
The Agricultural Experiment Station

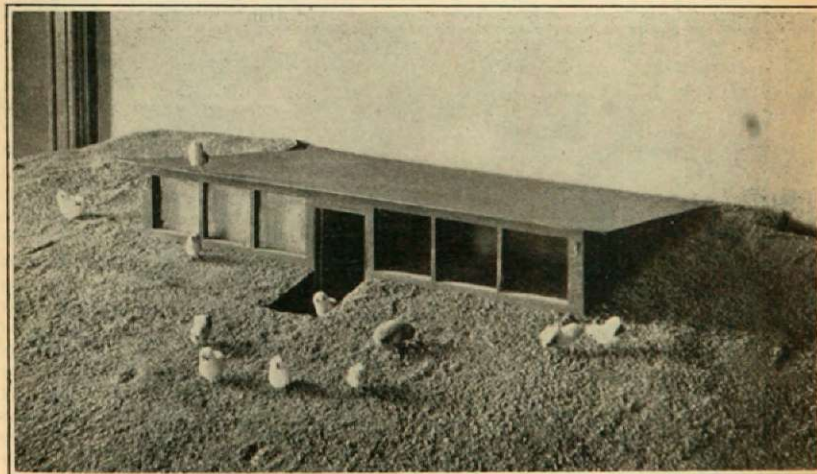
OF THE

Colorado Agricultural College

POULTRY RAISING IN COLORADO

—BY—

W. E. VAPLON



Under-ground Poultry House

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FORT COLLINS COLORADO
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The Agricultural Experiment Station

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POULTRY RAISING IN COLORADO

This is not a technical bulletin; it does not give the results of investigations or experiments; its only excuse for being published is the fact that more inquiries are being received by the State Agricultural College and Experiment Station relative to poultry conditions and the care of poultry in Colorado than can be satisfactorily answered by letters.

Two poultry bulletins have been published by this station: In 1910, bulletin No. 164, "Poultry Raising," and in 1912, bulletin No. 185, "Some Poultry Diseases." Both editions are exhausted and the demand for practical information is steadily increasing.

Only such matters have been taken up as are of interest to the person wishing to make poultry raising a business, whether in large or small degree, and the basis of the work is the questions received by the college and station. Each subject has been discussed as though in direct answer to such questions.

Colorado needs more hens than she now has to supply home demands. Turkeys raised in Colorado are considered the equal of those raised in Minnesota and Iowa, which states have long been noted for turkey quality, and they are in demand at profitable prices in the big eastern markets.

Good prices for eggs and poultry of all kinds must prevail in the West, probably for all time, and there is no reason why scientific business principles applied to poultry raising will not net as good returns as when applied to any other line of agriculture.

COLORADO FURNISHES FAVORABLE CLIMATIC CONDITIONS

Some sections of our country have milder winters, some have longer summers, but we doubt if any offer more favorable climatic conditions than Colorado, and certainly, few offer as many. Sunshine is the rule even in cold weather. The low precipitation makes it possible for poultry to spend much of the time out of doors, and we need have no damp buildings. Cool nights after warm summer days, and dry, sunny autums, promote vigor and quick maturity. Spring sometimes encroaches on summer, but early chicks thrive under cover if properly cared for.

GOOD MARKETS

Of the entire population of Colorado, about one-fourth live in Denver and one-fourth in the mining and mountain districts of the State; only about four-tenths live in rural communities or districts. More than 200,000 tourists visit Colorado during the year and many of these make this state their summer home. These conditions make it necessary for Colorado to import approximately two and one-half million dollars worth of poultry products a year, besides sending out many thousands of dollars for breeding stock. Even did we produce more than enough to supply home consumption, to the north, south and west are states importing vast quantities of poultry products, that would become valuable customers for our surplus.

CHARACTER AND VARIETY OF CROPS

The statement is frequently made that grain is high in price in Colorado. This is true only where feed is bought at retail from month to month. Wheat, our staple poultry feed, can be purchased at threshing time at \$1.10 to \$1.30 per hundred pounds. Much of the corn used for feeding purposes is shipped into the State, but can be bought at the same average price in the fall, and barley and oats will average the same.

