

Thus there is a saving of Rs. 14-1-0 in boiling alone. There is a saving in fuel also in the improved furnace which will amount to Rs. 5 and only three men are required for constructing the furnace and hence an extra saving of Rs. 2-5-0. Thus the saving on the whole is Rs. 21-9-0 by using the Sindwahi furnace.

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POULTRY AS A SIDE LINE

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In nearly every civilized country the egg has been recognized as a wholesome food. The demand for the article is so great that nearly every country is paying a great deal of attention to poultrying. Apart from mere production, marketing has become highly efficient. In Europe, especially in Denmark eggs are collected, each egg marked as to the number of Co-operative Society concerned, etc. and packed efficiently so that it may reach the market some hundreds of miles away with as little breakage as possible. From the East, China is able to produce large quantities of eggs for the market in England and make a decent profit, despite the distance the eggs have to travel. Assam is also making strenuous efforts in the marketing of eggs.

It is a well-known fact that various breeds of fowls have originated from the red jungle fowl (*Gallus Bankiva*) which ranges from the north of India to south-east Asia as far as the Phillipines. Though breeds apparently find their origin in India yet the Indian ryot cannot boast of maintaining a respectable breed. Generally the breed found in the villages are hardly pure and as for system of keeping, there is none. The economic conditions in India are simply pitiable and it is time that the ryot thought of giving more attention to poultry management, and earn a few more annas, which are no doubt most welcome in these hard times. The more advanced type of ryot, or the educated classes which are apparently interested in agriculture can easily organize poultry farming, and in course of time not only supply the markets in India but also the one in London.

Poultrying in Europe, is a woman's job on most farms. The farmer's wife generally manages the poultry and for her trouble keeps the earnings to herself. There is no doubt that similar system exists in this country wherever fowls are kept, and I hope earnestly that the women in this country would be as much interested in this side of Industry as her sisters in Europe. I am hereunder making some notes for the benefit of those, who wish to interest themselves in poultry, but it must be remembered these observations are in no way complete. For instance, feeding of poultry is still empirical and it is likely that we shall know more about the nutrition of poultry when Belfast, Harper Adams College and Cambridge poultry sections have completed their investigations. In the near future the Live-stock section will, I hope, be in a position to carry out feeding tests with local grains etc., and give the public useful advice.

CHOICE OF BREED.

Choice of breeds greatly depends on the purposes of the breeder. For egg production, one may choose either the Leghorns or the Ancona, for

general purposes perhaps Faverolle or Wyndotte, for table Indian Game, and for fancy either the English Game or the Cochin. Various breeds may be classified according to their special qualities. The general shape and carriage of different breeds give us a fair indication as to their utility. Look at a fowl from the side and imagine a line drawn from the front of the neck to the thigh. If the great bulk lies behind this line, laying qualities are indicated and the fowl is classed as a layer, but if the bulk is in front of the line, it is classed as a table bird. When it is difficult to say on which side the greater part lies, it is apparent that both the qualities are equally balanced and the fowl is classified, as general purpose or utility variety. For general information, a number of breeds are classified according to their qualities as follows :—

LAYING OR NON-SITTING VARIETIES

Ancona	Hamburg	Minorca
Andalissian	Houdan	Redcap.
Campine	Leghorn	

GENERAL PURPOSE OR UTILITY

Cochins.	Faverolle.	Langshan.
Brahma.	La Brasse.	Plymouth Rock.
Sussex.	Wynadotte.	Orpingtons.
		Rhode Island Red.

TABLE VARIETIES

Concou de Malines.	Game.
Dorking.	Indian Game.

FANCY

Aseel.	Bantam.
Cochin.	Silky Yokohama.

*Classification according to colour of Flesh and Skin.**White Flesh & Skin*

Black Sumatra.
Faverolles.
Minorca (White).
Orpington (Buff,
white and
spangled).

Yellow or Cream Flesh & Skin

Ancona.
Brahma.
Cochin.
Game (some varieties).
Leghorn.
Java.
Wyandotte.

Grey or White Flesh Skin

Andalusian.	Austral Orpington.
Langshan.	Minorca (black).

Ducks.

Caydega—Table—White flesh and skin.
Roven—Table—Yellow flesh and skin.
Aylesbury—Table—White flesh and skin.
Khaki complete—Layer—Iron white flesh and skin.
Indian Runner—Layer—Yellow flesh and skin.

Geese.

