

# Raising Healthy Poultry

Sustainable Agriculture



Training Pac

## INSTRUCTIONS

This Training PAC has a text and a separate Workbook that contains the exercises for the text. Follow these steps.

1. Read through the entire text to obtain an overview of the text content.
2. Become familiar with the Objectives at the beginning of each section.
3. Then reread the text while completing the exercises in the Workbook.

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## Objectives

When you have successfully completed the Training Pac you should be able:

To select and construct the best chicken house for your needs.

To select the best type of chicken for your family needs.

To know how to naturally incubate, hatch and raise your own chickens.

# SECTION I

## INTRODUCTION

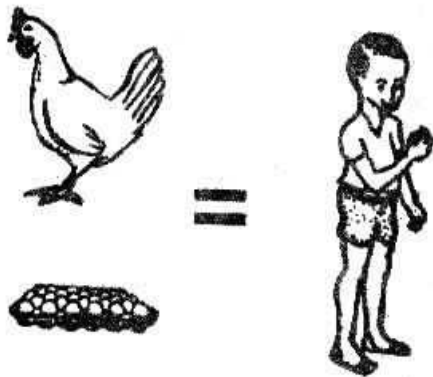
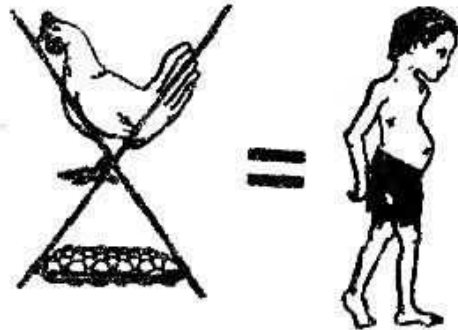


## INTRODUCTION

More people raise poultry than any other food-producing animal.

The best advice: "Start small the first year and let financial success govern your growth. Keep careful records!" Many failures have come from trying to start with large flocks without knowing the best sources and costs of high-producing chicks, feed, methods of disease prevention, or marketing. Large-scale poultry production will require study of more detailed textbooks. This manual is to help improve traditional small farms and backyard poultry production with dual-purpose chickens.

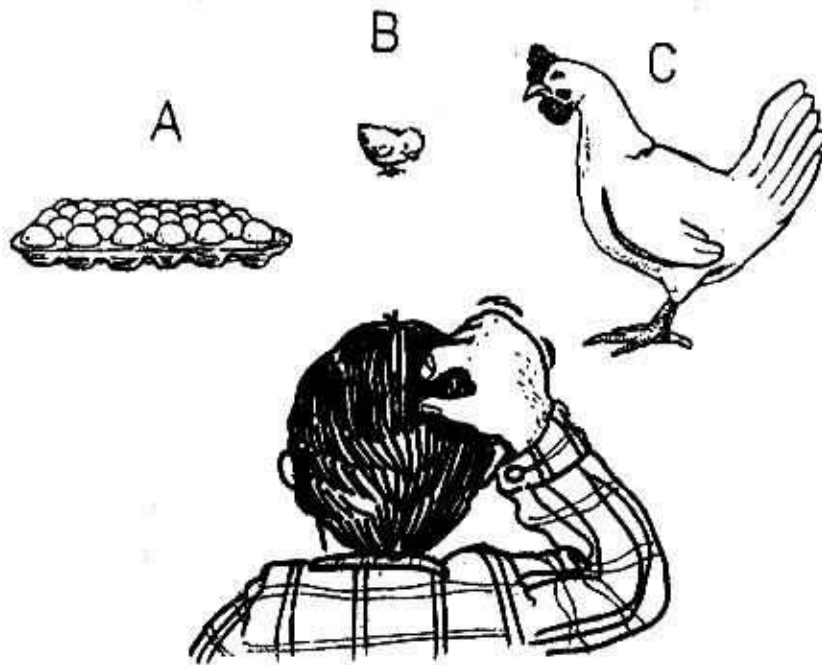
Eggs provide protein for our children's growing bodies and they contain vitamins for keeping our bodies healthy. Children between one and three years of age need protein more than adults. Children that do not have enough protein can suffer from physical and mental retardation. They can become weak and are easily affected by diseases.



Eggs can improve the quality of their lives and their children's lives.

## SECTION II

### GETTING STARTED



Which one shall I order?

## Words To Know – Section II

*Broody:* A hen showing she wants to care for eggs and young chicks.

*Contamination:* When something has been touched by something else making it no longer clean or pure.

*Incubation:* The period of time it takes for chickens to hatch.

*Pullet:* Female chicken younger than 1 year.

## GETTING STARTED

Chicken are purchased and moved to new locations at four different stages in their lives:

- 1) As day-old chicks. This is the most common method of starting your flock.

Advantages:

- Day-old chicks are nourished by stored yolk for 2 or 3 days.
- They do not require food or water during shipment to new quarters.

Disadvantages:

- During shipment, there is danger of smothering if over heated or getting chilled in freezing temperature.
- Newly hatched baby chicks need more heat than humans, groups of 25 generate enough heat to be comfortable in a cardboard shipping box. Provide holes for air flow and moderate room temperature. Provide water and food if shipment will be delayed more than 3 days.

- 2) Hatching eggs from good breeding stock is another good method of getting started. Eggs may be easily broken if not packaged right. Temperature changes are less critical than with baby chicks. You must be prepared to incubate the eggs as soon as they are received. Hatching eggs cannot be stored for much longer than a week. Try to store them at 13° C or 55° F.

Natural Incubation requires a broody hen, turkey, duck or other bird. With one broody hen and 12 fertile eggs it is possible to have 50 adult chickens in two years.

Artificial Incubation Hatching still larger numbers of chicks requires use of artificial incubation. Success with this method is dependent upon skill and care of hatchery operator. If eggs from disease-free stock are obtained, care must be taken to prevent contamination by eggs or chicks from other sources. The eggs that hatch will depend upon whether they are fertile, nutrition of the mother hen, condition of the egg shell, parent stock, egg storage time and temperature before incubation. Soiled eggs can explode in the incubator and cause serious contamination.

- 3) Started Chicks three weeks or more of age saves the beginner from having to supply equipment and the extra time it takes for brooding. These include the use of a man-made heat source, getting the chickens to eat and drink, and early vaccinations.
- 4) Started Pullets ready to lay at about 20 weeks of age.

Advantages:

- Males and poor quality females that are not good stock are eliminated before you purchase them.
- Vaccination and other disease prevention procedures may have been done.

Disadvantage:

- These birds are usually more expensive.

You may choose your chickens from three types of birds.

Dual purpose chickens produces both eggs and meat. Most young males are Slaughtered after 2 or 3 months for meat while females are kept for a year or more to produce eggs. Females are then used for meat when they stop producing so many eggs. Dual-purpose birds are good for backyard flocks. Be sure the breed you select will go broody, especially if you plan to do natural incubation.

Egg layer chickens are chosen for good egg production. Surplus males are often eliminated on hatch day since they fail to gain weight and not used as a meat bird. Females are then used for meat after their egg production drops below 50%, because of their small size they will not produce much meat.

Meat chickens, often known as broilers or fryers, are chosen for rapid growth. Both male and female birds are chosen from parent stock which produce rapid meat production. Some of these special chickens produce a bird weighing 2 kilos (4.4 lbs.) in 7 weeks after being fed less than 4 kilos (8.8 lbs.) of a well-balanced diet.

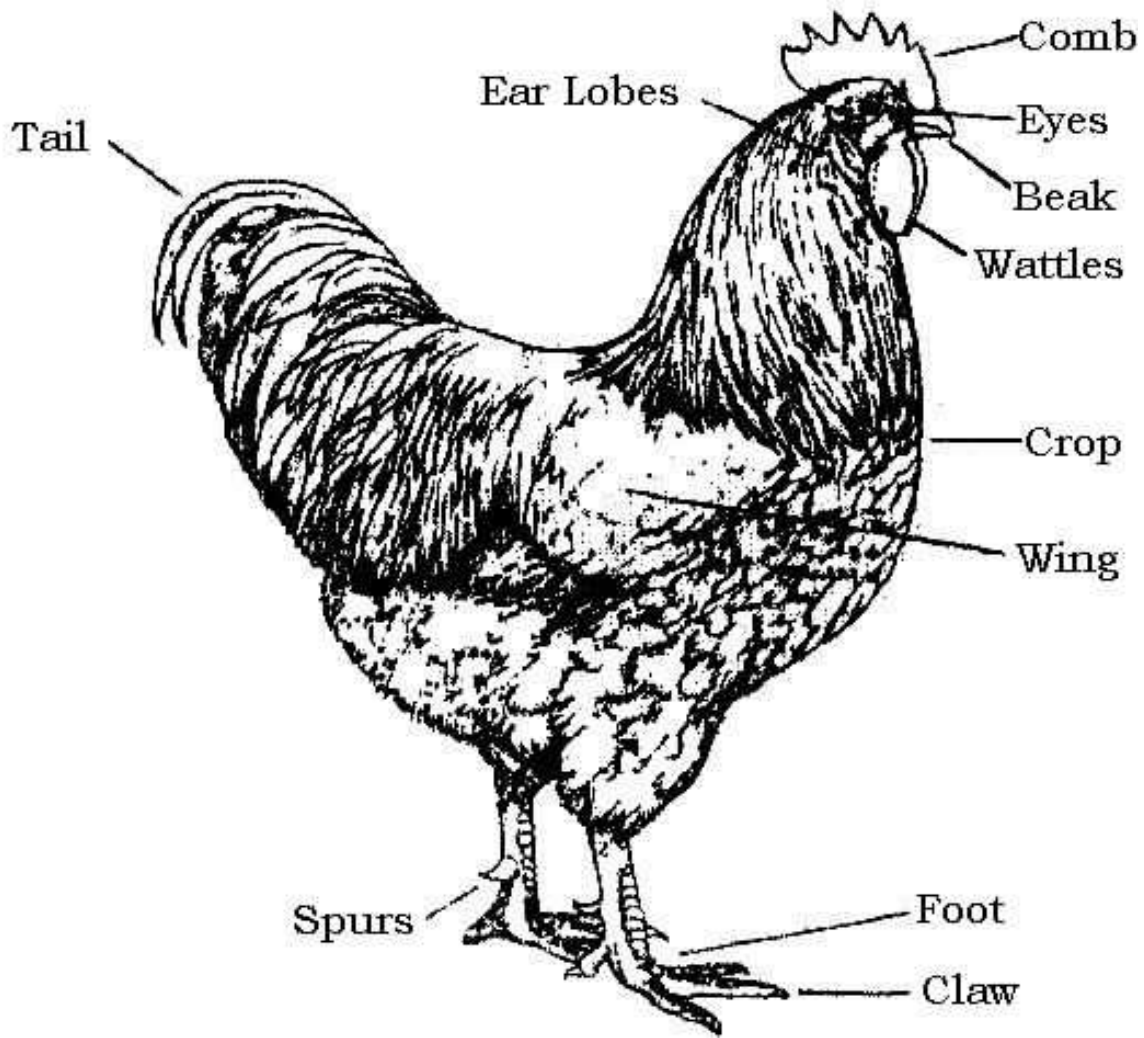
There are several differences in male and female chickens. These are:

Size: The male will grow taller and usually weighs between 0.5 and 1 kg (1-2 pounds) more than females of the same age upon reaching maturity. This greater size is not seen until the chicken is four weeks of age or more.

Comb and Spurs the comb of the male will become much larger than the comb of a female. On the female, the spurs hardly develop at all when compared to the spurs near the foot of the male.

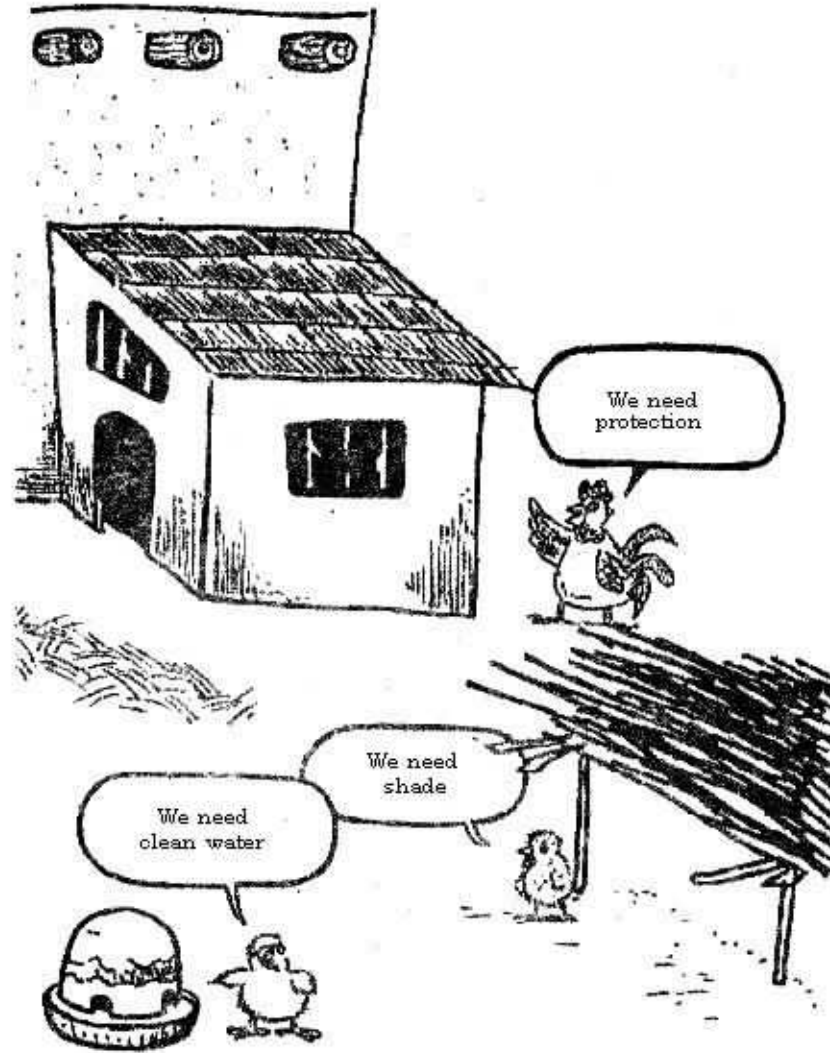
Vocal Expressions A rooster crows at different times during the day and a hen does not crow. The hen does cackle and make some noise, which usually indicates contentment. Clucking is a sound made by a hen calling her chicks.

Feathers Adult males have different feathers from those of adult females. The tail feathers are long and stringy on the male.



# SECTION III

## HOUSING AND EQUIPMENT



### Words To know – Section III

*Disinfectant: A chemical, as chlorine, that kills germs that cause disease.*

*Disease: Anything that causes the body to be sick or ill.*

*Parasite: An animal that lives in or on a different kind of animal and gets its food from the animal, often injuring the animal.*

*Predator: An animal or person that will take or harm the chickens or eggs.*

## HOUSING AND EQUIPMENT

Housing is important to protect chickens from predators, thieves, rain, wind, and very hot or very cold weather. Attacks from dogs, cats, rats, owls, hawks and other predators may destroy even adult chickens. If properly constructed and managed, the chicken house will protect against the adverse weather, parasites and diseases. Good chicken houses may be built from wood, stone, concrete, adobe, brick, bamboo, and sheet metals. Remember the following before building a house.

Location. The house needs to :

- 1) Protect against wind but permit some air movement.
- 2) Prevent too much heat from the sun and
- 3) Allow enough drainage to prevent wet floors.
- 4) Provide enough shade and roof overhang, especially in hot climates. If built in deep valleys there may not be enough air flow.

Temperature Control. Very hot or cold weather may create poor conditions in poultry houses. When the drinking water is too warm, the birds fail to drink. Frozen waterers create special problems in cold weather.

Ventilation. Air movement within the house is important to prevent smothering. Chickens need more fresh air per unit of body weight than any other farm animal. Wide open sides or windows are important in hot climates. Air movement should not be blocked by bushes or other buildings.

Moisture Control. Chickens need a lot of water. Layers may need more than a liter each day in hot climates. Slatted or wired floors may be used to provide good drainage. Drinking excessive amounts of water may be a cause of wet droppings.

Space. A crowded chicken is an unhappy, unproductive chicken that may peck other chickens so severely that they die. Putting too many birds in a small space is a waste of money.

