hand, it has been proved that for quick growth of young stock, free range is the thing.

Some years ago the colony plan for laying fowls was strongly advocated. But it never became popular, principally on account of the amount of labor necessary to go about a large farm and

attend to the individual flocks. This was especially distasteful during bad weather.

But when reference is made to yarding, it must be understood that generous-sized runs are meant, and not the small enclosures often found on city lots.

All poultry runs should be at least one hundred feet in length—and this divided into two separate runs. That is, have a run of fifty feet in front of the house, and fifty feet on the back. Then as the fowls are occupying the one, the other can be sown to some green crop and thus disinfected. In this way the soil will always be pure.

An argument in favor of free range is that the fowls get much needed exercise. So they do, but just as much exercise can be given them where scratching sheds are provided, and where the grain is thrown among litter so they must work for it.

The fact is that in every case where phenomenal layers have been found, or where trap nests are used, the fowls are yarded. In free range there is too much danger of hens hiding their nests, in which case no record could be kept of their product.

In market chickens, too much exercise toughens the sinews, and the flesh of a yearling bird is tougher than that of a two-year-old fowl yarded. This is especially so where corn has been the principal diet.

On the farm of the writer, a specialty is made of supplying spring roasters to a select retail trade. The reputation of the farm for choice, juicy carcasses is so well established that even at an advanced price the orders cannot be regularly served, they being compelled to go in rotation. The roasters are caged and fed a balanced ration, are never hog fat, but always in a good condition. The result is, the meat is sweet and tender, and as only the purest of food is given, the flesh is never tainted with some peculiar taste, nor does it have that strange odor so often noticed in poultry direct from the farmer.

But when it comes to raising young stock, especially when growing them for future breeders or roasters, free range gives them quick maturity, and they are all the more hardy for the rough and tumble life they are having.

In the case of broiler raising, however, range must not be given, or the carcass grows too lanky.

A big advantage in runs is that you economize on territory. The poultry houses and runs of the largest farm I saw in New England, did not occupy more than five acres of land, although the farm proper covered thirty acres. The young, growing stock were allowed the remaining twenty-five acres to roam over.

But yarded poultry must be well taken care of. They must be regularly fed, must be made to exercise, the houses must be kept clean, and everything possible must be done for their comfort.

Neglected poultry, especially if yarded, will soon be a financial loss.

Secret of Having Healthy Fowls

It often puzzles the amateur to know why it is that the flocks of the average veteran are in good health while his own are suffering from some disease. At the same time, he reasons, he has been giving the best of care, and continually looking up treatments. Probably a few hints in this direction may be of some service.

The veteran starts from the very foundation. When he mates up his breeding pens he excludes all that have ever been sick. He wants strong, vigorous birds, and birds whose ancestors were also hardy stock. With this start he is able to do good work. He avoids in-breeding, knowing that relationship will deteriorate the stock, and new blood will strengthen the constitution.

He never overcrowds his flocks, as experience has proved that better health is maintained and better results secured from small families than from large ones. Besides, such vices as feather-pulling, egg-eating, etc., invariably come from overcrowding.

He believes in fresh air, and his houses are so constructed that there is a constant presence of fresh air in them without the possibility of draughts. He is generous in the size of both his houses and runs; and, as the size of the flocks is limited, the fowls when compelled to remain indoors during bad weather of winter never suffer. The scratching sheds attached to the roosting pens are heavily littered and among this litter grain is thrown so that the fowls secure plenty of exercise in scratching, and the combs reddened up, there is great activity, and naturally there is a good egg crop.

He breeds only from matured stock so that he may have strength in the youngsters right from the start. He feeds generously of such foods as are best adapted to his wants; and he has regular times for feeding, that the fowls may not become restless on account of waiting to be served. He knows that fowls quickly become accustomed to regular hours for feeding, and that unless they are attended to they will get restless and cranky. He feeds the best of food. The first consideration with him is purity. Quality is worth more than cheapness, and the so-called "cheap" foods he has long since found to be the dearest in the end.

He is particular in the care of his flocks. Everything must be kept perfectly clean. The droppings are gathered up at least every other day; the atmosphere of the houses is kept free from offensive odors; ailing fowls are at once removed so that they may not contaminate the air; the drinking vessels are kept clean and only fresh water allowed in them; the feed troughs are kept clear of filthy or sour food. In fact all these small details are carefully looked after.