There is not a grain or product needed for poultry feed that cannot be economically produced in any section of Colorado where commercial poultry raising can be profitably carried on. Corn is imported in large quantities because of the enormous sheep and cattle feeding interests.

HATCHING AT HIGH ALTITUDES

This station has shipped eggs to all parts of the State. One setting of 15 eggs went to Parshall, Colorado, altitude 7,600 feet, from which 12 chicks were hatched. These eggs were carried in a commercial carton, not in a shipping case. During two days they traveled 360 miles by rail and street car, including a trip over the Continental Divide, then 14 miles in a wagon over rough mountain roads. We have had a report of 39 chicks from 45 eggs under hens at 8,500 feet, so that altitude is not the obstacle to good hatches it is so commonly considered to be.

LOCATION

The price of land, the market, and prices of feed are the chief factors to consider in choosing a location. Railroad facilities are excellent and one should be near a railroad if he is doing a wholesale business, as shipments should be frequent and time is money. If delivering products to the consumer, one should be near his trade. This means higher prices for land, which may offset the higher prices received for the products.

AMOUNT OF LAND REQUIRED

Do not crowd. Better go farther, pay less per acre and buy more acres. Crowding is the father of many evils and has driven many out of the poultry business. Rotation is as necessary in this line of agriculture as in any other. Fowls should never be allowed to run over the same ground indefinitely, but the soil should be turned over and cropped as often as possible. Fences are an abomination and the fewer the yards the better, but where yards are necessary they should be large enough to permit a horse and plow to enter. The labor problem, like a ruler's crown, causes much uneasiness, can easily be made to blot out the profits, and horse labor is both cheaper and better than man labor where it can be used. Land of a rolling nature can often be bought at a lower price because of the difficulty of cultivation or the character of the soil. These conditions may be an advantage to the poultryman, especially if the land is porous enough to dry off quickly

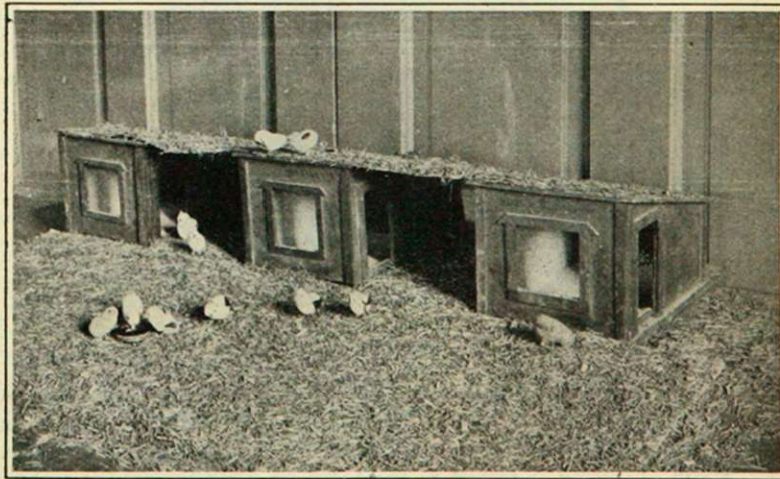
after a rain and still is suitable for producing good crops of vegetables, alfalfa, grain, berries or other crop desired, these crops to be used for the poultry, or as added sources of income. This character of soil can be kept cultivated with less labor than heavy clay soil, thus insuring clean, pure range for the fowls. If the land is level or low, it should especially be loose and porous, as heavy soil, when frequently wet, becomes foul and packed.

CONVENIENT ARRANGEMENT

In the matter of putting up buildings, fences, etc., convenience should never be lost sight of. The relation of each building to all the others, to the roads and highways, and to the residence, should be very carefully considered. Convenience means a saving of time and labor, which means added profits. The usual way of building each new poultry house in the most convenient place left vacant, without reference to those that may follow, will mean many unnecessary steps, discomfort and dissatisfaction. Plans should be made with an eye to the future, and then all building should be done in accordance with these plans.

BUILDINGS

The object of the house is to provide shelter for the fowls, and it should therefore be wind and rain proof; a single thickness of drop-siding is sufficient in our climate. Where lumber is used, the best is cheapest; good sheathing, covered or battened, will cost as much or more than drop-siding and will never make as tight a wall. Shiplap is not satisfactory, as it soon dries out and leaves cracks. Whatever the materials used, they should be good. If economy must be practiced, it should be done in the size of the building rather than in the quality of the material.