In your chicken coop, plan for at least this much space: (changed chart)

<u>Age (Weeks)</u>	<u>Number of Chickens</u>	<u>Space Needed</u>
Up to 6 weeks	15	1 sq. m/9 sq. ft.
Up to 16 weeks	5	1 sq. m/9 sq. ft.
17 weeks and up	3-4	1 sq. m/9 sq. ft.

Larger chickens, higher temperatures, very humid weather, or wet litter require more floor space.

Roof. The roof should be entirely rainproof. Allow for adequate shade and light.

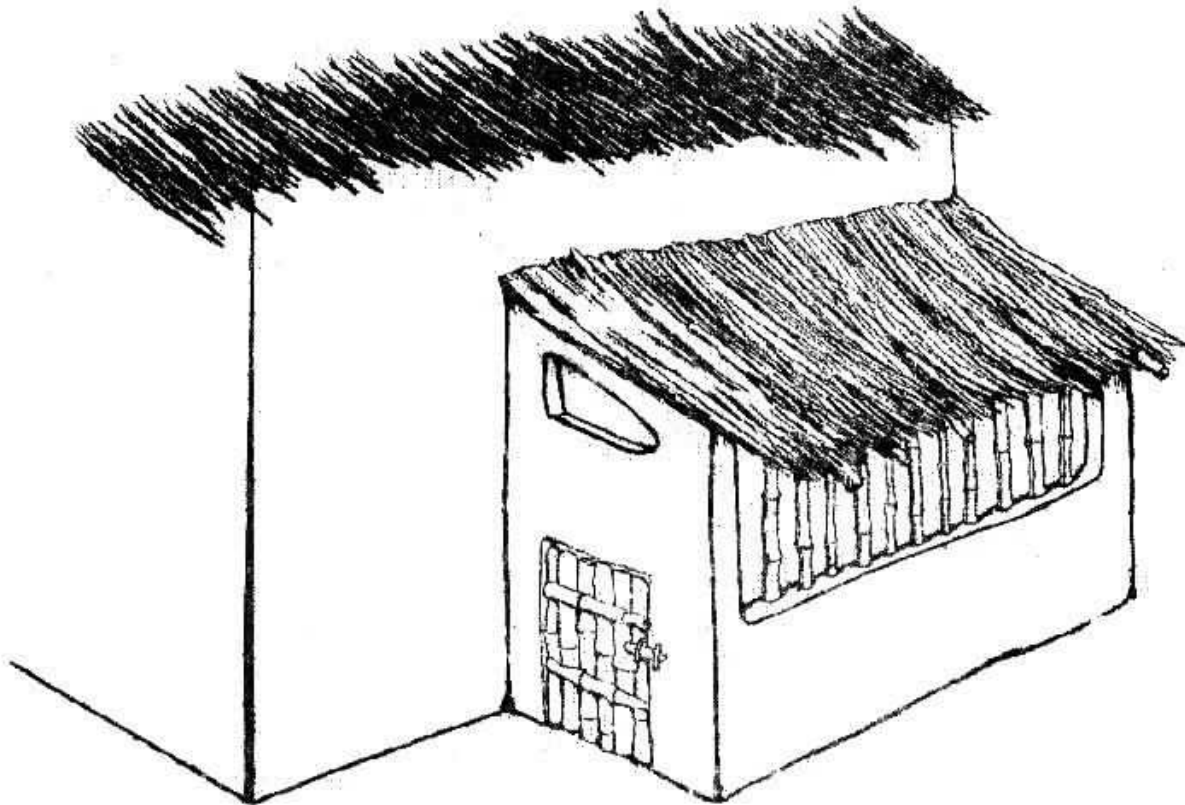
Floor. Most chicken house floors are dirt or heavy clay but concrete floors with wire mesh in them are ideal to keep rats out. Adequate drainage should be planned. Easy to clean out systems for manure need to be considered.

Animal and Bird protection. At night, protection against thieves, dogs, cats, rats, weasels, owls and day-time protection against wild animals, hawks and eagles should be planned. Wire mesh is often used.

Here are some possible designs for a chicken house.

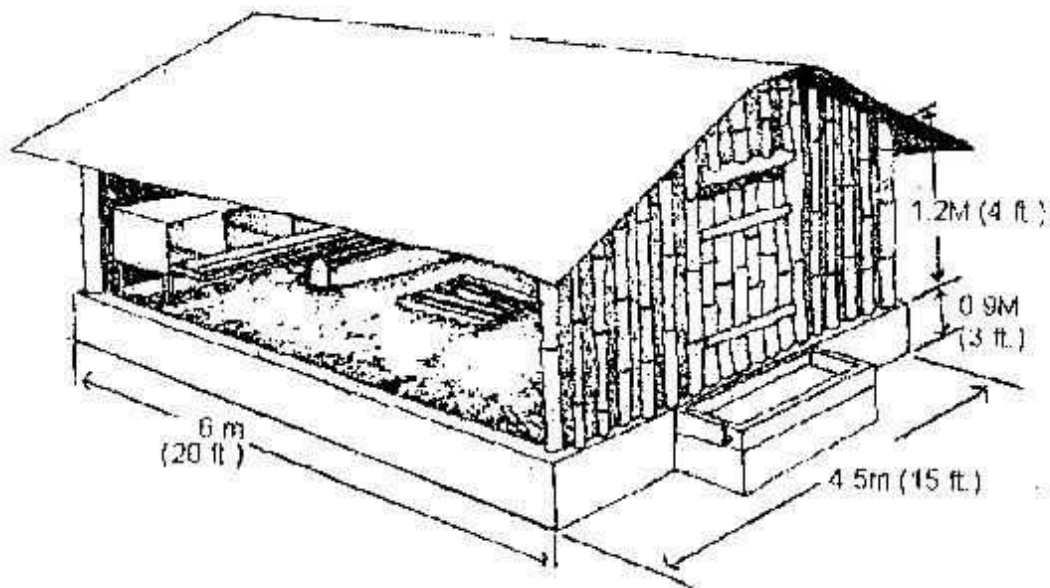
### Night Shelter

Night shelter for 20 adult chickens attached to family house or other building. Allow about 939 sq. cm (1 sq. ft.) per bird. Use deep litter or keep floor clean. In areas with heavy rains, allow generous roof over hang.



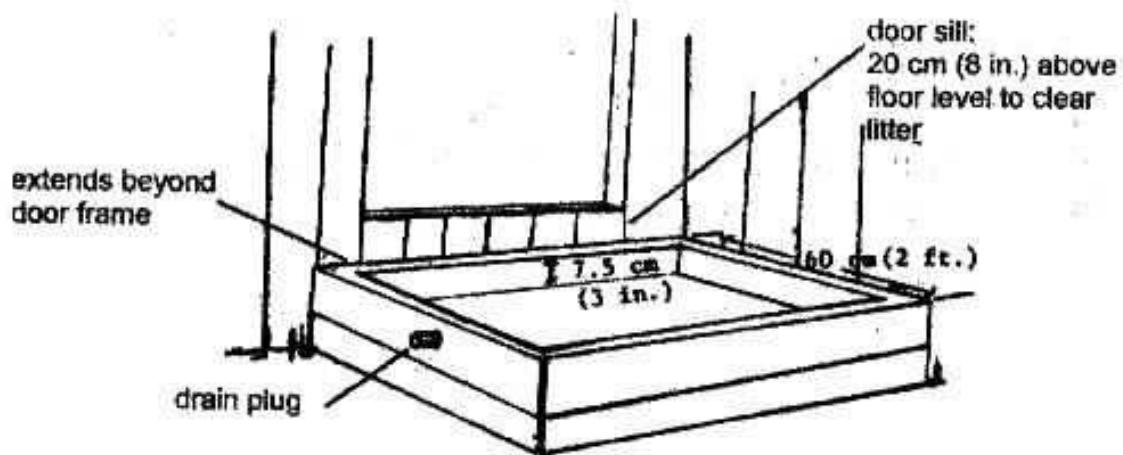
## Deep Litter House

Cut-away view of deep-litter house for warm climates. Enclose in wire mesh or wooden or bamboo slats. This house can hold 200 broilers or 100 layers.

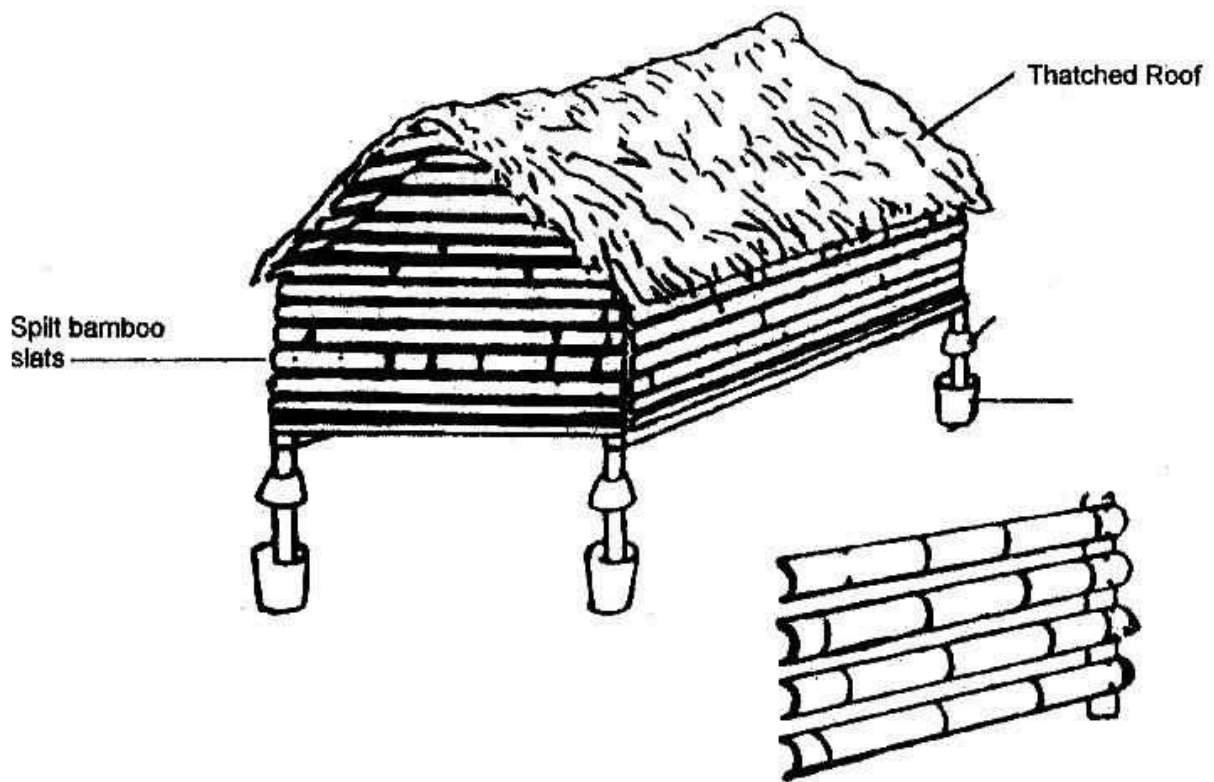


## Cement-lined Disinfectant Dip

The disinfectant box outside the pen helps protect against disease. Each shoe must be dipped in the disinfectant before entering the pen. A simple disinfectant can be made by mixing water and lime. Bare feet could be burned by the disinfectant dip.

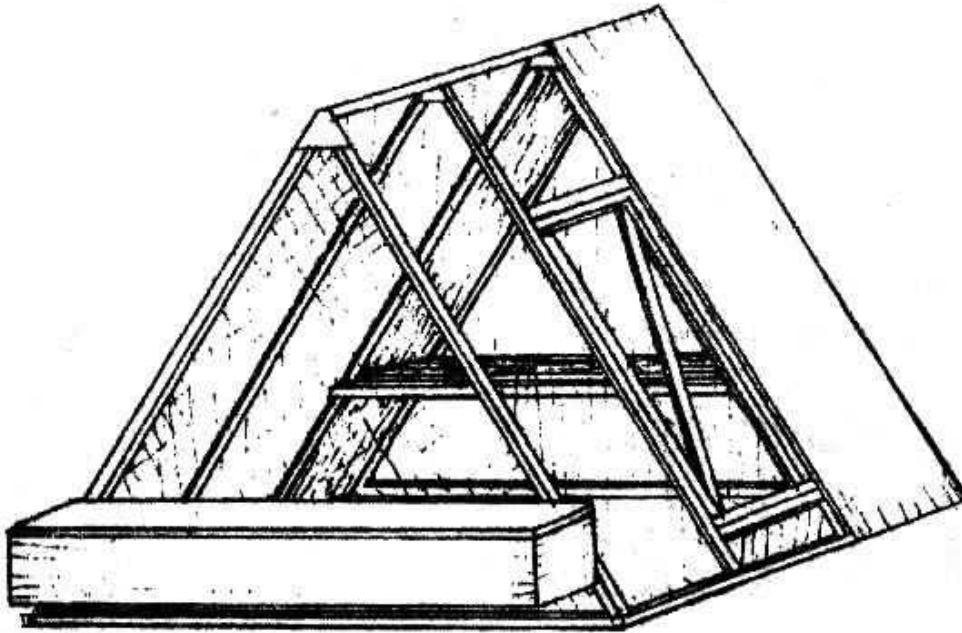


## BAMBOO CAGE HOUSE



Bamboo caged house with a thatched roof. Note the barriers on the legs keep out rodents and snakes.

## MOVABLE CHICKEN TILLER

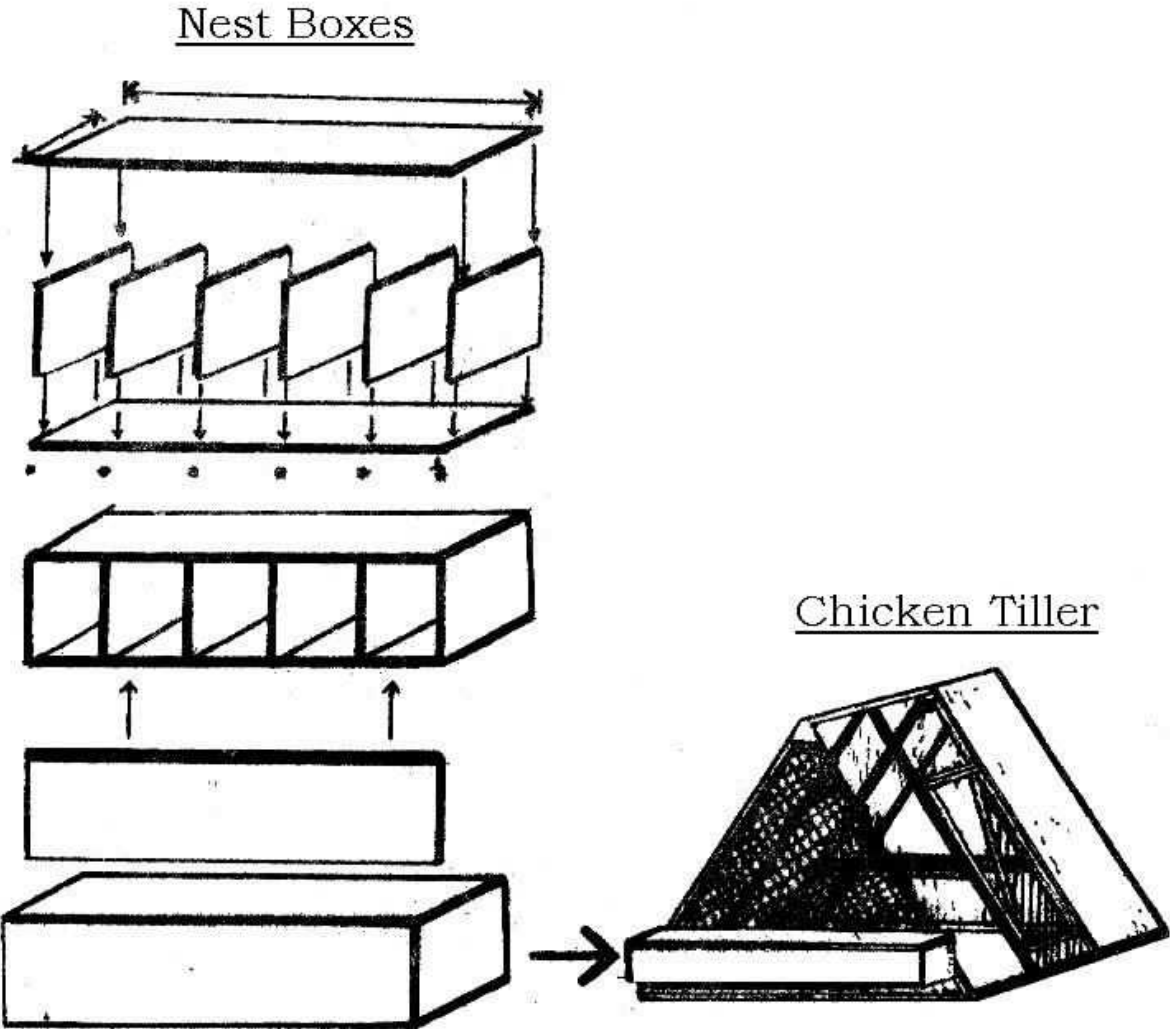


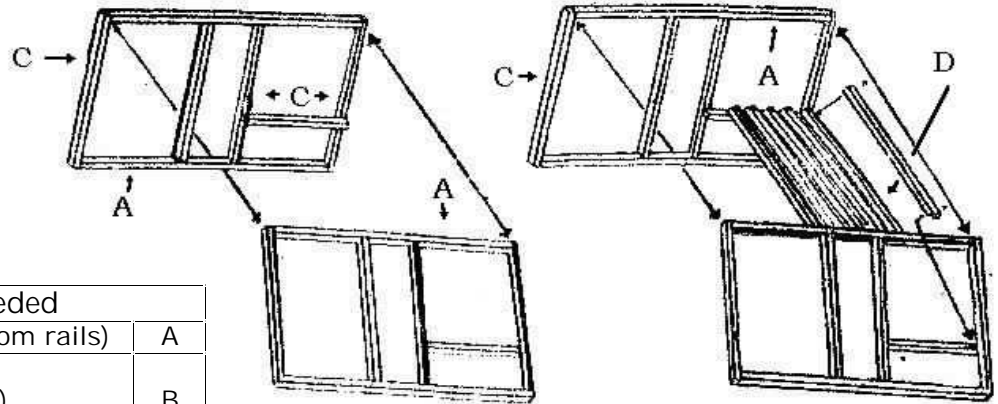
With the movable chicken tiller, you can move the chickens from one place to another so that they can eat fresh green grass and fertilize the soil. As the birds scratch the soil with their feet, they naturally mix their fertilizer into the soil. The chickens are given food and water for a few weeks before the tiller is moved and another area is naturally fertilized.