Upon such a foundation there is no trouble to build up a strong, thrifty race of fowls of any breed.

I so often hear the report that such and such a breed is of a delicate nature, when the truth is that the breed is hardy, but that certain strains of that breed have not been properly handled and for that reason a delicacy of constitution is found there.

Fowls as a rule are hardy, regardless of breed, but no breed can suffer neglect. Some years ago I saw in print that the white-feathered birds were not so strong and prolific as the colored or parti-colored varieties. This theory, however, has been disproved by the success and the good work of the White Wyandottes. Where can we find a more hardy or more prolific race? The writer has bred them almost from the time of their introduction, and not once has he had occasion to regret that he did not have some other variety.

The Molting Season

The proper months for molting are August, September and October, but in young stock it is apt to begin a month earlier and in old stock a month later. The older the fowl the more delayed will be the commencement of this period.

The sexes should be separated until the fowl has completed her new growth. In fact, it is not advisable to remate before the first of the new year.

Any weakness a fowl may have is pretty sure to develop at molting time. Molting is not a disease, but the strain in growing new feathers is apt to weaken the fowl, making it more or less susceptible to sickness.

It is generally accepted that it takes one hundred days for a fowl to change its coat of feathers.

The Van Dresser method of starving and then overfeeding fowls to make a quick molt has not stood the test expected. Poultrymen, as a rule, are more favorable to old Nature's method.

Both sunflower seed and linseed meal are valuable additions to the bill of fare at this season of the year. The bill of fare should be rich in nitrogen. Green food is important. Unless the material in the food is of a feather-making nature, the fowls cannot shed the old coat.

When a hen receives a large supply of carbonaceous food she increases her fat without supplying the necessary elements needed in the renewal of the feathers, and there is a general wasting away, inactivity of the bird, and death. When no stimulant is given, the shafts of the new feathers seem to stick on too long, not splitting open freely.

Secret of Telling the Laying Hen

Before the advent of the trap nest, quite a number of ideas were advanced concerning the general make-up of the laying hen, but none has been so accurate as that furnished by the trap

nest. The hen is caught in the act, and is known by the number of the band on her leg. This number is placed on the egg, and at night credit is given on a record sheet kept for that purpose. At the end of the year it can be readily determined whether the hen is worth breeding from or not.

Trap nests not only tell us which are our best layers, but we also learn the size and color of the eggs laid, and which hens lay eggs that are strong in fertility.

Trap Nest Secrets

The trap nest will pick out the layers of the largest eggs, enabling the breeder gradually to get his whole flock to produce eggs of the same size. When I began my experiments with traps, I found that seventy-five per cent. of my hens were laying either a white or a light-colored egg; to-day ninety-nine per cent. lay brown eggs.

On my farm the traps are looked after two or three times in the morning and once in the afternoon. The bulk of the eggs are laid before noon, and as I allow a nest for about every three hens in the pen, it is not frequent that any hens must wait their turn on account of all the nests being filled.

I use trap nests principally to pick out the cold-weather layers. To me it is not so much the number of eggs a hen lays in a year, as the number she will give during the fall, winter and spring, when prices are the best. I breed only from the best winter layers.

Secret of 200 Eggs per Hen per Year

There is no disputing the fact that with the introduction of an improved system of trapping the hens, and getting their individual records, and subsequently breeding only from the best layers, we poultrymen will eventually make a big stride toward the 200-egg hen. But whether the general average will ever reach even the 150 mark is a question. To average 200 eggs a year, in a flock, would require a number of layers in that flock with a record of 250 or more eggs, for each hen would not lay the exact 200 and then stop.

While I believe in breeding up for heavy records, yet at the same time I should rather have my hens average 120 eggs a year and remain in robust condition, than to have their systems drained of vitality in the race to pass the 200 mark. There is reason in all things. If fowls are forced to become champion layers, it will be done at the sacrifice of something else. What will become of the meat supply if poultrymen put all their forces on eggs? When they spend food and attention on the fowl with a view to creating an ideal carcass, do they not make the egg yield suffer? Will not

an unnatural flow of eggs tend to cripple fertility and make weak and puny chicks?

There is another method for telling the laying hen, and that is by the condition of the pelvic bones. Just as the size of the udder of a cow is a good indication of its milk qualities, so is the condition of the pelvic bones a good sign of the egg-laying qualities of the hen.