Roman—Layer—Creamy white flesh and skin.

Toulouse—Table—Yellow or orange flesh and skin.

Chinese—Table.

Turkeys—all for table.

Black—White flesh and skin.

White—Reddish white flesh and skin.

Cambridge Bronze—White flesh and skin.

Classification according to soils.

It is generally thought that :

Fowls with white flesh do best in light soils.

Fowls with grey and medium flesh do best in medium soils.

Fowls with yellow flesh and legs do best on heavy soils.

Speaking generally, the birds must be symmetrical and true to their breed with regard to colour, size and shape. They must not only be healthy but also show signs of vigour. Very often, the above breeds are crossed when catering for a particular purpose, such as utility. I have not given any descriptions of the breeds, for they can be had from any book on poultry.

HOUSING

Fixed house with runs and portable houses on wheels (see Sketch 1) are only meant for those, who wish to start poultrying on a large scale. For the Indian ryot, however, the usual method of putting the fowls under baskets for the night is the most economical, from the point of view of initial outlay and cleanliness. For those who wish to start on a large scale, it must be remembered that success can only depend on hard work. These houses should be cleaned every day, fresh litter put in, disinfectants or lime wash applied. The runs must also be limed often, changed as far as possible. There must be sufficient shelter from the heat and rain, and water-supply in the form of fountain is indispensable.

Trap nests. (See Sketch 2). *Details of trap nest.*

An ordinary dealwood box 2' × 1' × 1' will suffice for the nests.

The entrance is made of three pieces joined together; the top piece is loosely tied with two strings and the others with leather pieces.

In sketch 'A' is the natural position of three pieces folded and kept at the top—piece 2 is folded to 1 and 3 to 2.

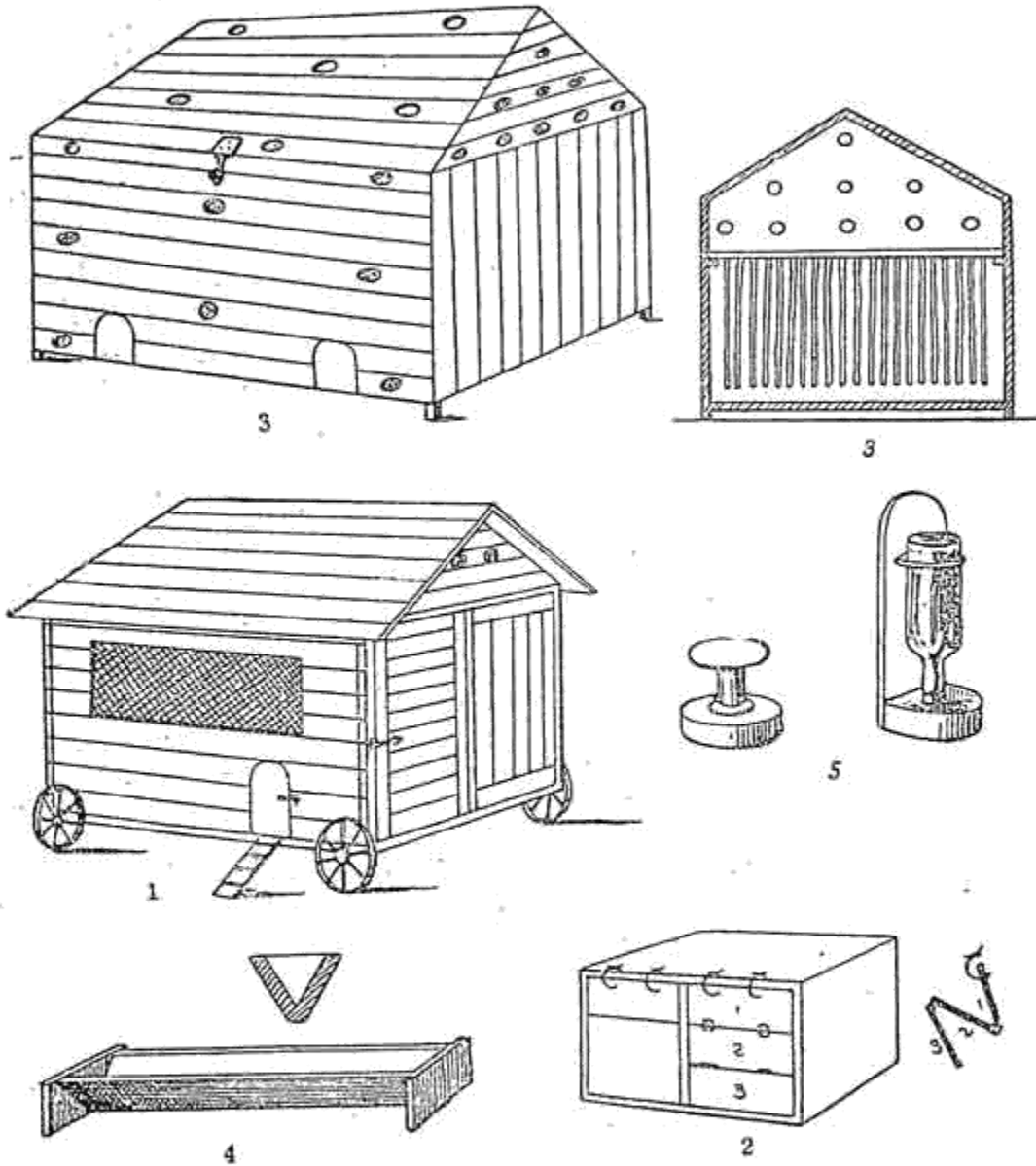
'B' is the position when the joined pieces fall down after the entrance of the hen.