Colony Straw House

The poultry house should face south; the front may be partly covered with burlap or muslin during cold nights, but should be open during the day. The burlap curtain will furnish plenty of fresh air when closed, providing all the necessary ventilation. The door should be either in the east or south, and the west and north walls and roof should be absolutely tight. We know of quite a number of poultry houses in Colorado facing east or west, but know of no good reason for it and many against it. There is no stronger ally in fighting disease and discomfort than the sunshine, and the south front, especially in the long house, permits the greatest amount of it to enter.

Colony, or individual houses, are becoming more popular each year. The long house, shown on previous page, furnishes ideal conditions for winter weather, and is made by placing cheap colony houses side by side about 8 feet apart, and covering with straw. The north wall is made by stuffing straw between two lengths of field fencing in the form of two fences about a foot apart. Field fencing is laid across the roofs of the colony houses to support the straw. In the spring, the houses are moved into the fields and the ground on which they stood all winter is plowed up and cropped.

The house shown on this page is 7 ft. long, 9 ft. wide, or deep; it is used as a brooder house until chicks are large enough to be turned



Brooder House

out on range, when the brooder is removed and roosts are installed. The window in the rear adds to the comfort of the little chicks and tends to keep them near the heat, the brooder being placed at the north end. Much objection is found to the habit of hens facing the light in scratching for their food and piling the litter under the droppings

platform. This can be prevented by placing a small window sash in the rear wall under the platform.

A good house for a farm flock is built the same shape as this brooder house, 20 feet square, 8 feet high at the peak, 4 feet high front and rear. This house should have a full window in the west end and also one in the east end beside the door. These windows provide plenty of light and sunshine; the front being low can be left open except in zero weather, when a cloth curtain is sufficient protection. The hens are far enough from the opening not to be affected by draught, yet fresh air is always abundant. The front and rear are low, only 4 feet high, lessening cost of material and adding to the comfort in cold weather. Sunshine from three sides helps to make it a cheerful house.

When careful attention is given to cleanliness and to providing plenty of litter, more hens can be comfortably housed in a certain space than when conditions are not so favorable. A poultry house should always be roomy enough to provide comfort and scratching space in bad weather. Wet, cold feet will not help fill the egg basket.

Comfort and Convenience.—A hen would probably consider a house about 3 feet high ideal, especially in cold weather, but for the convenience of the caretaker we build them higher; unnecessary height means a colder and more expensive house, so the building should be as low as possible, consistent with convenience. The farther the roosts are from the open end, the better for the fowls—twelve feet is better than less, fourteen or sixteen feet even better. The house should be shorter rather than narrower, if a certain amount of floor space is required.

The under-ground poultry house shown on the outside front cover, is slowly but surely gaining friends, especially in the plains regions. The chief, and about the only, cost is the roof. A cement plaster on the dirt walls is advisable, but is not necessary where the soil is firm. Dirt floor is good enough and can be renewed once a year. If the purpose of a poultry house is to provide shelter and comfort, the under-ground house fills the bill. A pit 4 feet deep, about 30 feet long and 14 feet wide for 100 hens; the roof either double pitch or shed style; if the latter, the north end resting on timber or concrete foundation 6 inches high, the south end raised 3 feet above the surface. The entire front, 3 feet by 30 feet, covered during cold weather with a bur-lap canvas curtain both for protection and ventilation. No windows are necessary on the south, as this curtain can be raised during the day, affording light and admitting the sunshine. If the door be made on the south, a small window can be placed in each end, giving more light and sunshine, also giving better ventilation in warm weather. Instead of steps there should be an incline; to avoid slipping, cleats may be nailed to the incline, leaving a smooth space for the wheelbarrow.