The pelvic bones are located at the lower part of the abdomen—in the rear of the fowl—between which the egg passes when it is being laid.

If the tip of the fore-finger fits snugly between these bones, the hen is a poor layer. If it requires the tips of the first and second finger snugly to fill the space between these bones, it is a good layer; and if the tips of the first three fingers are needed to fill this space, the hen is an excellent layer.

A pullet that has not laid, or has just begun laying, will have these bones of the pelvis almost touching. The bones gradually widen as the fowl continues laying, and at two years of age are much farther apart than at one year old.

Secret of Telling the Age

The age of a fowl is generally judged by its spurs, but the length of spur is no positive proof of its age. Some cockerels show more spur than do some cock birds. It is said that a pullet will show rose-colored veins on the surface of the skin, under the wings, and long silky hairs will be found growing there. These hairs and veins disappear after the pullet is a year old, and the skin becomes white and veinless. The skin, too, in a young bird is supple, and the scales thin and brilliant. The skin gets coarser and stronger, and the scales harder, as the bird grows, and the nail of the last toe, which does most of the work when the bird scratches, gets much worn. Also, the eyelids acquire wrinkles as the bird gets older, and there is a slightly shrivelled look on the face. This becomes more and more pronounced with age.

To some extent the texture of the legs is a guide, as also is the delicacy and freshness of the skin of the face and comb, yet an occasional hen will preserve her youthful appearance to a remarkable degree. The skin of the body is a better test, it becoming coarser and drier looking with age.

It is more difficult to judge the age of water fowls than of other poultry, partly from absence of spurs, partly from greater longevity, and partly because the water keeps their legs soft and fresh. Ducks waddle more heavily as they grow older, and after two or three years acquire a depression down the breast. An abdominal pouch of great size indicates great age in geese.

Turkeys up to a year old are said to have black feet, which grow pink up to three years of age, when they gradually turn gray and dull.

Egg Secrets

Secret of Preserving Eggs

There is no reliable method for preserving eggs so that they will positively retain their freshness. But they can be kept several months and be sufficiently good for kitchen use if packed in salt. For this purpose ordinary fruit jars are very good. About an inch of salt is placed in the bottom of the jar and the eggs are stood in this, not allowing them to touch. Salt is then worked around the eggs, and another layer placed on top, and so on until the jar is filled. The eggs should not only be fresh when packed, but should be laid by unmated hens, *as it is the fertility that quickly spoils eggs.*

Secret of Killing the Fertility of Eggs

Fanciers, after the season for selling hatching eggs, generally market their egg crop for table use; and, in order to prevent any one from hatching those eggs, resort to various tricks to kill the germ. Some dip them in boiling water for a few seconds. This partially hardens the albumen, and the eggs taste as though they were stale. Others smear the egg with lard so as to close the pores. This causes the germ to die and the egg quickly spoils. And still others make a hole in the egg with a needle which pierces the yolk, causing it to break. Such eggs have the appearance of being addled. All such practises are unfair to the buyer of table eggs.

On the farm of the writer, as soon as the breeding season is over the male birds are removed from the pens, and the egg crop goes to market. Such eggs are unfertile, and being so will keep in a fresh condition twice as long as fertilized eggs. In fact, an unfertile egg never rots.

Secret of Winter Eggs

I prefer having the pullets start in the latter part of November, and have found that such birds as a rule give the best results during the winter.

To prepare for the winter's work, the pullets should be placed in their winter quarters as early in October as possible, so that they will feel more at home. Moving pullets from place to place will so upset them that laying is often delayed for a month or more.

Large families must be avoided. For profit a family of fifteen is best. Nothing is gained by crowding twenty-five birds in a house that will comfortably quarter but fifteen.

The scratching-shed houses are to be preferred, especially for young birds. These houses admit plenty of air, and induce the stock to exercise by scratching among a lot of litter. Pullets placed in tightly-built houses never do as good work as when they are accustomed to conditions as near outdoors as possible. Another advantage in the scratching-shed house is that the fowls can exercise indoors during bad weather, and are not compelled to endure all sorts of weather. The stock must be protected, and herein is a great secret in winter egg production.