This fertilized soil is a good place to grow vegetables. Chicken manure gives nitrogen to the soil. Too much nitrogen will keep seeds and plants from growing properly, so do not leave the chicken tiller for a long time in one place. You can always add more manure as the plants grow.

Place 10 chickens in the "tiller". Provide food, table scraps and water. After 6-8 weeks move "tiller" to a new area and plant vegetables in the first area. Every 6-8 weeks, move the "tiller" again.

Build the nesting boxes with the plywood and attach to the tiller on the outside with the open side facing inward.

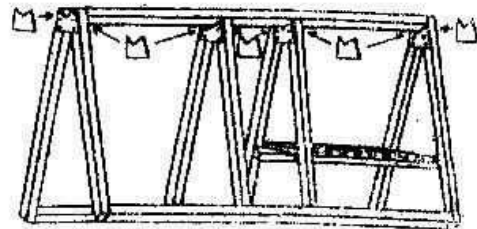




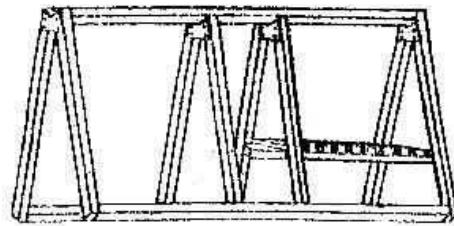
1. Build and connect side frames

2. Build roost

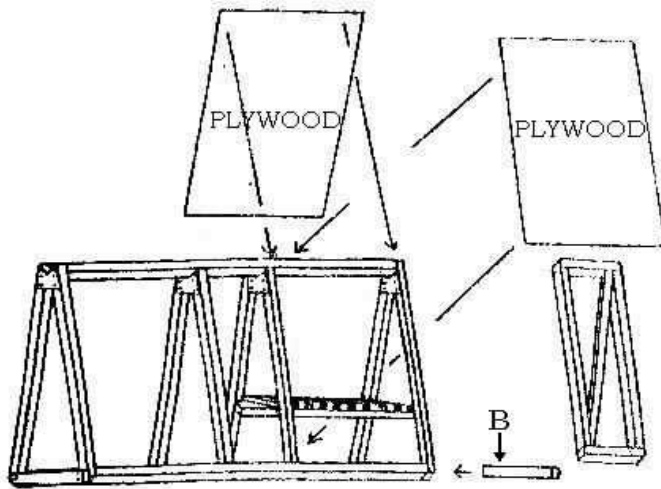
Materials Needed	
4 - 2" x 2" x 8' (top/bottom rails)	A
2 - 2" x 2" x 6' (end rails)	B
7 - 2" x 2" x 6' (side rails)	C
8 - 2" x 2" x 4' (roost bars / braces)	D
Chicken wire (1" mesh) 6' x 20' roll	
Exterior plywood 4' x 8' x 1/2"	
Nest boxes, closed end, corner braces	
Corrugated materials: 2 - 6' x 4,5' sheets need to cover roof	
Water for up to 15 birds Feeders	



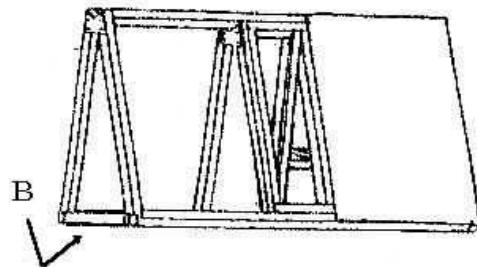
3. Attach corner braces



4. Finished frame



5. Attach closed ends, end rails and door



6. Add mesh to end and nest boxes

Chickens need water every 15 to 20 minutes.

Making certain there is enough water for the chickens is one of the most important jobs of the caretaker. You will need enough space around the waterer for all the chickens to drink without being crowded.

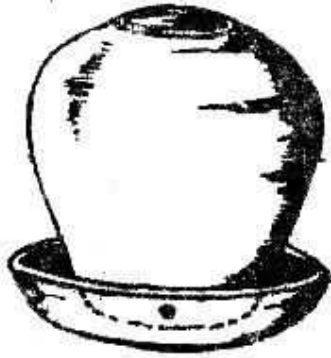
Chickens of any age should never be left without clean, cool water!

#### Approximate Water Consumption for 100 Chickens

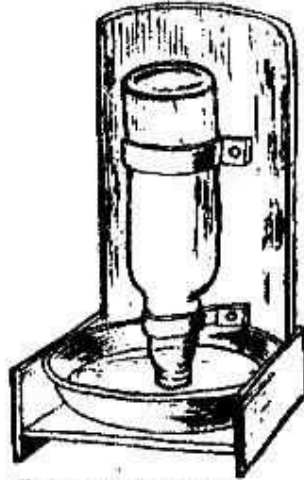
<u>Age in Weeks</u>	<u>Daily Water</u>	<u>Space Needed (length)</u>
0-1	2 liters 0.5 –1.0 gal	0.7 m 30 in.
2-4	8 liters 2.0-4.0 gals.	1.0 m 40 in.
4-9	15 liters 4.0-8.0 gals.	1.5 m 60 in.
9 -17	19 liters 5.0 gals.	2.0 m 80 in.
Above 17 weeks	36 liters 9.5 gals.	2.5 m 100 in.

Very important Note: In hot, dry climates, chickens may drink up to four times the above amounts of water. Watch the water level carefully. You may need to give more water to them more often. Never allow chickens to run out of clean water.

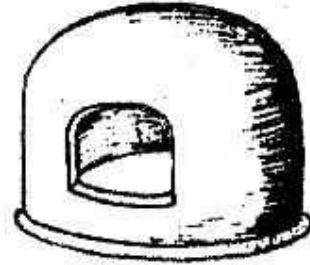
Slime molds begin to grow in waterers if they are not washed frequently. This should not be allowed to happen. A long handed brush is often used to clean out debris. Waterers need cleaning daily with a brush.



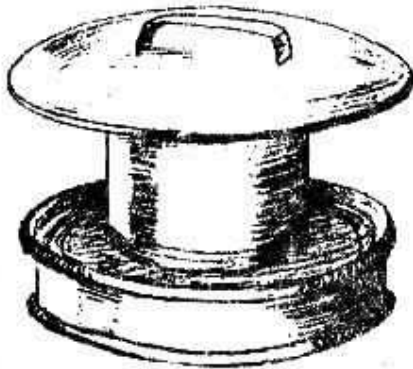
Clay pot with hole or groove in lip



Bottle and earthen bowl water fountain



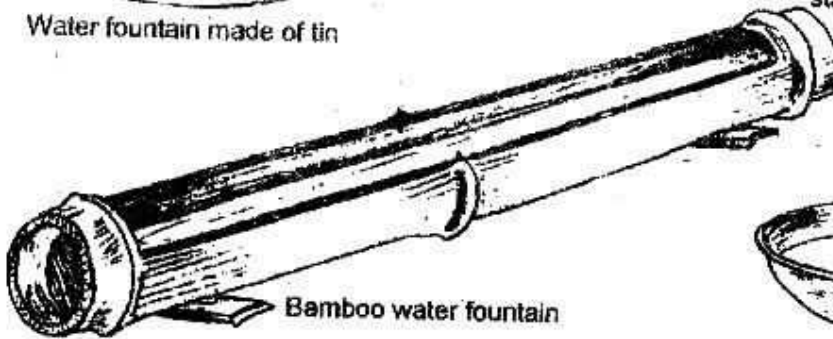
Earthen waterer



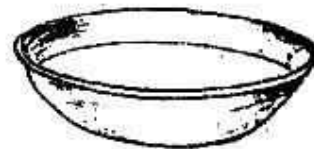
Water fountain made of tin



Gourd cut holes in side and sink into ground for stability-not for chicks.



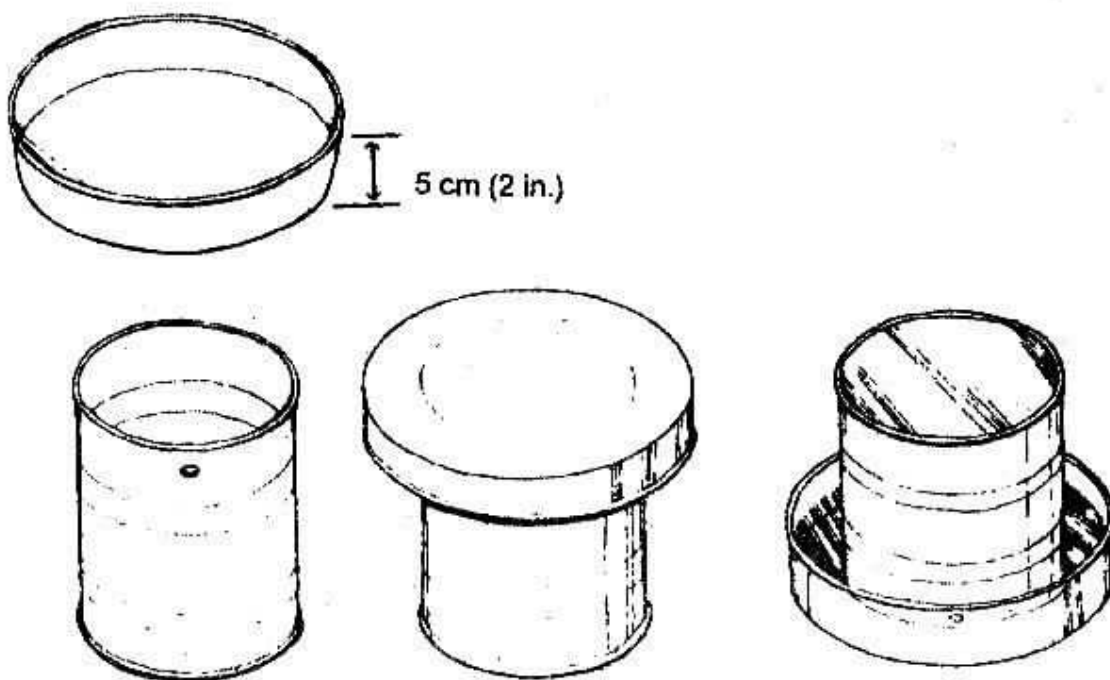
Bamboo water fountain



Earthen bowl water fountain

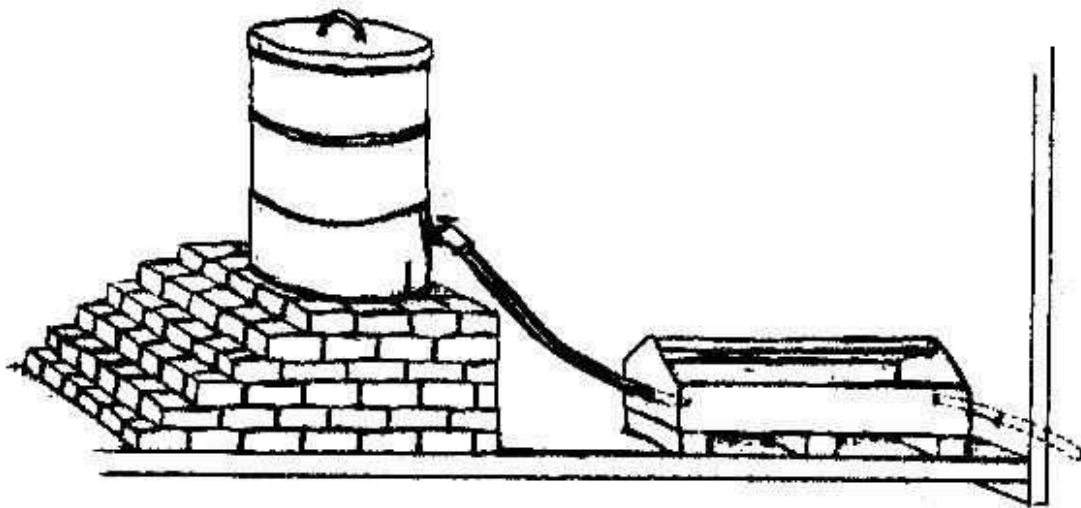
Waterer Design The simplest waterer is a tin can turned upside down into a soup or pie plate, or the bottom of a larger tin can. Punch a hole about 2 cm (3/4 in.) from the open end of the tin can. Fill the can with water and cover it with the plate. With one hand on the plate and one on the tin can, quickly turn them both upside down. The position of the punched hole and the vacuum in the tin can will regulate the water level in the plate.

### Simple Waterer



Large Waterer Fit a large, clean container (25 or 30 gal.) with a faucet or other type of valve and a tight cover. Set the container on a 1 m (3 ft.) stand of blocks, bricks or something strong, either inside or outside the chicken house. Place a hose or pipe from the faucet to one end of a galvanized (yero ng bubong) sheet metal or plastic trough (something that will not rust) about 10 cm (4 in.) high and 12.5 cm (5 in.) wide. The length of the trough depends on the size of the flock; a 1.2 m (4 ft.) trough will serve 100 birds if they drink from both sides. Level trough on flat rocks, wood, blocks, etc., so that the lip of the trough is as high as the bird's backs. Place an overflow hose or pipe 5 cm (2 in.) above the bottom of the trough in the side opposite the incoming water. Place the other end of the overflow pipe outside the house where the overflow water will not go back into the house. Adjust the faucet or valve so that the overflow of water is very little. Protect the trough from contamination by birds, using a spinner ( a bar that rotates so chickens cannot roost on it,) or building a cover over it.

### Large Watering System



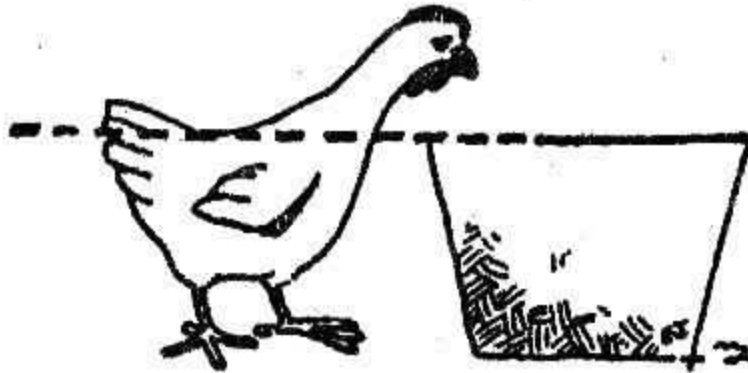
## Feeders

A well-made feeder is:

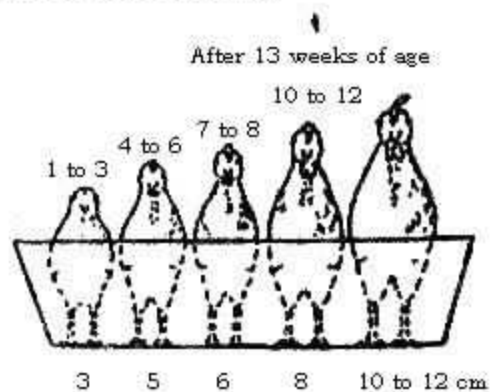
Strong - it must be able to be cleaned regularly without breaking.