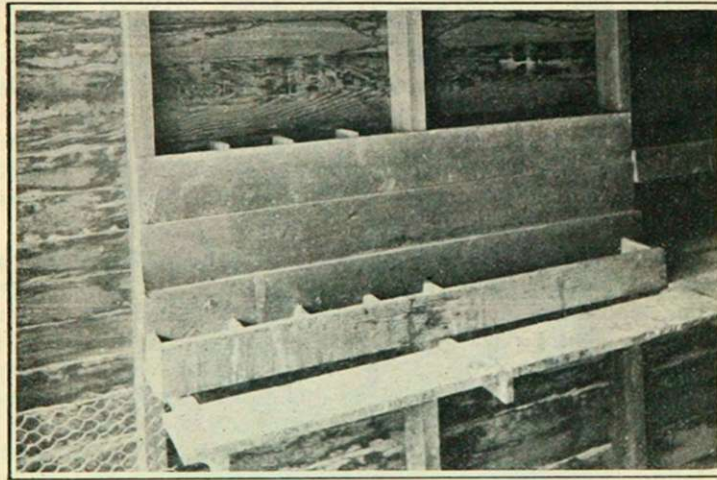
AVOID EXTRAVAGANCE

Cost of Building.—It is easy to be extravagant in building. Don't do it. Extravagance and waste are the causes of as many failures as

inexperience. Limit the cost of providing house room to \$60 for material per hundred hens. It can be done for less, perhaps, but ought not to cost more. A poultryman should be able to do his own building, even if he hires it done. By knowing how, it will be done right and to hire a carpenter for every little job is costly.

Nests.—Nests placed on the ground outside and against the building, covered with a slanting board to shed the rain, are sometimes very satisfactory; make openings through the wall of the house into the nests. If within the building, they should be above the floor and orange boxes will be found to answer the purpose. They are preferable to expensive lumber nests as they can be destroyed when mites infest them. When trap nests are used, one nest should be provided for each two or three hens, otherwise half the number of nests will be sufficient.

Fixtures.—All fixtures, such as grit boxes, feed hoppers, water dishes, etc., should be placed above the floor. The hopper shown on this page is built between the 2x4 studding and is roomy, convenient, clean, and can be made with box material.



Feed Hopper

Roosts.—Many use 2x4 material for roosts; a piece 2x2 is better and costs half as much. A round pole is objectionable, as it soon splits and the cracks offer a lodging place for mites. Instead of using hinges to fasten the roosts to the wall, a nail will answer the purpose if run through the piece supporting the roosts into the studding. The roosts may then be swung up out of the way when cleaning. They should be about ten inches above the platform, which is easier cleaned if covered with litter from the floor.

Water Supply.—No other water system can equal a living stream or spring, and if the fowls can help themselves at will, so much the better for them and for their keepers also. Every device or conven-

ience that lessens labor, especially if it costs little or nothing, means so much more profit, and carrying water to a large number of fowls is certainly very expensive by reason of the time and labor consumed. Where water is furnished, cleanliness should be carefully observed. Galvanized iron or stoneware drinking vessels are preferable. Wooden troughs are objectionable because they furnish lodgment for disease germs. Concrete troughs cost very little if made at home and are sanitary and enduring.

INCUBATION

It is our opinion that incubators are doing a better work, are more successful, than we think. Most people expect too much from a machine. They read in incubator catalogs only about the big hatches, never about the failures. Poultry papers tell the big stories, the man who fails seldom writes for the press. In comparing incubator hatches with those made by hens, we forget the hens' failures, do not even have the average in mind, and of course are disappointed at anything less than a 90% hatch.

There is no way of knowing, but we believe that not half the eggs entrusted to the hens produce strong chicks and that not half of the chicks hatched live to marketing size. If these figures are at all near the truth, a 50% incubator hatch would be gratifying. If we were to call for testimonials, hundreds could respond with reports of 50% to 80% hatches thruout the season. The cause of poor hatches in the incubator, especially if the hens are doing good work with the same eggs, is probably mismanagement, possibly poor construction of the machine. If more attention were given the breeding stock, more and stronger chicks would result. Immature breeding stock forcing for eggs out of season, overfat old stock and lack of range or exercise are causes of much disappointment in hatching chicks. It pays to follow the instructions received with the machine until thoroughly convinced that some other way is better. Manufacturers have experimented much to make their machines do satisfactory work and can often help out when hatches are poor.