A writer in an exchange says: "How shall we induce the hens to lay when eggs are scarce and high? Up to the present time it has baffled the world. We can count on the annual scarcity of eggs and accompanying high prices as confidently as we can count on the regularity of the tides of the ocean. . . . When I see an occasional hen lay regularly right through November, December and January, and even see an occasional man's whole flock do the same thing, I believe that the day is coming when we shall be able to understand just the conditions which can be depended on to produce the desired result in any given case. . . . I once supposed that if a hen was fed a ration that supplied everything needed to carry on the functions of life and produce eggs, and in liberal quantities, eggs would surely be forthcoming. I now know by sad experience that while this holds true during what we call the natural laying season, it does not hold true in autumn and winter."

Now that experience is no doubt the experience of the majority who keep poultry, but, nevertheless, it does not prove a fact. I have kept poultry for fully thirty years or more, and admit that at first my experience was like that of the writer just quoted. But I find it different now—our summer egg crop is not nearly so large as that of winter. What is the secret? Proper management, care and feed.

A. F. Hunter some years ago wrote: "There are thousands and thousands of farmers grumbling because their fowls do not lay eggs when the eggs would bring good prices (in December, January and February), when it is not the fowls' fault at all, but the fault of the cruel 'penny-wise and pound-foolish' owners, who, to save a dollar or two in the grain account buy cheap, damaged food for the fowls, and then expect them to make eggs."

That is correct so far as the feed question goes, but it is not feed alone that must be considered. In my experience I have learned that it is equally important to have the proper housing, and to have the stock not only early-hatched, but hatched from eggs laid by winter layers.

I use trap nests and keep a strict record of every egg laid between October 1st and June 1st. In making up my breeding pens for the following year I select only the best winter layers—those giving the highest records (as pullets) during the months mentioned. I discard all pullets that do not lay in January. Each year these trap-nest trials are repeated, and in this way each year I strengthen the ability of the stock to give good results in winter eggs. Pullets hatched between April 1st and May 15th should lay well during December and January—they certainly will if properly grown.

I have before me a clipping taken from an old issue of "Home and Farm" that is worth reproducing in this connection: "Much has been said and written regarding the keeping of hens or pullets for winter layers, and as yet the question is as far from being answered as it was years ago. Those who have taken care of their year-old hens, looked after them during the spring and summer and watched over them during the molting season, are a unit in saying that hens in their second year are the most profitable, while those who neglect them and allow them to get in poor condition complain and say they do not lay so well as pullets."

I am not ready to endorse that, for certainly a two-year-old hen cannot have sufficient control and strength to produce the number of eggs that a pullet, with all the vigor of youth, can command. But I have had yearling hens beat my pullets' records.

During 1899 I began experimenting with pullets, and from several pens secured 9,808 eggs. During 1900 these same birds—as yearling hens—laid 13,702 eggs, a gain of 3,894 eggs. But even that cannot be taken as a rule, for I have in many cases had the pullets out-distance the yearlings, and as for two-year-olds, I never expected them to reach even the yearling record.

The quotation from "Home and Farm" continues: "Hens, if through their molt before November 1st, should and will begin to lay during that month, while, on the other hand, the time of maturity of the pullets will determine definitely whether or not they will be profitable during the winter months. If they are hatched too early they will begin to lay in August and will molt in October, and therefore will not lay again until spring. If they are hatched too late they will not mature before cold weather, and, as with the early-hatched poultry, they will not lay during the time when eggs are scarce and highest. They must be hatched at exactly the right time, and they must be kept growing, else they will not make good winter layers."

Secret of Eggs all the Year

During the months of October, November and December of each year, there is always a more or less scarcity of fresh eggs, and the prices, in consequence, go up. This scarcity is due to two things in general: the molting period for old hens, and the absence of early-hatched pullets.

It is at that time of the year that the condition powder and the poultry-food man begins to cry his wares, and it is surprising to see what business he does. While I believe in the tonic effects of a good condition powder, or a scientifically-prepared poultry food, I do not credit these articles with all that is claimed for them.

They should be used with judgment—a little goes a great way. To accustom the fowls to them is but to lose the tonic effect. They are not so much calculated to make eggs as they are to tone up the tissues and to keen the appetite. In that condition the fowl eats more freely and better assimilates the egg food that it gets in good pure grain.

This scarcity of fresh eggs on the farm can only be remedied by early hatches of pullets. Pullets hatched in March and April, and well grown, will begin laying in the fall, and continue in the good work right through the winter. The molting hens will again start up in January, and by February the combined work of the pullets and hens will give a big supply of eggs, and it will be noticed that in February the market prices for eggs are on the decline.

