Introduction

One of the main concerns of Agriculture teachers in Vanuatu is the lack of teaching material resources which are of local taste as well as fitting the local environment.

This manual should meet some of those concerns to enable agriculture's teachers to teach along the same line and using the same course material.

Using this material should also provide students with sound background knowledge about improving village chickens to produce high productive yields.

It is the writer's aim and objective that students completing this unit should have some interest on chicken production so as to continue for further education in agriculture or to return to improve rural nutritional status and to upgrade Vanuatu economy at large. Since teachers majoring in other subject areas are bound to be teaching agriculture at this stage, it is the writer; hope that this manual be easy and effective for use both theoretically and practically.

Section I

Introduction to Chickens

Teaching objectives: Upon completion of this unit students should:

i. Have an aim to the type of chicken project one would like to run.

ii. State the importance of chickens in Vanuatu paying particular attention to:
   a. nutrition value.
   b. Why and uses of chickens.

iii. List different types of chickens available in Vanuatu.

iv. Identify the difference between layers and broilers.

1. Type of Chicken projects

Chickens are reared for many different reasons.

a. Broilers - chickens raised for meat.

b. Layers - chickens raised for eggs.

c. Hatcheries - chickens raised for their chicks.

d. Show business - chickens raised for show.

In Vanuatu chickens are mainly raised for meat. The meat is mainly used at times of special ceremonies.

2. Importance of Chicken in Vanuatu

a. History of chickens in Vanuatu

The bush fowl or red jungle fowl (Gallus gallus) would have been brought to Vanuatu several thousands years ago by some of the first settlers. These fowls have inter-bred with European or other breeds of chickens introduced and dispersed by overseas.

All family had poultry which all roosted in the trees standing around the houses (Bary Weightman 1989).

b. Uses of chickens in Vanuatu

Chickens in Vanuatu are raised mainly for its meat. The bi-products as feathers are used for decorations during customary dances as well as use to decorate mats for ceremonial purposes. The bones are good source of phosphate fertilizer.

Section II

ANATOMY

Teaching objectives

Upon completion of this unit students should:

a. Handle chicken with the hands in the correct manner

b. Identify the main external features

c. Draw and label diagram of a chicken in detail

d. Differentiate between the male and female characters in chickens.

1. Handle chicken with hand

Steps and key points in doing the job:

a. Enter the chicken yard, house or fence
   i. Wash hands and feet for house or fence hygienic purposes.
   ii. Be as calm as possible.

b. Select which chicken to be handled
   i. Move slowly towards the selected chickens.
   ii. Hold the chicken with a firm grip.
   ii. Do not allow the bird to flatter as it will alarm the flock.

c. Handle the chicken
   i. Get a firm grip on each tarsus.
   ii. One of the tarsus should be between the middle finger and the fore finger.
   iii. The other tarsus should be between the fore finger and the thumb.

d. Identify the different external parts
   i. See the diagram on page 10.

Poultry

1. Chickens
2. Turkeys
3. Geese
4. Duck

Chicken	Name
Male	Cock
Young Male	Cockerel
Female	Hen
Young Female Pullet	

Chickens

They are birds (they can fly)

1. Wings, feathers
2. No teeth (beak)
3. Have bizzard sucks-like teeth
4. No anus, have a common opening for foetus, eggs, sperms - cloaca or vent.

a. We keep chickens because:

i. *Food*
- proteins (body building)
- Egg
- Meat

ii. *Cash*

iii. *Subsistence farming*

iv. *Manure*:
- (compost)
- organic fetilizer - provide nutrients to crops.

v. *Feathers*:
- Use in custom ceremonies
- Shuttlecock (Badminton)
- Cushions

6. *Bones and blood*:
- Organic fertilizers
- rich in phosphorus

Poultry products have taken an important place in the nutritional section of Ni-Vanuatu for many years.

The egg supplies mainly:

- calcium
- iron
- vitamin A
- protein

The above list are all elements important to the growth of young children.

Among the products of animal origin a high rank must be given to chicken egg and meat with the following composition shown on the tables below:-

Table 1.1 : Average egg composition in percentage

Nutrients	Hen's eggs	Guinea Fowl's eggs
Shell $ membrane	12% total weight of edible part	15% total weight of edible part
Water	74%	72%
Protein	13.4%	13.5%
Lipids	10.4%	11.8%
Carbohydrate and mineral	2.1%	2.5%

