THE HISTORY OF THE
INDEPENDENT CHURCH

HUGH M. WATSON

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Secrets of Success in Poultry Culture

By
HUGH M. WALLACE

CINCINNATI
THE STANDARD PUBLISHING COMPANY
1911

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CONTENTS

PAGE

I. MAKING A START

Making a Start in the Poultry Business.....	7
The Farmer and His Flock.....	12
The City Man and His Back-yard Flock.....	15
The Breeding Stock.....	21
The Choice of Breeds.....	29

II. PROPAGATION

The Sitting Hen.....	36
Care of the Incubator.....	42
Care of the Brooder.....	49
Care of the Baby Chicks.....	57
Feeding the Baby Chicks.....	61

III. EGG PRODUCTION

The Laying Hens.....	71
Bad Habits.....	82
Making the Pullets Lay in Fall and Winter....	85
Age of Fowls for Most Profitable Egg Production.	87

IV. ACCESSORIES AND APPLIANCES

The Trap-nest.....	95
Feeding Troughs and Hoppers.....	99
Different Kinds of Nests.....	101
Home-made Incubators, Plans, Specifications, etc.	104
Home-made Brooders, Plans, Specifications, etc..	116

CONTENTS

	PAGE
V. MISCELLANEOUS.	
Poultry Houses.....	126
Brooder Houses.....	132
Yards and Fences.....	135
The Incubator Cellar.....	139
Lice and Mites.....	143
Testing Eggs for Market.....	147
Teach Your Birds to Love You.....	150
Eggs for Hatching.....	151
VI. EVOLUTION AND THE LAW OF PROGRESS	
The Law of Progress.....	154
Diseases of Poultry.....	160
Simple Rules for Breeding.....	162
VII. MY FAILURES	
My First Experience with an Incubator.....	177
My First Hatch (?).....	183
My First Experience with a Brooder.....	188
VIII. SECRETS OF SUCCESS, IN SHORT PARAGRAPHS	
Egg Production.....	193
Incubation	196
Brooding	198

PREFACE

ALL along the shores of poultrydom are strewn the wrecks of poultrymen who have gone into the business without proper knowledge of it or adequate experience to justify them in expecting success.

Every year finds a new army of recruits going, headlong, into the business, without knowledge or experience, with the expectation of making a fortune, a competency, or at least an easy living, all, or nearly all, to be wrecked along those inhospitable shores.

Why so many people think they can succeed in the poultry business, without experience or knowledge of it, is a mystery. The same people would not think of entering any other business without first gaining a thorough knowledge of it, and as thorough a knowledge is as necessary in the poultry business as in any other business you can enter.

PREFACE

It is a sad sight to see so many failures in the poultry business; and it is also a sad sight to go into the poultry shows and see so many birds that lack so much of nature's beauty and strength.

To guide those breeders who would like to breed more beautiful and profitable birds, and to lead the novice to a profitable goal, is my object in writing this book.

My many years' experience, my many failures and final success, my close and constant observation of nature, my close study of her laws and my out-of-doors life, I think, fit me for the task of writing such a guide.

In presenting this little work to the public, I do so with the hope that the time is not far distant when man will cease his conflict with nature and live in strict obedience to the laws of his Creator.

I

MAKING A START

Making a Start in the Poultry Business—The Farmer and His Flock—The City Man and His Back-yard Flock—The Breeding Stock—The Choice of Breeds.

**Making a Start in
the Poultry
Business**

In making a start with poultry, if a person has no experience, perhaps the cheapest and best way to get it would be to get a job with some successful poultryman for awhile, even though you have to work for nothing.

Another good way is to start with a few birds and gradually build up a flock and get experience at the same time. There is one great fault in the latter method: It is so easy to succeed with a few birds that the novice is apt to jump to the conclusion that he knows the business from A to Z before he has adequate knowledge, and invite failure by jumping in too deep. Deep water will be

SUCCESS IN POULTRY CULTURE

found very dangerous to the beginner until he gets experience and learns to swim.

It is easy to succeed with a few birds because there is always a variety of good food in scraps from the kitchen, crumbs from the dining-room table, grass from the lawn, and plenty of insects and plenty of room. These are the great essentials in successful poultry culture, and where there are but few birds they are provided almost without thought or care on the part of the poultryman: for the good housewife naturally throws scraps and crumbs to the birds, to get rid of them, and usually there is plenty of green stuff growing, about even a small place, to provide green food for a few birds. In the winter there will be plenty of green food from leaves from cabbage and parings from potatoes, onions, turnips, and other vegetables used in the kitchen; and scraps of meat, that would otherwise go to waste, go to the birds and take the place of insects.

All of this food, care and attention go to the birds so naturally, without perceptible thought, care or expense, and the

MAKING A START

profits look so large, that the novice is apt to jump to the conclusion that the poultry business is a get-rich-quick proposition. Don't do that; get right down to business and value that food that your wife has thrown out to those fowls at what it would cost you to buy it on the open market in the shape of grain, mill-stuff, meat scrap, etc., and allow something for work, caring for this small flock, and interest on the money invested; and while the profits will still be large, they will not look so startling as before; and it is well for the beginner to bear in mind that the profits on a large flock are very seldom, if ever, as large as on a small one; but if the beginner will grow up with his flock, so to speak, and gain experience as the flock grows larger, he can make a large flock pay well.

A good time to begin the poultry business is in the early summer, for at that time of the year breeders are beginning to need room for their oncoming broods, and good breeding stock can be bought cheaper then than at any other time. I believe it is better to begin with a few

SUCCESS IN POULTRY CULTURE

grown birds than to start by raising them from eggs, for success with little chickens is far more difficult for the beginner than any other branch of the poultry business. And then, too, starting with eggs is so slow and the time so long before any income can be realized from the growing flock, that discouragement takes the place of enthusiasm and failure follows as a result, while if grown birds had been used, profit would have commenced with the purchase of the birds and enthusiasm would have kept pace with the growth of the flock, and success would have followed as a natural result. However, should the first purchase of birds be made without due consideration of the requirements and expectations of the beginner, and birds be bought that are not suitable to the needs and environment of the purchaser, then failure might easily follow as a result of the bad selection. But under the heading, "The Choice of Breeds," in this chapter, I will give advice as to the variety of birds to choose for different purposes, so that you need not go far wrong in your selections.

MAKING A START

Before purchasing any stock the beginner should fully decide the branch of poultry culture to be followed, and then buy stock suitable for that purpose; bearing in mind that a strain of any breed bred exclusively for the show-room will not, as a rule, prove very satisfactory for utility purposes.

But if breeding show stock is the branch to be followed, then the breeder whose stock takes the most blue ribbons in the big shows, year after year, is the best man from whom to buy your breeding stock.

It is always well to state to the breeder from whom stock is being bought, the purpose for which the stock is intended. If he is a good business man, and a good breeder, he will not sell you stock that is not suitable for your purpose.

Breeding stock to start a flock with, should never be bought from any breeder until the buyer is sure his (the breeder's) reputation is all right, both as a breeder and a man, for there is too much at stake to be careless in this matter. In starting in the poultry business the difference between good stock and bad

SUCCESS IN POULTRY CULTURE

stock usually means the difference between success and failure.

**The Farmer and
His Flock** The farmer who has a flock of fowls that is not making as good an egg record as it should, can greatly improve it by using male birds that have mothers with good egg records. He can usually buy such birds, very reasonably, from breeders who make a specialty of breeding such stock.

The male bird should always be of the same breed as the flock. If the farmer has a mongrel flock, he can improve them in the same way; but it would be better to get some well-bred stock of the desired breed, and, after a start has been made, sell the mongrels to the produce man. While a mongrel flock can be made to pay, they will not pay as large a profit as well-bred stock of some of the standard breeds; therefore they are a poor investment. And then, too, the mongrel flock is so ugly, as compared with a flock of standard-bred birds, that they are not such a source of pleasure as a standard-bred flock would be with all of its members of uniform size and color.

MAKING A START

The farmer's good housewife will find her greatest profit, as a rule, in egg production; and for that purpose a good laying strain, of some of the Mediterranean breeds, is best. They mature young, are good hustlers, and commence laying when five or six months of age if well bred, brooded and cared for from the time they are hatched until they are grown. They lay white-shelled eggs; and they make good broilers when they are from eight to ten weeks old. While they will not bring so much as large birds when sold for meat, they will more than have made up the difference in the egg basket.

The farmer and his wife should read carefully the article in this book in Chapter III. entitled "Age of Fowls for Most Profitable Egg Production." Note the ratio of profit, as egg production increases, and you will see at once that there is a great loss in keeping a strain of fowls that are not up to the top notch in egg production; the cost of improving a flock compared with the gain in profit is so little that it is not worth considering.

All farmers and poultrymen should bear in mind that it does not cost any

SUCCESS IN POULTRY CULTURE

more to keep a bird that will produce two hundred eggs in a year than it does to keep one that will only produce one hundred, and the profit is not the only thing to be considered: The pleasure of caring for a flock that is very profitable is very much greater than that of caring for a flock that does not pay but a little; and that leads to a greater interest in the flock, which interest leads the poultryman on to still greater efforts and still greater profits.

When the good housewife gathers from a flock, in late fall and early winter, a large basketful of high-priced eggs, it gives her dreams of well-dressed children in a beautiful home, with flowers, music and books, and all that goes to make a home desirable and lovely. Such production leads to better care of the poultry and the building up of a worth-while flock of worth-while birds. If all members of the family can be interested in the poultry, so much the better.

Give the children a share of the profits to spend for themselves; not foolishly, of course, but in such a way as to benefit both them and you; this leads

MAKING A START

them to take an interest in the business and do better work.

**The City Man
and His
Back-yard Flock** Nearly every family, in either town or city, could raise a few fowls and produce a few eggs and a little meat for their own use, in a small back-yard poultry plant, if they only thought so.

The joy of eating nice, clean, fresh eggs, gathered from your own little home poultry plant, every day, would be so great that I don't see how anybody can resist the temptation to establish such a plant at once, if he has not already got one. The sweet-meated broilers, fryers and fat hens, that have been raised in your own back-yard plant, and fed on clean, wholesome food and kept in clean, wholesome quarters all of their lives, are so much superior to the stale fowls that are usually found on the city and town market that there is no comparison between them. After you have once had a taste of the sweet, wholesome products from your own poultry plant, you will never, I think, want to go back to such poultry products as are usually found

SUCCESS IN POULTRY CULTURE

on the average town or city market.

And the pleasure and recreation you will get in caring for such a plant will be worth so much to you, and the relaxation from your daily toil and care will be such a valuable asset, that you will soon look upon it as one of your most valued investments.

The birds will talk and sing to you in the most joyous way imaginable, and their talk and song will carry you back so close to nature and your childhood days on the farm that you will forget the trials of life that have been oppressing you.

The cost of keeping this little back-yard flock would hardly be felt, for they would live mostly on waste products from the kitchen that would otherwise go into the garbage-can; and even if all their food had to be bought, the flock would, as a rule, be found profitable.

As to choice of breeds, I believe the best for the back-yard plant are some of the more quiet, so-called dual-purpose fowls. They are the medium-sized fowls between the small, non-sitting breeds and the very heavy breeds.

The light, non-sitting breeds are very

MAKING A START

active and restless, and have such great wing power that they can rise into the air and go over almost any fence, and therefore are not well suited to that purpose; while the medium-sized breeds are, for the most part, very quiet and easily controlled. I don't think you would go very far amiss in selecting some one of the heavy breeds if your fancy runs in that direction. However, I would choose from among the medium-sized breeds if establishing such a plant for myself. These breeds make good sitters and mothers, so that if you wanted to raise a few young birds you could do so without the expense of an incubator and brooder. Of course, if you wanted to learn to run an incubator and brooder, and get experience along that line, this little flock would give you the opportunity to do so. And if you wanted to get the necessary experience so that sometime in the future you would be competent to take up some branch of the poultry business on a large scale, this little flock will give you that experience.

The house or coop for your back-yard poultry plant can be made at home or

SUCCESS IN POULTRY CULTURE

purchased from some poultry-supply house. If you have to buy new lumber of which to build your poultry house, perhaps it would be just as cheap and more satisfactory to buy a ready-made house from some poultry-supply house.

There are some beautiful little houses, with runs attached, made of galvanized sheet-iron, for the purpose of supplying the back-yard poultryman with just what he needs. These are sold by the poultry-supply houses very reasonable, and are just what you need for your little plant. They are easy to clean and manage, and can be easily moved about from one place to another.

Perhaps it would be well to say a word here about crowding, although I have spoken on the subject in another chapter: Don't crowd your little back-yard poultry plant, for if you do you will get disgusted and throw up the whole thing; for if you crowd your birds, lice and mites will be harder to keep down and disease will get the upper hand. Nothing is more disgusting than a filthy, sickly coop of chickens.

Twelve is about the right number of grown birds for such a small plant; of

MAKING A START

course, when you are raising young ones, you will have a greater number than that, counting old and young together, but as the young ones grow larger the number should be reduced, so that by the time they are grown you will have about the original number again.

You can breed your little flock of birds into a great laying strain if you so desire; or you can breed them into a great show-room strain; or if you have the ability of a great fancier, perhaps you will be able to breed them into great prize-winners that will be capable of carrying off the blue ribbon in the great poultry shows of the country and at the same time make great layers of them also. Anyhow, if you love the birds and love to study nature, you will get a great deal of pleasure out of trying.

You can divide this flock into families the same as you could a larger flock and have a superfamily to which you can give new blood from the other most distantly related families of your flock whenever they need it. You can have six families of two females each, and one male will do for all six families. You will not need to

SUCCESS IN POULTRY CULTURE

keep these families separate, for, by using numbered bands on their legs and keeping a record, you will always know just what birds you want to breed from. By the use of the trap-nest you can always get eggs for hatching from the hens that you want to breed from. The trap-nest will also enable you to find out which of your hens produce the most eggs in a year, or in any other given length of time, and enable you to always breed from the best layers.

There is another thing to be considered in connection with the back-yard flock: By establishing these little flocks of poultry you can help to win the great world war by providing a way by which the waste food products of the home can be converted into wholesome and nourishing food; and then if there was no war, to practice such an economy would be doing a great good to the nation, for this great war that we are now fighting with the sword will be followed with a much greater war: the war of commerce and industry. This latter war will be fought with the weapons of thrift, economy, efficiency and invention, and to the people winning the great conflict will come, per-

MAKING A START

haps, the distinction, honor and glory of becoming the super-race of man; and will it not be a glorious thought to us to think that, by practicing our little home economies, we have given our mite to help win the great conflict?

The rich are not exempt from this great conflict; for while they may, and do, give of their wealth freely, as a contribution to the great cause, yet they can never buy back, even with the wealth of a Rockefeller, the food that has been wasted; and it is food, and not money, that will count in the great struggle for existence.

The Breeding Stock

The first and main essential in the poultry business, after you have learned something about handling poultry, is good breeding stock. They must be strong, vigorous, healthy birds and up to the standard weight of their breed and very active. The females should have bright red and well-developed combs; and if you are looking for the best layers of the breed, choose those whose combs tend to grow a little larger than the average of the breed, or perhaps a little larger than the standard calls for. However, if

SUCCESS IN POULTRY CULTURE

you are intending to breed birds for the show-room, you should adhere strictly to the "American Standard of Perfection" which is published by the American Poultry Association.

The beginner should decide what branch of the poultry business he wants to go into before buying stock of any kind. I think the egg branch of the poultry business is the best branch for the beginner to undertake. He is almost sure to make a success of that branch, and if he succeeds he can a little later on take up some other branch, if he so desires. Before buying any stock it would be well for him to read all I have to say in Chapter VI. on "Evolution and the Law of Progress." It would also be well for him to get a copy of the "American Standard of Perfection" and study the different breeds and types of egg-laying poultry. Even after he has been to all this trouble, his main reliance will be in the good business and breeding qualities and the honesty of the breeder from whom he buys; for the person who has not had much experience will not be able to judge of the laying qualities of the birds he buys.

MAKING A START

He should also bear in mind that birds that lay well under the care of an experienced poultryman will not always lay so well under the care of a novice.

It would be better, perhaps, for the beginner to buy his male birds, for a time at least, from the breeder of whom he bought his original stock, provided he has found him honorable, until such time as he has learned something of the business and got a good start; for if he attempts to improve the egg-laying qualities of his birds, right from the start, before he has had time to gather any experience, he is liable to injure their egg-laying qualities.

If he intends to continue in the business of producing market eggs, without intending to become a breeder, it would be better and cheaper for him to buy his male birds from an expert who makes a business of breeding birds for high egg production; and, of course, he should be the man from whom the original stock was bought, if he has been found to be all right in every way.

He should always buy the males from the breeder's highest egg-producing hens, even though they cost several times as

SUCCESS IN POULTRY CULTURE

much as those from his lowest producing hens; it is a well-established fact that the male birds from a high producing hen are much more potent in transmitting the egg-laying qualities than the dam herself. I don't think that the meat-producing branch of the poultry business is as profitable as the egg-producing branch; at least, it never has been for me. Of course, a good many eggs are produced from the meat-producing branch of the business, and there is also a large amount of meat produced from the egg-producing branch of the business; one seems to about offset the other in this respect.

One good thing about the egg-producing branch of the poultry business is that every day produces a profit and there is a daily income, which is a joy to all of the members of the family. In this way it is analogous to the dairy branch of the cattle business, and the dairy branch of that business is conceded to be the most profitable branch of the cattle business.

If a man is a skillful fancier and a good business man, it is possible that he can make better profits breeding fancy poultry than he can out of the utility

MAKING A START

branches of the poultry business, but the ordinary poultryman can not do so.

I believe that all poultry breeding should be for the purpose of bringing about as great egg and meat production and efficiency as possible, and produce at the same time as beautiful birds as it is possible to produce without interfering with their efficiency as meat and egg producers.

We must have as much beauty as possible in all things, for the world would be a dreary place to live in without beauty; and I believe that beauty and efficiency can go mutually along hand in hand in the poultry business, for the most beautiful hen I ever saw was a laying type of one of the egg-laying breeds.

No, no, let us not rob the earth of any of its beauty, for efficiency's sake, so long as efficiency has not become necessary to our existence.

When selecting male birds to head our breeding-pens, whether from our own flocks or from the flocks of some other breeder, it is well to select those that are very active and very attentive to their mates. They should be brave and good

SUCCESS IN POULTRY CULTURE

fighters of their breed, which is a test of their ability to transmit vigor, strength and vitality to their progeny.

If a bird does not possess these evidences of strength, he should be discarded from the breeding-pen. Don't think, for a moment, that a bird that is beautiful of feather and comb, shape and carriage, unless he is also brave, aggressive and gallant, will make a good male to head your flock; for if he lacks the latter qualities, his offspring will lack the vigor and strength necessary to make success with poultry all that you would like to make it. You will surely invite failure if you don't see to it that the male birds that head your breeding-pens have these latter qualities. A breeder could not make any greater mistake than to choose a beautiful, cowardly male to head a flock, for he would certainly transmit weakness to his offspring and when he met his rival his beauty and glory would fade into an ignominious retreat. The coward and the under dog may have a place in our sympathy, but, so far as I can see, they have none in the plan of creation unless it be for demonstrating and

MAKING A START

promoting the strength of their rivals.

Do not crowd the breeding stock. If you would have healthy and profitable birds, don't allow more than half as many on a roost as could be put on it by crowding them. Their range must be ample; remember that one hen kept at a profit is better than one hundred kept at a loss; you may give your poultry the very best of care, and if you crowd them they will not be profitable, while with ample room they would be. The environment that Nature gives her fowls must be imitated by man as much as possible, if he would succeed; Nature gives them plenty of room, and a clean, cool, damp place in which to hatch their eggs, and a clean roost free from lice and mites.

If a flock of birds have good, clean surroundings that are kept clean all the time, and they get good care and attention and proper food, and they are not healthy, there is something wrong with the birds. And if a good many of them are sickly, instead of trying to doctor them up with medicine, it would be better to discard them and buy some good, strong, healthy birds to take their place.