The great trick is to get the eggs during the last three months of the year, and this can be done by early pullets given good housing, good feed and good care.

Secret of Having Perfect Eggs

It is common every now and then to read an account in some newspaper of one of the subscribers bringing an extraordinarily large egg into the office of the editor, and the aforesaid editor at once heralds the news as though it was one of great public importance.

Such eggs are important, but not in the same way as meant by the editor. They are important to the poultryman inasmuch as they are danger signals. They tell of an unhealthy condition of the hen that laid them. No strong, healthy hen will lay either a double-yolked egg, a round egg, or a badly-shaped egg. Something is wrong with the ovaries of a hen that lays anything different than a regular-shaped egg. The main trouble lies in the fact that the hen is overfat. Soft-shelled eggs can come from one of

two things, viz., lack of sufficient lime in the food, and of an over-fat condition.

Instead of rejoicing at these extra-large eggs, there is cause for regret. At once the matter should be investigated, and the general condition of the flock looked into. If it is found that all, or the majority of them, are heavy, it is best to cut down the quantity of the carbonaceous or starch foods, and increase the nitrogenous material.

In the main, the egg-eating habit is caused by soft-shelled eggs being laid. The hens get a taste of the egg and thus form the appetite.

To prevent these bad eggs the fowls should be compelled to exercise, and there should be such feed given as will supply plenty of lime, and in addition a small trough of cracked oyster shell should be constantly within reach of the fowls, so they can help themselves at will.

Market Secrets

Secret of Judging the Age of Dressed Poultry

When the writer was a boy, more old fowls were placed in the general market than is the case to-day, as no one parted with their hens until the fowls were so old that they were not profitable for egg production.

When the housewife selected a hen she would note if the spur was hard, and the scales of the legs rough—indications of old age. If the specimen showed very little spur, and if the legs were more smooth, the market women would bend the underbill. If unable to bend it down, and the comb seemed thick and rough, she would refuse to buy, no matter how fat and plump the carcass might be.

A young hen has only the rudiments of spurs, the scales on the legs are smooth, glossy and fresh colored, whatever the color may be; the claws tender and short, the nails sharp, the underbill soft, and the comb thin and smooth.

If the turkey hen had rough scales on the legs, callosities on the soles of the feet, and long, strong claws—or if the turkey cock had a long beard—this housewife knew that either of the carcasses was old.

Helen W. Atwater, in Farmers' Bulletin No. 182, United States Department of Agriculture, says that one of the commonest ways of testing the age of dressed poultry is to take the end of the breast bone farthest from the head between thumb and finger and attempt to bend it to one side. In a very young bird (say a broiler or a green goose) it will be easily bent; in a bird a year or so old it will be brittle; and in an old bird, tough and hard to bend or break. Unfortunately, tricky dealers sometimes break the end of the breast bone before showing the bird, and thus render the test worthless.

Mackenzie says that a young turkey cock has a smooth black leg, with a short spur. The eyes are full and bright, and the feet supple and moist. The bill and feet of a young goose will be yellow, and there will be but few hairs upon them. If old they will be red.

Scammel says that the feet and neck of a young fowl are large in proportion to its size. A young capon has a thick belly and large rump, a poll comb, and a swelling breast. Young ducks

and geese are plump, with light, semi-transparent fat, soft breast-bone, tender flesh, leg joints which will break by the weight of the bird, fresh-colored and brittle beak, and windpipe that will break when pressed between the thumb and fore-finger. In selecting a goose or duck, take hold of the toes and pull them apart; if the web separates easily it is young.

Secret of Dressing Fowls

The following method is practised by some poultrymen, and recommended for quick and thorough work in dressing fowls: The carcass is first dipped into cold water and then allowed to drip, after which finely pulverized rosin is sprinkled over the feathers, using a dredging box for convenience. This being carefully done, the fowl is scalded in the usual manner. The rosin sticks the feathers together so that pinfeathers come out with the others, saving much trouble. Use the common crude article.

Secret of Celery-Fed Broilers

Some years ago a broiler plant on the outskirts of Washington, D. C., secured quite a trade, at advanced prices, for what it termed "celery-fed broilers." Two weeks before being marketed, celery was chopped up fine and fed the birds being fattened. This gave the stock a peculiar wild flavor, similar to the canvas-back duck. It had no pronounced celery taste, but it so changed the order of things that epicures "smacked their lips" and cried for "more."