The height may be adjusted by tying the top piece loose or tight.

In order to be really successful at poultrying, trap nesting and keeping of egg-laying records are absolutely important. Trap nests can be easily made from square boxes 18" × 18" × 18". The door, which is in three parts, is held from the top of the entrance by strings, which can be adjusted as required. The three parts are attached to each other by leather strap and folded inwards.

The nest in the box should be clean and comfortable and sometimes a dummy egg may be placed in each box. In order to find out which of the

POULTRY AS A SIDE LINE



1. Portable Poultry House.
2. Trapnest and side view.
3. Foster mother (with flannel strips) and cross section.
4. Feeding Trough.
5. Fountains.

hens are laying, they are ringed either on the legs or wings, with numbered rings. The box is kept as in diagram A and as soon as the hen enters, the door gradually works inwards, due to slight push and gravitation. The thickness of the door should not be more than $\frac{3}{4}$ "

INCUBATION

(a) *Natural method.*

Select a broody hen of the proper type—good size and docile. Experience shows that hens with short legs are efficient for the purpose. The nest should be about 15 inches across, made in the earth as a mould, and nicely covered with hay. The number of eggs to be placed would naturally vary with the size of the hen. Usually seven to fifteen, may be placed in the nest depending on the size of the hen. The brooder should be fed with maize and wheat or paddy and cholam, or paddy and ragi (add lub.), grit, and water by placing the food at the door of the nest. Each day, it would be best to remove the hen gently by placing the thumb on the wings and fingers under the thigh and lifting her off without disturbing the eggs. After five minutes, the hen should be allowed to the nest. In cold climates, while the hen is away, the nest should be shut to keep in the warmth. The hen should be disinfected so as to keep away lice etc.

(b) *Artificial method.*

By artificial method, hatching is done by placing a number of eggs in an apparatus, the temperature of which can be regulated. This machine must be in a room where the temperature does not change frequently. A great advantage in this method is, that a large number of eggs, depending on the size of the incubator, may be hatched. The temperature should be 103° F. before the eggs are placed in the drawers, and the egg should be turned twice daily, aired for five minutes the first week, 10 minutes the second week and 15 minutes during the last week. In order to avoid overheating, the eggs should be sprinkled with water each day and make sure that the receptacle for water within the incubator is not empty. In some parts of the country it will be necessary to keep buckets of water in the incubator room so that the atmosphere does not become too dry. It would be best to keep one of the buckets under the incubator. In the plains eggs may be hatched artificially generally between June and February.

TESTING EGGS

The egg should be neither too small nor abnormally large. Stale eggs and delicate eggs that are from highly inbred stock can generally be hatched by the natural method. The egg should be of good size, clean without nodules on the shell. The shell should not be too thin under natural method, because the hen is likely to break the egg. The egg may be placed before a paraffin lamp in a dark room and the air space clearness, network of veins, bloody patches, and abortion noted. Air space depends on fertility and the age of the egg. By 18 days the air space increases to about $\frac{1}{4}$ " depth of the egg. The spiderlike line indicates fertility while the other types are not fertile. In Europe, when testing on a large scale, electric lights are used, and many hundreds of eggs are tested in an hour. Under artificial method, it would be best to test eggs every other day and remove the infertile ones.