SUCCESS IN POULTRY CULTURE

To try to breed the weakness out of the sickly flock would be a slow, expensive process; however, it can be done by following the law of evolution as taught in this book; and perhaps, for the beginner who wants to get experience and is not easily discouraged, it would be a good thing to do. Experience, after all, counts for more than any other one thing in the poultry business; and if you can get it by breeding a sickly flock healthy, perhaps you are the gainer by doing so; but from a money standpoint you would be loser, unless you put a money value on your experience.

The breeding stock, in order to produce strong, fertile eggs, must be well mated and kept in the best possible health and vigor. If the birds have plenty of range, where green food and insects are plentiful, this is easy, but if they are confined in small yards, the problem becomes more difficult. It is almost impossible to get a good per cent. of fertile eggs from flocks that are closely confined, and this is more especially true if the birds are crowded. If close quarters can not be avoided, then the difficulty can be

MAKING A START

partly overcome by dividing the birds into small flocks and keeping their quarters scrupulously clean and feeding them well-balanced rations. They should also have plenty of good, sharp grit, ground oyster-shells, and plenty of fresh water before them all the time.

The Choice of Breeds The choice of breeds is, in a great measure, a matter for each individual to decide for himself. Almost any of the breeds, if well bred and cared for, will be a source of pleasure and profit to the poultryman or breeder.

If you are going in for egg production, my advice would be to choose one of the lighter and more active breeds, and if for meat production, one of the heavy breeds; and if you desire to make a success in the production of both meat and eggs, perhaps some of the middle weights would be the best. But whatever breed you choose, get the best that can be found for your foundation stock.

The first question to be asked by the poultryman who is looking about for a change of breeds, or the beginner looking about for a breed to start with, is, What

SUCCESS IN POULTRY CULTURE

branch of poultry culture shall I take up? But even before he asks this question he should look about him and see what kind of a market he has for poultry products, what kind of products will be in the greatest demand, and what prices the market would be likely to pay for them.

If you intend to raise a few birds in the back yard, for the sake of a few fresh eggs and an occasional broiler, choose any breed that you like best and can get the most pleasure out of. If after awhile you find another breed that you like better, change to it, for your poultry business is mostly one of pleasure, and you could probably get as much pleasure out of changing from one breed to another as anything else you could do. But if the beginner is going into the business for a livelihood, he should investigate all the conditions surrounding him, and choose a breed best suited to those conditions and stick to it. A change, when you are in the poultry business extensively, is apt to be very expensive, and sometimes it leads to failure. However, should he find that he had made a mistake in choice of breeds and finds other breeds better suited

MAKING A START

to the conditions that surround him, a gradual change to another breed would not prove so very expensive.

Buy from a reliable breeder, who, if he is a good business man, will only charge you a live-and-let-live price for good stock. Do not expect the man who keeps his stock well bred up to sell you eggs for hatching and stock for breeding purposes for a produce market price, for he can not afford to do it. While you would apply the live-and-let-live rule to him, you should also apply it to yourself.

You will never know what it costs, in money, time and labor, to keep a flock up to "Standard" requirements, until you have tried it. Therefore, buy the best, even though your capital is very limited, for it is much better to start with a few birds of good quality than with a large number of poor quality.

After the beginner has chosen the breed he likes best, before he buys he should ask himself this question: Do I care for the utility side of the poultry business? If he does not, then fine feather, strength, vigor and bearing are about all that he need look for in the

SUCCESS IN POULTRY CULTURE

breed that he has selected. But if he is hunting for utility, they must have an egg record back of their fine feathers and should be strong, vigorous, active, healthy birds. If he is looking for profit in egg production, the breed does not count for so much as the strain: for a poor-laying strain of the non-sitting, egg-producing breeds is greatly inferior to a good-laying strain of the larger breeds. Therefore, if he wants eggs, he must select his breeding stock from a good-laying strain of the breed he has chosen. If he is looking for birds that are capable of carrying off the blue ribbons in the best poultry shows and at the same time winning first, or even second, prizes in the national egg-laying contests, he will have to look far and wide, and a long time, before he finds them. I doubt if such birds can be found at the present time, but I believe the time is coming when such birds will be produced. But I also believe that the "Standard of Perfection" will have to be changed in the case of a good many of the breeds, before such breeds can be produced.

At the present time, if the beginner

MAKING A START

is looking for fine feather and egg production combined, he is very liable to be disappointed in one direction or the other.

Perhaps it would not be out of place to relate here the experience of a man who desired to get an egg-laying strain of single-comb White Leghorns. He watched the national and international egg-laying contests, and when the premiums were awarded he ordered eggs from two different men who owned the premium winners. The eggs that one of the men sent out for single-comb White Leghorns hatched out chickens some of which had black spots. Those with black spots on were discarded and the white ones retained to breed from, with the hope that their offspring would all be white, but a good percent. of them turned out to be spotted; all of which seemed to me to be very good evidence that the prize-winner had been breeding his birds for egg production alone, because, perhaps, he found it beyond his ability to breed according to the "Standard of Perfection" and for egg production at the same time.

I mention this incident here to put the beginner on his guard. There is nothing

SUCCESS IN POULTRY CULTURE

more annoying than to be disappointed in the breeding stock that has been bought for the foundation of the future flock; therefore the beginner can not be too careful of whom he buys.

This man who bought the single-comb White Leghorns, because they won first and second premiums in the national and international egg-laying contests, did so with the intention of getting a start of the two best egg-laying strains of single-comb White Leghorns, with the intention of crossing the two strains and continue breeding them for egg production; but when he found that one of the strains persisted in breeding partly black, he discarded them altogether and bred the other strain alone. While this man did not expect to get show-birds from these two breeders of egg-laying strains of single-comb White Leghorns, he did expect to get single-comb White Leghorns that would breed all white.

There are plenty of good breeders who will tell the whole truth about their stock, and if the buyer will make known his wants they will tell him whether or not their stock will fill the bill. To the begin-

MAKING A START

ner I would say: First find a breeder in whom you have confidence, and then confide in him and tell him your wants and expectations, and you are not very liable to be disappointed in what you get.

Egg production is my specialty, and I chose single-comb White Leghorns for that purpose. While I don't claim that they are the best for that purpose, yet anybody desiring to make egg production a specialty will not go far wrong in choosing them. There are others, perhaps, just as good for egg production, but I don't believe that there are any others that are better. If you go in for egg production, be sure and get a laying strain of the breed you choose.

II

PROPAGATION

The Sitting Hen—Care of the Incubator—Care of the Brooder—Care of the Baby Chicks—Feeding the Baby Chicks.

The Sitting Hen The sitting hen should be chosen from the more gentle members of the flock. She should be kept as free from lice as possible, during the period of incubation, by dusting her frequently with a good louse powder, which you will usually find at the drugstore and sometimes at your grocery and feed store. The powder should be worked well down into the feathers and on to the skin of the bird. A good dust-bath should also be provided where she can dust herself when she comes off for food.

Her nest should be, preferably, on the ground, but should that be impracticable, then a good supply of damp soil should be placed under the nest. Don't sit a

PROPAGATION

hen on a nest that has been used by the flock for laying purposes, without first cleaning and thoroughly disinfecting it. Put in new nest material, and be sure the nest is free from lice and mites. It should be so situated that the laying hens can not disturb her.

A box open at one side makes a good nest. It should be fourteen inches square and fourteen inches deep for small hens, and sixteen inches square and sixteen inches deep for large ones. There should be a strip five inches wide nailed across the lower front of the box to hold the nest material in place. Almost any sort of a box or barrel can be used for a nest by using a little thought in its arrangement.

When a hen becomes broody and you are ready to sit her, and you desire to get her on a nest away from the one that she has been laying in, it is best to move her after night. She should be handled very tenderly and a few nest eggs or china eggs left under her for a day or two to see that she takes kindly to the new nest before giving her the eggs that she is to hatch. If a hen can be left on

SUCCESS IN POULTRY CULTURE

the nest in which she has been laying, she is usually better satisfied and more contented than when she has been moved to a new nest. It seems to be natural for a hen to sit on the nest in which she has been laying; therefore we should make arrangements to sit them there when we can do so without too much danger of their being bothered by the other laying members of the flock. To go against nature is always more or less difficult, and the less we try to do so the less trouble we will have and the greater will be our success.

Do not put too many eggs under the sitting hen, for, if you do, those on the outside of the nest will not get heat enough to hatch well. The whole hatch will be endangered by such practice, because the hen will move the eggs about in the nest, and part of them will be too cool all the time throughout the period of incubation and all of them will have been first warm and then cold, from time to time, as the hen moves them about; the result will be a poor hatch of weakly chickens, and they will never make the strong, healthy stock that they would

PROPAGATION

have, had they been properly hatched to begin with. A small sitting all hatched and well hatched is far better than a large sitting poorly hatched and a good per cent. of them not hatched at all. Chickens can be poorly hatched, under a hen as well as in an incubator, and when this happens they will be found to be very hard to raise and never prove very profitable to the poultryman. If the weather is cold, put ten or twelve eggs under one hen, and if the weather is warm, twelve or thirteen will be about right. Without proper incubation there can be no success in the poultry business. Too many eggs under a hen will produce poor incubation, and bad results are sure to follow.

If profitable fowls are to be raised, they must come into the world strong and healthy. Even then they will be found hard enough to raise. If any prove too weak to get out of the shell, they are not worth bothering with. Remember that if the weaklings are disposed of at this stage only the eggs are lost, but if they are nursed along for a week or two and then die, both eggs, labor and feed have been lost.

SUCCESS IN POULTRY CULTURE

And to dispose of the weaklings at once when they are first hatched is not discouraging like it is to see them dying, day by day, after a great deal of care, feed and labor has been spent on them.

Many breeders make a practice of stopping the incubation when half of the eggs are hatched, claiming that the first half of the chickens hatched contain ninety per cent. of the profit-makers in the hatch, and that ninety per cent. of the last half of the hatch will lose you money if kept to maturity. While I have not yet tested out this theory, it looks good to me, and I shall give it a thorough test; and I would advise every breeder to do so, for if the profit-losers can be eliminated at so early a period of their existence, it will surely add greatly to the profits of the poultry business, and the annoyance and discouragement of having a large per cent. of weakly chickens in your flock will be done away with.

The very fact that some chickens hatch out in a shorter time than others, of the same sitting, is very good proof that they possess some advantage over those that hatch out later, and I have noticed

PROPAGATION

that those that hatch out first have an easier time getting out of the shell than those that come out later. This is also good proof that they are stronger and more vigorous and will stand a better chance of winning in the struggle for existence than the last part of the hatch.

One breeder says that those that hatch first mature younger, and the pullets commence laying younger and lay more eggs during their pullet year than those that hatch last, and are more robust and healthy, better rustlers, and make better use of their food.

Mr. T. E. Quisenberry, president of the American School of Poultry Husbandry, says: "The fact that a chick grows rapidly in the shell and makes good use of the food which nature has placed there for its use during the first twenty days of its growth and development, and then hatches and beats another chick out of the shell from six to twenty-four hours, is an almost sure sign that the first will beat the last in the race of life and at every stage of its existence."

He further says: "There are exceptions, but this is the rule. Mark the first

SUCCESS IN POULTRY CULTURE

one-third or one-half of your chicks that hatch, and try this out. It is an almost certain indicator of the profitable and the unprofitable chicks."

This thing is worth trying; let us all try it out, and then talk and write about the results and by so doing help one another.

Under the headings, "Care of the Baby Chicks" and "Feeding the Baby Chicks," in this chapter, will be found full directions for their care and feeding. Study these directions carefully and well, for on your success with the baby chicks depends your success in the poultry business. If the chicks are not properly raised, from start to finish, the profits are very apt to be found on the wrong side of the ledger.

When the sitting hen comes off for food she should be liberally fed. This is especially true early in the season, for, should she remain off too long when the weather is cold, her eggs would get chilled and the whole sitting lost.

Care of	While the sitting hen
the Incubator	is nature's way of hatch-
	ing eggs, and perhaps the
best way where	but few are to be hatched,

PROPAGATION

yet where a considerable number are to be hatched, she is so much trouble and expense that man has sought and found a better way; he has invented a machine that does the work with less trouble and expense and has named it "incubator." Eggs can be hatched with these machines—in large and small quantities—with but little trouble and expense. The chicks come out free from lice, which is a great advantage over those hatched with hens, and if the machine is made on the right principles I believe the chicks come out as healthy and strong as those hatched with hens. Whether you make your own incubator or buy it from a manufacturer, be sure that it is a good one. There is nothing so annoying as sitting up nights with a cheap, worthless incubator, and, after all your toil and sleepless nights, get but an inferior hatch of scrawny chicks that it is almost impossible to raise.

If you raise any of the non-sitting breeds, and expect to raise early chicks, you will have to have an incubator; and if you expect to raise early chicks from any of the breeds, you will find the incubator indispensable.

SUCCESS IN POULTRY CULTURE

I will not give directions for operating an incubator here, because incubators designed by different men do not all require the same management. My advice to those who would run an incubator, successfully, would be to run it according to the instructions of the designers or manufacturers. However, I might say here in a general way: The incubator lamp should be kept clean, and, unless the fount is a large one, it should be filled morning and evening and should have a new wick at the beginning of each hatch. Always turn and care for the eggs before caring for the lamp, for the soot and coal-oil that get on your hands while caring for the lamp will injure the eggs should you handle them after caring for the lamp; your hands should always be clean when handling the eggs, and you should always wash them thoroughly before going to the incubator-room.

Cleanliness is a great help to success with the incubator, and it should not be overlooked. The incubator should be thoroughly cleaned and disinfected after each hatch, and if it is a hot-water machine the water should be drawn off and

PROPAGATION

the machine refilled with fresh water. Where rainwater is available it should be used to fill the incubator tank. Well water or spring water is apt to carry minerals in solution that will form scales on the heating parts that will impede the circulation of the water and reduce the heating efficiency of the system; reducing the efficiency of the heating system, by using mineral water, will make it necessary to use more coal-oil for each hatch than would have been necessary had rain-water always been used. Using hard or mineral water accounts for, in some measure at least, the increasing difficulty of maintaining the proper temperature in hot-water machines as they grow old.

The regulator on most machines will have to be adjusted, from time to time, as the incubation proceeds, on account of the increasing heat given off by the eggs. If it can be avoided, the incubator should not be opened, after the chicks commence to hatch, until they are all hatched out and dry.

The eggs should be allowed to cool and air a short time each day, but they should be placed back in the incubator as

SUCCESS IN POULTRY CULTURE

soon as you can detect a coolness by placing your hands on them. They should be turned twice each day.

It is best to keep the incubator door closed unless the manufacturer's instructions are to keep it open during the time the eggs are being turned. The temperature of the machine should be maintained as near 103 degrees F. as possible. The bulb of the thermometer should always be on a level with the top of the eggs.

Some manufacturers recommend laying the thermometer on top of the eggs, but I never liked this plan very well, for the reason that sometimes the bulb will be lying on an egg with a live embryo, and sometimes on an infertile egg or on one which contains a dead embryo. If the thermometer bulb lies against an egg with a live embryo, the reading will be more than when it lies against an infertile egg or one containing a dead embryo, while the temperature in the incubator remains the same. The reason for such a result is that the egg with the live embryo gives off heat, while the infertile or dead egg does not. Such a result causes confusion and a tendency on the part of the operator

PROPAGATION

to be constantly changing the regulator, which results in an uneven temperature in the machine. An uneven temperature is not conducive to good hatches. However, if the manufacturer of the machine that you are using instructs you to lay the thermometer on top of the eggs, then I think it is best for you to do so. And I think it is a good practice for those who have had but little or no experience with incubators, even though the manufacturer does not so recommend; for while the bulb of the thermometer that lies on the eggs will always be the right height, the one with adjustable legs or the hanging thermometer is liable to be adjusted too high or too low by the novice to get good results. I have known persons who have had a great deal of experience with incubators to make such bad adjustments of their hanging and adjustable-leg thermometers that they got very poor results. The fact that eggs vary in size gives the thermometer that lies on top of the eggs an advantage over a hanging or suspended thermometer, for it is self-adjusting and will never be placed too high or too low to give good results. And if the eggs are

SUCCESS IN POULTRY CULTURE

kept well tested out, so that there will not be any, or but very few at least, dead or infertile eggs in the machine, the thermometer that lies on the eggs will not vary much more than the others.

The thermometer that lies on the eggs can not very well be read without opening the door of the incubator, while the suspended thermometers can usually be read without opening the door. The opening of the door is, perhaps, a good thing for incubators that lack ventilation, but for those that have proper ventilation it might be a bad thing; so, on the whole, I think it better to follow, without deviation, the instructions of the manufacturer of the machine that you are using.

The reason that it is so important that the thermometer needs to be just at the proper height is that the temperature increases so very rapidly as you go up towards the heating system of the machine; therefore a very slight rise of the bulb of the thermometer above its proper place will cause it to register too high a temperature, and if it is very slightly too low it will not register high enough.

Experience will help you much in han-

PROPAGATION

dling your incubator, and you should observe carefully every cause and effect connected with it.

For myself, I use a thermometer with adjustable legs. It stands on the bottom of the tray, adjusted so that the bulb is on a level with the top of the eggs, with the tube slanting upward. An egg or two is left out so that there is space all around the bulb of the thermometer. This arrangement causes the thermometer to register more accurately, at all times, the temperature of the machine than when it is placed on top of the eggs. The thermometer should not be moved about from place to place in the incubator, but should remain about in the same place during the whole period of incubation.

The management of the incubator should be left to one individual of the family; for if two undertake it at the same time, they are apt to confuse one another and the result will not be so good.

Care of the
Brooder

The brooder should, like the incubator, be run according to the instructions of the designer or manufacturer. The brooder must be kept scrupulously

SUCCESS IN POULTRY CULTURE

clean. If it is a lamp brooder, the lamp should be lit up and kept burning at least twelve hours before chicks are put into it; the lamp should be cleaned and filled at least once every day; the regulator should hold the temperature up to 95° F. before the chickens are put in. After the chickens are put in, the heat from their bodies will raise the temperature in the brooder to 98° F., or perhaps more, and you may find it necessary to lower the lamp a little in order to keep the temperature from rising too high in spite of the regulator. The temperature of the brooder should be watched very closely for awhile, until you are sure it is going to remain about right. The chicks should be allowed but little room outside the brooder for at least a week; by that time they will have learned how to use it and they may be allowed more room.

Don't crowd your chicks. As with the breeding stock, crowding is fatal to success; there should be five hundred square inches of space under a brooder for each fifty chicks; ten square inches to the chick is about right for the first two weeks, after which the space should be doubled.

PROPAGATION

Large flocks of chicks are more difficult to succeed with than small ones, therefore I would advise the beginner to start with a small flock and give them plenty of room.

The bulb of the thermometer used in the brooder should be about one and five-eighths inches above the floor of the brooder for chickens, and for ducks a little higher, say about one and three-fourths inches. This is very important, for if your thermometer is too high or too low, you will be deceived, by its reading, into believing that the temperature is right when it is not. If the bulb of your thermometer is on the floor of the brooder and reads 95° F. to 100° F., the temperature is much too high for the chicks, and if the bulb of the thermometer is much over the height that I have given, then if it reads 95° F. to 100° F. the temperature of the brooder would be too low.

The cause for this difference of temperature at different heights in the brooder is the same as that which brings about the same results in the incubator. I explained this when I was writing about the incubator.

SUCCESS IN POULTRY CULTURE

You will not be able to keep the temperature in the brooder as steady as you have kept it in the incubator, for the reason that the changing position of the chickens will affect the reading of the thermometer: for instance, if they are gathered closely around the bulb of the thermometer, it will register a higher temperature than it will when they are scattered out, while the general temperature of the machine would be about the same; and then, when part of the chickens are out of the machine, the temperature will not be so high as when they are all in the machine. All of these things must be taken into consideration when managing the brooder. You must not expect to keep the temperature of the brooder just at a certain degree, for you can not do it; the best you can do is to keep the temperature as near the proper degree as possible.

The ideal brooder is the one that has ample heat and allows the chicks to get away from the heat when they are too warm and approach nearer to it when they are too cold.

This is one of the reasons why the

PROPAGATION

stove brooder is such a great success when properly constructed and properly handled. Another reason for its great success is its good ventilation. All brooders should have good ventilation, without which they are worthless.