The same thing was at one time done by a firm of duck breeders in Stroudsburg, Pa., who had a metal tag fastened on the leg of the duck, announcing that it was celery-fed. Their trade, in consequence, was greatly increased.

Secret of High-Priced Market Stock

In these days of sharp competition with breeds of all classes, the beginner is apt to become puzzled by the arguments used on all sides, and is very much undecided just what breed will give the best returns.

Of course much depends upon the kind of roaster wanted. If a medium size is most salable, say four to five pounds at six months of age, I suggest such breeds as the Plymouth Rocks, Rhode Island Reds, or the large-size strain of White Wyandottes.

But if a bird is wanted that will weigh from six to eight pounds at six months of age, I should advise either the Light Brahma in its purity, or a cross of Indian Game on Brahma. This

cross, by the way, gives a very satisfactory roasting fowl. The Indian Game, being a solid, plump fowl, will add more weight than would a cross between one of the American or the Mediterranean breeds on the Brahma.

Rankin says that he can get ideal roasting fowls best from the Light Brahma in its purity, especially if he first grows a good frame on his birds, and then fills them out with carbonaceous material.

At any rate a bird must be produced that will stand extreme forcing and at the same time have a plump and nice body, with good weight. The prime spring roaster, or, as it is sometimes known, the "soft roaster," is a bird not more than six months of age, and which has the foregoing characteristics. Such a fowl will certainly be good and tender.

In mentioning these varieties it is assumed that the market calls for a yellow-skinned carcass. Should it demand a white-skinned bird, I know of no better fowl than the Black Langshan in its purity, or a cross of Black Minorca and Black Langshan.

Secret of Fattening Turkeys

As the killing time draws near, feed often, being sure to give a variety. It is a mistake to depend upon corn alone. Potatoes, swedes or mangolds, boiled soft and mixed with ground oats, barley meal, buckwheat meal or cornmeal, constitute good fattening foods.

The French fatten with beetroot, artichokes or potatoes, boiled and mixed with meal, and give acorns, chestnuts and walnuts. The latter they consider give a delicious flavor to the meat.

While being fattened, turkeys should have plenty of ventilation and fresh air in their coops, and there should be a plentiful supply of grit, sand and lime rubbish to aid digestion. They should also have all the clean water they will drink.

A popular American method of fattening is to give a morning mash of cornmeal, barley meal or buckwheat meal, mixed with skim milk; a few sweet potatoes can be added. At noon give cracked corn, buckwheat or barley, and at night give whole or cracked corn, with an occasional feed of buckwheat.

It is not best to coop turkeys during fattening, as they are apt to lose their appetites and become sickly. If fed all they will eat three times a day, they are not inclined to roam, but will sit around quietly. Turkeys intended for the later markets should not be so heavily fed as those intended for sale in a few weeks. They should be killed at once when ready for market, as they will begin to lose flesh and prove unprofitable if kept over this time.

Miscellaneous Secrets

Secret of the Breeding Age

May is the natural breeding season. April, and even March hatches, are prolific, but, as a rule, they predominate in male birds, while in the case of May hatches there are generally more females.

As adult cocks cannot always be relied upon to fertilize the eggs during winter, the main reliance for fertility must come from younger birds. A good, vigorous cockerel mated to hens gives me the best results.

A fowl's usefulness in breeding depends upon its condition. I believe in continuing both hens and cocks so long as it is proved that they are strong and vigorous, and that the eggs are properly fertilized. In the yards of the writer there are some three and four-year-old birds. These have, by tests, proved that they still possess good reproducing powers, and are therefore considered too valuable to discard.

In breeding turkeys, two and even three-year-old birds produce much larger stock than yearlings. In ducks, the best mating is ducklings with drakes a year older. Geese, as a rule, mature when ready for breeding, and remain in full vigor for many years. An instance is recorded where a Canada gander was still serviceable at the age of forty-five years.