Stable - it should not tip over when bumped by a farmer or chickens.

The correct height and depth - as birds grow, the feeder height and depth should be increased.



To prevent waste of feed the lip or top of feeder trough should be as high as the back of the chicken.



Changes in Trough Length with increasing Age.

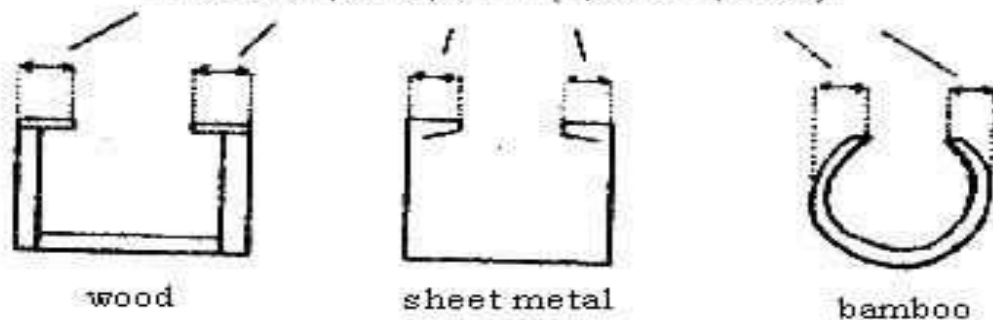
Chicken proof -- birds can't get into or roost on it.

Efficient -- it should have a lip to prevent birds from "breaking" (spilling) feed out onto the floor.

Place feeders throughout the chicken house. No feeder should be more than 4.5 m (5 ft.) from a waterer. Adjust the height of the lip of the feeder to a level even with the backs of the birds. This will stop them from scratching contaminated litter into the feeders. The more they have to stretch their necks to reach the feed, the less feed will be wasted.

### Feeders with Lips to Prevent Waste

depending upon the size of the feeder, the lips should measure  $1/4 - 3/4$  in. [ $1/2 - 1\ 1/2$  cm].



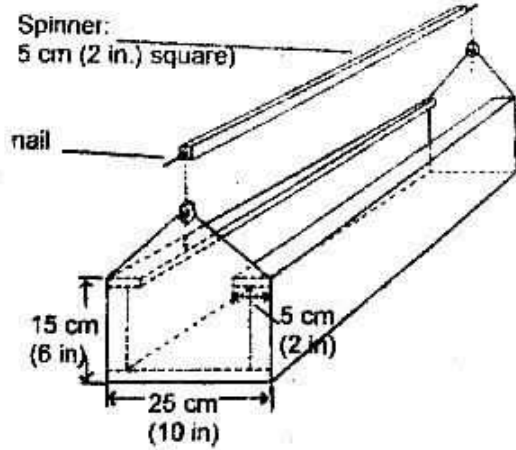
Except for the first three days with day-old chicks, feeders should not be filled more than half full, as feed will be wasted.

To reduce spoilage and mold problems try to adjust amounts of feed supplied so that the birds finish it before sundown. This will take practice. Supply the feed regularly at sunrise and about 2 p.m.; more times during the day if the birds empty the feeder.

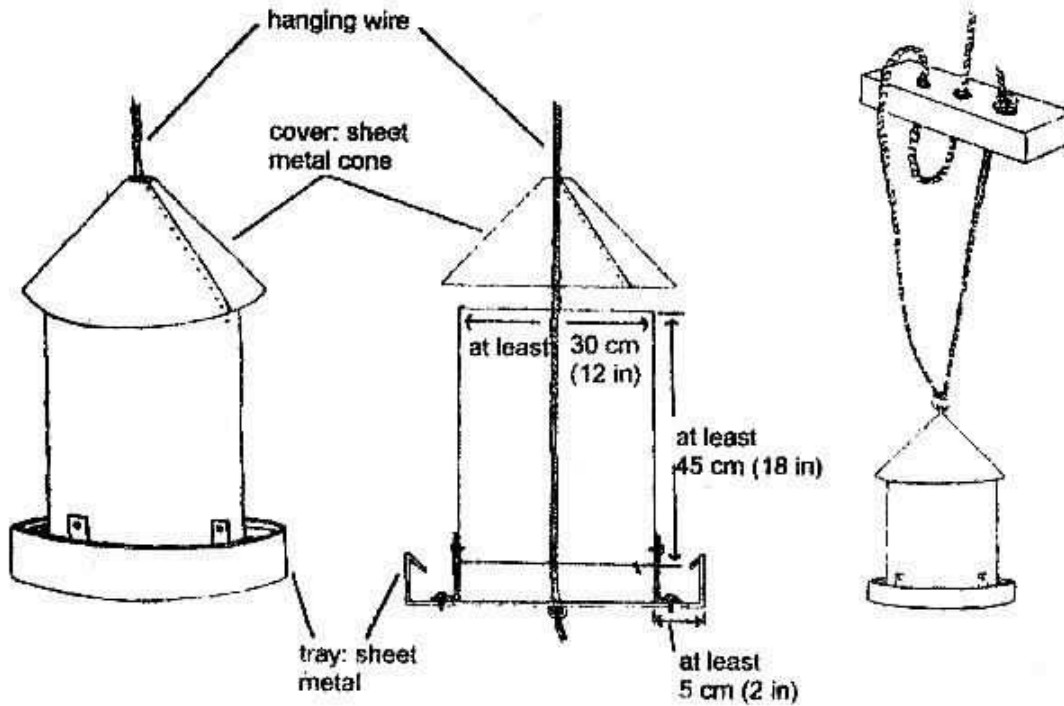
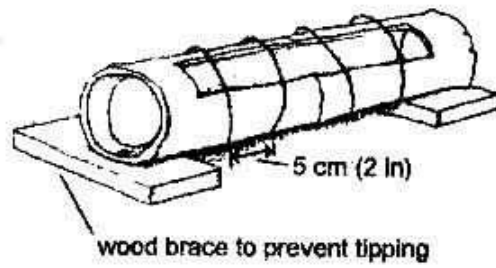
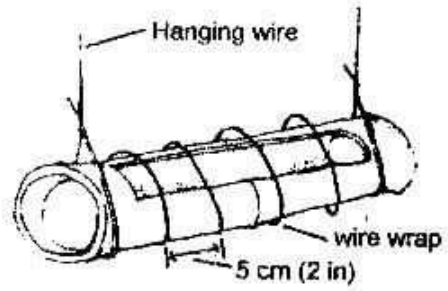
When feeding chickens vegetables, don't throw them on the floor – hang feeders at beak level with a rope, or in a hanging net, or place in a feeder made out of wire mesh.

Feeder space - As with waterers, feeder space is important. Make sure there is enough space around the trough for all the chickens to eat without being crowded.

# Feeders

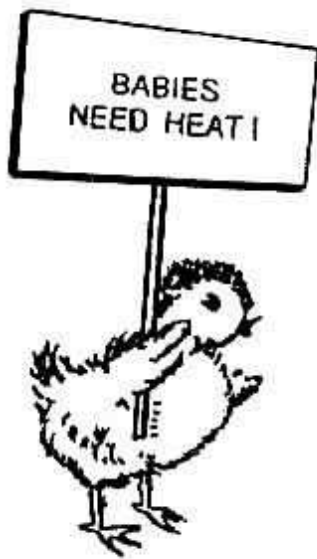


Wood Feeder



# SECTION IV

## MANAGEMENT



### Words to know – Section IV

*Beak Trimming: Removing part of the beak to prevent feather pulling or cannibalism.*

*Brooder: Something man-made that takes the place of a broody hen to keep baby chicks warm and protected.*

*Candle: To beam a strong light source, from a candler, through the egg shell to look at inside of the egg.*

*Nutrients: Something that comes from food that is good for the body. Nutrients help the body stay healthy and grow.*

*Roost: A branch or perch that a bird rests upon.*

*Sanitize: A method used to clean for good health.*

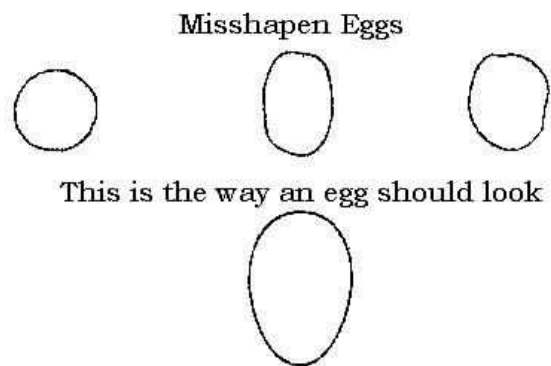
*Veterinarian: A doctor trained to give animals medical care.*

### Hatching & Incubation

Obtain fertile eggs from a neighbor or commercial source, or use eggs from a current flock. Choose eggs from hens that are between eight and eighteen months of age. Eliminate any eggs that have cracks, very dirty or misshapen.

The eggs should not be older than seven days and should have been kept cool 13°C (55°F) at all times. They will be hatched by a broody hen or an incubator.

Eggs can be sanitized by wiping them with a damp cloth containing a chlorine solution. Do not place eggs in water.



## Hatching Chicks

To have more chicks you will need a rooster to fertilize the eggs. One rooster is usually enough for ten hens.

Three to four days after a healthy rooster is with the hens, the eggs laid should be fertile, if the rooster and hens are good breeders. Fertilized eggs for hatching can be kept cool in a clay pot. Eggs can be kept in the pot for five days.

The eggs can be kept up to ten days at 15.5°C (60°F). Use clean, fertile eggs from several hens if possible, because not all hens will produce fertile eggs. Eggs should be average size, normal shape and without cracks.

Select or develop a broody hen. Generally, hens from the hatchery won't do because broodiness has been bred out of them. Pullets (females less than a year old) often do not make as good mothers as older hens. A broody hen ruffles her feathers, stays on her nest and will return to it quickly if taken off. She will peck your hand if you try to move her or take her eggs. If hens are not broody when needed, one can try to make a broody hen by setting three or four eggs on a nest in a small pen in a quiet place that is protected at night. Put a healthy hen (the fatter, the better) on the nest in the evening. Do this every evening until she becomes broody. If it takes more than three days, provide new eggs and eat the old ones. Always keep water and feed in small containers just out of reach of the nest in the brooding pen.

When you have a broody hen, treat her and the nest for lice. Set about 10 to 15 fertilized eggs under her; the number of eggs she can cover depends on her size. The sooner the eggs are set for hatching after laying, the better the hatch will be. You should expect seven or eight chicks from 10 to 15 eggs, half of them female and half male.

Keep the hen enclosed in the brooding pen day and night, allowing her out to eat and exercise early in the morning and again for a few minutes in the afternoon. Do this at the same time everyday while she is hatching the chickens. She will be upset if you change the way she eats and exercises. While she is out, clean any feces from the nest box. In very dry climates, it may help to sprinkle a little water on the litter under the eggs, but never on the eggs themselves.

In most cases, the hen will turn the eggs and keep them moist by herself. Sometimes a brood hen will refuse to leave the nest to eat. If she does, carefully lift her straight up off the eggs, making sure she doesn't have any tucked between her wings and body. And put her out. Let or put her back 20 minutes later.

On the 7<sup>th</sup> day of incubation for white eggs (10<sup>th</sup> day for brown eggs) you can use a candler to test eggs for fertility while the hen is out. Remember that there may be a delicate embryo inside, so handle eggs carefully. Remove all eggs without embryos, and those that have cracked shells or are defective.

On the 21<sup>st</sup> day of incubation, chicks should begin to hatch. Do not disturb the hen on the nest until the hatching period ends in the evening of that day. At that time, remove all unhatched eggs and broken shells. Dispose of weak chicks that can't free themselves from the shell; they will never do well. Provide clean litter for the nest. At this point, chicks are ready for brooding.

## Incubation

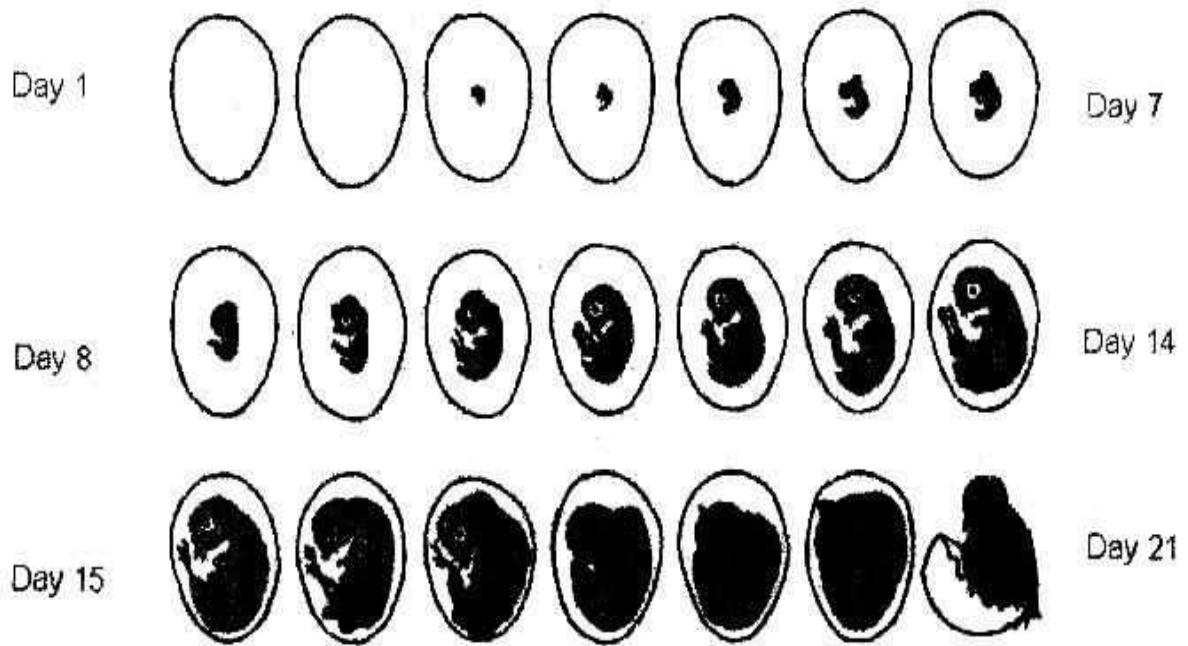
For small numbers of eggs, one or more broody hens will do the job nicely. If there are no such hens around, or if you want to hatch more eggs, you will need to incubate the eggs artificially.

The main reason you will want to incubate eggs is to produce chicks which, when grown, will bring greater returns than chicks which could be obtained elsewhere. Other reasons could include incubation for educational purposes or unavailability of chicks from other sources when they are wanted. In order to succeed in your incubation you must have these basics:

- Selected clean, fertile eggs.
- A source of heat.
- A means of humidity control.

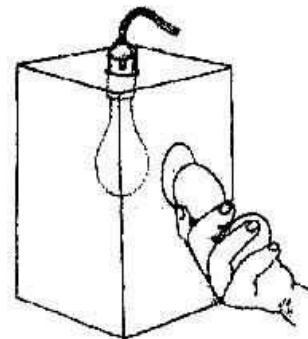
More specifically, clean fertile eggs are from hens ideally between the ages of eight to eighteen months. These hens and, if possible, sisters, brothers and parents of these hens, should have the characteristics desired in the chicks.

## TWENTY-ONE DAYS OF CHICK DEVELOPMENT



### Candling Eggs

You can get a good look at the inside of an egg by using a candler. A candler has a light source in a case or box with light shining through a circular hole 3 cm (1-1/8 in.) in diameter. Usually the light source is a 25 to 60 watt light bulb, but you can use a slide projector, a powerful flashlight (electronic torch) or even a candle.