Where good Pennsylvania anthracite coal can be had at a reasonable price, I consider the well-made stove brooder a good machine when flocks of considerable size are to be brooded together. Most manufacturers of stove brooders overestimate their capacity, or rather, perhaps I should say that they estimate the capacity up to what an expert can do with them, which is about twice as much as a novice can do. The beginner should never undertake to brood under any brooder more than half the number of chicks that the manufacturer estimates that they will accommodate. It takes an expert with good judgment and good machinery to raise a large number of chickens together in one flock. Plenty of room makes it easy to raise chickens, while a lack of room makes it very difficult.

SUCCESS IN POULTRY CULTURE

The dust-bath which I have recommended for the mother hen and her brood should also be provided for the brooder chicks.

If you have kept your incubator and incubator-room as clean as you should, and your brooder as clean as it ought to be, there will not be any lice to bother your brooder chicks; if, however, the grown hens are allowed to go among them or the chicks are allowed to go among the grown hens, they are very liable to soon have lice on them.

Whether the chicks have lice on them or not, they love to wallow in a nice, fine, dry dust-bath, and it should always be provided for them; as I have said before, it should always be situated in a dry, sunny place.

Perhaps before leaving this subject I should describe more fully, for the benefit of those of my readers who have never seen one, and more especially the new beginners, the stove brooder. While it has been on the market several years, very many people have never seen one and it is very probable that all such people would like to know something about them.

PROPAGATION

They are, as a rule, made very much like the old-style, round-cannon, cast-iron, soft-coal heater, only they are made very much smaller. Some of them have a body large enough to hold hard coal enough to burn twenty-four hours, and others have a smaller body and are provided with a magazine for holding most of the coal, which is fed down to the fire-pot as fast as it is needed to keep the fire burning steadily, something on the principle of the magazine in an ordinary base-burner. These magazines should hold coal enough to last from twelve to twenty-four hours. The stoves are provided with a regulator which is operated by a thermostat that is located near the floor under the hover; the thermostat is far enough from the stove so that all the space under the hover will warm up nicely before it expands enough to operate the regulator which controls the draft of the stove and the temperature of the hover. They are also provided with a thermometer made especially for them; they are provided with a hover that deflects the heat from the stove down onto the floor where the chickens hover; this hover is, as a

SUCCESS IN POULTRY CULTURE

rule, about fifty-two inches in diameter and is usually provided with a curtain made of thick, heavy, warm cloth that hangs down to the floor; the hover is also provided with means by which it can be raised up out of the way while cleaning the floor and caring for the stove.

If success is expected in raising little chickens, the brooder must be a good one. Nature supplies the little chickens with just as good a mother after they are hatched as she does before, and if man would succeed with small chickens, he must do so too. The idea, that most people have, that any old box of a thing is good enough to brood the chicks under after they are hatched, has led to more failures than any other one thing. The brooder should be able to maintain a fairly even temperature of about 95° F. during all kinds of weather. It should have good and constant ventilation. It should be easily cleaned. If it has these three qualities and is kept clean, and not crowded, and the chicks are properly fed, and the breeding stock are what they should be, and the hatching

PROPAGATION

has been properly done, success is almost sure to follow.

Care of the Baby Chicks The mother hen should not be allowed to run at large in the early morning when the dew is on the grass. Most hens, if allowed to do so, will trail the chicks through the wet grass and weeds, getting them wet and cold, which weakens them very much, checks their growth, and leaves them an easy prey to all the diseases that attack and destroy them. Such treatment will cause the loss of a good per cent. of the brood, and turn into a serious loss what would otherwise have been a good profit.

My experience teaches me that the best plan to follow when chickens are brooded with hens is to confine the hen in a coop. The coop should be one that can be easily closed at night for protection against cats, rats, and other enemies that prey upon them; but the coop should not be closed so tight that the brood can not get plenty of fresh air at all times. It should be provided with a small covered run that will be dry in all kinds of weather; and whenever the weather is warm and the

SUCCESS IN POULTRY CULTURE

grass and weeds are dry, the chicks should be given as much range outside of their covered run as can be spared for them. While playing about and hunting for bugs, worms, and other insects on this range, they will get all the exercise they need; but if the mother hen is allowed to run at large with them, even when the grass and weeds are dry, they are very liable to be overworked, and should the whole brood be raised by such methods, which is almost impossible, there would be a considerable loss in growth. To make the most profit out of the business, and that is what we all like to do, all of these little things must be taken into consideration. At the present time of such great efficiency in production no ordinary business can succeed unless the little leaks are most carefully looked after.

When chicks are raised with hens the louse problem is a very serious thing and will require a great deal of attention. The mother hen should be well powdered, from time to time, with some good louse powder, and the little chicks should be examined very often for lice: look for the lice on top of the head, under the wings,

PROPAGATION

and around the vent, and should any be found a little grease such as lard should be rubbed on those places. The grease should be applied very moderately, for if too much is used the chicks will be very greatly injured, if not killed outright. Provide a good dust-bath for the little fellows to wallow in, and it will be found a great help in keeping down the lice. The coop should be large enough so that the mother hen can also have a dust-bath to wallow in.

You can use almost any sort of coop if it comes up to the requirements that I have stated above. Chicks are not particular what sort of a coop they have, if it is comfortable and roomy. The coop should be made handy and as easy to operate as possible, so that the work of caring for the chicks will not become arduous and disagreeable.

I speak of this here because I know that the almost constant care that the little chicks require soon becomes a disagreeable task if the coops and everything about them do not work well. Such coops can usually be constructed from material found on almost any place or from lumber

SUCCESS IN POULTRY CULTURE

bought from the lumber-yard. Many people who are handy with tools, and are ingenious, use goods boxes and barrels, which they work over into handy coops. If, however, you have not the time, nor the genius, nor the desire, to make your own coops from material found on the place or close at hand at the stores and lumber-yards, then they can be bought from the dealers in poultry supplies or direct from the manufacturer of such supplies, whose advertisements you will find in your poultry and farm papers.

If you have to buy new lumber to make coops from, and have no plans to work from, it is, perhaps, cheaper and more satisfactory to buy ready-made from the dealer or manufacturer. This is especially true if you have plenty of other work to do, that needs doing, and the money is at hand with which to make the purchase.

The proper care and feeding of the little chicks are, perhaps, the most difficult things the poultryman has to learn. While the baby chicks are not entirely helpless, like the human baby, and therefore do not need such constant care and attention, yet they need gentle and loving care at the

PROPAGATION

proper times, if one would make the greatest success raising them.

This part of the business should be learned thoroughly and well, for, unless you are capable of succeeding well in raising the baby chicks, I can not see how there is any chance for you to succeed in the poultry business. When once and well learned, it will be found to be one of the most valuable assets in the business. After you have learned to raise them in small numbers, then you should learn to raise larger and larger flocks until the limit has been reached. And as your poultry plant grows, you will grow with it, so to speak, and will soon be able to instruct your helpers so that they can also succeed.

Feeding the Baby Chicks	Feeding the baby chicks is easy, but what to feed and how much is more difficult. They should not be fed anything during the first forty-eight hours of their lives. Some people think this too long to wait before giving the first food, while others would wait even longer.
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Nature has provided plenty of food for the first few days of the chick's life

SUCCESS IN POULTRY CULTURE

in the yolk of the egg from which the chick is hatched. Just before the chick hatches from the shell the yolk is absorbed into the abdomen. If you will consider the quality and quantity of food provided by nature for the little chicks, in the yolk absorbed, and then consider the chicks' size and strength and probable needs, you will readily see that they will not suffer without other food for at least three days after they have been hatched.

From my observation of nature and my own experience in feeding little chicks, I believe that forty-eight hours after hatching is the best time to commence feeding them.

A few hours before giving them their first food, place a little sharp grit before them. They will not eat enough of this to hurt them; a little coarse, clean sand will be good for this purpose.

The opinion of many good poultrymen is that a little grit in the chick's gizzard to start with is a good thing, for it stimulates it to early action, thereby causing the first food received to be well ground. Good and thorough grinding is the first step in good and thorough digestion,

PROPAGATION

which also leads to thorough assimilation of the food consumed.

Good digestion and thorough assimilation mean health and strength to the chicks and economy in food. Economy in food and health to the chicks lead to large profits, and that is what the most of us are after in the poultry business. My opinion is that a little fine, sharp grit fed to the chicks before they receive their first food is indeed a very good thing, and my experience sustains this opinion; therefore my advice is to follow this practice. The grit should be followed by a little buttermilk. If the chicks do not readily drink the buttermilk, they should be picked up, one by one, and their beaks dipped into it.

Soon after they have had a little buttermilk they may be given their first solid food. All this may seem to be a great deal of trouble, but it pays to do it. Unless you are interested enough to take a little pains to get the little chicks started off right, you had better stay out of the poultry business.

Somebody will suggest, I presume, that Nature has no buttermilk to feed her

SUCCESS IN POULTRY CULTURE

little chicks and succeeds very well without it, and why can not we do so. It must be remembered that Nature has insects to start her baby chicks on, and that buttermilk is a good substitute for insects. If we can supply the insects, then we will not need the buttermilk. But as we can not, as a rule, supply the insects in sufficient quantities, then we must find a substitute, and that substitute must not be too expensive lest our profits vanish.

Since buttermilk is a good substitute, and cheap, I don't think we can do better than to use a good per cent. of it in the chicks' rations. Clabbermilk is almost as good as buttermilk, if used before the whey begins to separate from the curd. Sweet skim-milk is also good, but buttermilk is the best of the three, and, where available, should constitute a part of the first ration of the baby chicks. As a rule, it would be best to let the sweet skim-milk clabber before feeding it to the chicks.

Their first solid food may be rolled oats or hard-boiled eggs, well-crushed shell, and all mixed with five times their bulk of bread crumbs, or both. The infertile eggs that have been tested out of the

PROPAGATION

incubator may be used for this purpose.

You may continue this ration for a few days, gradually replacing it with cracked wheat and corn or cracked wheat and Kafir-corn; or you may replace it with some of the best commercial chick foods on the market.

Whatever you feed, it must be fed very sparingly for the first six weeks of the chicks' lives. *Remember always* that a small amount of food well digested and assimilated is very many times better than a large amount poorly digested. *Don't overfeed your chicks.*

If they have food enough to make their craws show plainly, withhold your food. If their craws are crammed full, they have been overfed. Overfeeding causes indigestion and a derangement of the digestive organs, weakening and chilling the body and making it an easy prey to all the diseases that chickens are heir to.

Keep your chickens hungry—very hungry. Turn an old hen and her brood out in the open field and watch nature feed them, and you will learn a better lesson in feeding little chickens

SUCCESS IN POULTRY CULTURE

than I or anybody else can give you.

I have just been reading a newspaper article about the infant death-rate decreasing in Germany since the war began. Men who claim to know the cause state that it is because of the short milk supply, which forces mothers to give their babies breast milk instead of other milk from a bottle. And because nature's food in nature's quantities has been given to the German babies, the death-rate has decreased, notwithstanding the unfavorable environment that surrounds them.

But you ask, What has this German war-baby story got to do with raising baby chicks? A great deal. It shows you what nature's food, given in nature's quantities, will do for human babies, thus pointing out the way to success in raising baby chicks. And then, too, I have just sent you to the field with a mother hen and her young brood, to snatch from Nature, if you can, her secret of success in raising baby chicks. Search diligently and you will find out what she feeds them and how much; and there alone with mother hen and Mother Nature and the baby chicks you will learn the great lesson

PROPAGATION

that took the greatest war the world has ever known to teach mankind: that babies need nature's food in nature's quantities.

How well Nature has provided for all of her young babies, both plant and animal, none but those who study her methods as they are presented to us in a natural way can ever know. Of all the sources of knowledge, there are none so complete, good and reliable as nature's open book; I believe it is the duty of everybody who is engaged in the propagation of animals or plants to study her lessons well, and, after they have learned her ways, to practice them to the letter. Her ways sometimes seem complicated, but, after we have found them out, they are simple and easy to follow. Of course we can never learn all of her secrets, for many of them are beyond our comprehension, but we can learn all we need to know about the propagation of animals and plants to make a success in any branch that we desire to follow. I have seen many people who have never been able to read any other book but that of nature succeed well in raising baby chicks. In fact, it seems to me that they succeed better than people

SUCCESS IN POULTRY CULTURE

who can read other books, and I believe they do, as a rule, succeed better with them. The reason they succeed better for the most part is, I think, because their minds are not befogged with so many foolish notions that so many writers seem to think it their duty to write down for the guidance of their readers. Another reason is that they have learned their lessons from nature's book, and those lessons are superior to the lesson taught by man.

I hope you will take this book with you as you go to the field with mother hen, and read all its pages. I hope you will read and digest it well, and, after you have done so, if you think of something that you don't find here, that you think would be worth trying, try it in a small way, and, if you find it good, adopt it as a part of your poultry practice, and then sit down with pen in hand and tell us all about it. Whether you are a good writer or not, the poultry and farm journals will always be glad to receive and publish any description of your methods that you have found by practice to be good.

If your chicks don't have access to a

PROPAGATION

range where there are worms and bugs, about fifteen per cent. of their food should consist of lean meat in some form. The best grades of meat scraps are, perhaps, the best forms in which to buy it. Your chicks should have clean, fresh water and fine, sharp grit before them all the time.

Chicks will devour almost any sort of food found on the farm, and, if it is wholesome and well balanced, they will thrive on it, provided they don't get too much. Never feed a sloppy mash to them; you may, however, with good results, moisten the mash with sour milk, but it should not be moistened so much that it will not crumble freely when feeding. A good mash for chickens after they are a week old is as follows: Eight lbs. wheat bran, 2 lbs. alfalfa meal, 4 lbs. cornmeal, 2 lbs. wheat middlings, 2 lbs. sifted meat scrap and $\frac{1}{2}$ lb. ground bone; moisten with sour milk and feed three times a day; this, in connection with the cracked grains, and what they will pick up, will keep them thriving. A clean place for feeding should be provided, and they should be fed often and a little at a time. Give as great a variety of food as possi-

SUCCESS IN POULTRY CULTURE

ble. After they are five weeks old the grains may be fed whole, all except corn, which should be cracked for them until they are nearly grown.

Should it be found necessary to change from one food to another, the change should be made very gradually. At first a little of the new food should take the place of a little of the old; the new should be gradually increased as the old is gradually decreased, until the new food has wholly taken the place of the old. Remember that proper feeding is the right road to success with little chickens; all sorts of food in large quantities will not do; if everything else is as it should be, and their food is not given them in proper variety and proper quantity and in a clean way, they will surely die in great numbers. I lay great stress on the food question, because without proper food in proper quantities young chickens can not be raised successfully.

III

EGG PRODUCTION

The Laying Hens—Bad Habits—Making the Pullets Lay in Late Fall and Winter—Age of Fowls for Most Profitable Egg Production.

The Laying Hens I am going to tell you how we (my wife, daughter and I) manage our home flock of laying hens. I shall not claim that our method of feeding and caring for our flock is the best; all that I shall claim for it is that it proves profitable with us.

There are so many kinds of food, some of which are abundant in one locality and some in another, and some of which are cheap in one locality and dear in another, that any given combination that proves profitable in one locality may not prove so in another. But I don't think there is any locality in this country where a good, economical and profitable ration can not be made up, for the most part, out of home-grown products of the locality. This

SUCCESS IN POULTRY CULTURE

being true, I don't think it would be best for poultrymen in other localities to try to follow my methods of feeding to the letter, but rather to try to make up well-balanced rations from the home-grown products. Poultry will thrive and be found profitable on almost any well-balanced ration that can be thought of, and that ration should be composed of the foods that are the most abundant in your locality.

A great many poultrymen think that they can not get along without a good per cent. of wheat in their poultry rations, but wheat, as well as oats, is so scarce and high-priced in our locality that we have not been able to use either of these grains profitably in making up our poultry rations.

We are in the egg-producing business, and we breed single-comb White Leghorns for that purpose. Our method of feeding these active birds might not work so well with some of the less active and larger breeds. Our flock has a large range to run over, which is not often covered with snow in the winter-time. This gives them plenty of exercise and an out-of-doors life

EGG PRODUCTION

which is conducive to fertility and good health and strength. We keep before them all the time a dry mash composed of sixty per cent. wheat bran, thirty per cent. shorts and ten per cent. cottonseed meal. In addition to this, they have access at all times to a bin of Kaffir-corn; they also get a good ration of sour milk every day. When the sour milk is not available, which sometimes happens, then we add ten per cent. meat scrap to their dry mash. Where cottonseed meal can not be had, linseed meal will be found to be just as good, if not better.

This, together with what they pick up on their range and what green food we give them and a little refuse from the kitchen, constitutes their rations. On these rations they produce eggs at a good profit.

Where corn is cheaper, it could take the place of Kafir in the rations with just as good results. The chemical composition of corn and Kafir is so nearly alike that where one is not available, the other can take its place in the rations without any perceptible difference in the results.

With the larger breeds of poultry it would, perhaps, be best not to keep corn

SUCCESS IN POULTRY CULTURE

or Kafir before them all of the time, lest they get too fat for profitable egg production, but give them what they will clean up just before roosting-time. The dry mash should be kept before them all of the time, also the sour milk, if you have it. As with the baby chicks, plenty of grit, ground oyster-shells, and clean, fresh water should be kept before them all of the time.

Remember that the oyster-shells can never take the place of grit in the rations, but are used in connection with it to supply the fowls with lime, from which the egg-shell is made. Hens will not lay well unless their rations contain plenty of lime, in some form, from which to make egg-shells. All of the feeding appliances should be kept nice and clean.

Other rations than the ones described can be made up from the different grains usually found on the farm, with just as good results; wheat, oats and corn, equal parts of each by weight, mixed together, make splendid grain rations for laying hens.

When fowls have plenty of sour milk, it, together with the cottonseed meal used

EGG PRODUCTION

in the dry mash, takes the place of meat in the rations; but where the very best results are expected, a very little meat scrap, or some other form of lean meat, should be added to their rations. When cottonseed meal or linseed meal is not used in the dry mash or in any other of their rations, and there is no sour milk, then fifteen per cent. of the dry mash should consist of meat scrap.

They should have plenty of green food in winter as well as in the summer. Their range, if it is not too small, will furnish, if well managed, green food both winter and summer, except in times of drought or heavy fall of snow. Wheat or rye may be sown early in the fall to make winter pasture for them. In the absence of green pasture, on account of drought in summer or snow in winter, keep before them some bright, clean alfalfa or clover hay. They will pick off the leaves, and the coarse part can be fed to the cows. Our hens eat with great relish the bits of leaves that fall from the Kafir and cane that we feed our cows. The poultry should be kept off of the sown wheat or rye until it gets a good start, or they will kill it out.

SUCCESS IN POULTRY CULTURE

Where cabbage is cheap and plentiful it makes a good green food for the birds, and when it is used, whole heads should be hung up in their houses or scratching-sheds, just out of their reach, so they will have to make a good jump for every bite they get. This, together with the scratching for the grain, will give them plenty of exercise, and plenty of exercise helps to fill the egg-basket; birds that have plenty of exercise are always more prolific than those that have but little.

If cabbage can not be had at a reasonable price, then, if the litter in which their scratch food is hid is composed of bright clover or alfalfa hay, and cut up fine, they will get a good deal of green food out of that, but not enough to satisfy them. A few sprouted oats in connection with the alfalfa and clover make the green-food ration complete. Most poultrymen think that they can not get along without sprouted oats, but with us oats are so high and scarce that we don't find it profitable to feed them.

Some poultrymen say that corn and Kafir silage, when cut fine, makes good green food for poultry, but we have never

EGG PRODUCTION

tried it. I think, however, it is worth trying, and I would advise those who have the opportunity, to do so.

Some poultrymen use alfalfa meal, and we tried it with our flock, but, on account of the difficulty of getting meal that was made of bright, well-cured alfalfa hay, we discontinued its use. It seems that a good many alfalfa-growers in this locality ground their poor and damaged hay into alfalfa meal and baled their bright, well-cured hay. We have never been able to get good results feeding anything to our poultry that had the least bit of mold about it, either in grain or green food.