Secret of Preparing Fowls for Exhibition

Many who visit the poultry shows and see the fowls in a "spick and span" condition, little know of the training, washing and conditioning that these specimens receive before they are shipped to the show room. The following are secrets in the fanciers' trade:

A noted Black Spanish fancier says: "The comb, wattles and face are thoroughly cleansed by using lukewarm water and a soft cloth. A soft brush or sponge is then used to scour the shanks and feet, in warm water, to give them the finest appearance. After being thoroughly cleansed, the shanks are somewhat improved by rubbing or polishing with a chamois skin and a very small amount of melted beeswax. They are then placed in separate pens, about three or four feet square, and the face washed two or three times a week, using a good quality of soap, warm water and a soft piece of sponge. After thoroughly drying with

a soft towel, a little oxide of zinc powder is dusted on the face. Hemp seed and bread soaked in warm milk is part of their diet."

A Black Hamburg fancier after selecting the fowls intended for exhibition, shuts them up for a few days in a dark place, only letting in the light at the time of feeding. By this means, and the application of a little weak vinegar and water, the earlobes are blanched. The fine iridescent green gloss on the feathers is very much enhanced if the birds are highly fed on wheat and a mash of one-eighth linseed to seven-eighths ground oats. White fowls are much improved by this confinement, as it gives the plumage a clear milky-white color and it loses under this treatment the yellowish cast acquired by exposure to the weather. If bad in this respect they should be put in the darkened quarters at least a month previous to the exhibition.

I. K. Felch, in referring to washing white-plumaged birds,



RIGHT WAY TO CARRY A FOWL

Note the ease of the bird. There is no undue pressure on any part of its body.



WRONG WAY TO CARRY A FOWL

Note how the breast is bulged out.

says no soap must be used that contains rosin. He recommends either Pear's or Ivory soap as the best. He further says:

"Thoroughly soap and lather to the skin, and leave it on long enough to cut all dirt, or any gummy or adhering substance in the plumage. Then remove to a second tub of clean, lukewarm water, deep enough to submerge the fowls, and by gently rubbing with a large sponge *with* the feathers, remove every bit of soap. Then shake the plumage in the water thoroughly, and rub it to the usual smooth condition. At last plunge in a tub of cold water that has been blued as the housewife blues the water for the linen in her wash. By gentle manipulation of the plumage thoroughly rinse it with this blue water, and take the bird out into a wire-bottom dripping cage, allowing the specimen himself to shake the water out, and then he may be removed to either of two rooms. Now the best in the world is a room the floor of which is covered

four inches deep with sea beach sand, and the atmosphere heated to 100 degrees, having been warm long enough to heat the sand to 100 degrees. Then allow the room to cool to seventy degrees at the height of a man's waist. This will cause the heat to rise from the sand, and the fowls will, with the water in the plumage, secure a steam or Turkish bath that will make the plumage spread out to its fullest extent, and be immaculately white. Or, put the bird in a cage with a wire bottom and cut-straw that is absolutely clean, and set this cage over a register so as to heat the straw to 100 degrees in a room of seventy degrees; and in this let the bird steam dry. When washing, brush the black dirt out from under the scales of the legs and toes, as one cleans one's finger nails."

Just previous to the show, the head, comb and wattles should be sponged clean, to free them from dirt and dandruff, then rubbed (not smeared) with vaseline.

Secret of Scaly-Leg Cure

While grease—lard or vaseline—and kerosene, will greatly assist in ridding fowls' legs of scales, the most positive and the simplest treatment the writer has tried is thoroughly to coat the legs with gas tar. When the tar wears off the scales go with it, leaving the legs clean and fresh looking. This gas tar can be secured at any gas works.

Secret of a Successful Start

There are a number of reasons why fall is the best time of the year for beginners to start in poultry culture. Supposing that the houses are in readiness, October is a better month than September for buying stock. The October pullet will be better matured, and the yearling hen practically over her molt.

The best beginning is made with healthy, thrifty yearling hens. They will not only give a satisfactory winter egg yield, but will produce stronger and better chicks in the spring. Good yearling hens, bred for egg production, can be purchased during October at two dollars per head in lots of twenty-five or even less. In lots of fifty they can generally be had at one dollar and seventy-five cents each.

Fifty hens will make a fine start, and should produce twenty-five hundred eggs before June 1st. If five hundred of these eggs are placed under hens, there should be from three to four hundred chicks hatched, and the remaining two thousand eggs should bring about forty dollars. The value of the chicks and eggs should the first year not only offset the cost of stock and feed, but should also pay part of the cost of buildings and fixtures.