Use the candler in a darkened room. Turn the eggs quickly in the light so that the contents rotate, and look for:

Embryos Thin blood vessels emerging from a dark red spot mean the egg has been fertilized and the chick has started developing. Use these eggs for incubation.

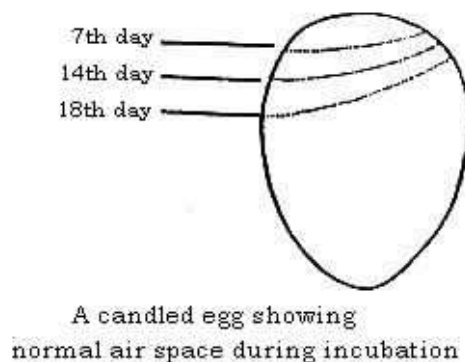
Eliminate the following types of eggs:

Cracked shells - The candler will reveal cracks that can't be seen otherwise.

Shape and movement of yolk - Yolks that are out of their usual central position, stuck to their shell, uneven in color or misshapen show poor quality eggs.

Blood spots - Although blood spots in eggs are harmless, many people do not want to eat them, so don't market eggs that contain them.

Discolored whites - Clouded or streaked whites reduce egg quality.



Size of air cell An air space more than 1.25 cm (1/2 in.) deep may show a bad egg.

Mold or rot Various colors on or in the egg, or its smell are signs of moldy or rotten eggs.

Always wash your hands before and after handling hatching eggs.

## Brooding chicks

Small numbers of chicks can be given to a broody hen to care for. After she has set on a few eggs for at least two or three days, she should accept chicks. In the evening, slip a few chicks under her and, if she doesn't reject them, give her the rest and remove the eggs.

If there is no broody hen about, or if there are more than a dozen or so chicks, they will have to be brooded artificially. This is a very important time in their lives - they must be kept warm and have water available at all times.

## Preparation

Remove all feeders, waterers, nesting boxes, roosts and other equipment from the house. Wash them, leaving no visible dirt. Clean them with a strong disinfectant, and rinse with fresh water. If possible, let them dry in the sun. Keep the day old chicks far away from full grown chickens. Older chickens can give them diseases.

Remove all old litter from the house. Sweep walls, ceiling and floors to remove dirt and dust, then scrub with water and disinfectant. Make any necessary repairs to house and equipment. Spray the house with a safe insecticide if ticks, lice or mites have been a problem. Warning: Be very careful when using any type of insecticide. They can be dangerous to humans and chickens if used improperly. Check with local authorities to determine which insecticide to use, and follow their directions carefully. On the following day, wash the walls and floor with a solution of a mild disinfectant, if available; otherwise, use water. The house and equipment should have at least two days to dry out. Spread litter 5 to 10 cm (2 to 4 in.) deep on the floor. If sawdust is used for litter material, cover it with paper during the first three days so the chicks don't eat it. Sawdust can cause problems in the digestive systems of young chicks. Replace the equipment, place the brooder and test it for at least 3 days before the chicks arrive.

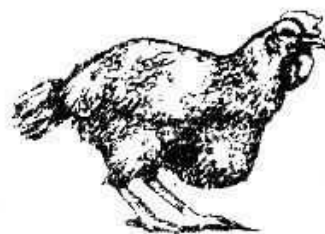
Deep litter management - Any natural material that takes in water can be used for litter. Try to use local materials.

- Peat moss – usually very expensive, if available at all.
- Chopped oat straw
- Softwood chips
- Hardwood chips
- Chopped rice straw
- Chopped wheat straw
- Softwood sawdust – (only after four weeks of age)
- Hardwood sawdust – (only after four weeks of age)
- Shredded maize (corn) stalks
- Rice hulls
- Groundnut (peanut) shells
- Shredded sugar cane stalks
- Dried pineapple waste
- Coffee hulls
- Ground maize (corn) cobs, shucks or husks – may present mold problems
- Broadleaf leaves – may present mold problems
- Sand – use as a last resort

Watch for mold on litter. Any straw used should be well dried in the sun. Chopping the straw, although it may be difficult causes the straw to take in more water and can be turned more easily than unchopped straw.

Start with a litter depth of about 7.5 to 10 cm (3 to 4 in.), and slowly add more until it is about 15 to 20 cm (6 to 8 in.) deep at the end of a laying cycle. Don't let litter get hard or packed down -- turn it in a number of times. In humid climates, this should be done each day. Replace wet litter right away. Add powdered lime to moist litter to help dry it. In dry litter, enough heat builds up to kill most bacteria, worms and fly larvae.

NOTE: Do not use fine grass straw – the chickens may eat it and it may be caught or bound in their crops. If the chicken then eats and drinks normally, feed and water will be clogged above the straw. The result is a large, soft and mushy crop. There is no cure for a crop-bound bird – it is best to eat the chicken.



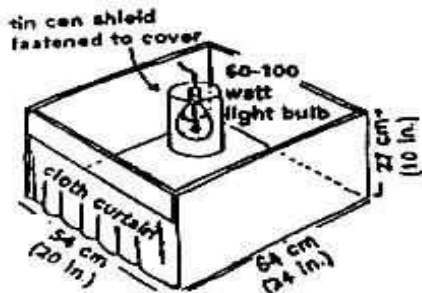
### Brooders

Brooders are used in place of broody hens to keep chicks warm and to protect the chicks from wandering. Either a kerosene lamp with wire around it to keep chicks from crowding next to the hot glass or an electric light bulb can be used as a heat source. Brooders are a major cause of fires, so special care is always needed.

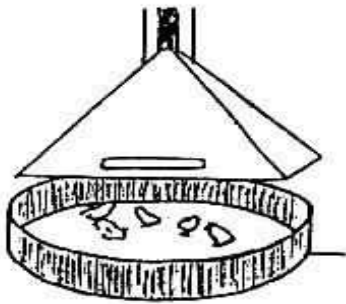
Place litter beneath and distribute feeders and waterers evenly. Electric light bulbs (100 to 150 watts) can be used or kerosene lamps. (Note: brooders are a major cause of chicken house fires. Kerosene lamps, especially when near dry litter, must have a solid, level base and careful handling is a must to avoid spilling kerosene.

## Types of Brooders

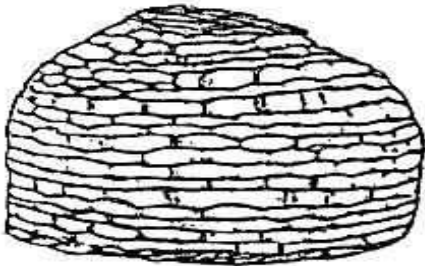
Light bulb brooder



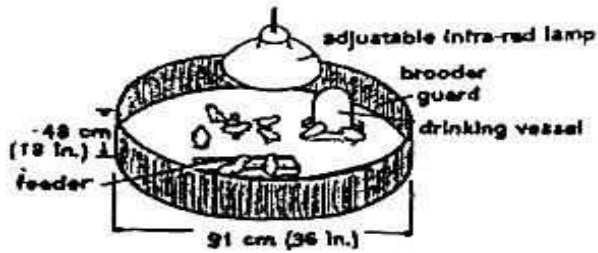
Gas brooders with hood



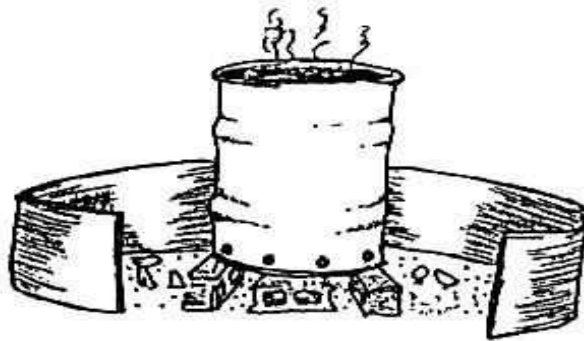
Basket Brooder



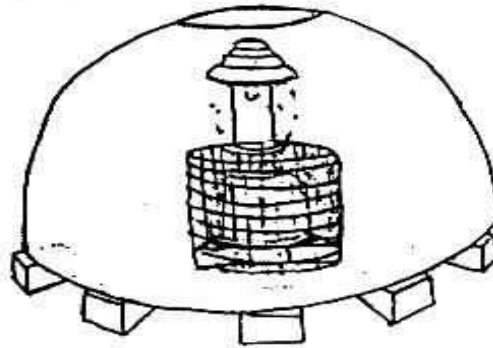
Infra-red heat lamp



Oil barrel - charcoal



Kerosene brooder



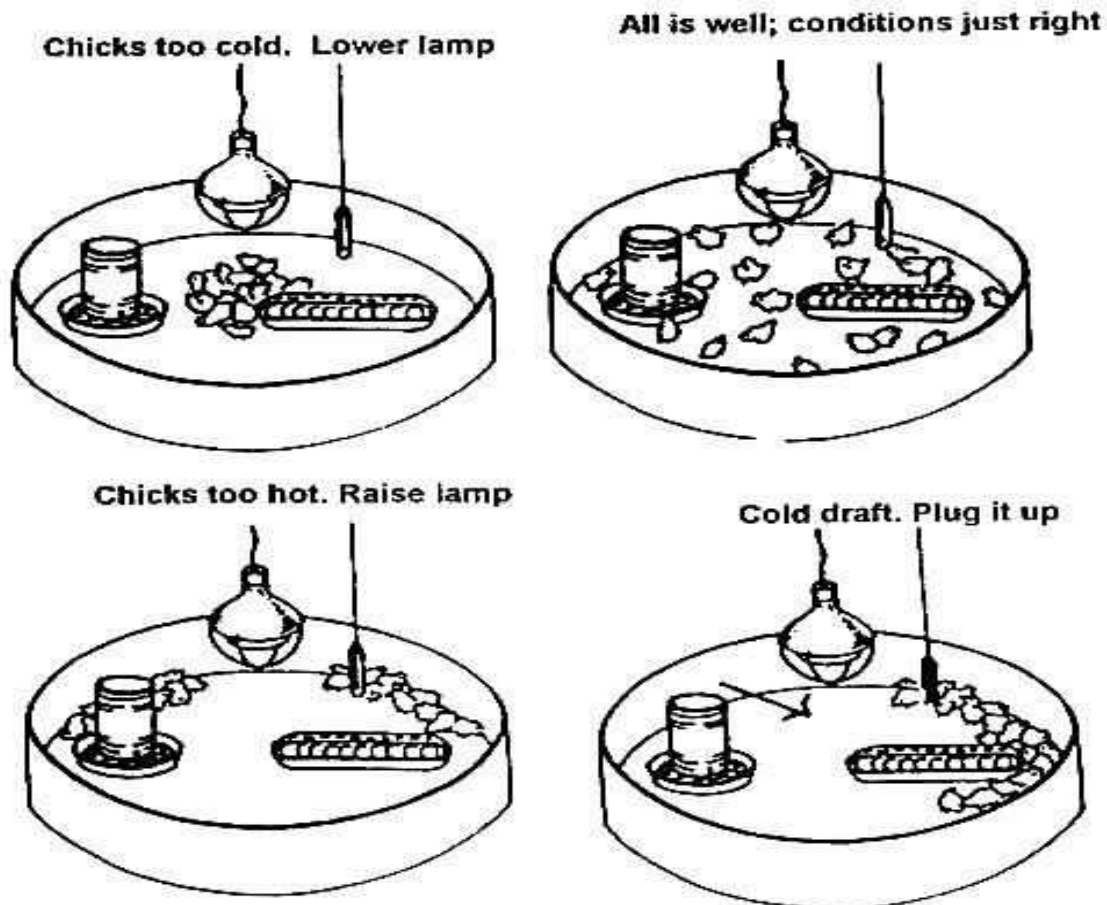
An upside down box-type brooder with a protected light bulb hanging 20 cm (8 in.) from the floor furnished a satisfactory brooder for about 50 chicks. A fenced in area outside will permit chicks to run outside through the cloth curtain. An infra-red light bulb adjusted to hang 45 cm (18 in.) from the floor is a good heat source for small number of chicks. A hood, which is usually made of sheet metal, may be hung by small posts or bricks with the edge 10-12 cm (3-4 in.) above the floor.

Hover design - A hover is a hood that keeps and distributes heat evenly. It can be made of wood, woven bamboo or sheet metal, and either placed on legs or hung from beams. When using any heat source other than electricity, the hover should have a vent on top to allow fumes to escape.

Brooder guard - A temporary fence outside the hover area is called a brooder or chick guard. A brooder guard keeps the chicks near the hover, but allows them to get away from too much heat. It usually is made of solid material, such as cardboard, to reduce floor drafts. It has no corners where chicks can pile up and smother. As the flock grows, the brooder guard should be extended and then removed when not needed.

Brooder temperatures - Read temperature 5 cm (2 in.) from the floor and 30 cm (1 ft.) from the heat source. Start the brooding at 35°C (95°F) for the first week, and reduce the temperature by 2.8°C (5°F) each week by moving the heat source or height of the hover.

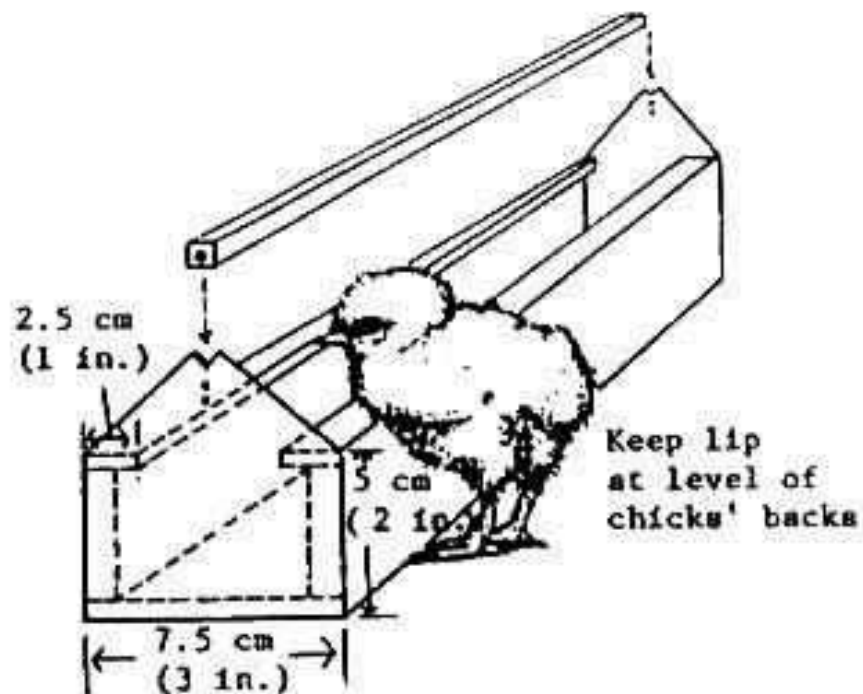
### Brooder Management



Brooding feeders - The first few days chicks will pick at anything and will not be able to tell a feeding area from the rest of the floor, so it is wise to have feed scattered over a large area. Put paper or cut cardboard boxes down on the floor and scatter feed on them to help the chicks learn to eat.

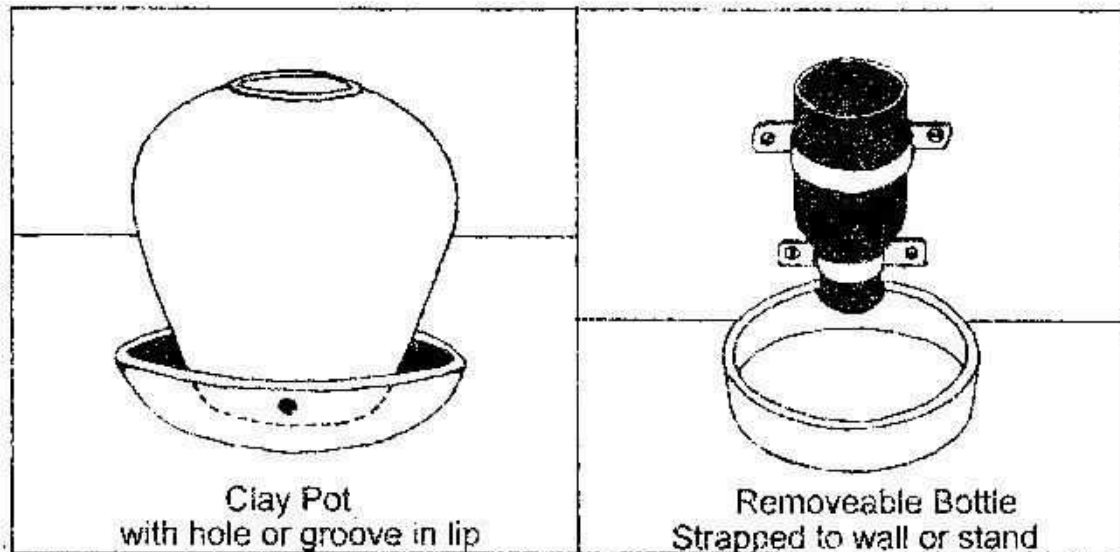
For their first three weeks, 100 chicks will need about 2.5 m (100 in.) of feeding space – four feeders, each 33 cm (13 in.) long should be enough.