I will not say anything here about the methods used in sprouting oats for poultry, for the reason that the manufacturers of the machines for doing the work give full instructions how to use them. You will find these machines advertised in your poultry and farm journals, and I would advise you, if you intend to use sprouted oats, to buy one of these machines.

Potatoes, potato parings, onions, beets and turnips will take the place of green food to a great extent, if they are avail-

SUCCESS IN POULTRY CULTURE

able; and even when the poultry have plenty of other green food, if these succulent foods are plentiful and cheap it will pay well to use some of them in the poultry rations.

If we expect our egg machines to produce eggs, we must feed into them egg material in proper quantities. You had just as well expect woolen machinery to produce woolen cloth when cotton is fed into it as to expect egg machines to produce eggs when fed on non-egg-producing food.

There is another thing that must be considered in connection with poultry food: It must have not only the right chemical composition, but it must be composed of things that are relished by the poultry; it must be so combined and prepared that they enjoy eating it and so that it will be conducive to good health. In feeding poultry for eggs or any other purpose good judgment must be used and the home-grown foods combined in such a way as to produce well-balanced rations and at the same time be relished by the poultry. There is no standard by which foods can be the most economically mixed,

EGG PRODUCTION

for the reason that the different foods vary so much in price in different localities. The best that we can do is to combine the foods that are available in our locality in such a way as to produce good results.

Laying hens should be provided with nests that can easily be kept clean, and the old nest material should be replaced with new very often. On another page is a nest arrangement that I like better than anything else that I have ever seen. Lice and mites should never be allowed in the nests, and if they are kept as clean as they should be, the lice and mites will never get a start in them.

On page 37 I have given the dimensions of a single nest that will give good results both for sitting and laying hens. There are a good many sheet-iron and wire nests on the market, some of which give good satisfaction.

The roosts should be about two feet above the floor, and so arranged that they can be easily disinfected. We use coal-oil on the roosts to kill lice and mites, and find it very good for that purpose. The droppings should be removed every day,

SUCCESS IN POULTRY CULTURE

so that the fowls can have a clean, healthy place in which to sleep. Remember, always, that without cleanliness no success worth while can be had in the poultry business.

As winter eggs always bring a better price than summer eggs, we should seek every means at our command to get as many eggs in winter as possible. To do this we should study springtime conditions and try to provide those conditions for the hens in winter as near as it is possible, for the springtime is nature's best time for producing eggs.

To take the place of bugs and worms picked up by the fowls in the springtime, we must provide lean meat or its equivalent.

Their houses must be clean and warm, and have plenty of room, air and sunshine. A plentiful supply of green food, in some form, should be provided, and the birds should be made to work for their rations. We should bear in mind, too, that pullets are better winter layers than hens, and where they can be produced and made to lay in five or six months after they are hatched, the most profit

EGG PRODUCTION

will be secured. They should be hatched at the proper time so they will not molt in the fall of their first year. Although the cost of producing winter eggs seems to be much greater than the cost of producing summer eggs, it is not really so, for the fowls have to be carried through the winter in order to have them for summer laying. And to carry them through in such a way as to produce winter eggs is cheaper than to carry them through in such a way as not to produce winter eggs; for if they can be made to lay well in winter, their eggs will more than pay the expense of carrying them through. Give them clean, warm houses and proper food in proper quantities, and if the flock is a laying strain and healthy, they can not help but lay. If you are so situated that you can not do this, you need not expect to get many winter eggs.

No artificial heat should be provided, for they will do better without it.

The difference between carrying a flock through the winter in such a way as to produce eggs and carrying them through in such a way as not to produce them is so trifling that it should not be considered.

SUCCESS IN POULTRY CULTURE

In fact, the difference in cost is only a little extra care and attention, for the food cost will be about the same whether the flock lays or not.

In addition to clean, warm houses and proper food, give them sunshine, dust-baths, and plenty of room. If your flock is crowded and you can not afford more buildings, a part of them should be sold, for a crowded flock will never prove satisfactory.

Bad Habits There will be found individuals in every flock that are prone to acquire bad habits, such as feather-pulling and egg-eating. Hens sometimes form the habit of pulling feathers from themselves and from their mates and eating them. This habit is not very apt to develop, however, if the birds are well cared for and properly fed on well-balanced rations. Should you discover any with either of these bad habits, they should be disposed of at once.

The loafers of the flock are the ones that are the most apt to develop the bad habits, and if you, by means of the trap-nest and close attention to your flock, will dispose of all of these loafers, there will

EGG PRODUCTION

be but little trouble. It sometimes happens, however, that one of your best layers develops the egg-eating habit. You can save the eggs of such a hen by using one of those patent trap-nests that has a hole in the bottom to let the egg roll down out of reach of the hen.

If a good many of your flock should develop this bad habit, you can keep them from eating the eggs by putting canvas bottoms in all of your nests with a hole in the center just large enough to let the egg drop through; this hole should be worked like a button-hole, so it will not ravel out and get too large; this canvas bottom should bag down enough so that it will assume the shape of the bottom of an ordinary hen's nest. Beneath this canvas bottom, and two and one-half inches below it, there should be another piece of cloth to catch the egg when it drops through the bottom of the nest. This under piece of cloth should not have any hole in it, but should slant enough to one side so that when the egg drops onto it, through the hole in the upper canvas, it will roll to that side out of the reach of the hen. The side towards which the

SUCCESS IN POULTRY CULTURE

egg rolls should be cushioned so that when the egg rolls against it there will be no danger of it breaking. There should be room enough on the under cloth for several eggs to roll out of the reach of the hens, for several different hens will lay in the nest during the day. The slant of the lower cloth bottom should be just enough so that the eggs will roll gently; for if the slant is too much, the eggs, after several have accumulated, will roll against one another hard enough to break them. The nest that I have told you about on page 37, if made a little deeper, will do for double canvas-bottom nests. Nail some cleats around the inside at the right height to tack the upper canvas to, and if the bottom edges of the box are slanted off a little, the lower canvas can be tacked on the bottom edges. The narrow strip across the front side at, or near, the bottom will need to be a little wider than it is for the solid wood-bottom nest.

Keeping the fowls busy is one of the best preventive methods for overcoming bad habits.

If you spend as much time among your fowls as you ought, you will discover

EGG PRODUCTION

the first symptoms of the bad habits. You should proceed against them at once.

Making the Pul-
lets Lay in
Fall and Winter

To get the best results from a flock of pullets, they must be got to laying as soon after they are hatched as possible. To do this they must be kept growing rapidly from the time they are hatched until they are full-grown. They must be hatched early, but not so early that they will molt before winter. As the egg or Mediterranean breeds, such as Leghorns, Spanish, Blue Andalusians, Minorcas and Anconas, will commence laying when they are from five to six months old, and the American or general-purpose breeds, such as Wyandottes, Dominiques, Javas, Buckeyes, Plymouth Rocks and Rhode Island Reds, and the English breeds, such as Dorkings, Redcaps and Orpingtons, at from six to seven months old, and the Asiatic or heavy meat breeds, such as Cochins, Brahmas and Langshans, at from seven to eight months old, the best time to hatch them for winter layers would be April and May for the egg breeds, March and April for the general-purpose breeds, and February

SUCCESS IN POULTRY CULTURE

and March for the heavy or meat breeds.

After the pullets are nearly grown, keep a good egg-producing food before them all of the time. Read carefully what I have said in Chapter III. about feeding laying hens. A little lean meat, in some form, in their rations every day, when insects are scarce, will help start them to laying.

Don't give them stimulants of any kind; remember that springtime is nature's egg-producing time, and you should seek to give them what nature will give them when springtime comes, both in food and comfort. If this is done, there will be no trouble in getting the pullets to laying in the fall and early winter if they have been properly raised.

The chickens should never stop growing from the time they are hatched until they are grown; and it should be remembered that to overfeed them while they are young will stop their growth quicker than to underfeed them, and then, too, the underfed chick will recover at once, when its rations are increased, while the overfed chick will never recover in time to make a good fall and winter layer. In-

EGG PRODUCTION

deed, it is very doubtful if a chick that has been overfed can be made to lay in early fall and winter.

So that, after all has been said that can be said as to how best to get pullets to laying in the fall and early winter, and keep them laying throughout the winter, the question resolves itself into this simple proposition: They must be hatched at the proper time, and properly fed and cared for until they are grown, and be given a clean, comfortable place in which to live and sleep during the cold weather, and furnished with nice, clean, attractive nests in which to lay their eggs.

**Age of Fowls for
Most Profitable
Egg Production** This is a subject on which poultrymen differ greatly. Some will have nothing but pullets, while others keep their hens until they are two and three years old. The easiest way to get at this question would be to go, in your imagination, on the market and buy an equal number, each, of six-months-old pullets, eighteen-months-old hens and thirty-months-old hens. If the cost of all three lots was the same, and after keeping them one year we found that all three

SUCCESS IN POULTRY CULTURE

flocks laid the same number of eggs, and would sell on the market for the same amount, and the eggs of each flock sold for the same amount, and the cost of keeping them was equal, the correct conclusion would be that there was no difference in the profits of each flock. But it is probable that six-months-old pullets would cost more on the open market than older hens, which would make the interest on the money invested in them more than it would be on the older hens; then, it would seem that if the pullets just laid enough more eggs to cover the difference in their cost and interest charge, the profits on each flock would be the same; but such a conclusion would not be correct, for the pullet eggs, even though they did not outnumber those of the older hens, would be worth very much more because a very much larger percentage of them would be laid when eggs bring the highest price; but the pullets will not only lay higher-priced eggs, but they will lay considerably more of them.

There is another factor to be considered: The ratio of profit with increase in egg production. For example: If a

EGG PRODUCTION

hen lays 100 eggs a year, and ninety-nine eggs represent the cost of production and one egg represents profit, then if the egg production of the hen could be increased to 101 without increasing the cost of the hen's keep, the profit would have increased 100 per cent., while the egg production would have increased only one per cent. Then, if pullets lay more and higher-priced eggs, and a small increase in egg production means a larger increase in profit, all the argument so far stands in favor of the pullets.

It is, however, probable that good, well-grown pullets, six months old, from a good laying strain, could not be found for sale at anything like a reasonable price; but they could be produced for about what they would sell for on the open market after they are eighteen months old, or at the end of their first laying year.

The unprofitable molting season is also avoided, for if the pullets are hatched at the proper season they will not molt in the fall of that year, and the end of their first laying year will have been reached at or before the beginning of their first

SUCCESS IN POULTRY CULTURE

molt. Then they can be sold to give room for the new flock of pullets that have been raised to take their place.

These young hens could be sold in almost any neighborhood for considerably more than a produce market price, for very many farmers and farmers' wives, who have all the work they can attend to without raising chickens, would be glad to get them to renew their flocks.

Very many farmers and their wives, who find a small flock of poultry profitable and who have not the experience nor the time necessary to make the raising of pullets for winter egg production profitable, could be depended upon to take all the eighteen-months-old hens that the poultryman would have to sell, at a good price. And after the poultryman had established a reputation for having extra good layers of that age for sale each year, he would not have to hunt the buyer, but the buyer would hunt him.

But if there is nothing but a produce market, where the eighteen-months-old hens will only bring their meat value, it seems to me that all the argument is in favor of the pullets where the poultryman

EGG PRODUCTION

is making a specialty of egg production. But with the farmer and his wife who make the poultry business a side line, and with whom the experience necessary to raise pullets and get them to laying in the fall and keep them laying all winter is not available, perhaps the older hens would be the most profitable.

It seems to me that the farmer's flock of poultry is a very profitable side line, even though he can not get his pullets to lay much in the fall and winter, because they pick up a large amount of food that would otherwise go to waste, and destroy very many insects that would otherwise damage his crops. I can not see, however, how the poultryman who makes egg production a specialty, and has all of his feed to buy, can make the business profitable unless he can get his pullets to laying in the fall and keep them laying all winter. And if he can do this I can not see why it would not be more profitable to sell the pullets at the end of their first laying year, when another flock of pullets are ready to take their place, than it would to keep them one and two years longer. There is another factor that must

SUCCESS IN POULTRY CULTURE

be considered in this connection, and that is the breeding every spring from pullets that have been stimulated to their greatest capacity the previous winter for egg production. Most poultrymen believe that one and two year old hens are the best to breed from. If that be true, it would be necessary to keep birds into their second and third year for that purpose, unless eggs for hatching of baby chicks could be bought from a desirable flock of that age.

I don't believe it is true that two and three year old hens that have not been stimulated for egg production are better to breed laying pullets from than one-year-old pullets that have been stimulated for egg production.

First: Because to stimulate for egg production during the first fall and winter of the pullet's life means to approximate as near as possible during that time the conditions that exist in the springtime, which is nature's season for egg production.

Second: Because such stimulation, instead of tending to sap the vitality and weaken the birds, as most poultrymen believe, tends to strengthen and invigo-

EGG PRODUCTION

rate them; the very fact that they lay lots of eggs in the late fall and winter is proof that their environment and food have been invigorating and strengthening.

Third: Because nature never hesitates to breed from one-year-old birds, and she always gets good results; and then, too, birds bred from one-year-old pullets that have been stimulated, in nature's way, to early egg production, will transmit those qualities to their offspring, and the longer they are bred along those lines the greater will be the early egg-laying qualities of the flock.

The stimulant that man provides for his birds, to induce them to lay in fall and winter, must not be a medicine which would have a depressing reaction, but nature's stimulant, which is springtime environment and springtime food.

It is true that nature gives a rest period to her fowls from egg production, but that period is accompanied by bad weather and a shortage of food that is harder on the birds than egg production under favorable conditions.

I am not seeking to decide this question for myself or the reader by argument

SUCCESS IN POULTRY CULTURE

alone, for my observation of nature and my own experience bear me out in the conclusions I have reached.

A great many poultry-raisers do not succeed in getting their pullets to laying in the fall and winter, and in that case they would be almost certain to prove less profitable than the one and two year old hens.

But somebody must raise the pullets before the one, two and three year old hens can be had; whoever that somebody is, he should seek to hatch the chickens at the proper time and raise them in such a way as to produce fall and winter laying pullets; to do otherwise is not only a loss to the person who does it, but it is also a great economic loss to the State.

Since profit increases in such a great ratio, after a point has been reached where profit begins, it behooves every poultryman to seek every means at his command to increase the egg production of his birds without at the same time increasing the cost of their keep. One of the best means at his command is breeding in the direction of egg production. Another is good care and attention and young laying pullets.

IV

ACCESSORIES AND APPLIANCES

The Trap-nest—Feeding Troughs and Hoppers—
Different Kinds of Nests—Home-made Incubators,
Plans, Specifications, Etc.—Home-made Brooders, Plans,
Specifications, Etc.

The Trap-nest Trap-nesting is tedious and exacting work. Those who would like to build up an egg-laying strain will find it cheaper, in both money and labor, to buy, from a reliable breeder of an egg-laying strain of their breed, such birds as they need for the purpose, than to try to get them by the trap-nest process. If you decide to buy your birds for breeding purposes, instead of getting them by the trap-nest method, while you are selecting and buying them it is well to remember that the male birds are much more potent in transmitting the egg-laying qualities to the flock than the females, and although they may cost a little more than the females

SUCCESS IN POULTRY CULTURE

they are worth many times more for that purpose.

However, for those who are after experience and pleasure, as well as profit, the building up of a laying strain of birds by the trap-nest process will be beneficial.

I will not give the plans and specifications for making a trap-nest here, for the reason that I am giving, in this chapter, as many plans and specifications for making accessories as I think it would be well for the poultryman to undertake, and perhaps more.

If you undertake too much, you are more liable to fail than you otherwise would be; for the poultry business requires plenty of thought and action, and you will have plenty to do without going into the manufacturing business. I have given plans for making an incubator, brooder and poultry house for the purpose of helping those of my readers who have not the ready capital with which to buy these things to start the business with. After you have reached the trap-nest stage of the business, you will either have made money enough to buy trap-nests or you will have failed; in either case you

ACCESSORIES AND APPLIANCES

will not need to make them. All kinds of poultry accessories and appliances, including poultry houses, can be bought ready-made, and I believe it is better, for the most part at least, for poultrymen to buy them ready-made.

Your coming flock of hens can be improved in laying qualities by sitting your incubators at times when only the best layers of the flock are laying. Perhaps the best months for this purpose are February and March in the Southern States and March and April in the Northern States. Another good way to improve the laying qualities of your flock is to study them closely, and you will soon learn to pick out the poorer layers. Early-molting is a good sign of a poor layer. Get rid of the poor layers as soon as they are discovered.

If an individual egg record of every bird of the flock is desired, I know of no way that it can be had except by trap-nesting the flock; and if a pedigreed flock of birds is desired, it can not be had in any other way.

Where you have a large flock the best way is to select a few of the most desir-

SUCCESS IN POULTRY CULTURE

able birds and put them in pens by themselves, and trap-nest them and keep a record of the results. Males produced by the best layers of these pens can be used to improve the range flock. Hens in these pens should have numbered leg-bands on so that there will be no mistake in keeping the record.

This method of selecting the very cream of the whole flock to be trap-nested improves the flock in many other ways besides egg production; for their good qualities are considered before their egg-laying qualities have been tested, so that there is no danger of being tempted to keep for breeding purposes a bird of high egg-laying qualities that is lacking in other good qualities. Where birds lacking in "Standard" requirements are trap-nested there is very apt to be a temptation to keep for breeding purposes some birds of high egg-producing qualities that are very deficient in "Standard" requirements. This leads to a deterioration of the "Standard" qualities, which is very undesirable. The new revised "American Standard of Perfection" should be in the hands of every poultryman, and then he

SUCCESS IN POULTRY CULTURE

to injure themselves; this is more especially true of the little chicks. The little chicks should have troughs for their moistened mash and sour milk that can be easily cleaned, and these troughs should be scalded and sunned every day.

Remember that although you seek to imitate nature in every way that you can, you are yet raising your chicks artificially, and every precaution that you take to guard them against disease and protect them from discomfort will add to your success. Baby chicks, like human babies, ask for nature's environment and nature's food, given in nature's quantities and in nature's clean way, and if they don't get them or something that approaches very near to them, they die.

And it seems to me that death is welcomed by them whenever their surroundings and food are not what they ought to be; and I believe it comes as a blessing, both to them and their owner, for it relieves them of a life that can never be anything but a life of misery and him of a burden that can never prove anything but unprofitable.

Feeding troughs and hoppers can

ACCESSORIES AND APPLIANCES

sometimes be made from waste material found about the place, but I believe it is better to buy those that are nicely made by machinery by manufacturers that are prepared to make them as they should be made; for if they are nicely made by machinery, they will be much easier to keep clean than they would be if they were poorly made by hand. However, if the means are not at hand with which to buy them, they can be made at home. There are a good many kitchen utensils that can be used for sour milk and moist mash that are handy and are easy to keep clean.

When the laying hens have a constant supply of food before them all of the time, either dry mash or mixed grain, self-feeding hoppers save lots of time and labor as well as food, and should be used.

I have told you in other chapters (on pages 37 and 83) about two different kinds of home-made nests, and in this chapter about trap-nests, and there is but one other nest that I care to say anything about, and that is a new patent trap-nest that has lately come on the

SUCCESS IN POULTRY CULTURE

market. It is a nest that has two doors, so arranged that when a hen goes in one door and lays an egg she can go out at the other, and if she does not lay she will have to go out at the same door she went in at. This nest can be placed in the partition between two pens and the hens all placed in one pen, and all the hens that lay during the day, in this nest, will pass through into the other pen. By the use of this nest, it will be seen, an egg record of a pen of hens can be kept without the trouble of going to the nest to release every hen that enters it. This is a great saving of time and labor for the poultryman. While I have not tried the machine, it looks good, and, if it works as well as the manufacturers claim it does, it is certainly a good thing. Poultrymen have heretofore tried trap-nesting a flock of hens with a partition trap-nest that would let the hens in on one side and out on the other, whether they had laid or not, but such nests failed to give a correct record of the flock for the reason that a good many hens go on the nest and off again on the other side of the partition without laying. The new patent trap-nest, that

ACCESSORIES AND APPLIANCES

only lets through the partition the hen that has laid, does away with this trouble.