The following year, double the amount of stock would be had, and thus each year the farm would gradually be growing on a firm foundation. Poultry plants started in that way are, as a rule, successful.

The beginner must learn the fact that he must creep before he can hope to walk. He must not begin on too large a scale. By starting in the fall, and making full preparations for the winter, he will become better acquainted with his task, and will be better fitted for the more arduous duties in the hen yard. Besides, the poultry will have a better chance to become acquainted with their new home and master, and if careful work is done the winter's results will be highly satisfactory.

Should the poultry houses already erected not have any scratching sheds attached to them, it is advisable that such be added at once. To accommodate fifteen fowls a shed 7x10 feet would be satisfactory, although 10x10 feet would be better. A door should lead from the regular house to the shed so that the fowls can come and go at pleasure. The front of the shed, facing the south, had better be enclosed with one-inch wire netting, and during very cold weather a muslin or burlap curtain should be hung on the inside of the wire netting to keep out driving snow or heavy winds.

Poultry kept in this way do not catch cold so readily as do fowls quartered in close, tight-fitting houses.

Secret of Sex in Geese

It is not an easy thing to distinguish the sex of geese, especially of the Toulouse variety. Both sexes are the same in color, but in this variety the male or gander is somewhat larger, has a larger head, longer neck, and carries himself more erect.

The voice of the female is coarser than that of the male, a point that is relied upon quite generally by experienced growers of these fowls.

Gilbert says that there is an embarrassing likeness between the gander and the goose, and out of the breeding season it is not easy at first to distinguish between them, while the young goslings long baffle conjecture as to their sex. Yet certain distinctions gradually manifest themselves, as, for instance, the noise—the gander's hiss being more shrill and sibilant than the goose's.

Newman says that when they are six or seven months of age, or at maturity, the Ganders can be told from the geese by observation. In most cases, the male grows somewhat larger than the female. The goose is deeper in the body, a trifle slimmer in neck, and smaller in head. The call of the gander is loud, long and shrill, while that of the goose is merely an answer to it.

There is a curious plan to determine sex adopted in Cam-

bridgeshire, England. All the geese are shut in a stable or a pig sty; a small dog is then put in. It is said the geese will all lift up their heads and go to the back of the place, while the ganders will lower and stretch out their necks, hissing all the time.

Gilbert refers to the same method, saying that the ganders will put their heads down at the dog and hiss, while the geese will keep their heads up and try to avoid the intruder.

Incubator Secrets

No oil should be used that will not come up to 150 degrees test.

Fill the lamps in the evening, so as to carry a strong heat during the night.

It is safest to use a new wick in beginning each hatch.

Cooling the eggs makes the strongest chicks.

Ventilate the incubator room, as foul odors will jeopardize the hatch.

The fresher the egg the better the hatch.

Never place the incubator near the window.

After the fourth day of incubation turn the eggs both night and morning.

Too high a temperature will quicken a hatch, while one too low will prolong it.

It is advisable to have all the large ends of the eggs pointing the same way.

A hatch that has been delayed, can be quickened by adding sponges dipped in hot water to the incubator.

Begin cooling the eggs after the fourth day, and continue until the eighteenth day.

In cooling eggs it is best to place a thermometer on them after being turned. Return the tray to the machine when the temperature has reached eighty-five degrees.

In heating a machine do it gradually.

Here is a good pointer given some years ago by H. S. Thompson, in "Farm-Poultry": Cut two narrow cardboard strips for each of your egg trays. Write or print "Night" on one, and "Morning" on the other. Tack each one to the sides of the tray that show through the glass door. When turning the eggs see that the trays are shifted around so that the sign "Night" shows at night, and "Morning" in the morning. This will insure the even application of heat, which is so important.

After a few hatches, it is advisable to place the burners of the lamps in hot water, to which is added about a tablespoonful of washing soda, and boil them for several hours. This cleans the sieve thoroughly, and makes it safer to use.

Broody Hen Secrets

The quickest way to break up broodiness, is to remove the hen from her nest the very first evening she deserts her roost. The sitting fever grows in intensity each day after it has fairly begun. Obstinate cases will require a week or more to cure, but when taken in time a few days will suffice. Broody hens should be penned in a pen that is light and the front of which has wire netting, so that plenty of air can be admitted. Feed them regularly and have fresh water constantly before them. Be sure that no nests are in the building.

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