CHICKEN REARING

Chicken rearing is the most difficult part of poultrying and yet, if proper care is taken, there should be no loss. Chicks generally die of cold, chicken-pox or bad feeding. It is, therefore, imperative that personal attention is paid more than ever while rearing chicks. They ought to be kept warm and clean, and given sufficient food and exercise. When artificial incubation is adopted, a foster mother is essential, and care must be taken with regard to the temperature when using a lamp for heating, but in the plains heater is not necessary and partition with flannels may be substituted. (See Sketch III).

By natural method, attention must be given to housing and feeding. Dust bath, charcoal and grit are indispensable in poultry management. Green foods such as dandelion, alfalfa (lucerne), cabbage, onions, green oats, lettuce and greens of various sorts available in India may be given in every stage in poultry feeding, for they supply the required salts and vitamins.

FEEDING TABLE

First Week.

After hatching no food may be given from 36 to 48 hours and very little for the first week, because the yolk is not completely absorbed in the abdomen and causes digestive troubles. For the first week, a little skimmed milk to drink and dry feed (dry oatmeal, equal parts of kibbled wheat and maize or broken rice) may be given every three hours in addition to good supply of water and grit.

At Hosur the following ration is adopted with success. Yolk of hard boiled egg chopped very finely along with the shell and toasted bread crumbs given about ten spoonful for every six chicks once in two hours. One loaf of bread would last six days for 12 birds. When there is no skimmed milk pure water may be given. Charcoal powder and shell grit may also be placed in the scratching pen, and the floor covered with chopped straw.

Second and Third Weeks.

(Scalded biscuits-meal mixed with Sussex ground oats for the first meal and midday) and dry food (same as first week) be second and last meal. The following rations may also be given :—

- | | | |
|--|---|---|
| i. 4 parts middlings or ragi flour
2 " maize
1 " pea or gramseed | } or } | $\frac{1}{2}$ part fish meal
$\frac{1}{2}$ " crushed oyster shell. |
| ii. 3 parts canary seed
2 " millet seeds
1 " emp seeds
2 " groats
1 " crushed peas | iii. Broken rice and wheat alternately with egg and oatmeal as above. | |
| iv. 4 parts finely broken rice.
1 Do. cholam
1 Do. ragi flour
1 Do. shell grit. | | |

Note.—Pure food and water in all cases. Wherever skimmed milk is available it can be used in lieu of water.

4th to 10th Week.

Some crushed oyster shell separately.

Sussex ground oats with a little skimmed milk may be given (twice) and grain (twice).

or

Mash : 3 parts rice bran
 2 " wheat bran
 1 part ragi flour
 1 " fish meal
 $\frac{1}{2}$ " lime and bonemeal
 $\frac{1}{4}$ " chipped alfalfa hay or lucerne.

Grains : 1 part cholam }
 2 parts paddy } or { 1 part cumbu
 3 " broken rice } { 1 " ragi
 { 2 parts paddy
 { 2 " broken rice.

Mash may be divided into two portions and given twice a day. On cold days it is better to give the mash a little warm.

After 10 weeks.

Cockerels should be separated from the pullets on about the 12th week. When there is room for foraging two feeds may be given. Usually where cockerels are not required for breeding they are fattened off. As no water is given and they are kept in small runs they ought to be given moist food :

1 to 2 oz. grains }
 1 to 2 oz. paste } according to the size of bird.

The following is quite a good morning food for layers :—

4 parts scalded bran.
 2 " well worked maize-meal.
 2 " pea meal.
 1 part sharps.
 1 " cooked lean meat.
 2 parts chopped and scalded alfalfa or lucerne.

Grains as above ; shell grit and water with a little potassium iodide as disinfectant ; 2 to 3 oz. grain every morning and 2 to 3 oz. green feed midday, and 2 to 3 oz. mash in the afternoon.

For fattening, first quality Sussex ground oats mixed with skimmed milk is given twice a day. Fattening period lasts for a fortnight.

BREEDING

Healthy and hardy birds should be chosen. Strong chickens are produced from hens in their second year. Generally cockerels are mated to hens in their second year for a high percentage of fertile eggs. When very early chickens are required, pullets are mated to a vigorous two-year old cock. In the early part, six hens may be allowed to one male but the number may be increased to 10.