I would advise poultrymen, who have not already done so, to try this new trap-nest and report their success with it. If such an invention can be made to work well and be reliable at all times, it will make the trap-nesting of a flock of hens a very simple and easy matter.

INCUBATORS

Key to Plans and Specifications

Study the cuts well as you proceed with the construction.

Box is the inner case of the incubator.

The sign " at the upper right of number means inch or inches.

Board is lumber $\frac{7}{8}$ " thick.

1 x 4 means lumber about 4" wide by $\frac{7}{8}$ " thick.

2 x 4 means lumber about 1 $\frac{1}{2}$ " by 3".

4" ceiling is about 3 $\frac{1}{2}$ " wide by $\frac{1}{2}$ " thick.

Rip is to cut lengthwise with a saw.

Thermostat lever is the wire extending from inside of incubator to outside.

Fulcrum bracket is the support for damper lever and can be seen in Fig. 3 fastened to back side of heater.

Damper is a round disc of tin or sheet-iron which fits over upper end of heater pipe (F) and is swung to front end of damper lever.

Connecting rod is a small wire with thumb-nut at lower end for adjusting regulator and connects thermostat lever with damper lever.

The front of the machine is the side the door is on.

SUCCESS IN POULTRY CULTURE

Right end of machine is at your right hand as you face front of machine.

If your lumber or hardware man can't supply you with asbestos cement, you can find it listed in mail-order catalogues.

Plans and Specifications

From a 12" board cut two pieces $37\frac{3}{4}$ " long and two pieces 27" long. Rip a piece $6\frac{1}{2}$ " wide off of one of $37\frac{3}{4}$ " pieces. This $6\frac{1}{2}$ " piece will be for your door and the remaining $5\frac{1}{2}$ " piece will be for your front over the door. Nail these four pieces together as shown in Fig. 5, nailing through the long pieces into the ends of the short ones; square this box and tack a strip across one corner to hold it square.

Now, tack on your door board (lightly so it can easily be removed) just flush with the bottom edge of box; this will leave what you have cut out with your saw in ripping the board as clearance for your door.

Cut three pieces of 2×4 , $14\frac{7}{8}$ " long; nail one each of these on the back corners, half their width back as shown in Fig. 5, the lower ends flush with bottom of box. Rip the remaining piece in center and nail one to each front corner

ACCESSORIES AND APPLIANCES

flush with the front and bottom of box.

Now cut a notch 4" wide and $5\frac{3}{4}$ " deep in upper edge and center of each end of box. Rip another piece of 2 x 4 in center $18\frac{1}{2}$ " long and cut two $5\frac{3}{4}$ " pieces off of each of these; nail one of these on each side of notches on outside of box, flush with edge; the remaining two 7" pieces nail on flush with bottom of notch and directly under it.

Now put on the bottom; use flooring for this. The front edge should come out flush with door board; back edge and ends should be flush with corner posts.

I would cut flooring 2" too long, and, after they are all nailed on, line each end and saw off, flush with corner posts. Bore six 1" holes in bottom as shown in Fig. 5, three under center of each tray. End cleats for trays to slide on are $\frac{7}{8}$ " x $\frac{7}{8}$ " and 26" long; center cleats are $\frac{7}{8}$ " x $1\frac{3}{8}$ " same length and should be nailed together with a strip of lath between projecting $\frac{1}{2}$ " above the surface, to separate the trays and guide them in and out. Nail a piece $\frac{7}{8}$ " x $2\frac{1}{2}$ " x 4" across bottom of center cleats 3" from each end; these cross-pieces are for the purpose of fastening down

SUCCESS IN POULTRY CULTURE

center cleats to bottom of machine; they should be fastened down with screws. The end cleats should be nailed on same height from bottom as center cleats, so that trays will set level.

Nail a small cleat under each notch on inside of box so its upper surface will be 1" below bottom of notch. Cut a 1 x 4 36" long and lay it on these cleats with its center directly under center of notches, and nail it there securely.

The Heater In Fig. 7 are shown all of the pieces of the heater. A, B, C, D, E and F are galvanized sheet-iron. A is 6" x 6", with notch 2 $\frac{3}{8}$ " wide and 4 $\frac{5}{8}$ " deep; B is 6" x 6", with 2 $\frac{3}{8}$ " hole in center; C is 7 $\frac{7}{8}$ " x 7 $\frac{7}{8}$ ", with 3 $\frac{1}{8}$ " hole in center; D is 3" x 3", and should have a right angle bend 1" from center of concave end. Cut two each of A, B, C and D. E is two pieces of 2" conductor pipe, such as is used to lead rain-water from the roof of buildings; the lower one is 48" long and the upper one is 38" long. They are fastened together with a piece of small wire tightly wrapped around them near each end. F is a 16 $\frac{7}{8}$ " piece of 3" conductor pipe with a 2 $\frac{3}{8}$ "

ACCESSORIES AND APPLIANCES

hole in its side, the upper edge of which is $3\frac{1}{2}$ " from top end of pipe. G is one 6" board $14\frac{1}{4}$ " long and two 8" boards $15\frac{1}{4}$ " long, assembled, so that the top ends are even, and the 8" boards nailed to edge of 6" board. H is heater board $15\frac{1}{4}$ " long and 6" wide, with a notch in upper end 4" wide and $5\frac{3}{4}$ " deep, with two cross-pieces across its back $\frac{7}{8}$ " thick, one flush with lower end of notch and the other with its lower edge $2\frac{1}{2}$ " from lower end. H also forms back side of heater box.

Nail one of D on front of heater board at lower end and one at bottom of notch at upper end; nail one of A on front of heater board over notch so its upper end will be flush with upper end of heater board; nail the other A on inside of right end of box directly over notch with its upper end flush with upper edge of box; nail one of B on left end of box, directly over notch and flush with upper edge of box.

Now side right end of box up to bottom of notch with 4" beaded ceiling, beginning flush with bottom. Nail on three pieces, the ends flush with outer edge of corner posts. The upper piece will extend

SUCCESS IN POULTRY CULTURE

above bottom of notch and should be notched down flush with side and bottom of notch.

Now slip in heater pipes F; put on heater board H, with upper cross-piece flush with bottom of notch in box and fasten with one screw near end of each cross-piece. Slip on heater pipe F, as shown in Fig. 6, and fasten down tight with two wires with each end nailed to heater board. The end of lower heater pipe E should extend into heater pipe F $\frac{1}{2}$ ", and upper heater pipe E should be extended $\frac{1}{4}$ " beyond front of heater board.

Now is the best time
Regulator to put in regulator, though it can be easily put in after machine is finished. You can buy a regulator for less than the tools would cost to make one. I am manufacturing a regulator for this incubator and I will sell it as listed in this book. It works the best of any regulator I have ever seen. It is very simple and easy to put on, and I would advise you to order one at once for your machine, for you can not run it successfully without one.

Look at Fig. 3 and see how simple and

ACCESSORIES AND APPLIANCES

how out of the way the regulator is. Many who have other machines are buying them to replace the out-of-date ones that are on their machines.

To put on the regulator: Draw a line back of heater parallel with bottom of machine $7\frac{3}{8}$ " above it; draw another perpendicular line $4\frac{1}{2}$ " back of heater; at the point where the lines cross put the center of your bit and bore straight through, a $1\frac{1}{2}$ " hole. Slip the regulator tube through from inside until it is flush with outside, drive a small tack in hole near outer end of tube; now put on fulcrum bracket in center of back side of heater, flush with upper end, and fasten with four small screws. Put damper lever on fulcrum bracket, slip connecting rod through thermostat lever, turn on adjusting nut and hang on damper and there you are.

Top of Box Use flooring for this $\frac{7}{8}$ " thick. Lay on across the short way; they should be flush with outside of box all around.

Now see that your heater pipes are in proper place and drive a small nail down through top into upper heater pipe near

SUCCESS IN POULTRY CULTURE

right end. This nail must not be long enough to go through lower heater pipe.

Finish siding the right end, letting short pieces come flush with heater notch on both sides of notch; after you are above notch, then you can let boards extend from corner to corner of machine.

Side up left end the same, only as deep a hole need not be left for the one pipe as for the two at right. No wood should touch heater pipes at either end; however, box top should lie against upper heater pipe, which is only a warm-air pipe and does not get hot.

Now, side up back side, letting ends of lumber come flush with ends of machine. Now the front side: Tongue should be taken off of first piece of siding put on. Commence flush with bottom of box as you have all around; let the boards come out flush at end same as at back side, but these boards must be nailed to door board instead of corner posts. Continue up until you get $\frac{1}{2}$ " above door board—you will probably have to rip a siding board here—then continue on up and nail the balance to corner posts. The

ACCESSORIES AND APPLIANCES

siding should rise $\frac{1}{2}$ " above corner posts all around. See Fig. 4.

Now we will return to heater: See that lower heater pipe E is $\frac{1}{2}$ " into heater pipe F. Now with wet asbestos cement make an air-tight joint where pipe E enters pipe F. Now slip on heater box G over heater board H, flush at top and back, and fasten with two screws on each side.

Now slip one of C over top of heater pipe F and nail down to top of heater box. Slip remaining C over bottom of heater pipe F and nail to bottom of heater box.

You will notice that the board on right side of heater is 1" shorter than the other three, which provides a hole for ventilation.

Now slip remaining B over heater pipe E at left end of incubator and nail down securely.

Now, with asbestos cement fill in notch all around heater pipes at each end of incubator and the space between heater and incubator above upper cross-piece on back of heater. Also put enough of the cement on top of heater to come up within $\frac{1}{8}$ " of top of heater pipe F. To aid you in putting the cement on top of heater,

SUCCESS IN POULTRY CULTURE

tack a strip of sheet-iron around top of heater wide enough to come up within $\frac{1}{8}$ " of top of heater pipe F. This piece of sheet-iron is not shown in cuts. Put a little of the cement around lower end of F. Now fill in all around between outer and inner case of incubator with dry sawdust. Fill in on top of inner case to top of corner posts with same. If dry sawdust is not to be had, dry chaff will do, but it is not so good.

Now make a top out of ceiling lumber same as used on sides, just large enough to fit inside of siding and rest on corner posts. Fasten it together by nailing it to two cross-pieces placed on the under side 2" from each end. Now make four legs out of 1 x 4 32" long; put on two at each end flush with front and back as shown in Figs. 1, 2 and 3. Fasten them with screws. The swinging lamp bracket is so plain that it needs no description. It is swung to leg of machine with one T hinge the height to suit the lamp you intend to use.

Trays The trays are made
out of good soft pine or
redwood laths; the dimensions are $17\frac{3}{4}$ "

ACCESSORIES AND APPLIANCES

x $26\frac{7}{8}$ " outside. The bottom is screen wire tacked on under side of frame before cross-pieces are put on. See Fig. 6. Rip off some narrow strips of lath and cut them off the right length to fit between cross-pieces; they are to prevent cross-pieces from catching when sliding the trays in and out. They should be nailed on with small nails, the heads of which should be sunk a little below the surface.

Door

The door is swung on $1\frac{1}{4}$ " narrow steel butts or hinges. They are fastened to under edge of door and under side of bottom of incubator with small screws. Put on two white porcelain knobs and two wooden buttons as shown in cut. Instead of three holes in door as shown in cut, bore two 1" holes, one at center of left-hand tray; 2" to right of it bore another, which is better than three holes as shown in cuts.

Now stain and varnish your machine, and if you have done your work well you will be very proud of it.

Important

There should be a piece of sheet-iron $1" \times 2\frac{1}{2}"$ tacked on each side of thermostat lever, leaving a slot just wide enough for

SUCCESS IN POULTRY CULTURE

the lever to work freely in. This is to prevent too much air escaping from incubator at this point. These pieces are not shown in cut. A small piece of glass should be placed over holes in door on the inside. It can be fastened on with large-headed tacks.

The heater pipe F should have the corrugations straightened out of its lower end so that lamp chimney will fit. You can use conductor pipe that has no corrugations, but I think the corrugated is the best.

First level the incubator. Set two shallow pans of water over the holes in the bottom of the incubator, one under each tray. These pans should be 10" in diameter and set on four small blocks $\frac{1}{2}$ " thick.

These blocks are for the purpose of holding the pans up so air can pass under them and out through the holes in the bottom of the machine. *This is important*, for if the holes are closed, by setting the pans flat down over them, the incubator would not get proper ventilation. If other moisture-pans are needed, they can be set flat down on the bottom of the incubator.

ACCESSORIES AND APPLIANCES

The lamp should now be lit and the temperature in the machine run up to 103° F. and run several days at that temperature, or until it is running steadily, without much variation; the eggs should not be put in until after this preliminary run has been made, to see that everything works smoothly and all right. During this preliminary run the bulb of the thermometer should be as high from the bottom of the tray as the top of the eggs that you intend to hatch in the machine will be. The bulb should not come in contact with anything, but should have a clear air space all around it.

The
Thermometer

I use a thermometer with adjustable legs that set on the bottom of the trays, but for the novice, or a person using this incubator for the first time, I would recommend a thermometer without legs, that will lie flat down on top of the eggs. After the eggs are put in, lay your thermometer flat down on top of them about 6" back from the front end of the tray. Put the thermometer in the tray nearest to the lamp and near the side of the tray farthest from the lamp. Keep

SUCCESS IN POULTRY CULTURE

it in about the same place during the whole period of incubation.

Be sure that your thermometer is a good one; don't let a few cents' difference between the price of a good thermometer and a poor one ruin your eggs. You will have to open the door and pull out the tray to read a thermometer in this position; but this will do no harm with this machine.

I want you to read all that I have to say about thermometers on pages 45-49.

On the eighteenth day of incubation fasten the thermometer to a block of wood heavy enough so that the chicks can not turn it over. Be sure that the bulb is the same height that it has been during the hatch. The eggs that you have tested out will give room for such a block. Fasten the thermometer to the block in such a way that the stem will slant up a little, and so that there will be a clear air space all around the bulb.

Brooder Plans and Specifications

Fig. 8 shows the brooder complete. It is made just the same as the incubator, except that you use a curtain instead of

ACCESSORIES AND APPLIANCES

a door and the legs are just long enough so the lamp will go under the heater. A false bottom of thin, light lumber should be made just the right size to cover bottom of brooder. This makes it handy to clean the brooder. It can be slipped out and dumped and put back in a few seconds. An extra one should be provided, so that while one is in use the other can be thoroughly cleaned and sunned.

Make a bridge for the chicks to run up to the brooder on. It should be 37" x 28", and laths nailed across it so that chicks will not slip when running up. If your brooder house has a ground or dirt floor, you can dispense with the bridge and legs and set the brooder flat on the ground, by digging a hole for a box in the ground the right size to hold your lamp and manipulate it in. This box should have a lid to keep the chicks from scratching dirt into it. The lid should have plenty of holes in it so the lamp can get plenty of air, or else it will smoke. I like this plan for the brooder better than the bridge and short legs. I have not given the size of this box, because I do not know the size of your lamp. You can plan and make it to

SUCCESS IN POULTRY CULTURE

fit your lamp. The ground floor is best for brooder house, if kept dry. A wooden or cement floor should be covered with fresh soil often. Use the incubator plans and specifications in making the brooder. The same regulator and everything except the door and long legs. In fact, you can convert your incubator into a brooder by removing the door and putting on a curtain and short legs and putting in a false bottom.

I am now, since these plans were written, making a brooder 24" square, with single walls and without any bottom. The top, however, is double, same as the top of the incubator. This brooder is intended to be used in a brooder house, with a ground floor so that a box can be sunk in the ground for the lamp. It broods fifty chicks nicely, and is giving good satisfaction at our poultry plant. Its advantages are: That it is lighter to handle and cheaper to make, both in lumber and labor, and it broods as many chicks as ought to be brooded in one flock with this style of brooder; it is also easier to clean and manipulate, for it can be raised up on its edge, where it will stand,

ACCESSORIES AND APPLIANCES

while the droppings are being swept out and replaced with clean litter. In making this brooder, use the same lumber that you do for making the inner case of the incubator, and proceed the same in every way, only, of course, you cut the lumber the right length to make a box 24" square instead of making it as large as the inner case of the incubator; and the strip that you rip off for the door to the inner case of the incubator need not be over 4" wide in the brooder; this strip will not be used in the brooder for a door as in the incubator, but can be used for other purposes, and a curtain cut into strips can be used to close the opening; the top, instead of having an air space to be filled with chaff or sawdust, can be made out of two layers of $\frac{1}{2}$ " matched lumber, with very many sheets of old newspaper laid between.

The Lamp The lamp should hold oil enough to burn twenty-four hours. It should have a No. 2 safety burner and metal chimney. Put in new wick at the beginning of each hatch. Trim wick so as to give large, hot flame without smoking. Do not turn lamp too high. Should the lamp have too much draft, the

SUCCESS IN POULTRY CULTURE

open end of heater pipe at left end of machine should be partly closed with a piece of tin. Do not close enough to make the lamp smoke. If lamp chimney is a conical one, it should extend as far up into heater as it will go; it should be large enough at top of mica to fill heater pipe. Turn the eggs before caring for the lamp. A little coal-oil or soot on your hands will injure them.

The Regulator Adjust regulator so that damper will not rise until temperature is 102° F., then adjust it so that damper will just start to rise. Run the machine for a day or two before putting in the eggs and watch it closely, and if temperature does not rise above 103° nor fall below 102°, your regulator is properly adusted, and your machine is ready for the eggs. Do not turn lamp high enough so that damper will rise over $\frac{1}{4}$ "; to do so is a waste of oil. Hold temperature at 102° to 103° the first week, and then at 103° for the remainder of the time. Regulator will have to be adjusted from time to time on account of increasing heat given off by the eggs as hatch proceeds.

ACCESSORIES AND APPLIANCES

Moisture

A hygrometer is a very useful instrument used for measuring the moisture in the incubator, and it costs about twice as much as a thermometer.

A good way to run an incubator without one is to set a hen at the same time you do your incubator. Her nest should have plenty of damp soil under it. Watch the air space in the large end of the eggs, that are under the hen, grow large as the incubation proceeds. If the air space in the eggs in the incubator grows as fast as those under the hen, your moisture is all right. It is a good plan to put under your trays as many pans of water as there is room for at the beginning of the hatch, and if the air space in the eggs in the incubator does not grow as fast as those under the hen, you can remove some of them. Never remove the two that are over the holes in the bottom of the machine, and always keep water in them.

Turning the Eggs

The eggs should be turned twice each day after the second day until the eighteenth day. They should also cool and air each day for a short time. Place

SUCCESS IN POULTRY CULTURE

trays on top of incubator to turn and cool the eggs. Trays should not project over edge of incubator while the eggs are cooling. Change ends with trays each time before placing them back in the incubator. The door of the incubator should remain closed while turning and cooling the eggs.

Testing Out Infertile Eggs Testing should be done in a dark room. In testing the eggs a tester should be used that will not bring the eggs close enough to the source of light to heat them. They can be easily ruined for hatching by bringing too close to a hot lamp while testing.

The eggs should be tested two or three times during the hatch, and all infertile ones, and those with dead germs, removed. The infertile eggs are those that remain clear for six or seven days after sitting.

With a little practice you will soon be able to distinguish those that have dead germs from those that have not. Never expose the eggs to bright sunshine.

At Time of Hatching If the incubation has been successful, the chicks should commence to hatch on the morning of the nineteenth day, and

ACCESSORIES AND APPLIANCES

all that are worth anything will be out by the end of the twenty-first day. The incubator should not be opened while the chicks are hatching if it can be avoided. The light should be shut out of the peep-holes in the door. After the twenty-first day they should be removed to the brooder.

The Incubator-room The incubator-room should be one in which the temperature does not fall much below 60° F. There should never be any artificial heat in the room. A well-ventilated cellar or dug-out that is not too damp is an ideal place for an incubator. See pages 139 to 142 for further information.