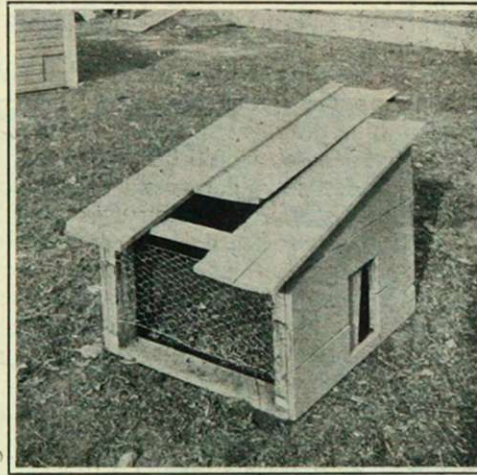
THE BEST BREED

Farmers' Bulletin No. 51, of the U. S. Department of Agriculture, gives a description and history of the various breeds of poultry. The Reliable Poultry Publishing Company, Quincy, Ill., publishes some very good booklets on various breeds.

Regardless of sentiment or personal preference, one should consider market requirements, whether egg or flesh production, or both, is intended. The family trade may and often does want a different fowl than does the commission merchant or hotel. The wholesale trade of Denver wants a large carcass, 5 pounds or over. The average family prefers a smaller fowl, especially at present prices. The preference for yellow-skinned fowls is not so marked as formerly, as milk feeding is very generally practiced and this method of fattening produces rather a white carcass. Uniformity is appreciated; pure bred stock is preferred, especially those of the American class.

The Plymouth Rock is still a great favorite in the open market, but others of the same class find as ready a welcome. Some of the Mediterraneans make good squab broilers, but as roasters they are not desirable nor profitable. Where Mediterraneans are chosen, it is for the purpose of producing eggs for market, no consideration being given to flesh production. Without question, the Mediterranean type is the most economical egg producer, even as the dairy type of cow is the most economical butter fat producer. Without discussion of the "best breed" question, it must be admitted there are "best types" for certain purposes.

The amount of land, size of units run in a flock, whether the enclosure or free range system is to be followed, and, as above mentioned, kind of products desired, all should be carefully considered before choice of breed is made.



Brood Coop

BROODING

Only a few years ago the rule was that not more than 50 chicks should be placed in a brooder. It is true that crowding is the cause of much mortality, but heat is the best preventative for crowding. We also believe heat to be the very best preventative of bowel disorders in baby chicks. Too much heat cannot be supplied if care is taken to furnish a way of escape. Chicks will go only as near the source of heat as is necessary for comfort.

The brooder should be as warm as was the incubator from which the chicks were taken. If the brooder is of the hover variety, allowing the chicks to come close to or go from the heat, it is wise to furnish a surplus of heat; if the brooder is of the box type, care must be taken to have the temperature high enough, uniform, and at the same time to furnish plenty of fresh air. Chicks will not bunch up if they are

warm enough. They will not cry if they are happy and usually cry on account of being cold.

BROODERS

The large unit brooders, heated by oil burners or by coal stoves, capable of furnishing warmth for from 500 to 1,000 or even more chicks, seem to be the coming brooder where larger numbers of chicks are raised. This station has not tried them out, but feels satisfied that they are satisfactory because of the good words spoken for them by many Colorado poultrymen. It seems that with this type of brooder especially, plenty of heat must be furnished to prevent crowding. Certainly the brooder house should be well built for use during the early part of the season.

FEEDS AND FEEDING

Variety is the price of health. If the hen has considerable range, grain is all that need be provided during the summer months. In the winter, and also if confined in summer, everything must be provided. For best results fowls should have grains, greens, meats. How much of each cannot be stated, but equal amounts of two or three grains, whole, and the same proportions in the mash, will be found not far wrong. Probably too much wheat and not enough corn is fed to our poultry in the irrigated sections. Corn is our most important poultry feed and should always appear in the ration. Oats, because of often being of poor quality, is not as desirable as corn or wheat, and may be fed in smaller quantities, or eliminated. Milo and kafir are good feeds, but not quite as valuable as corn. When they are purchased, it should be because they are lower in price than corn.

There is no excuse for not furnishing plenty of greens to poultry in winter. When they have free access to the alfalfa stacks they are pretty well supplied. However, root crops will add to the value of the feed because of their succulence; they can be raised in abundance or can be cheaply bought. Mash once a day, especially in cold weather, is not only an appetizing meal but a means of utilizing many waste products. Small potatoes and cull onions, cooked and mixed with bran and shorts, make an excellent and cheap ration.