DISEASES

If any bird shows signs of illness, it must at once be removed from the healthy stock. The following are the commonest, their symptoms and control:

DISEASE	SYMPTOMS	CONTROL
Catarrh ...	Sneezing and thin watery discharge from the nostrils ...	Dry quarter food, soft and nourishing with a little ginger powder. Copper sulphate in drinking water poured in an earthen vessel.
Roup ...	Discharge thicker with offensive odour, loss of appetite ...	Same as above and mouth may be washed with permanganate of potash.
Crop bound ...	Caused by careless feeding ...	Pour a little water down the throat and gently work the crop with hands.
Gapes ...	Parasite worm in wind pipe. Repeated gaping, shaking wings, running backwards and droops the wings ...	Remove chicks to fresh ground and good dressing of lime. With a small feather dipped in turpentine or eucalyptus oil pass down the wind pipe. Dead chicks should be burnt.
Scaly leg ...	Rough scales on shanks ...	Wash legs with warm water and soap and dress with paraffin. Disinfect the perches. Avoid fattening.
Eggs bound ...	Prolonged visit to the nest without laying eggs ...	Avoid fattening food, hold the hen with vent over vessel containing boiling water and pour a little oil into the vent. The bird should then be left in a quiet place for a few hours. Give little Epsom salt in drinking water.
Red mites ...	Egg yield diminishes and birds are not quite thrifty ...	Disinfect all birds, limewash houses, and clean perches with paraffin every day.
Liver disease ...	Emaciated comb, shrivels, excreta is light yellow ...	Change quarters, disinfect; bad cases should be killed and burnt, give doses of Epsom salt and feed sparingly. Administer liver falls.
Avian Tuberculosis ...	Do.	Same as above: consult Veterinary department.
Fowl cholera (enteritis) ...	Exceedingly thirsty, excreta green at first, then thin white and adhere to feathers. Die suddenly...	Isolation of infected birds, change quarters, disinfect. Burn excreta and cover the run with lime.
Chicken-pox ...	Discharge from nose and eyes, dulness, off-feed, black protuberances on the nose, eyebrows, angles of wings, joints of legs, etc. ...	Segregation, wipe eyes and nostrils with boric lotion, paint with tincture of iodine and give low nutritious diet.
Pseudo Pest ...	White diarrhoea, paralysed condition of limbs and wings, open mouth and difficulty in swallowing ...	Dead birds should be burnt; vaccine injection. Consult Veterinary department.

MARKETING

This side of the industry is neglected by many and the cause of failure is due to bad marketing. The egg should be graded so as to have the best ones weighing about 2 oz. As soon as they are collected they must be cleaned with a wet rag, and smeared with good butter or soaked in silicate of soda (water glass) for about a day, when all the pores get closed. The eggs are placed on their broad end downward and stored in a cool room. Where there is a Co-operative society, these may be collected and marked by the Society before packing off to a market like Madras or Bangalore. If the Industry is increased, they may even be sent to foreign countries.

Birds that are meant for table should be killed by dislocating the neck and feathers plucked when still warm. At present there are machines for carrying out this operation. Soon after plucking, they are placed on a board with breast downwards, a weight placed on their backs and left till cold. The latter process greatly improves the appearance as they look plumper. When there is market which appreciates, the birds may be dressed and trussed. By this, birds are carefully signed and cleaned without in any way blemishing the skin; expose the neck by making incisions, removal of the vent and internal organs, and stitching up of the birds with string, giving them a compact appearance. They are now ready for wrapping and shipping.

POULTRY PRODUCTS AS FOODS

It has already been stated at the outset that the egg has been recognised as a wholesome food. The feeding values of the poultry and products are hereunder given so as to compare with milk and rice, the most well-known human foods. The values have been taken from Hock.

—		Water	Protein (N × 6.25)	Fat	Ash	—	Calories Per lb.
Chicks.	{ Broiler ...	74.8	21.5	2.5	1.1	...	492
	{ Fowl ...	63.7	19.3	16.3	1.0	...	1,016
Eggs.	{ White ...	86.2	12.3	0.2	0.6	...	231
	{ Yolk ...	49.5	15.7	33.3	1.1	...	1,643
	{ Entire edible portion.	73.7	13.4	10.5	1.0	...	672
Milk	...	87.0	3.3	4.0	0.7	5.0	314
Rice (Boiled)	...	72.5	2.8	0.1	0.2	24.4	498

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