Running the Brooder The brooder should be fired up at least twelve hours before the chicks are put into it. The thermometer fastened to a block same as used in the incubator should be used. The bulb should be same height from bottom of brooder as it was from the bottom of the tray in the incubator. Raise the temperature to 90° F., and adjust the regulator so that the damper will just start to rise. Watch it closely for a few hours, and if the tem-

SUCCESS IN POULTRY CULTURE

perature does not rise above 95° it is all right. After the chicks are put in, it may be necessary to turn lamp down a little, lest the temperature rise too high in spite of the regulator, on account of the heat produced by the chicks. Watch the machine closely for a few hours until you are sure it is all right. After a week the temperature should be gradually reduced to 85° F. and in two weeks to 75° or 80° F. However, if weather is cold, do not lower temperature below 90° F.

The chicks should receive their first food forty-eight hours after they are hatched, consisting of hard-boiled eggs, crushed, shell and all, and mixed with twice their bulk of bread crumbs and rolled oats, fed very sparingly. A little fine, sharp grit should be placed before the chicks before giving first food. After a few days a variety of cracked grains should gradually take the place of this food. Ten lbs. of wheat bran, 5 lbs. of shorts, 3 lbs. of cornmeal and 2 lbs. of sifted meat scraps moistened (not wet) with sour milk is a good mash to feed in connection with the cracked grains. Don't overfeed the chicks. More harm is done

ACCESSORIES AND APPLIANCES

by overfeeding than any other one thing. Fresh water and sharp grit should be before them at all times. (Read "Care of the Baby Chicks," pages 57 to 60.)

Capacity of	My brooders have a
Brooder	capacity of one hundred
	chicks, but after the
	chicks are two weeks old the number
	should be reduced to fifty.

While removing chicks from incubator to brooder do not chill them. Handle them carefully, for they are very tender.

Chicks should be confined in a run about the size of the brooder for the first week, or until they learn to use the brooder well, when they can be given more room. (Read pages 49 to 57 for further information.)

V

MISCELLANEOUS

Poultry Houses—Brooder Houses—Yards and Fences
—The Incubator Cellar—Lice and Mites—Testing Eggs
for Market—Teaching Your Birds to Love You—Eggs
for Hatching.

Poultry Houses There are two different systems of housing poultry; one is the colony plan and the other is the apartment-house plan. The colony plan consists of a number of small houses set far enough apart so that the different flocks will not mix to any great extent, and is best adapted to poultrymen who have plenty of land for their flocks to run over. Its advantages are that it conforms closely to nature, and the birds are able to get more natural food during the summer months than birds that are closely confined, and they are not so liable to attack from diseases, and the expense of fencing off the different flocks is done away with. Its disadvantages are that it

MISCELLANEOUS

costs more for labor to care for large flocks when they are scattered over a wide territory than it does when they are closely confined, and the expense for buildings is greater than in the apartment plan.

The apartment plan consists of a large house divided into rooms large enough for each flock, and each room has a run fenced off for each flock. Its advantages are that it does not cost so much for labor to care for the flock, and the cost for buildings is less than with the colony plan. Its disadvantages are that it costs more for food and fencing, and the skill and experience necessary to success must be greater; scrupulous cleanliness must be practiced, and any deviation from that rule will lead to disaster.

Another advantage that the apartment plan has over the colony plan is that it does not require so much land as the colony plan. Five times as many birds can be kept to the acre with the apartment plan as can be kept with the colony plan. For the farmer who has plenty of land, perhaps, the colony plan would be the best, and the apartment plan would be the

SUCCESS IN POULTRY CULTURE

best for the poultryman who has but little land.

If the colony houses are built on runners, they can be hauled together in some desirable place for winter protection, which will also reduce the cost of labor in caring for the flock.

On pages 132-134 will be found plans, specifications and cuts for a brooder house that will make a good colony house by adding roosts and nests to it. These cuts show the nests already added. Fig. 10 shows the nests closed and Fig. 9 shows them open. The outside board is hung on hinges so it can be raised up for gathering the eggs or for any other purpose. This is the best nest arrangement I have ever used. It is so arranged that the hens can go in at the side next to the building. They can go in at either end. The nests are set back eight inches from the house, which leaves a small alley between the house and building, so that a hen entering either end can walk along to any nest she desires to use. An 8" board is placed over this alley to protect it from the weather and exclude a portion of the light. These nests give seclusion to the

MISCELLANEOUS

laying hens, which they enjoy very much. I don't think it necessary to give plans and specifications for making these nests, for anybody can look at the cuts and see just how they are made. Each nest should be about 14 inches square and 14 inches deep for small hens, and about 16 inches square and 16 inches deep for large hens. A little deviation will do no harm, but the principle of seclusion and protection from heat, cold and storms should be adhered to.

In the summer-time these nests are placed on the north side of the house and in the winter-time on the south side. This arrangement gives them the cool shade of the house in the summer and the warm sunshine in the winter. In more northern localities, where there is lots of snow, they can be placed inside of the house in the winter and moved out again in the summer. When they are moved inside of the house for winter use they should be set facing the wall, so as to give the same seclusion and protection to the laying hens as they did when they were on the outside of the house.

Almost any kind of a house that you happen to have, if it is comfortable, can

SUCCESS IN POULTRY CULTURE

be converted into a poultry house by adding roosts and nests to it. If it is large, it can be converted into an apartment house by dividing it into rooms. The partitions may be made of poultry wire or lumber as desired. I think poultry wire is the best for such partitions.

The rooms in an apartment poultry house should be about ten feet square. Such a room will accommodate from twenty to thirty hens nicely. Poultry are not very particular about what kind of a house they have. The main thing with them is to be comfortable and be well fed and watered and kept clean. Whether the walls are painted and varnished or rough and bare does not matter to them.

If you live in a Northern State, the walls of your poultry house should be double and well built. In the Southern States single-wall houses are all right. Whatever locality you live in, if you are intending to build a new poultry house, it is a good plan to ask your agricultural experiment station for advice as to the best house for your locality. They usually have bulletins containing cuts, plans and specifications for such houses, which are

MISCELLANEOUS

usually sent out free to everybody within the State.

Fig. 9 and Fig. 10 show the poultry house that we use on our poultry ranch out here in New Mexico. This house is very simple and cheap, and can be built, with a saw and hammer, by almost anybody. It fills all requirements for this locality, and is all that is needed for laying hens or a brooder house for the little chicks. You will need several of them if you have a large flock. It has a ground floor. I am a little partial to ground floors for this locality, for the climate is dry and sunny, and the floors are very seldom, if ever, damp.

This poultry house, as shown in the cuts, has doors both in front and at the ends. One door at the end is all that is necessary, unless you have some special reason for having more.

The fact that it is more desirable for poultry to remain in the same house, from the time they are hatched until they are sold, makes this combination house about all that could be desired. Fowls don't like to be moved from the house in which their home has been established. The egg

SUCCESS IN POULTRY CULTURE

production will surely fall off whenever they are moved from one place to another. The poultryman who would avoid this loss should arrange to keep them in the same house during their whole lives.

These houses should be built facing the south, and can be built with a canvas front, if so desired. There are very many different kinds of poultry houses, but this little shed-roofed house, with or without a canvas front, is the best thing I have tried for colony purposes. For a large apartment house something different will have to be designed.

Brooder Houses A brooder house 9 x 10 feet will accommodate two hundred chicks until they are about four weeks old, after which time they should be given more room. The walls should be high enough so there will not be much, if any, stooping while attending to the chicks. It should front south and have plenty of windows in the south side for sunshine and air; or, if you like a canvas front, it can be used instead of the windows. The lower part of the window should be about two feet above the ground and arranged so that it can be opened for

MISCELLANEOUS

ventilation. These windows, if properly manipulated according to wind and weather, will give plenty of ventilation without any harmful floor drafts. Here are the dimensions for a brooder house that gives good results: Front wall, 7 feet high and 10 feet long; back wall, 5 feet high and 10 feet long; end walls, 7 feet by 5 feet high and 9 feet long. The frame may be made out of 2" x 4" lumber; the roof may be made of inch lumber, supported in the middle with a ten-foot 2" x 6" and covered with good roofing felt. Two windows in front, about 24" x 28", two feet above the ground, will give plenty of sunlight and ventilation. There should be a two-foot door in the east end. The side walls should be of inch lumber with cracks well battened; or, if a warmer house is desired than battened cracks will make, the side and end walls may be covered with roofing felt.

A dirt or ground floor is preferable if it can be kept dry. This house can be used for laying hens by putting in roosts and nests. It will accommodate about thirty nicely. It can be placed on runners and moved from place to place as desired.

SUCCESS IN POULTRY CULTURE

As I have neglected to say anything about roosts for this house, when used for laying hens, perhaps it would be well to say something about them here. You can use 2" x 4" lumber ten feet long for your roosts. The upper edge should have the corners rounded off a little so they will not hurt the feet of the birds. The roosts should be about two and one-half feet above the ground or floor, and a dropping-board placed about six inches below them. There are patent roosts on the market that, the manufacturers claim, will catch the lice and mites, but the roost that I have described above is good enough for me. However, I would suggest that poultrymen try any new device that comes out, that looks good to them, and if they find it good they are the gainers by having done so. Every appliance that will save the poultryman time and labor should be used as a matter of economy; for the more steps and time he can save, the larger flock he will be able to care for.

If your poultry house has a ground floor, it should be renewed from time to time by taking out a layer of the old dirt and putting in a layer of fresh, clean

MISCELLANEOUS

dirt or soil from the field; this should be done while you are using it for a brooder house as well as when you are using it for laying hens.

Yards and Fences Where the apartment plan is used and too many birds are in each yard to allow the grass to grow, double yards may be used, and in the summer-time, while the birds are occupying one yard, the other can be plowed up and sown to some quick-growing crop such as rape, lettuce, radishes, turnips, etc. This plan keeps the soil fresh and pure, and gives the fowls a frequent change of pasture, besides giving them at all times a supply of green food; all of which is conducive to the health of the birds and to the profits of the poultryman.

The fence should be a good, substantial one of woven wire about six feet high, and if some of the birds persist in flying over it their wing feathers may be clipped. The feathers of one wing only should be clipped.

Some poultrymen use fencing wide enough to extend above the posts about two feet, and then bend it towards the

SUCCESS IN POULTRY CULTURE

inside of the pen to an angle of about forty-five degrees, to keep the birds from flying out, while others stretch a barbed wire or two a few inches above the top of the fence. If you have any of the Mediterranean breeds, you will find it hard to keep them all confined in small yards without doing some wing-clipping; at least, that has been my experience. When you have a field or range fenced in, large enough for several different colonies, then they will not often fly over a six-foot woven-wire fence.

The American, the English and the Asiatic breeds are easy to keep in small yards, and will seldom try to fly out.

Yards can be built on both sides of an apartment house, and one side can be used by the poultry while the other side is being plowed and seeded, and after the seed has sprouted and grown into green pasture they can be turned into it and the yards on the other side can be treated in the same way. I like the long, narrow apartment house on account of giving more room for the yards.

If the house is only ten feet wide, each room can have two yards, one on each

MISCELLANEOUS

side of the house. This, to my mind, is an ideal arrangement for an apartment house and yards.

If you have houses on your place that have been built for other purposes, and you desire to use them for poultry apartments, you will have to arrange the yards, as best you can, to suit the houses.

There should be in each yard some kind of shade. If the yards are to be plowed, some sort of a movable shade should be provided. Some poultrymen use canvas for this purpose, while others use lumber. If your fowls are Mediterraneans, canvas is the best, for they are not so apt to try to fly upon it as they are to fly upon a shade made of lumber. In either case the shade should be as high as the fence, and, if lumber is used, some wire netting two feet wide can be placed around and above the edges to prevent them from rising in the air and alighting upon it. If the yards are wide enough, some permanent shade of some kind can be planted close along the side fences; raspberry or gooseberry bushes are sometimes used for this purpose; some people use flowering shrubs, which make the yards beautiful.

SUCCESS IN POULTRY CULTURE

If your yards are to be permanent, shade-trees can be planted along the border of each yard and headed high enough so that the top will be above the fence. After the trees have become well established, the trunks can be used for posts to fasten the fence to.

Fruit-trees are better than shade-trees for this purpose, for they not only provide shade, but plenty of the finest kind of fruit, for the fowls destroy the insects that prey upon the fruit. There is no better place to raise plums than in the poultry-yard, for the poultry are a deadly enemy to the curculio—the insect that destroys the plum by depositing its eggs in the fruit, which hatches into a worm that eats the fruit, causing it to decay and fall to the ground before it is ripe.

When trees are used for shade, the plowing should be shallow, lest you cut too many of the tree-roots, which would seriously injure them.

From these few hints I think you will be able to plan and construct or grow some sort of shade that will be both beautiful and useful.

In building your poultry-yard fences

MISCELLANEOUS

be sure that your corner posts are large and strong and set four feet in the ground and well braced. The others may be ordinary posts and set two feet in the ground. If the posts are creosoted, they will last about twice as long as they will without it. Charring the posts does not help to preserve them very much.

A long, narrow yard is preferable to a square one, for it can be plowed much easier and in less time. It should, however, be wide enough so that a team of horses hitched to a plow can turn easily at each end.

The Incubator Cellar	The incubator-room, whether it be a cellar, dugout or well-insulated
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house on top of the ground, should be well ventilated. It should be reasonably dry and clean and free from all odors. The temperature should not fall much below 60° F.; for if the room is too cold, the eggs will lose much of their vitality from chilling when the trays are removed from the incubator to turn and cool them.

Some manufacturers claim that any old room, or even a tent, is good enough for their incubators to do good work in,

SUCCESS IN POULTRY CULTURE

but such statements are, to say the least, misleading and should not be heeded by those who desire to get the best results from their incubators. Nature seldom sets a hen in cold weather, and when she does the hatch will be a failure unless man provides protection for the nest during the incubating period.

To get the best results from an incubator in cold weather it should be surrounded with conditions that imitate, as near as possible, those conditions found in nature during the natural breeding season of the fowls. Those conditions are not found in a room in which the temperature sometimes falls as low as zero; which is the case when February and March hatches are attempted, in a cold climate, in a room that is not well insulated. Even in many of the warm climates the morning temperature often falls below the freezing-point early in the hatching season, and if the incubator-room is not well built and well insulated, the temperature in the room will fall nearly as low as the temperature out of doors.

No matter what incubator you are using or intending to use, don't let anybody talk

MISCELLANEOUS

you into believing that just as good results can be had in one place as another. Think of what a cold chill strikes you when you get out of a warm bed in a cold room, even when you have your night-clothes on, and you will get some idea of what happens to the little chick, inside the egg-shell, when the egg is brought out of the warm incubator into a cold room. And then, too, we should remember that the little, developing chick is far more tender than a grown person and can not stand the sudden and extreme changes of temperature that you can. Chicks are, in fact, among the tenderest of growing things, and sudden and extreme changes of temperature often kill many of them outright, and those that are so strong that they live through such treatment will be greatly weakened and their chance of making strong, healthy birds greatly reduced.

Don't say that you can not afford such a room; that is not the point; the point is, Can you afford to do without it? If you have no cellar, dugout or suitable room, and have not sufficient means with which to build one, if your time is not all taken up you can dig a hole in the ground

SUCCESS IN POULTRY CULTURE

and cover it over with lumber and dirt or logs and dirt, and you will have one of the very best incubator-rooms; or, if you live in a country where stone is plentiful, you can build a good incubator-room out of stone and mud; of course, if you have the capital, it is better to build something nice that will be an ornament to your place, and then, after the hatching season is over, it can be used for something else.

There should be no artificial heat in an incubator room, for the temperature varies in such a room so much that it is hard to keep the temperature in the incubator right; and then, too, the artificial heat dries out the air in a room so much that the air in the incubator is liable to get too dry. I know that a good many chickens are hatched in rooms with artificial heat, but it is not a good place to hatch them; that is why I advocate a cellar or dugout or other well-built and well-insulated room.

Remember that the stronger and healthier your chickens are when they come into the world, the greater will be your success in the poultry business; and the nearer you can keep to nature when

MISCELLANEOUS

hatching them, the stronger and healthier they will turn out to be.

Lice and Mites Lice and mites are the cause of more failures in

the poultry business than any other two things. If you can not go into your poultry house without getting mites on you, then your success in the poultry business is no success at all, but a dismal failure.

Mites are a very small insect, or louse, that infest poultry houses and prey on the birds at night. They suck the blood of the fowls, and, after they have gorged themselves, leave the birds, to hide during the day in the cracks and crevices of the roosts, nests and buildings.

When they get a start they breed very rapidly, and will soon get so numerous that they drive the fowls to new roosting-places and in some instances kill them outright. They weaken the birds so much that they can not lay eggs, and such weakness makes them an easy prey to all sorts of diseases.

They breed in their dark hiding-places, and their presence may be readily known by the numerous little white specks seen around the cracks and crevices in

SUCCESS IN POULTRY CULTURE

which the pests are hiding and breeding.

It is almost impossible to keep filthy roosting-places from becoming infested with mites. If, however, the droppings are removed every day, and the houses kept clean, the mites will not bother very much. As a precaution, it is well to spray the roosts, at least once a month, with coal-oil, and much oftener if there is any indication of their presence. Should they once get numerous, the whole building will have to be sprayed often for awhile to get rid of them.

They are often called red mites, but their color is gray except when they are gorged with blood. At such times they appear to be red on account of the transparency of their bodies, which permits the red blood to show through.

When a poultry house gets thoroughly infested with them, which it soon will if neglected, you will find them in the roof and everywhere. Should they get such a start in your poultry house, don't get discouraged, for they are easily killed, and you can soon get rid of them if you go at it right. I know that a poultry house thoroughly infested with mites is

MISCELLANEOUS

a discouraging proposition to go up against, but it is not so bad as it looks.

You will need a sprayer of some sort; I have a gasoline blow-torch, such as mechanics use for so many purposes; it has a spraying attachment, and I use it for spraying the poultry houses. It can be used for very many other purposes, and is, in fact, a very convenient accessory to the poultry plant.

Every poultryman should have one of these spraying torches, for they cost but little and are worth their weight in gold. Mine holds a quart, and I can shoot a fine spray into any crevice or crack in which a mite can hide. If you had a large poultry plant that was thoroughly infested with mites, you would, of course, need a larger sprayer than this; but if you have a large plant and let the mites get such a start that you can not quickly subdue them with this little sprayer, you had better go out of the poultry business. I use coal-oil and, everything considered, it is the best thing I have ever tried; the mites will not live long after it strikes them; it is penetrating, and will go at once into the very smallest crack or

SUCCESS IN POULTRY CULTURE

crevice; it is cheap and very easy to apply, and its odor is very disagreeable to the mites and lice.

If you keep your poultry house clean, you will never be bothered with mites as long as there is an odor of coal-oil about them. Don't let anything, so small and weak as a chicken mite, ruin your business when they are so easily destroyed.

There are other lice that bother poultry besides the little red or gray mites. They are larger than the mites, and seldom leave the fowls. They will be found the most numerous on the head, under the wings, and around the vent.

These lice, when very numerous, injure the fowls very much. I know of no way to get rid of them, and of no economical way to control them, except nature's way. Of course, where there is but a small flock, like the city man's back-yard flock, it might be possible to get rid of them altogether; but even in this case, if you should succeed in getting rid of them, some transient bird, flying about, would be kind enough to give you another start. But the methods that you would use to get rid of the lice on a small flock could not

MISCELLANEOUS

be used on a large flock, for the expense would be so great that it would eat up all of the profits.

So we will let nature take care of those lice, and we will help her all we can by providing plenty of dust-baths such as I have spoken of for the sitting hen and the little chickens. A little sulphur or a little of some good louse powder, or perhaps a little of both, may be added to these baths to make them a little more effective. If the fowls are provided with plenty of these dust-baths, they will take care of the louse problem for themselves. These baths must be kept where they will be dry at all times. If the house and runs are kept clean, the lice will not be so numerous. Filth is the root of all evil in the poultry business, and must not be tolerated.

Giving the fowls plenty of room in their houses and runs also helps to control the louse problem.

**Testing Eggs for
Market**

Testing eggs for market, or candleing them, as it is sometimes called, is practiced by poultrymen who are not sure that their market eggs are all as fresh as

SUCCESS IN POULTRY CULTURE

they should be. For this purpose a dark room is necessary.