A good method of feeding is to furnish wheat or oats in the litter for the morning feed to induce exercise; the mash at noon when loafing is least objectionable; an abundant feed of corn, kafir or milo at night.

The best feed on the farm and the one least supplied to the hens is milk. It is preferable to commercial meat feeds when it can be had without stint. It was determined by experiments at the Purdue Experiment Station that hens, furnished all the buttermilk, sour milk or sweet milk they wanted, did as well as those furnished more expensive feed in the form of beef scrap.

FEEDING BABY CHICKS

It might be very appropriate to say "feed them anything"; better yet "feed them nothing", for we find about everything being fed to the little chicks. The following ration will be found to answer all purposes and can be modified or supplemented according to circumstances:

For a scratch feed:	For a mash feed:
10 lbs. cracked corn	10 lbs. bran
5 lbs. oatmeal	10 lbs. middlings
10 lbs. cracked wheat	10 lbs. fine corn chop

A johnny cake made from the above mash mixture mixed with milk, and scraps from the table, will help to add variety to the ration. But what is considered the most important food for little chicks is milk, sour or sweet, but milk every day of the chick's life, from the egg to the table. With plenty of heat, plenty of grains and milk, and a clean body, the chick will thrive.

DISEASES

Carelessness and neglect are usually the forerunners of disease in the flock. A spoonful of epsom salts in the mash for every 3 or 4 grown fowls, every week during the late fall and early winter months, is worth more than any dope for curing. Enough permanganate of potassium to give the water a rich wine color, during the same time, will help greatly to prevent diseases that often follow colds. Fowls should not be turned out when the ground is cold and wet; until the sun has warmed things up, they should be kept confined, busy hunting in the litter. Keep the flock thinned out to the capacity of the buildings. Weaklings should be removed. Lice and mites must be kept down. Just a little lard or vaseline smeared on the baby chick's head will kill the lice there; a vigorous fowl will look after itself in the "earth" bath.

The most dangerous enemy we have is roup. It attacks all sizes of chicks and fowls, and usually starts in with its deadly work in the autumn. Chickens should be removed from the small coops before the nights get sharp; the new quarters should be clean and roomy; they should be kept in during stormy weather; if weaklings have been eliminated, there is little danger of infection. If roup appears, the infected fowls should be isolated at once; those with bad cases should be killed and buried; those slightly affected should be sprinkled with insect powder to kill the body lice, their heads should be immersed in a 5% solution of some disinfectant, such as zenoleum or creolin, and for a few days they should be fed lightly. Fowls are subject to bronchitis, pneumonia, tuberculosis, chicken-pox, and liver troubles; they have bumble foot and scaly legs, are sometimes crop bound, and have almost as many disorders as people. If we tried to cure all their ailments, we would have but little time for anything else. After trying many remedies, experience usually teaches that prevention is about the only cure worth while with a fowl. The veterinary department of the col-

lege will be glad to handle a limited number of "cases". Please write to Dr. I. E. Newsom, care Colorado Agricultural College, who will tell you how to ship sick or dead fowls.

MARKETING

Colorado markets are not particular as to color of the egg shell, neither do they discriminate against the white skin of fowls. To obtain the best prices, eggs should be clean, uniform in size and color, shipped in clean carriers. Denver markets, however, do object to the quality of Colorado eggs in late spring and early summer. No one is quite ready to give the cause nor to suggest a remedy, but the State Agricultural College intends to investigate this matter during the next season. The eggs show bad under the candle, the yolks appear brown, spotted and very dark, and the whites are very thin and watery. These eggs are not desirable for storage purposes, which means that Colorado farmers will receive less rather than more for early summer eggs than is paid to the Kansas farmers. The best way to shut out outside products is to produce better quality.