### Chick-Size Feeder



Brooding waterers - For 100 chicks, use four waterers made of small clay jars, fruit jars or tin cans upside down in saucers or the bottoms of larger tin cans. Use more waterers as the flock grows. Because chicks drown easily, openings in waterers must not be large enough to allow chicks to fall or be pushed into the water.

Here are some possible designs for waterers



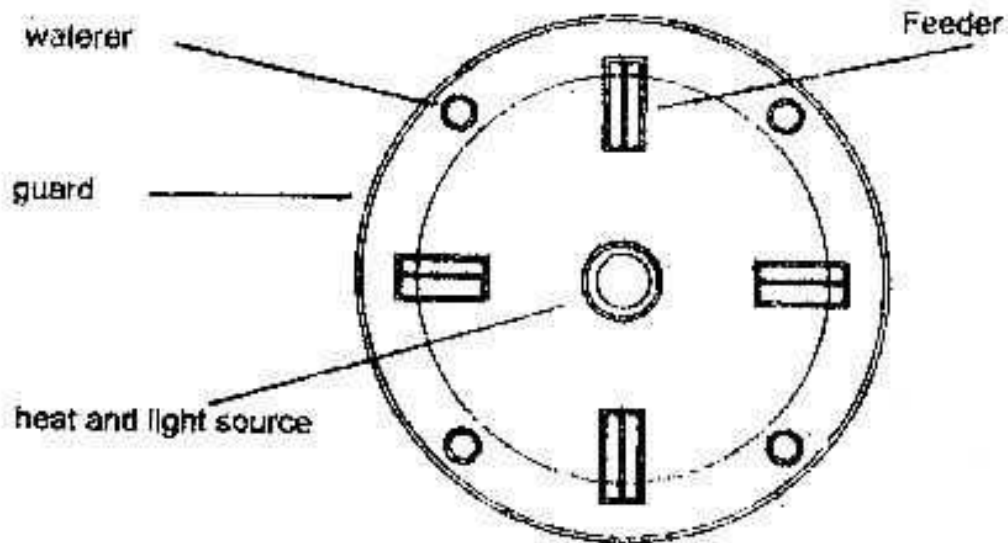
Place waterers on flat boards and keep the area around them dry. Chickens need water every 15 to 20 minutes. They must have fresh, clean water at all times, if they are to do well. Change the water at least once, and it would be best to change twice, each day. Keep waterers as clean as possible and replace rusty ones.

Place waterers throughout the brooder house. During their first week or two, no chicks should be more than 1 m (3 ft.) from a waterer and not more than 3.5 m (10 ft.) thereafter. Keep the area around the waterers dry and clean.

It is better to place the waterers on flat rocks, bricks or slatted or wired platforms than on litter. Remove and replace wet litter right away. Disease can start quickly when water is spilled on litter.

Place the equipment evenly under the hover to give all chicks a good chance to eat. Move waterers and feeders as needed to keep litter clean and dry.

### Layout Brooding Equipment



### Day Old Chicks

Chicks should be free from Salmonella Pullorum disease free breeder source. It is very important to know exactly when and where the chicks will arrive. This time is very important for them. A few hours before the chicks arrive, put clean water in the waterers, completely fill the feeders and put some feed on the paper or cardboard. The temperature under the hover should be 35°C (95°F).

When the chicks arrive, count them and dip the beak of each one into a waterer to be sure that it gets a drink. Vaccinate them if necessary. (Note: Check with local authorities for all vaccination recommendations and schedules, before vaccinating chickens against any disease. If you vaccinate for a disease that is not present in your area using live virus vaccine, you may introduce that disease instead of protecting against it.) Watch the chicks for at least two hours. If any look ill, remove them.

The chicks will show you if the brooder temperature is correct. If they huddle close to the heat source, it is too cold; if they crowd the brooder guard, it is too hot. See that they have feed and water often – every three hours for the first 24 hours, including the night.

During the brooding stage, chicks will eat day and night because the light is always on. They should never be without feed for more than 30 minutes at a time (this is true for all chickens during daylight). Use medicated feed if it is recommended by the local authorities.

Spend time everyday watching the flock. While they grow, see if they are all about the same size and are putting out feathers at about the same time. If so, the chicks are probably from good stock, healthy and receiving good feed. Watch for inactive, listless, or sick chicks. One that stands still for more than ten minutes most likely is sick. Separate this chick from the healthy ones. If there are several sick or that die, some medication might be needed. Again contact local authorities for suggestions.

On the 3<sup>rd</sup> day, allow the chicks to finish the feed in the feeders. From then on, fill the feeders half full. If chicks are eating well, remove the paper or cardboard.

For the rest of the chickens' lives, completely change their water at dawn and in the early afternoon, rinsing the waterers out as you do so. Chickens should have water at all times. Throw the water away so it does not get the litter wet.

On the 4<sup>th</sup> day, begin looking for signs of diarrhea that might indicate coccidiosis. If there is a serious outbreak, take immediate action. Be alert for coccidiosis until the flock is at least 12 weeks old. The best medication is Albion, Amprol or Sulmet in the drinking water. Always follow label instructions.

On the 7<sup>th</sup> day, fowl pox vaccinations may be recommended by local authorities. At this young age only a half dose of vaccine is given. This is accomplished by removing one of the two needles from the applicator. Decrease the temperature to 31.1°C (90°F). Remove the brooder guard.

On the 14<sup>th</sup> day, lower the temperature to 29.4°C (85°F).

On the 21<sup>st</sup> day, provide longer feeders. Lower the temperature to 26.6°C (80°F).

On the 28<sup>th</sup> day, lower the temperature to 23.9°C (75°).

On the 35<sup>th</sup> day, Give recommended vaccines and provide additional waterers and feeders. Place waterers on a slatted or wire mesh platform. Lower the temperature to 21.1°C (70°F). If nighttime temperatures do not fall below this, remove the brooder. In cold weather, you may need to remove the brooder a week later. Make sure that drinking water does not freeze. It may be necessary to run the brooders all night at 21.1°C (70°F), so the chickens do not become cold and pile up.

Watch the flock and treat for outbreaks of worms, coccidiosis, parasites and other health problems.

Remove any sick birds. If there are more than one or two, take them and the dead birds to a veterinarian or a laboratory to find out why they are dying.

Rearing (Grow Period) Use of added heat in this period will depend on the weather. The flock may be reared on free range, limited range, in pens, in cages or within chicken houses. The risk of free range is greater because of lack of protection.

Advantages of range rearing include:

- 1) Reduced feed costs as birds freely choose food such as green grasses, insects, and scratching in manure from large animals, and
- 2) Reduced housing costs.

Disadvantages include:

- 1) Loss from predators, and
- 2) It requires close flock shepherding.

A limited range requires less flock supervision. With natural brooding the hen will care for the chicks. They should be in protected place during the day and at night. Predators such as dogs, hawks and thieves can be a problem any time.

Advantages of pen rearing include more protection from weather and predators. Disadvantages include the cost and responsibility for furnishing all necessary nutrients in the feed and cost of complete feeding, fencing, and problems arising from wet pens in rainy weather which may result in disease and parasite problems.

Cages save space and should be hung to avoid contact with droppings. Birds may be protected against some diseases and parasites. Cages cost a lot in the beginning and require a manure disposal system to prevent flies and odors.

Confinement rearing provides greater protection against predators and may prevent disease if sanitary measures exclude visitors, older chickens and pets. The caretaker must be responsible to make sure the proper nutrients are in the feed. Recommended space per bird should be 650 sq. cm (100 sq. in.) for the first 5 weeks, and increased to 2,750 sq. cm (3 sq. ft.) as it reaches maturity. The floor is usually covered with 5 to 10 cm (2-4 in. of litter). Type of litter depends upon local availability and cost.

Poor quality litter requires greater floor space to stay dry. If litter becomes wet, it should be replaced quickly. Fine grass, straw or hard pieces of feed that are not completely ground may cause a blockage known as "cropbound". If a "cropbound" chicken is healthy in every other way, it is best to eat it.

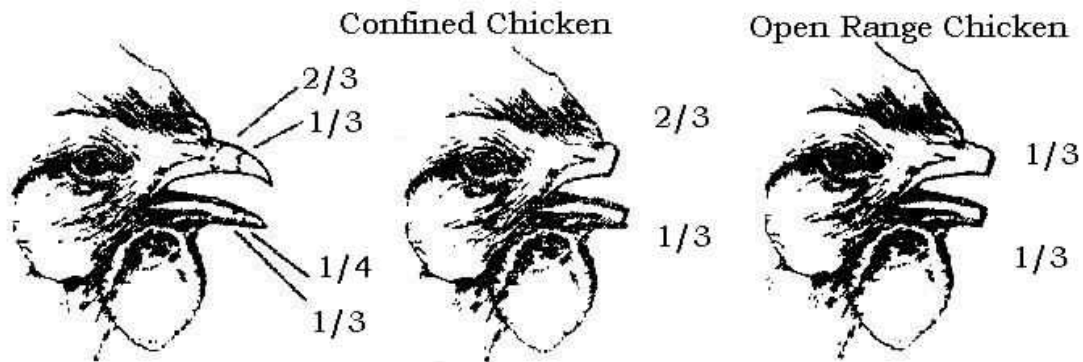
Cannibalism An accidentally injured bird with blood on it will be pecked, sometimes to death by other birds. Pecking may start when:

- A chicken is injured
- Chicken are over crowded
- They are missing salt or protein in their feed
- They are growing permanent feathers
- There is a problem with lice or mites

To stop pecking, you may:

- Give crowded birds more space
- Always remove pecked birds form the flock
- Improve the diet
- Treat lice or mites
- Spread pine tar or other non-toxic, bad tasting substance over the wounds of the pecked birds
- Remove the most aggressive birds for awhile
- Place evergreen (pine) tree boughs with needles, leaves, fresh-cut green grass, torn up newspapers, in the pen to provide distraction
- Trim the chicken's beak

### Beak Trimming

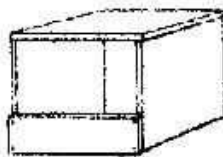


- Beak trimming is a method of cutting or burning off the tip of the upper and lower beaks. If done properly, this prevents cannibalism. 1/3 to 2/3 of the upper and 1/4 to 1/3 of the lower beak is removed. Do not remove more than 2/3 of the beak. Scissors, a sharp knife, or wire snips may be used if a beak trimming machine is not available. Dip the freshly cut beak into the feed if bleeding occurs or press a red hot iron to the beak to stop the bleeding.
- Birds on an open range should only have their beaks trimmed if there is a problem with cannibalism. Birds that have their beaks trimmed cannot pick up food from the ground. If there is a problem with cannibalism, trim the tips of both top and bottom beaks the same.

Nests. Nests should be provided for layers before they begin to lay. They may be constructed of wood, sheet metal, wire mesh, clay, mud bricks, or woven mats. Individual nests should provide a space of about 0.12 cubic m (1 cubic ft.) They may be placed on the floor or against the wall and in the darkest part of the house. They should be lined with fresh litter and kept clean to prevent dirty eggs. If hung above the floor, nests should be provided with a

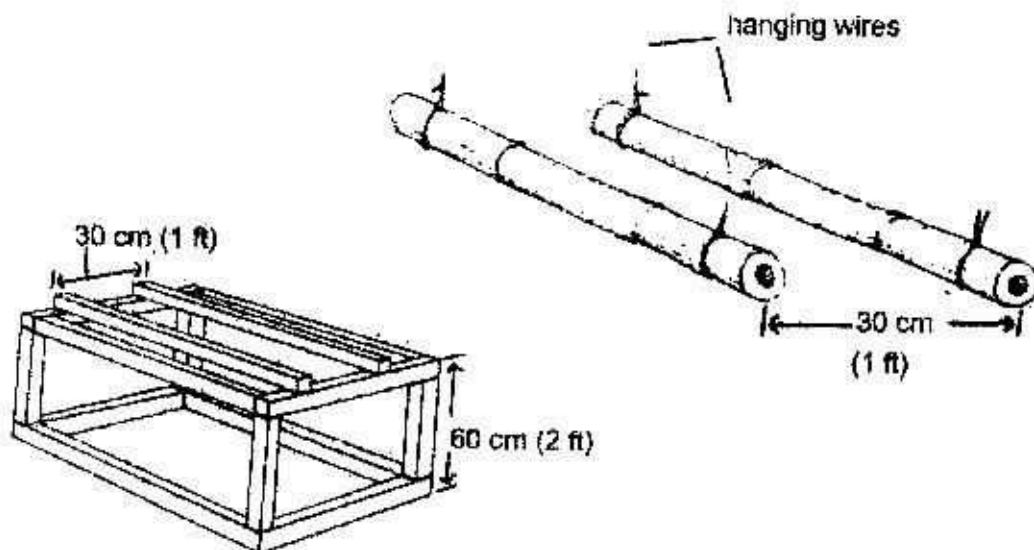


perch in front. Nests used by several birds at one time, must be four times the size of a single nest. Allow 25 nests for 100 hens. Close at night to keep the nests clean. Open at day break.



Eggs should be collected 2 or 3 times daily and placed in a cool place 4.5°C (40°F) to prevent spoiling. You can make 4 or more collections a day especially in hot weather. Hatching eggs require special care and should not be kept more than about 7 – 10 days at 13°C (55°F).

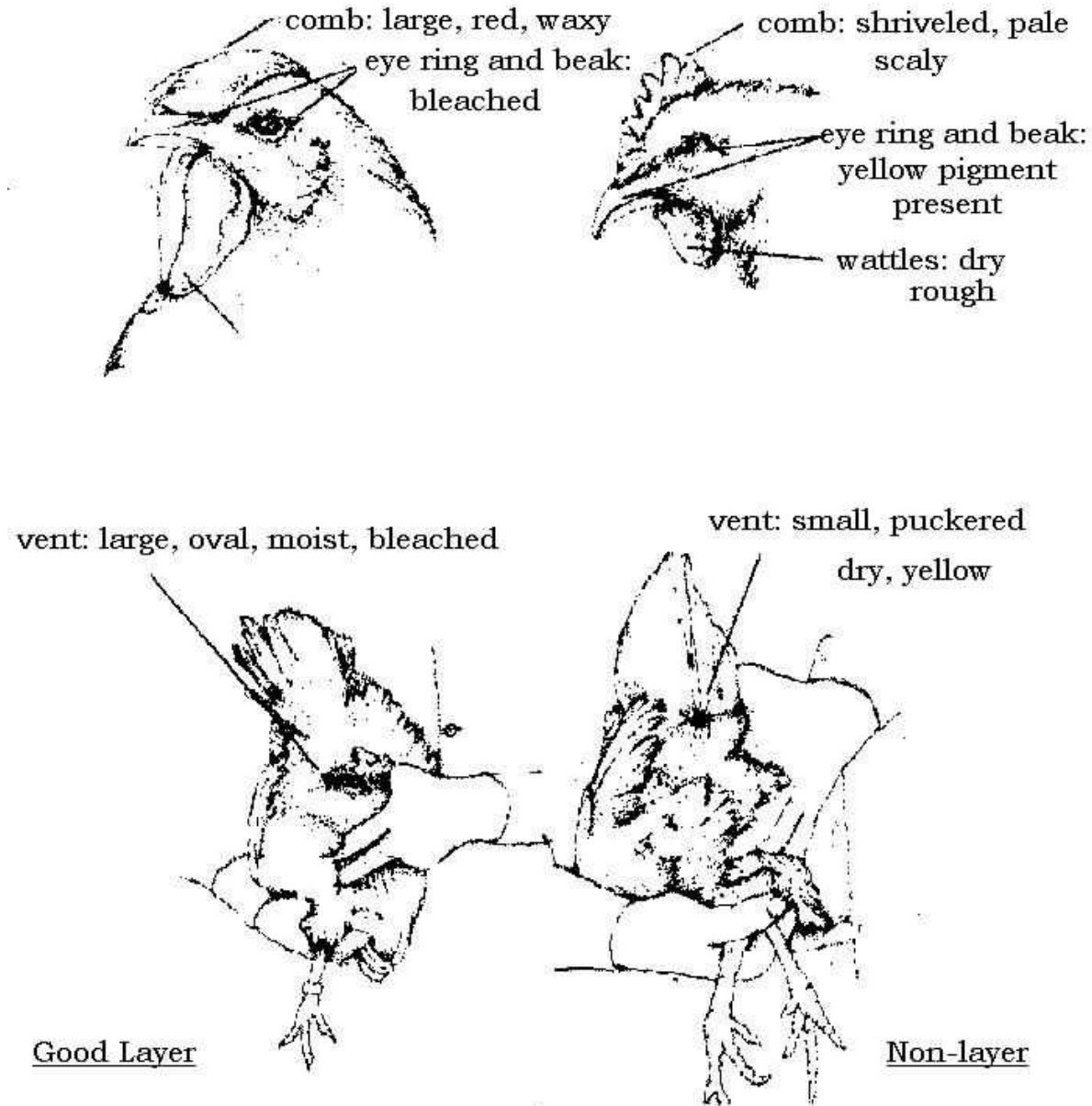
Roosts Since birds traditionally sleep in trees, they are more comfortable if you provide roosts. However, roosts are unnecessary. Hens require about 20 cm (9 in.) of roost space per bird. Roosts do concentrate droppings which may be used for fertilizer. If roosts are built, house design should be planned for ease in cleaning out droppings.