For a light an electric bulb or a coal-oil lamp can be used. The lamp can be placed in a suitable box, with a round hole cut in the side for the light to shine through. This hole should be about the size of an egg, and should be in the right place to come right before the blaze of the lamp. The box should be so arranged that no light will escape from it except through this hole. It should also be arranged so the lamp can get plenty of air, or it will get so hot that it will be dangerous. The eggs can be held before the beam of light coming from the hole in the box, and if they are fresh they will look clear and bright; if they are not fresh, they will have dark spots in them and some of them will look clouded. These spots and clouds will usually float about as the egg is turned. In white-shelled eggs the yolk of the fresh ones can be seen floating about as the egg is turned, and the novice is apt to think that a good, fresh egg is bad on this account; but by a little practice you will learn to distinguish, very readily, between the good and the bad. It might

MISCELLANEOUS

be well for the novice to break a few eggs that he is in doubt about, until he learns well how the different grades ought to look.

We never test any of our market eggs; if we find any in stray nests, the age of which we are in doubt about, my wife breaks them, and if she finds them fresh she uses them in her kitchen. When people found out how we handled our eggs they asked for them, and were willing to give more for them than for eggs that had been handled and tested in the usual manner.

When testing eggs that are for hatching, don't bring them close enough to the source of light so that they will be injured by the heat. Never test them by holding them up to the hot sunshine.

A good egg-tester, with directions for using, can be bought for a trifle.

I think that farmers and poultrymen should market their eggs while they are fresh, and be careful to keep them well gathered up, and then there would be no use for egg-testing for market, and the eggs would bring enough more to pay for the extra trouble. They sustain great loss

SUCCESS IN POULTRY CULTURE

by holding their eggs until a large per cent. of them are stale; and such a loss is not only a loss to the individual, but is also a great loss to the community. The time has come when we must consider the welfare of the aggregate if we would continue our existence as a nation.

**Teach Your Birds
to Love You** You can teach your birds to love and respect you. In order to do so, you must first love and respect them; talk gently and lovingly to them as you would your child; handle them with great care and tenderness; never pick one up by the legs and let its head hang down.

Strangers should not be allowed among them unless they are very quiet, and the less strangers visit them the better it will be for your flock. They know when a man is strange just as well as you do, and while you may look upon him with great confidence and trust, they doubt and fear him. Poultry that has been cared for exclusively by women will have great fear of a man, and those that have been cared for exclusively by men will have great fear of women; this is especially true of the Mediterranean breeds. The more quiet

MISCELLANEOUS

you can keep them, the more eggs you will get and the greater will be your profits.

Eggs for Hatching should be selected from your best breeding stock;

and if you desire to increase the egg production of your flock, the eggs should be from the best layers of your flock. Eggs that are well shaped and uniform in size and color should be selected, and they should have good, strong, thick shells. No egg with a weak, thin shell should ever be used for hatching, either under a hen or in the incubator.

Of course, if you had paid a high price for a sitting of eggs and found among them some thin-shelled ones, it would be all right to try to hatch them, but it would be best to separate the weak-shelled ones from the strong, and put the weak-shelled ones under one hen and the strong-shelled ones under another. For the weak-shelled ones it would be best to select the most quiet, gentle hen available, and be sure and sit her where she can not be disturbed by other hens, or anything else, for if she is disturbed the thin-shelled eggs will surely be broken. But, in general, where

SUCCESS IN POULTRY CULTURE

you have plenty of good breeding stock and plenty of eggs to select from, it is best to choose eggs with thick, strong shells for hatching. No breeder ever ought to be guilty of sending out thin, weak-shelled eggs to his customers, but they sometimes do it, and when we receive such eggs we have to get along the best we can with them.

If you always select well-shaped eggs, with strong, thick shells, the tendency to produce such eggs will soon become inherent in your flock. The tendency of your flock to produce eggs of a desired color can also be strengthened by careful selection of the desired color. By selecting eggs with the desired shape and color, and strong shells, and from hens that are the strongest in the qualities that you desire to transmit and strengthen, and selecting your male birds from such hens, you will slowly but surely improve your flock. Don't expect too much improvement from your selections, for the tendency in nature to deviate is so strong that disappointment follows the most skillful breeding.

Eggs for hatching should be handled

MISCELLANEOUS

with great care. They should not be exposed to heat or cold. They should be kept in a cool, dry place where the temperature ranges between 50° F. and 60° F. They can be kept ten days and hatch well, but it is not advisable to keep them over six days if best results are desired, because the vitality diminishes rapidly, and although they may hatch well after being kept as long as two weeks, the chicks will not be so strong as they would have been had the eggs not been so old. Therefore eggs should not be kept too long, because the chicks need all the strength that it is possible to give them at hatching-time to carry them through the two or three dangerous weeks that follow.

The vigor of the breeding stock must be up to the top notch, and the fecundity of the male bird should have been tested prior to the breeding season if the best results from eggs for hatching are to be expected.

VI

EVOLUTION AND THE LAW OF PROGRESS AS APPLIED TO THE POULTRY INDUSTRY

The Law of Progress—Diseases of Poultry—Simple Rules for Breeding.

The Law of Progress In studying the law of progress, as laid down by Darwin and others, I find that man in the propagation of himself and of his domestic animals is a great violator of that law. Perhaps he is not to blame for such violations in connection with his domestic animals, for he finds at least a temporary profit in so doing.

I say temporary profit because I believe that only temporary profits can follow such violations, and that he (the violator of the law), or his customers, or his successors, must finally lose by such violations.

I have seen such violations of the law, as the inbreeding of live stock, carried so

THE LAW OF PROGRESS

far that their physical strength and fertility were greatly reduced, and their ability to care and look out for themselves under the stress of life was almost gone. Their weakened physical condition left them an easy prey to all the diseases that the species is heir to, and made them a burden to the man who bought them for the purpose of propagating for pleasure and profit. I have seen some of the laying breeds of poultry inbred to such an extent that they were almost worthless for the production of eggs, and their offspring so weak in the early stages of life that a good percentage of them were unable to break out of the shell, and those that did succeed in getting out were so weak that it was almost impossible to raise them. I have seen some strains of some of the breeds of hogs inbred to such an extent that their fertility was greatly impaired; so much so, indeed, that large, strong litters were the exception instead of the rule. A good percentage of the scant litters died when born, or soon after, and often the mother also died.

Darwin says on the subject of inbreeding: "I believe that their fertility has been

SUCCESS IN POULTRY CULTURE

diminished . . . by too close interbreeding. I have made so many experiments and collected so many facts, showing on the one hand that an occasional cross with a distinct individual or variety increases the vigor and fertility of the offspring, and on the other hand that very close interbreeding lessens their vigor and fertility, that I can not doubt the correctness of this conclusion."

Poultry, or live stock of any kind, that has been bred in violation of the laws of progress instead of having been bred in strict accordance to that law, will be a very poor investment to the man who wants them for utility purposes; and the person who buys them for the show-room will as a rule be disappointed; for if they have been greatly inbred, they will not have the strength and vitality to resist the attacks of the many contagious diseases that they will be exposed to in traveling from one show to another, nor to withstand the fatigue of the many journeys they will be called upon to make; and then they will also suffer very greatly, when changed from one climate to another, before they become acclimated, and

THE LAW OF PROGRESS

if the purchaser desires to breed them, he will find it a very difficult thing to do and the results are not apt to be satisfactory.

The laws of heredity are so little understood that most people, in trying to improve their live stock, are apt to injure it by improper mating. The art of breeding is so difficult to learn and practice that most people who undertake it are foredoomed to disappointment and failure. So true is this that Darwin has remarked: "Not one man in a thousand has accuracy of eye and judgment sufficient to become an eminent breeder. If gifted with these qualities, and he studies his subject for years, and devotes his lifetime to it with indomitable perseverance, he will succeed, and may make great improvements; if he lacks any of these qualities, he will surely fail. Few would readily believe in the natural capacity and years of practice requisite to become even a skillful pigeon-fancier."

The laws governing the tendency to vary in all living organisms are so little understood that the results sought and desired from any mating, that we are able to make, are seldom, if ever, realized be-

SUCCESS IN POULTRY CULTURE

cause, "if man goes on selecting, and thus augmenting, any peculiarity, he will almost certainly modify unintentionally other parts of the structure, owing to the mysterious laws of correlation."

So we see that the greatest minds can but dimly see and but little understand the laws that govern variation and inheritance; furthermore, that almost infinite patience and knowledge and skill are necessary for any one to become a skilled fancier or breeder. Nevertheless, they (the great naturalists) know and admit, and we (the common, weak-minded and numerous people) also know, that many owners of mongrel herds and flocks do improve them (unconsciously, perhaps) by always selecting the strongest, healthiest and most beautiful of their herds and flocks to breed from.

This being true, then I am going to give to my readers some very simple rules for the breeding of poultry, which I have found, by long experience, to be good and reliable.

But before I do so I desire to say a few words as to my methods of treating diseases of poultry—methods which I have

THE LAW OF PROGRESS

found by long experience to be very successful. But I shall not claim that these methods are the only ones by which anybody can succeed in treating the many diseases of poultry, but I do claim, without reserve, that they are the only methods by which I have been able to succeed in a way that was satisfactory to myself. I am not content to breed birds that suffer from every trifling disease that comes along, and take cold with every sudden change of weather, nor have I ever found it profitable to breed such birds; therefore I have sought out, by reading and observation, nature's way of keeping her birds strong, vigorous, healthy and beautiful.

It will require considerable courage for most people to follow the methods that I practice in combating disease, more especially if their birds are pets, as most successful poultrymen's birds are; but after they have practiced my methods for a short time, and begin to see the good results that follow such practice, they will no longer look upon death as a bad thing sent by our Creator to cause suffering amongst His living creatures, but as a good thing sent for the purpose of

SUCCESS IN POULTRY CULTURE

relieving them, as far as possible, from pain and suffering.

Diseases of Poultry

There are very many diseases that attack and destroy poultry. Preventive methods of combating disease are much preferable to curative methods. I have discontinued giving medicine or doctoring poultry in any way. I believe that nature's way of combating disease is far better than anything that man has ever devised. Nature's way of resisting disease is by condemning to death every individual that is not capable of resisting all of the diseases that prey upon them, thereby cutting short the career of those weaklings and preventing a transmission of their blood to future generations of the flock. By cutting short the life of these weaklings the flock will grow stronger by the predominance of blood from the stronger members of the flock; and if man will aid nature in this process of eliminating the weaklings, the flock will grow strong more rapidly still. When he doctors the weaklings and seeks to prolong their lives, he is working against nature, and, if he succeeds in his effort, he will

THE LAW OF PROGRESS

surely be working against his own interests.

This may seem to be a cruel law, but it is nature's law of progress, without which animal life could not evolve. If we could look upon death from a philosophical standpoint, we would not see it as a curse, but as a blessing through which Nature takes back to her bosom all that are no longer able to wage the cruel war of existence. In other words, it is the law of the survival of the fittest. If we seek to violate this law in the slightest degree, in the poultry business, loss will be almost sure to follow.

My advice is this: No matter how much labor it has cost to produce a bird, or how much money it has cost to buy it, if it is not capable, under sanitary conditions, of resisting disease, its blood should not be transmitted to the future generations of your flock.

Don't doctor. You can spend a dollar's worth of time and medicine on a fifty-cent bird before you know it, and you have not only lost your time and money, but, if you succeed in curing a sick bird and allow it to remain with your flock, it will trans-

SUCCESS IN POULTRY CULTURE

mit to the future flock a weakness that will surely cause future loss.

Simple Rules for Breeding

If we are not willing to accept the theory of a single conception of life from which all animal life sprang, lest it conflict with our religious belief, or for any other reason, then we need only to go back to the time of Noah's ark to get a starting-point from which nature began with a single pair from which to breed all of the different families of a given species that now exist throughout the world. We will choose, for instance, the pair of fowls that came safely through the flood in the ark the nearest akin to our domestic fowls of the present time, or from which sprang the jungle fowls which are supposed to be the ancestors of our domestic fowls. If Nature started with a single pair of birds and bred so many different families, of the same species, and always kept them healthy, strong, vigorous and prolific, and always keeping close to a certain standard of perfection which she has established for herself, and does so without any bad effect which would result from inbreeding, it is very good proof that she has

THE LAW OF PROGRESS

accomplished these results without inbreeding. It is probably true that Nature, in the long line of descent from the ark to the present time, has at times inbred her species, but the natural law against such practice is so strong that such occurrences must have been very rare indeed—so rare that no perceptible bad results have followed.

I do not wish to be understood as saying here that Nature has established an unchangeable standard of perfection, towards which she is breeding, for she is constantly changing her varieties and species to fit them to the constantly changing conditions that surround them. These changes are so slow, however, that any change that would take place during the span of a human life is imperceptible to us. I think that Nature's standard of perfection is one that fits her living creatures to the environment that surrounds them. So we see that man, in order to become a successful breeder, must make his standards of perfection such that when the animals he desires to breed have been bred up to that standard they will fit as harmoniously as possible into

SUCCESS IN POULTRY CULTURE

the environment that surrounds them.

If the standard of perfection does not fit the animals, when bred up to it, for the environment that surrounds them, then the standard of perfection or the environment should be changed.

In starting a flock of poultry from a single pair I proceed thus:

From the offspring of the first mating of the single pair I choose the male that comes the nearest to being perfect as measured by the standard of perfection towards which I am breeding. I mate him back to his dam, and then I choose a few of the best females from the same mating and mate them back to their sire.

These two latter matings will start me out with two distinct families. I will keep these two distinct families separate and line-breed each family in such a way as to avoid inbreeding. From these two distinct families I will start several other distinct families, until I have as many distinct families as I desire or have room for. All of these different families I will keep separate and line-breed them all towards a common standard of perfection. After I have as many as I desire, then I

THE LAW OF PROGRESS

will start what I call my super-family. I will start this super-family by choosing one male and one female from the two most distantly related of the distinct families that I have previously established. This super-family I will also breed, in the same way that I have the other families, toward the same common standard toward which I have been breeding them. Now, since by this time I have several different families that are distant kin to one another, and all have been and are being line-bred towards the same standard of perfection, and are all of the same blood-line as my super-family, I can from time to time, as I think my super-family needs new blood from distant kin, introduce it from the one of these several families that by my records is shown to be the most distant kin from my super-family. By this method of breeding I can get new blood for my super-family from birds in whose veins flows the same blood as that which flows in the veins of my super-family, and who have been bred along the same lines and who are of distant kin. This method of breeding puts me in a position to get new blood for my

SUCCESS IN POULTRY CULTURE

super-family of birds, without the danger that follows the practice of introducing new blood from outside, and, for the most part, from unknown sources. And this position gives me a great advantage over those who seek to improve their flocks by line-breeding a single family, because the most careful line-breeding with a single family of birds soon merges into an in-breeding proposition; and it is on account of this inbreeding proposition that so many breeders find it necessary to seek new blood from outside sources to build up the vitality and fertility of their declining flocks. If they had gone to Nature and studied her ways and practiced what she taught them, they could have built up the vitality and fertility of their flocks without having had to suffer the disappointment that almost always follows the introduction of new blood from partly or wholly unknown sources.

The reason that there is so much danger from introducing new blood from outside sources is because the different strains of the same breed are bred by different men and are not all bred under the same environment and by the same

THE LAW OF PROGRESS

methods; therefore, while each individual may be breeding toward the same standard of perfection, yet each one of them may be trying to perfect his birds by different methods; to cross two strains of the same breed that had been bred by different methods, and by different men, towards the same standard of perfection, seldom, if ever, produces good results. In nature this danger would not exist, for she is breeding all of her families, of the same variety and species, in the same direction; so that if infusion of blood takes place, in nature, between distant related families, no perceptible change between the offspring and the parents takes place, for the reason that both families have been bred towards the same common standard, by the same methods. This rule will not hold good if the two families are so far separated that they are living under different environment, for nature will seek to fit each family for the environment that surrounds them; and if these families have been widely separated, and have lived under different environment for a long time, they will be so much changed that to cross the two

SUCCESS IN POULTRY CULTURE

families would not produce offspring very much like either of the parents. Two widely separated families in nature, which live under different environment, are analogous to two different families of the same breed being bred by two different men, inasmuch as the two different men would not be likely to give their birds the same environment and their selection might differ even more than the natural selection of the two natural families in the widely separated regions.

Perhaps it would be well to state here that if two different strains of the same breed had been bred by different men, by different methods, towards a high standard of egg production, to cross the two strains would be likely to produce good results for the reason that crossing strains of the same breed, that are distantly related, tends to produce offspring that are more prolific than the parents. The reason for this is obvious when we consider the sterile effects of close breeding.

This obvious reason seems, to me, to lend an element of truth to the theory that exists amongst the farmers of many

THE LAW OF PROGRESS

localities, that to cross the different strains, and the different breeds as well, produces offspring that are more prolific than their progenitors.

I think it would be better for the beginner, who intends to start the breeding of a flock of fowls for a given purpose, to start with at least two females, or, if he can spare the capital to buy them, as many females, not exceeding ten, as he intends to start separate and distinct families. These females should be mated to a male that is of the same breed and strain and as distant akin from them as it is possible to get. With this kind of a start, all the distinct families desired can be started from the first mating and a great deal of time, trouble and expense saved.

The beginner should purchase his first birds from a breeder that is well known to him, if it is possible to do so, and, if it is not possible to do so, then from a man who has the reputation of being a good breeder of a strain of birds that are well adapted for the purpose intended to be carried out by the beginner, and of the breed desired. The breeder, of whom

SUCCESS IN POULTRY CULTURE

stock is purchased, should be one who confines himself to that breed alone, for reasons which are obvious and that need not be stated here.

As the lack of space prevents me from entering into a full discussion of the art of line-breeding, I will only say that it consists, mostly, of the art of breeding a single strain or family in such a way as always to breed from those that are the farthest related or are the least kin to one another. A breeder should never be tempted to mate two birds that are too close kin because their qualities seem to indicate that good results would follow such a mating, for to do so would be more liable to bring bad results than good. While it is probably true that a standard of perfection, as to plumage, can be more rapidly approached by inbreeding, such progress will be at the expense of vigor and fertility, and therefore the method should not be practiced.

As egg production is one of the most desirable qualities that can be bred into a strain of fowls, and that quality can not be obtained by inbreeding, then it is obvious that inbreeding is a

THE LAW OF PROGRESS

bad thing and should not be practiced.

There is an egg type of fowls just as there is a milk type of cows, and there are also several non-sitting, egg-laying breeds of poultry just as there are also several breeds of milk-producing dairy cows. Our best dairymen claim that a man who desires to go into the dairy business will not go wrong if he chooses any one of the popular dairy breeds with which to build up his herd, but he will go far wrong if he does not choose from amongst the individuals of the breed those that are of the dairy or milk type for his dairy herd. For there are in all breeds of dairy cows very many individuals that are unprofitable to keep for milk and butter purposes. This is true even of the so-called milk strains of the dairy breeds—strains that have been more carefully and scientifically bred for dairy purposes than the average run of the breed. Our best cattle-breeders also claim that a good dairy cow and a good beef cow can not be found in one and the same animal, or, in other words, that a dual-purpose cow is an impossibility.

I believe that all these truths about the

SUCCESS IN POULTRY CULTURE

dairy cow apply also to the egg-laying hen. A hen that is best bred for meat production will never make a good layer. The hen that lays from two hundred to three hundred eggs in a year must have a body that is bred for that purpose. She must have a large craw in which to store food; she must have a large gizzard in which to grind and prepare that food for digestion; her digestive organs must be powerful, strong and ample, so that she can digest and prepare large quantities of food for assimilation; her lungs must be large and powerful, in order to oxydize the large amount of blood necessary for the production of such a large number of eggs; she must have a large and powerful heart to pump that blood through her arteries and veins at the proper pressure; her organs of reproduction must be large, active and strong, and all of her other vital organs in proportion; and to give room for all of these large and powerfully developed organs she must have a deep, long and wide body, with well-sprung ribs; she must be very active and full of life; her legs must be rather long and slim, with a well-muscled thigh on which

THE LAW OF PROGRESS

the body is carried with a beautiful poise; her wings must be large, strong and well muscled; strong enough, in fact, as to breeds in the Mediterranean class, so that she can take the air with ease for considerable flight in case of danger; her neck should be rather long and slim; she should have a dense coat of fine, silky feathers that lie down close to the body; her comb should be a bright red and rather large for her breed, and her eyes should be large, bright and keen. Such a bird is what I call an egg type, and if her ancestors, for several generations back, have been bred to such a standard and the best layers amongst them have been selected for breeding purposes, and the males have been chosen from the broods of the best layers and there has been no inbreeding, a good-laying strain of birds will have been established.