The markets prefer fowls alive. Broilers should be $1\frac{1}{4}$ to 2 pounds in weight and the more uniform in size and appearance the more desirable. Roasters and hens should be large to obtain the best price, as much as 3c or 4c more per pound being paid for those over 5 pounds than for those under 4 pounds. There is a time, a best time, to sell. One should study the markets. Does it pay better to sell a 2-pound broiler at 50c or to keep it three or four months and then sell it at 5 lbs. for 50c or 60c? Shall I sell a hen as soon as the season's work is over, from June to September, at 13c to 15c, or keep her four or five months longer in idleness and then sell her for 10c or 12c? Too little attention is paid to the matter of marketing and many of our farmers are selling at the wrong time.

Poultrymen can with profit encourage their customers to preserve eggs for winter months, thus stiffening the market when eggs are most plentiful and also relieving the demand for eggs when eggs are scarce, thereby better satisfying their trade.

The Parcel Post.—Some of our poultrymen are shipping their entire output of eggs by mail. A very successful plan is to ship to one person connected with a large business firm in Denver who stands responsible for the shipment. He distributes the eggs among his fellow workmen who pays him for their share of the eggs. This is getting the producer and the consumer pretty close together and is working out very advantageously. The family trade is also proving profitable, being supplied by mail. Shipments are made once or twice a week and often include vegetables, fruits, butter, etc.

POULTRY SECRETS

There are no secrets which one needs to buy in order to succeed in the work. All the so-called "secrets" and "processes" can be procured through experiment station and government bulletins. It is

not the breed, nor the feed, nor the house, nor the care; not any one or two of these factors that count, but a careful application of thrift and industry.

Continued selection of the best, elimination of the weaklings, eternal cleanliness, comfortable shelter, plenty of fresh air, sunshine and range, a variety of good, nourishing, succulent feeds; all thoroughly mixed with love for the work and faith in the hen, seasoned with common sense and business ability; these are the great secrets of success with poultry.

THINGS TO REMEMBER

To build in a well-drained spot; avoid dampness within.

To face the house to the south; sunshine within is a good medicine.

To make the north, east and west wind-proof; plenty of openings in the south for fresh air. Fresh air is health.

To furnish for small flocks 4 to 5 square feet floor space for a hen; for larger numbers 3 to 4 square feet. It never pays to crowd. Crowding encourages disease.

The convenience of the care-taker; roosts on a level and removable; nests and other appliances so arranged as to make cleaning easy.

To have the floor well covered with clean litter.

To make a wide doorway; much hard work can be eliminated by wheeling in clean sand or dirt for the floor, and by wheeling out old litter and the droppings.

Hatch Asiatic breeds in March.

Hatch American breeds from March 15th. to April 30th.

Hatch Mediterranean breeds from April 1st. to May 15th.

Hatch the year's crop as quickly as possible.

For two or three weeks keep the hen confined; let the chicks run.

Early hatching means broilers at a high price.

Early hatching means early laying pullets.

As the chick grows after broiler size the price declines.

Molting is a natural function. Do not overfeed a molting hen; make her hustle for her living.

Furnish variety for the fowls; every farm has it.

Lice on the chicks means no chicks.

Cold feet require fuel; feed is the fuel.

Milk—sour milk, buttermilk, sweet milk; nothing better.

Chilling, lice, mites—the chick's greatest enemies.

Market prices for good poultry products are good; keep down cost of production.

Count the loss as well as the profit. What is the non-producer costing you?

Do not forget water, lots of it, fresh.

When eggs come soft shelled, furnish lime.

If you like the flavor, eat the dirty eggs, but don't sell them.

Kill the weaklings.

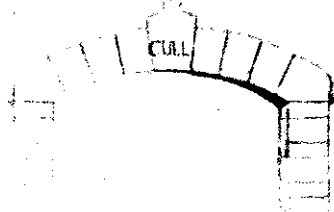
Use the "crow-heads" for fertilizer.

Keep after the lice.

Mate pens at least a week before using eggs for hatching.

On the average:

A hen will eat in one year.....	60 lbs. grain
A hen will loaf in one year.....	120 days
A hen will lay in one year.....	110 eggs
A hen will cost in one year for shelter.....	10 cents
A hen will cost in one year for labor.....	25 cents



**THE KEYSTONE OF
SUCCESS**

No LOAFERS
No DRY HENS
No COCKERELS
No WEAKLINGS
No RUNTS
No CROW HEADS
No-THING THAT IS NOT
PRODUCING SOMETHING
MARKETABLE