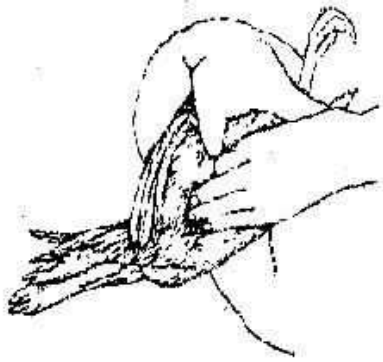
Records Keep a record book to see how well your hens are doing. Record how many eggs your hens are laying. When and how much feed you buy, any disease or deaths, date of delivery of chicks, and vaccinations or treatments given. These records are valuable for planning.

Rats, mice and other rodents disturb the flock as well as eat feed. This can cause great loss. You may not notice rodents since they feed at night. Trash, weeds and junk around the house provide hiding places, and should be removed. Rats may be killed by baiting, fumigating, trapping or shooting. When fumigating or using bait, follow directions to avoid hazards to humans.

Check for good layers, cull non-layers.

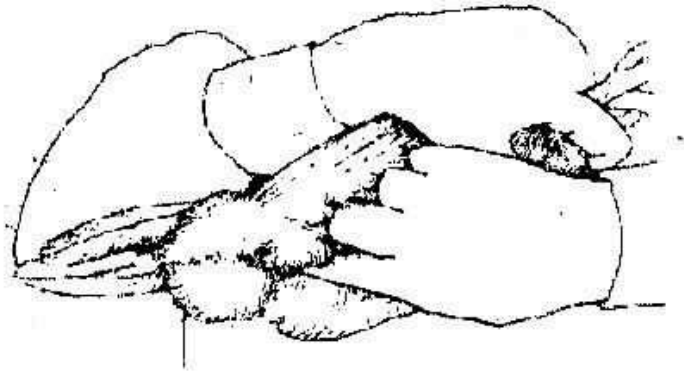


Culling Some hens eat feed but don't lay eggs. These chickens can be eaten or sold. Every month check for extra roosters or non-layers. This way you will not waste money on extra feeds. When culling remember: you only need 1 rooster for 12 to 15 females. It is good to have an extra rooster in case one dies.



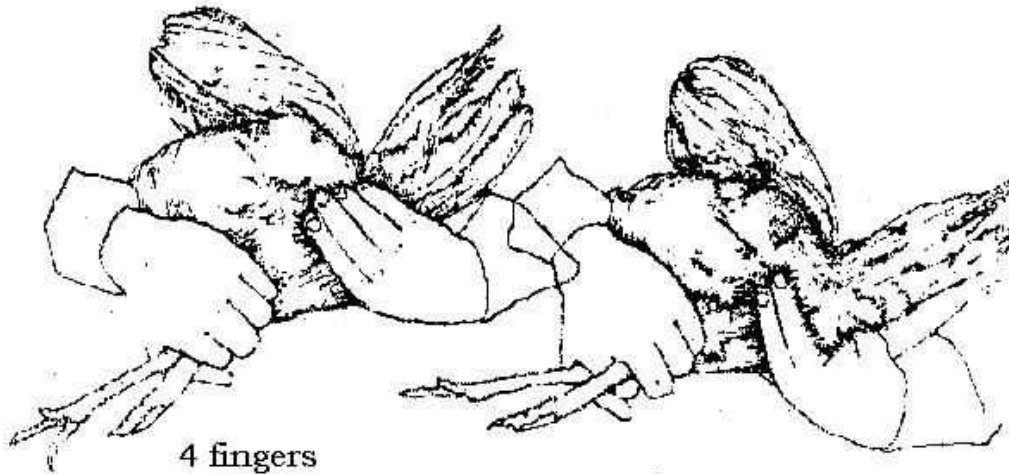
3 fingers

Good layer



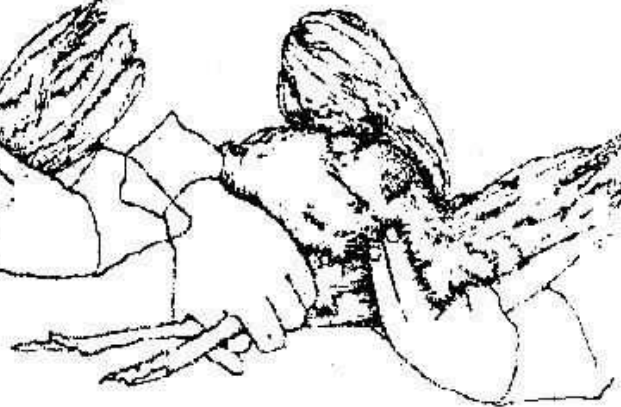
1 finger

Poor layer



4 fingers

Good layer

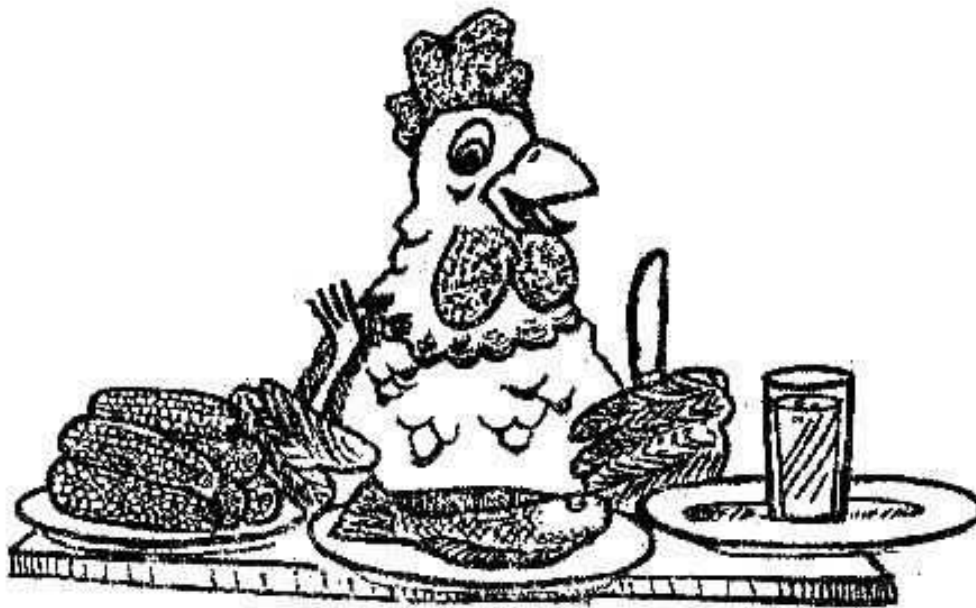


2 fingers

Poor layer

# SECTION V

## NUTRITION



Energy

Minerals

Proteins

### Words to know – Section V

*Nutrients: Something that comes from food that is good for the body. Nutrients helps the body to stay healthy and grow.*

*Energy: A food source necessary for chickens to produce eggs.*

### NUTRITION

Chickens that graze in open fields or barnyards, usually eat enough nutritional food to survive. A small flock of 10 to 20 birds may only need table scraps, garden products, extra milk, tender green leaves or grasses and insects. Give the chickens only what they will eat in 10 to 15 minutes of this type of feed. Spoiled meat, onions and other strong flavored food may give a bad taste to the eggs and should not be fed to the birds. Potato peelings can be fed to chickens if they are cooked. Vegetable peelings and green tops of vegetables are also good.

Energy is needed by chickens to move, eat, digest, grow, provide body heat and produce eggs. Good energy sources are corn, milo, wheat and soy beans. Grains that are good for people are good for chickens. Chopped root crops and bananas can also be given.

To make egg shells strong, chickens also need calcium. Good sources of calcium are dried, crushed (make sure you dry and crush them) eggshells fed back to the birds and crushed oyster shells.

You may also want to use commercial feed as part of your chicken's diet. Commercial feed is already mixed and well balanced. As the chickens lay their eggs you can sell or trade eggs for commercial feed.

Chickens need clean, cool, fresh drinking water at all times. A chick may be able to survive several days without feed but if they do not have water, they will die quickly. An adult chicken without water for a day in hot weather may also die. Birds drink a lot of water to cool the body in hot weather. "Flushing" may happen when hens go without water for short periods of time – they will then drink too much water and get diarrhea.

See the following pages for those wanting to mix their own dry feed.

## Home Made Chicken Feed

4 can yellow corn or broken rice (binlid)	1 can dry ipil-ipil leaf meal
1 ½ cans rice bran (darak)	1 tablespoon salt
1 can dry fish meal or 2 parts fresh fish or ground snails	1 handful powdered shell/ agricultural lime (apog)
1 ½ cans copra oil meal	
1 can ground mungo, sitao, patani or soy bean seeds	

Note: Use boiled gabi, ubi, cassava or camote as substitute for corn meal. Double the recommended amounts if ingredients are not in dry form. Use dried azolla or dried filter cake to replace part of the rice bran.

### A. Other Low - Cost Poultry Feeds

- Bananas
- Fingerlings
- Snails
- Termites
- Fly maggots
- Azolla
- Filter cake\* (dried and good)
- Earthworms

\*Filter cake is the dark brown-black sediment after clarification and filtration during the manufacture of sugar.

### B. Anti-Nutrients\* in Some Feeds

<u>Kind</u>	<u>Anti Nutrient</u>	<u>Remedial Measures</u>
Sorghum	Tannins	Milling, use only the Recommended amount
Legumes Seed/beans	Protease inhibitors	Boiling and Toasting
Cassava	Cyanogens	Boiling, roasting, soaking
Ipil-ipil	Mimosine	Use recommended Amount

\*These acts as growth inhibitors

\*\*International Institute of Rural Reconstruction

## A "NATURAL" LAYING HEN DIET

To be fed as all mash to medium size layers kept in floor pens

Amount (lbs.) per

<u>Ingredient</u>	<u>100 lbs.</u>	<u>Ton</u>
Yellow cornmeal	60.00	1200
Wheat middlings	15.00	300
Soybean meal (dehulled)	8.00	160
Maine herring meat (65%)	3.75	75
Meat & bone meal (47%)	1.00	20
Skim milk, dried	3.00	60
Alfalfa leaf meal (20%)	2.50	50
Iodized Salt	0.40	8
Limestone, grd. (38%Ca)	<u>6.35</u>	<u>127</u>
Totals	100.00	2000

<u>Calculated Analysis</u>	<u>"Natural" Laying Hen Diet (per pound)</u>	<u>Recommended (N.E.C.C.) Nutritionists (per pound)</u>
Metabolizable energy Cal./lb.	1252	1292
Protein	16.07%	16%
Lysine	0.79%	0.74%
Methionine	0.31%	0.29%
Methionine & cystine	0.55%	0.54%
Fat	3.67%	3.33%
Fiber	3.15%	2.51%
Calcium	2.77%	2.75%
Total phosphorus	0.53%	0.50%
Available phosphorus	0.44%	0.42%
Vitamins (units or mgs./lb.)		
Vitamin A activity (U.S.P units/lb.)	5112	5290
Vitamin D (I.C.U.)		1000
Riboflavin (mg.)	1.36	1.38
Panthenic acid (mg.)	3.89	4.05
Choline Chloride (mg.)	411	500
Niacin (mg.)	17.46	16.95

The birds must receive direct sunlight to enable them to synthesize vitamin D. Unfortified cod liver oil can be fed in place of sunlight to supply vitamin D. The amount of cod liver oil would depend upon the potency of the oil – the need for 1000 (I.C.U.)\*\* per pound of feed.

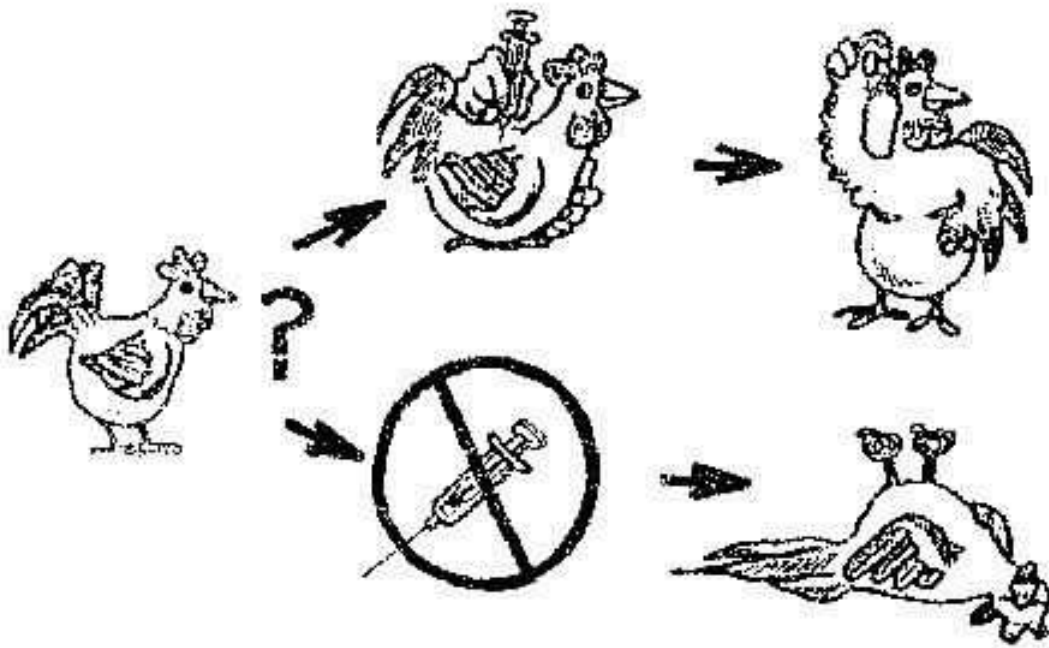
(Prepared by Dr. Richard Gerry, Department of Animal & Veterinary Sciences, University of Maine, Orono, Maine).

\*New England College Conference nutritionists

\*\*International Chick Unit

# SECTION VI

## POULTRY HEALTH



*Sanitary: To keep clean for good health.*

## POULTRY HEALTH

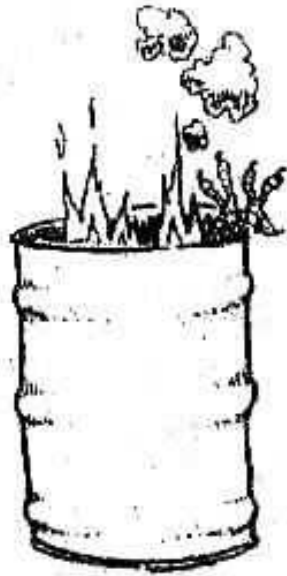
PREVENTION IS THE KEY TO CONTROL OF POULTRY DISEASES.

### Heat Stroke Caused by Hot Weather

Chickens do not perspire when it is hot – they pant and hold their wings out from their bodies. When the temperature is more than 37.8°C (100°F), chickens may die from heat stroke. Make sure chickens have plenty of shade and cool drinking water. Completely open all areas for air flow. Add extra waterers or buckets of water to reduce crowding. Spray with water especially if any deaths occur. Spray the ground or deep litter during the heat of the day.