So we see that it is not very difficult to breed a laying strain and type of fowls if that is all our standard of perfection calls for; but if we undertake to breed to a standard that calls for a minimum yearly egg production that is above the 200 mark, a plumage with given mark-

SUCCESS IN POULTRY CULTURE

ings, a comb with a given number of points, a given colored eye and ear-lobes, legs of a given color, and many other given points that must be produced in an egg-laying strain and type of fowls, to bring them up to the "American Standard of Perfection," then we find that we are up against a more difficult proposition. The latter can not be done except by the most skillful breeders.

I don't believe that any of the meat type of fowls can be bred into a laying strain of high egg producers without changing them from a meat type to an egg-laying type. I know that very many good breeders do not believe that there is an egg-laying type, but I can not agree with them. Very many good breeders, however, believe that there is such a thing as an egg type of fowls, and that there is also a meat type; but I don't know of any who don't believe that a meat type can be bred into a first-class layer without at the same time breeding them into a distinct egg type. The reason why it is so easy to breed to one certain point of perfection alone when all other such points are disregarded, and so hard to breed up to very

THE LAW OF PROGRESS

many points of perfection at one and the same time, is because we but little understand the mysterious laws of correlation.

There is another point that I wish to mention here in passing: That domestic fowls kept in close confinement are not so fertile as those that have a wide range. While those that are kept closely confined will, perhaps, lay as many eggs, if properly cared for, as those that have a wide range, yet a larger percentage of the eggs laid by the fowls that are closely confined will be infertile than will be those of the ones that have a wide range. What effect confinement has on the organs of reproduction of animals to cause them to be less fertile when closely confined than when running at large, we do not know.

We do know, however, that it is true, and that this is the reason why so many breeders who don't have plenty of room for their breeding stock are often disappointed that they don't get a larger percentage of fertile eggs from them.

Many of our wild animals when brought into captivity cease to reproduce

SUCCESS IN POULTRY CULTURE

themselves altogether, even after a union of the sexes has taken place. In view of these facts, then, it is not strange that our domestic animals are not so fertile when closely confined as when allowed to run at large.

VII

MY FAILURES

My First Experience with an Incubator—My First Hatch—My First Experience with a Brooder.

My First Experience with an Incubator

When I went into the poultry business, thirty-two years ago, for the first time, I had no experience with incubators and brooders. I thought, of course, that I had to have an incubator and brooder to get into the chicken business properly. Incubators were not so much used nor so well understood at that time as they are now.

I commenced to make inquiry around the neighborhood to find out who had an incubator, and what my neighbors knew about incubators and brooders that they were willing to tell. If any of them knew anything about incubators and brooders, they did not seem inclined to want to tell it; but some of them, I noticed, looked very wise when I approached them on the

SUCCESS IN POULTRY CULTURE

subject. I did not exactly understand what such wisdom, as I saw shining out through their benign countenances, meant; but I reached the conclusion, through some process of reasoning, that they had it in for me, for some reason best known to themselves, and that it would be a waste of time to seek any further information from them. I concluded, further, that I had a little genius of my own, and, being from Missouri, would show them (Missouri, you know, is the "Show Me State") before long that I could make an incubator incubate. Well, I finally showed them, and they certainly enjoyed the show, as you will soon see.

I heard of a neighboring lady who had a home-made incubator that she had hired a carpenter to make; so I went to see her to find out what she knew about incubators and to get her plans and specifications, if she had them, for making one. Instead of offering to let me have the plans and specifications, either with or without price, she seemed more anxious to loan me her machine, and that, too, without price. I marveled at this, at the time, for the hatching season was rapidly approaching

MY FAILURES

and she always kept quite a large flock of poultry. But she insisted that I should take the machine, for she was going to hatch what few chickens she raised that spring with hens. So the next day I went over to her house with my horse and wagon and got the incubator. I thought I saw a roguish twinkle in her eye as I hauled that old incubator away, and I wondered what the joke could be, but I did not ask any further questions about the machine, and she did not volunteer to enlighten me any further.

It was the most peculiar incubator I ever saw; it was built in sections and was three stories high; and after it was all put together, an outside casing, with a twelve-inch air-space all around, was built around it and this air-space was to be filled with sawdust. When I got it all in the wagon I found that I had nearly a wagon-load. I hauled the thing home and set it up in an old cow-stable that had a thatched roof. When I got it set up it looked nearly as big, to me, as a refrigerator car. I then went to the sawmill and got a load of green oak sawdust to fill in the air-space with. It seemed to me, at

SUCCESS IN POULTRY CULTURE

that time, that the plan the machine was built on was one of fuel conservation, for I could not see any possible way for the heat to escape through all of that great thickness of sawdust.

The next thing I did, being something of a mechanic, was to put a glass door on it; I thought I wanted to see what was going on in there during the hatch that I contemplated making. It had no door nor trays; but, instead of these, it had a big, heavy drawer that slid in and out with a heavy, awkward turning-rack in it; this turning-rack took up lots of room that I thought could just as well be used for eggs; so I discarded the old, heavy drawer and turning-rack and put four nice, light trays in their place. I put nice screen wire bottoms on the trays, and the four of them together held five hundred eggs. The new glass door and the nice, light trays made a great improvement on the old incubator, and I began to hear old Mr. Success knocking at my door; but alas! alas! alas! he got shy and foxy and disappeared before I had time to open the door and let him in.

The incubator was now ready to heat

MY FAILURES

up; so I got the lamps (it had two lamps, one on each side) and cleaned them all up nicely and put in new wicks and filled them with oil, and proceeded to light them and put them in their proper places on the incubator. These lamps had glass chimneys when they should have had metal ones. I don't suppose they knew anything about metal chimneys for lamps at that time; anyhow, these lamps had nothing but glass chimneys and they were a great nuisance; for they were always getting broken, which caused a great deal of trouble and loss of time. But I got along with them the best I could.

Everything now being ready and the incubator started on her heating-up trial, I proceeded to regulate the blaze of the lamps so that both of them would give about the same amount of heat and also so that they would not be liable to smoke; then I left it, with the belief that it would soon be ready for the eggs, but when I came back in a few hours I could not see much change in the thermometer from what it was when I left it; but as the lamps had not been lit very long I thought, and correctly too, that I had not given it

SUCCESS IN POULTRY CULTURE

enough time to get thoroughly warmed through; so I left it until the following morning, thinking that it surely would be ready for the eggs by that time; imagine my surprise when I went to the stable the next morning, with the expectation of finding the incubator ready for the eggs, on finding the thermometer, in the egg chamber, only a little higher than the day before; but that green sawdust was commencing to steam, so I still had hopes; day after day I cared for that machine, and still the temperature was not half-way up to the incubating-point; but I had up steam, for that green sawdust was steaming away, day after day, the days lengthening into weeks, still the old incubator was not hot enough; so one morning I turned the lamps unusually high, thinking that, perhaps, I had not been turning them high enough, and then went to my work in the field. When I came in at noon the first thing I did was to go to the old cow-stable to take a look at my incubator. As I approached the stable I saw an unusual light shining through the cracks; I quickened my step, and when I reached the stable and flung open the door I saw that

MY FAILURES

old incubator wrapped in a blaze, the flames reaching nearly to the thatched roof. Now, you can just bet your boots that there was some lively hustling to get that fire put out before that thatched roof ignited. I succeeded. I also succeeded in getting that old incubator hot; and it was considerably wet, too, when I got that fire put out. But I succeeded in saving that old cow-stable and what was left of the old incubator.

Now, I suppose you think I was discouraged, but I was not in the least. You see, I had the chicken fever, and, like typhoid, it never subsides until it runs its course; and anybody with the chicken fever never gets discouraged. Well, I proceeded to repair that old incubator and make some improvements on the heating apparatus so it would not take fire again; I lit the lamps, and, after keeping them burning for a week or two more, the sawdust was dry and the temperature was right, and the poor old thing was then ready to sit.

I scoured the neighborhood to get five hundred eggs to sit that old incubator on. It

My First Hatch

SUCCESS IN POULTRY CULTURE

was in February, and you know the price that I paid for those eggs was a plenty. Well, I sat old Mrs. Incubator on those five hundred costly eggs, and took up my twenty-one days' vigil. The old thing had no regulator, and, believe me, that was some vigil. At the end of that long twenty-one days I invited in the neighbors to see five hundred chickens pop out of those five hundred eggs like corn in a popper. Oh, you bet I was confident, but never a chick popped out. Some of the neighbors looked upon me with compassion, some with disgust, and some with derision. There were Irish families living in the neighborhood and present at the hatching (?), and auld Tim Moloney made the remark that he had "niver had sich a toim in all his loif," and that he "would not have missed it for the prrice av a sack av tabaca."

The other Irishmen present made a number of those witty, cutting remarks that sting deep, without offending, so characteristic of the race; they felt free to do this on account of the Irish blood that they knew flowed in my veins, my father having come from the "auld sod"

MY FAILURES

across the "dape" and married a Yankee.

The lady with the roguish twinkle in her eye, who was so anxious to loan me her incubator, was not present at this hatching (?), but I began to see what that roguish twinkle meant, and after I had improved her incubator and made a successful hatch with it, she was anxious to get it back; so I hauled it back without delay, and she said she would not charge me anything for the use of it. I thanked her very kindly, and I think, as I did so, I must have had something of a twinkle in my eye, for she gave me a curious look as I bowed myself out of her presence. The twinkle that I suspect was gleaming from my eye was caused by the belief that I had, that she could not succeed with it even after I had rebuilt it and put a regulator on it; for the regulator was a complicated electrical device that nobody but an experienced electrical engineer could fathom and make work. She did not ask for any advice, and I did not offer any, for unasked-for advice is seldom, if ever, appreciated or heeded.

While we all have a little revenge in us, and I guess I have my share, yet I

SUCCESS IN POULTRY CULTURE

think I would rather the lady had succeeded with the incubator, which she did not, than fail; for she was a very amiable lady, and gossip seldom, if ever, left her lips, but her eyes sometimes revealed her thoughts.

I remember now that somebody was presumptuous enough to ask me if I was going to try it again; just as though a man with the chicken fever could resist the temptation to try a worthless old incubator again and again.

Well, you may not believe it, but that old incubator and I were the talk of the neighborhood for several weeks; and don't you think that it is something in our favor—the old incubator and me—to be able to say, with truth, that we entertained a whole neighborhood for that length of time?

I now decided that the old machine needed a regulator, and I went to work to invent and construct one. After constructing a regulator and getting it in working order, I proceeded to sit the poor old thing again on five hundred more costly eggs.

This time I tried to keep the hatching-

MY FAILURES

day a secret, but some of my neighbors kept tab on me, as some neighbors sometimes will, and when hatching-day came around I had a considerable company who do not think an invitation a necessary prelude to attending a hatching-bee; and to my great joy, if not surprise, some of those costly eggs actually popped out into live chickens. But those chickens were not properly incubated, and I found them very hard to raise; so hard, indeed, that they all died.

My chicken fever had not yet subsided, so, after improving the old incubator to my notion, I gathered five hundred more eggs and started the machine again. The hatch this time was more satisfactory; the chicks came out strong, vigorous and healthy, and I felt greatly encouraged. As a result of this last hatch I raised a flock of nice, strong, healthy birds.

I say last hatch, because my chicken fever had subsided, and, after raising this last hatch of chickens, I went out of the chicken business for a long time: but the experience that I gained, experimenting with that old incubator, stood me in great stead in after years.

SUCCESS IN POULTRY CULTURE

In late years I have experimented, further, with incubators as well as brooders, and I am now able to build machines that are better than any that I have ever seen, and the cost of them is very small; and then, too, they are so simple that anybody that is handy with tools can build them, and the tools necessary are such as are usually found on the farm.

I have never failed to make a flock of hens produce eggs at a profit; how I do this with a flock of very poor layers is a secret, but I guess I had better tell my readers how I do it. It is so very simple that you will be surprised that you did not think of it before; all you have to do is to weed out the non-layers and the poor layers, and follow the teachings of this book.

My First Experience with a Brooder After improving the old incubator so that it would hatch the chickens, the next problem was a brooder with which to raise them. I could not find a neighbor lady, with a roguish twinkle in her eye, who had an old brooder she wanted to get rid of, nor could I find anybody in the neighborhood who knew

MY FAILURES

anything about making one; then I tried to find somebody that had some experience in the management of them, and I also failed in that; so I was thrown altogether on my own resources.

I then set my brains and hands to work trying to make a brooder. This took place during my first three weeks' vigil with my borrowed incubator. I guess my mind was not very clear during that time, for I made the most unnatural brooder that it is possible for a man to make; it had bottom heat, when it should have had top heat, and there was not even enough of that.

When my first hatch came off, which I have already told you about, all of which died, I put them under this brooder. They commenced dying at once, and I guess, if the truth was known, the brooder was somewhat to blame for this one hundred per cent. death-rate; anyhow, they all died. Perhaps the food had something to do with it, too; I think it did; at any rate, this hatch of chickens was well out of the way before the next hatch came off, and I had the old brooder rebuilt and ready for the next hatch when they came off.

SUCCESS IN POULTRY CULTURE

This was before the days of the hot-water jug brooder, or, at least, it was before I had ever heard of it; had I known of it I would have had an easier and better time raising my first chickens.

After reconstructing the old brooder I put my second hatch, which was my third sitting, under it and went about my business; for the spring season was well under way when this hatch came off; I guess it was lucky that I did not have much time nor attention to give them, for they grew up rapidly and into a fine flock of birds.

Here is the way I managed them: I set the brooder out of doors on the south side of the house, and kept the lamp burning under it; every morning, noon and night I would throw them a little food, and they had to hustle for what else they got; for I was away in the field all the livelong day, and sometimes I did not get in from my work in time to give them their supper; there was no wife nor children to look after them, for I had not yet married; therefore they had to look after themselves, which they did in the most natural manner. The brooder

MY FAILURES

was kept clean and warm at all times.

I have raised, since then, very many chickens and tried many kinds of brooders and systems of brooding and feeding, and I have never had a flock of chickens do better than this flock did.

I account for the great success of this flock in this way: There were no other chickens on the place, at the time, and there must have been plenty of insects and worms for them to get; the green grass was just starting when they hatched, which gave them plenty of green food; they had a large range to run over; they had plenty of air and sunshine, and I never gave them much food at one time; the food I gave them, such as scraps from the kitchen, crumbs from the dining-room table, together with a little grain, was the very best food that could have been given them. Their mealtimes were far apart, which caused them to get hungry and go a-foraging for insects and worms, which gave them plenty of exercise, sunshine and air; in short, they were surrounded with almost natural environment.

The fact that we are seldom situated so that we can surround our fowls with

SUCCESS IN POULTRY CULTURE

natural conditions is what makes the poultryman's task so hard and success so difficult to attain.

My success with brooders since that time has not been uniformly good, for I have tried many experiments, and a good many of them have not been as successful as I could wish, but the experience gained has almost always been worth the price paid.

Don't be afraid to experiment, if you have a pet idea that you would like to see tried out, for if you don't succeed as well as you would like to, the experience is usually worth the price you paid for it; and then, too, you will be working with the consciousness that you are helping along the progress of man. Without experimenting there would be but little progress.

When your experiments fail, search out the cause, and you will not only benefit yourself, but you will enlighten and benefit others; and all this is in obedience to the law of progress—the evolution of man.

VIII

SECRETS OF SUCCESS, IN SHORT PARAGRAPHS

Egg Production—Incubation—Brooding.

Egg Production Don't go into the poultry business thinking that it requires no thought or action.

Don't let lice and mites act as a governor on your egg machines; let them race.

Keep your hens happy.

If your hens are not glad to see you coming, your profits are not what they should be.

If your hens are profitable, they will also be happy.

If your hens are not profitable, don't blame the hens nor the business.

Don't expect the business to succeed without your help.

Give the hens plenty of good, dry dust-baths; place the baths in a sunny place in

SUCCESS IN POULTRY CULTURE

the winter and in a shady place in the summer.

Don't allow strangers nor strange dogs among them.

Give them well-balanced rations.

Hens in the Mediterranean class will usually balance their own grain rations if they have access to a variety of it.

Their combs should not chill.

Keep plenty of grit, oyster-shells and fresh water before them all of the time.

Oyster-shells should not take the place of grit.

Grit should not take the place of oyster-shells.

Don't doctor them; they should be healthy without it.

Increase their resisting powers by proper breeding instead of weakening them with medicine.

Get rid of a flock of hens that can not be kept healthy under sanitary conditions without medicine.

Weak, sickly birds should be killed and burned as soon as discovered.

Watch their combs, and if any of them are pale and sickly looking, hunt for the cause; it is usually mites.

SUCCESS IN SHORT PARAGRAPHS

The produce man should get the poor layers and non-layers at once.

“One out of every twelve hens in the annual egg-laying contest at the Missouri State Poultry Experiment Station at Mountain Grove, Missouri, did not lay eggs enough to pay for her feed. Hens from thirty-seven States and eight foreign countries were entered in the contest, and the utmost care was used in the selection of the hens entered.” This gives a pretty fair indication of the number of poor layers in the average flock of laying hens, and shows us that the practice of breeding for egg production has not been practiced long enough to produce a well-established trait.

Don't keep any roosters with the flock after the breeding season is over.

A litter of alfalfa or clover leaves is fine for them to scratch in.

Scatter a little cracked grain in the litter for them to scratch after.

Give close attention to details.

No detail, however small, should be overlooked.

Read this book carefully and well, and then read it again.

SUCCESS IN POULTRY CULTURE

Stop in the middle of an important sentence, if necessary to a full comprehension of its meaning.

Subscribe for a good poultry paper, read and digest its contents, and don't believe it all.

After you have read and digested an article in a poultry book or paper, proceed to debate it in your own mind, and you will soon be able to separate the wheat from the chaff.

To read an article does not mean to glide over it, like a proof-reader, who looks for nothing but typographical errors, but to grasp the thought that inspired it.

Confine yourself to one breed.

Use a little horse sense.

Incubation Follow the manufacturer's instructions in setting up and running an incubator.

An incubator should always set level.

Run the incubator a day or two before putting in the eggs.

You should be able to maintain an even temperature of about 103° F. before putting in the eggs.

Keep the thermometer in the same place in the incubator all of the time.

SUCCESS IN SHORT PARAGRAPHS

Turn the eggs twice each day, after the second day, until they commence to pip.

Turn the eggs very gently, by rolling them around with your hands, after a few have been removed from the tray, to give you room to do so.

Never let the tray extend out over the edge of the table or incubator on which it sets, while turning and cooling the eggs. If you do so, those in the end of the tray, extending beyond the edge, will cool faster than the others and are liable to be chilled.

The top of the incubator is a good place to set the trays for turning and cooling the eggs, if there is no regulator in the way.

A regulator should not be placed on top of an incubator.

If your incubator is not properly ventilated, opening the door to look at the thermometer is a good thing.

Don't get nervous; keep your head cool and your incubator warm, but not hot.

Let the sitting hen have her own way as much as possible; remember that nature is her teacher.

SUCCESS IN POULTRY CULTURE

Brooding Put some fine, sharp grit before the little chicks a few hours before giving them their first food.

Give the first food forty-eight hours after hatching.

Don't overfeed.

Keep them warm.

Give them room.

Give them sunshine.

Keep the brooder clean and warm.

Don't wait for weak chicks to die; it is cruel. It is also bad for the strong ones.

After they are six weeks old get them to roosting as soon as possible, if the weather is warm.

It is easy to teach them to roost if they are healthy and the weather is not too cold.

Don't chill the chicks when moving them from the incubator to the brooder.

Be sure that the brooder has had a temperature of 95° F. for ten hours before putting the chicks into it.

Give them a well-balanced ration.

Feed very little and very often.

Keep plenty of grit and fresh water before them all of the time.