### Remember to:

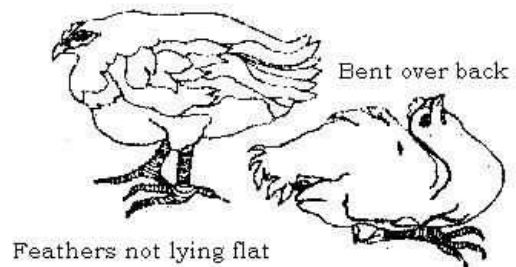
- 1) Vaccinate for specific diseases. Check with local authorities for all vaccination recommendations and schedules.
- 2) Get chicks only from blood-tested Pullorum and Mycoplasma-free (Chronic Respiratory Disease) breeders.
- 3) Provide nutritionally balanced feeds complete with vitamins, minerals, amino acids, and energy to prevent diseases caused by poor nutrition.
- 4) Never introduce older birds into a young flock.
- 5) Prevent visitors (including neighbors), wild flying birds, rodents and especially other poultry men from entering your chicken coop.
- 6) Avoid visiting neighbor's flocks and returning to your own without a complete change of footwear and clothing.
- 7) Keep dirty crates, egg cartons, feed sacks and other contaminated items from poultry houses.
- 8) Establish and "All in, all out" rule – keep birds of one age together.
- 9) Practice sanitary clean-up and waiting period (2-weeks minimum) before introducing a new flock to used pens. Exposure to direct sunlight kills many germs.
- 10) Remove dead birds immediately and get rid of them by burning or deep burial.



## Chicken Diseases

You can tell a chicken is sick when:

- ✓ It does not eat.
- ✓ It keeps away from other chickens.
- ✓ It does not move around much.
- ✓ It has a bent-over back.
- ✓ It has ruffled feathers that do not lie down flat.



Take the sick chicken away from the others. Put it in a cage by itself so that the others do not get the disease. Medicate if needed. Sometimes young chickens look sick, but are cold and need additional heat.

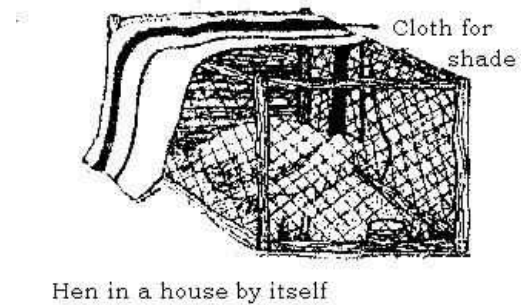
Ways to vaccinate chickens are different with each disease and type of vaccine. Always follow the veterinary drug store directions on how to store and administer. Destroy any unused vaccine.

Some vaccinations and health control practices have to be repeated every three months. It is good to have someone help you hold the chickens as you give the vaccine. Follow advice by experienced poultrymen.

## Newcastle (Raniket) Disease

### Signs of Newcastle Disease:

- ✓ Loss or drop in egg production in mild cases
- ✓ Bad egg shell quality
- ✓ Diarrhea
- ✓ Nervous signs such as twisted necks
- ✓ Difficult breathing
- ✓ Mortalities – varies depending on severity of infection

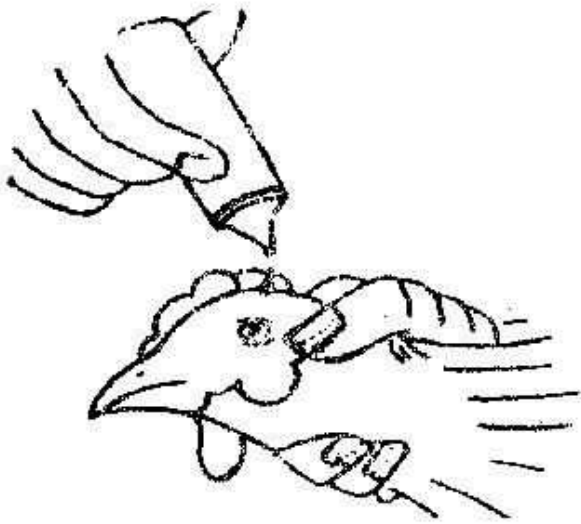


This disease cannot be cured; however, in mild cases, production returns after two or three weeks. If mortality is severe, it is necessary to kill all the chickens. After killing all the chickens, clean the chicken house and all the feeders, drinkers, nesting boxes and perches with a disinfectant. You can eat the chickens that did not look sick.

After cleaning and disinfecting, new chickens that have been vaccinated for Newcastle Disease can be placed in the chicken house.

You can stop young chickens from getting Newcastle Disease by giving them vaccine. The vaccine must be kept in a refrigerator until you are ready to use it. (Deleted sentence) As soon as it is out of the refrigerator it should be used quickly.

There are different types of vaccine to prevent young chickens from getting Newcastle Disease: eye drop, injection, putting the vaccine in the water. The veterinary drugstore should supply information about how and when to use the vaccine.



Give the chickens this vaccine when they are 10 days old.

Follow the directions.

Put all the chickens in a box.

Half fill the vaccine bottle with the sterilized water from the eye drop bottle.

Shake it well, then pour the mixture into the eye drop bottle and shake it again.

Put 1 drop into 1 eye of each chick. You must finish using the vaccine on the same day.

When you have finished, burn or otherwise destroy all the vaccine you have not used. If you throw it on the ground, it can give other chickens Newcastle disease. Do not save for later use.

### Coccidiosis

This disease is common in chickens starting from a very young age. If a chicken has Coccidiosis it may show the following:

- ✓ Diarrhea – may be bloody
- ✓ Listless, droopy and weak
- ✓ Not eating – off feed
- ✓ Appear cold - show ruffled feathers
- ✓ Mortalities

There are several drugs for treating Coccidiosis: Liquid Amprol used for 3 to 5 days at the treatment level and for 7 to 10 days at the prevention level; Sulfamethazine (Sulmet) or Sulfadimethazine (Albon) at the label's recommended level. Adding 2 teaspoons of sugar per liter of water may make it more palatable.

## Fowl Pox Disease

If a chicken has this disease, lumps grow on its head and inside its mouth. It is a very common disease and can easily come from other people's chickens.

To get rid of Fowl Pox, paint the lumps or scales with Tincture of Iodine or First Aid Ointment every day until they go away. No treatment is effective for lumps inside the throat.

To prevent Fowl Pox, inject all your chickens with Fowl Pox vaccine when they are 8 weeks old. The vaccine package includes a needle or applicator for administering the vaccine.

Mix the vaccine by adding the diluent or liquid provided. Shake well.

Dip the needle into the vaccine.

Push the needle through the wing web near the body (at the first joint of the wing). As you push it through, the vaccine will be wiped off the needle inside the wing. After one week, look for a red mark (a take) where the needle went in – this means the injection worked.



Chronic Respiratory Disease: This disease is common when chickens are overcrowded or stressed from some other reason (chilled, moving, vaccine reaction, etc.).

When chickens have this disease:

- ✓ They show respiratory symptoms.
- ✓ They have wet noses.
- ✓ They have swollen or puffy eyes.
- ✓ They sneeze and cough.
- ✓ They become weak, listless, off-feed and have ruffled feathers.

Do not put too many chickens in the house.

They need air.



If your chickens get Chronic Respiratory Disease, improve the ventilation, reduce ammonia fumes, and provide fresh air. It may be necessary to increase the brooder or house temperature. Medicated water containing Terramycin or Sulmet is helpful.

Before you buy the Terramycin Powder, look at the date on the box. If the date has already passed, the powder will be too old and may not work. Use as directed on the label. Make sure the chickens drink this water quickly.

## Internal Parasite Control

The most common intestinal parasite is roundworms. They are in the intestines and easily found when slaughtering.

Infected chickens fail to grow well and adult chickens lay fewer eggs.

Young chickens are the most seriously affected by internal parasites and some may even die.

It is best to deworm the entire flock using Piperazine in the water or as a pill.

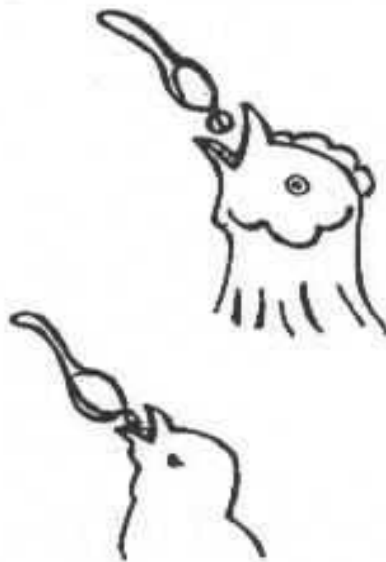
Chicks ½ pill

Adults 1 pill



Deworming pills can be purchased in veterinary drug stores. The treatments should be repeated every three months. To save time, deworming can be done with vaccinations and dusting for lice.

Piperazine is the most popular dewormer and is available as a tablet or liquid for the drinking water. Dose as directed on the label.



## External Parasites: Lice and Mites

### Lice Control

A common chicken louse



Lice should be controlled as they cause weight loss and lower egg production. Lice are also a very common problem on setting hens. Lice can be controlled by using Malathion or Sevin powder.

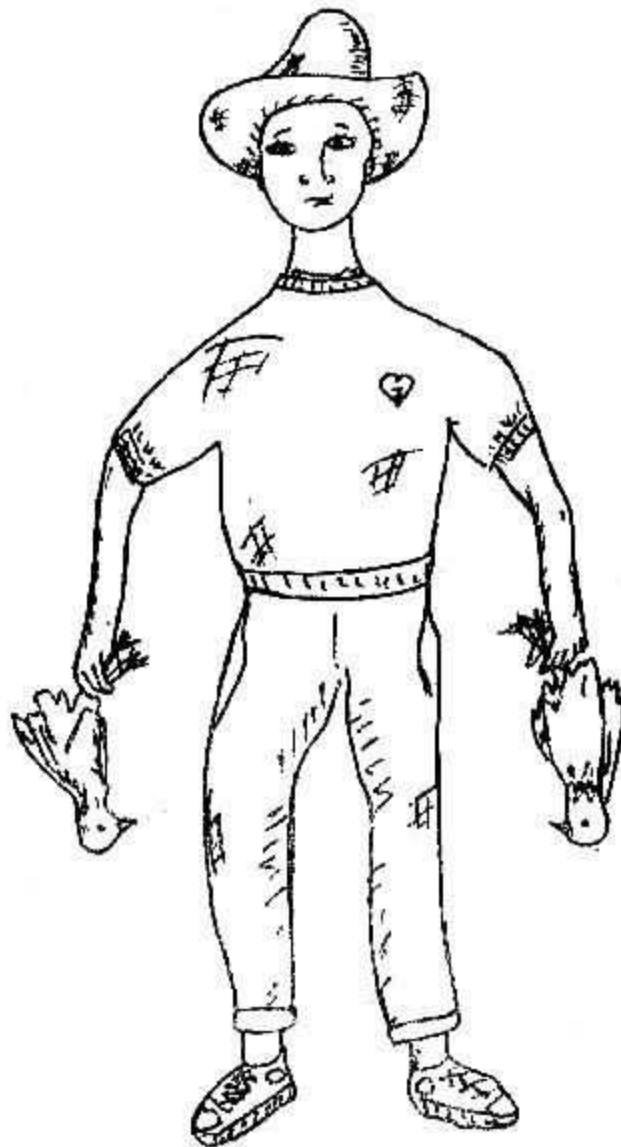


The mixture is easy to shake on using a jar with a top that has holes. The wings and legs of all birds should be dusted every three months, at the same time as the other control practices. In addition, hens and their nests should be dusted at the beginning of natural incubation.



SECTION VII

MARKETING



## MARKETING

Eggs. Eggs lose their quality rapidly in hot weather or if left in the sun. In hot weather, some farmers gather eggs 5 times a day and move them to cool storage. The best storage temperature for eggs is 4 to 13°C (40 to 50°F). If you do not have the use of a refrigerator, you may bury eggs in a clay pot in a shaded area. They may be placed on straw or a mat and covered with a damp cloth or straw. Soil around the pot should be moist but the eggs cannot be in water.

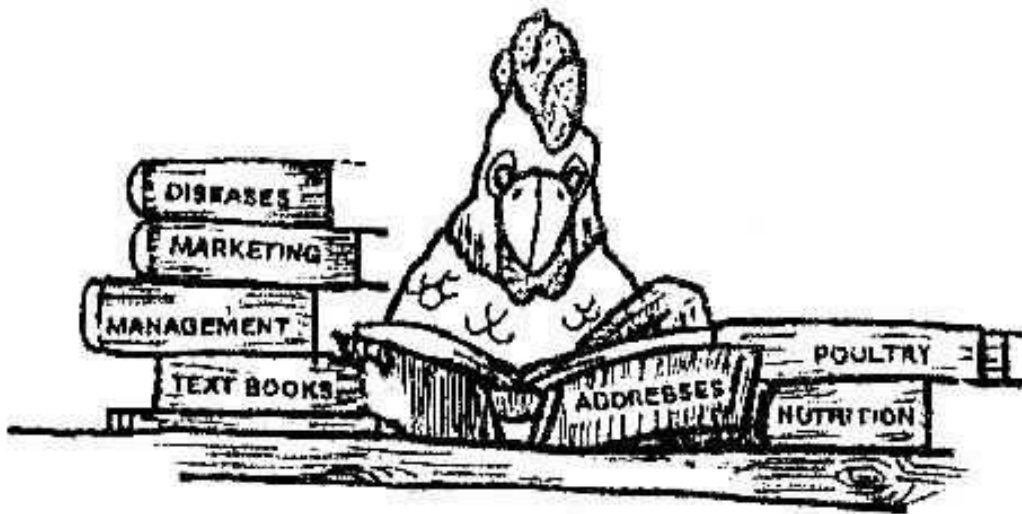
Sell fresh eggs as soon as possible. The best market is for fresh, clean eggs. Always sell the best eggs so the buyer will return to buy more.

Soiled eggs may be cleaned by rubbing them lightly with fine sandpaper, emery cloth or steel wool. Washing may contaminate the egg through the shell. Since eggs are different sizes, they are sometimes sold by weight. Poor quality eggs may be seen by candling. Remove eggs with cracks, blood spots, mold or rot. Soiled or dirty eggs are never washed nor used for hatching.

Meat. Small flocks of meat chickens (broilers) are usually sold live and the buyer will slaughter and prepare it for cooking. If fresh poultry meat is held too long without cooking it may spoil and cause food poisoning.

## SECTION VIII

### OTHER INFORMATION



## GLOSSARY

*Automatic:* Works or moves by itself.

*Cockerel:* Male chicken less than 1 year old.

*Cock:* Male 1 year or older.

*Commercial:* Made in a large quantity for market.

*Contamination:* Something that has been touched by something unclean or impure.

*Digestive:* The parts of the body that are used to change food for the body to use for energy.

*Efficient:* Doing something the right way.

*Eliminate:* To get rid of.

*Germs:* Are very small organisms that you cannot see with your eyes. Too many bad germs cause sickness and disease.

*Hover:* Cover used on brooder stoves to hold heat near the floor when brooding chicks.

*Insecticide:* A chemical that kills insects.

*Perspire:* To give off sweat (salty water from the body).

*Poultry:* A bird, as chicken, duck, turkey or geese raised for eggs or meat.

*Production:* To make or produce, for example, eggs and chickens.

*Sanitize:* The different ways used to protect health by keeping places clean.

*Sire:* The male parent of poultry.

*Smothering:* The chickens pile on one another and cannot breathe.

*Sterilize:* To make free from germs.

*Stock:* A related group of family of animals.

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P.O. Box 7698  
Riverside, CA 92513

For his ever ready support and consultation, for the store house of information and resources, made available through him to Sommer Haven of which so many receive benefits.

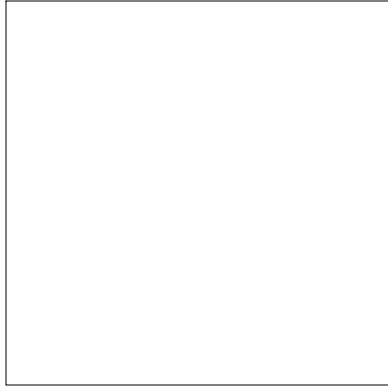
The People's Workbook, Environment & Development Agency  
1981, Box 62054 Marshall Town,  
2107 Johannesburg, South Africa  
ISBN 0620053550

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