Table 1.2 : Average Yield carcase/live weight

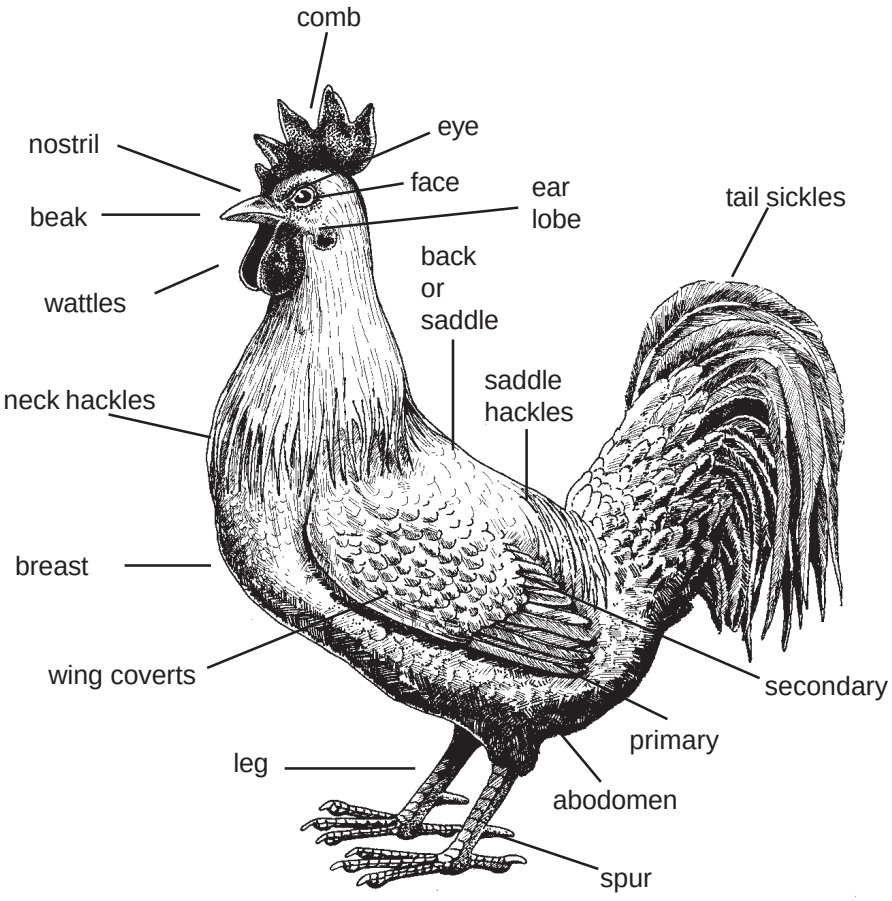
Animal	Percentage
Cattle, sheep and goat	50%
Pig and poultry	65%

Table 1.3 : Proportion of protein in the flesh

Animal	Percentage
Cattle	15%
Sheep & goat	12%
Pig	11%
Chicken	14%

2. External feathers of Chicken

a. The diagram below shows some of the main exterior parts of chickens.



b. Different types of feathers and their uses

The body of chickens is covered with feathers.

The feather developes from the skin and has the functions of protection and locomotion.

Steps in doing the job

Plug out the feathers, and identify the purpose each type of feather.

Compo Diagram showing features of chicken feathers.

Key points

a. The pinnae are the long rigid feathers. This are used main for flying. These are sometimes called primary feathers.

b. The tectrices are shorter and more flexible than the pinnae and are sometimes called secondaries.

c. The down feathers are small and tufted. These feathers mainly provide for thermal insulation.

d. Filoplumes are small unshaft feathers carrying only a few barbules.

D. Difference between the male and female chicken characters

The difference between male and female characters can be best featured is a small school chicken project.

Steps in doing the job

Handle a male chicken or rooster.

Key points

a. The whole size of the bird is much larger than the size of the female bird.

b. The comb is much larger

c. Longer size of the tail sickles

d. Longer tarsus

e. Larger shank

f. Larger wattle

g. Presence of the spur

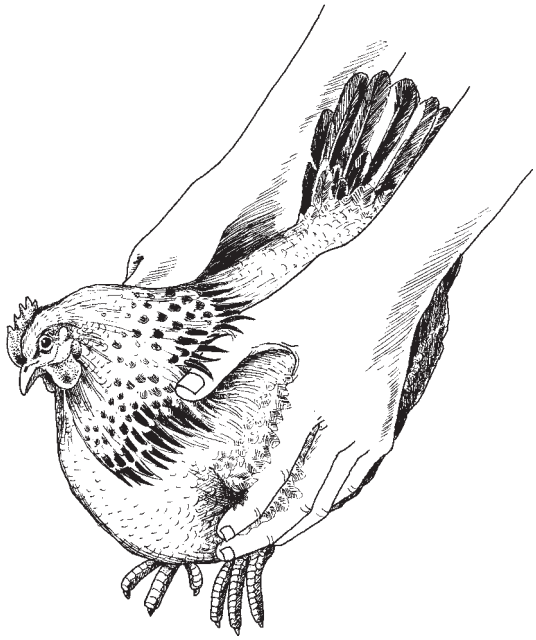
Handling of Birds

Birds must be handled firmly.

A hook could be used to catch bird with.

i. Handling of chicks
See diagram on lesson 25, Solomon Islands (Agriculture Teaching Notes) **Growing Meat Chicken**

ii. Handling of adult birds
Handle firmly from the *side*, under the *abdomen,* with the two hands. Care should be taken on having the bird "*quiet*".



The ark can be moved into fresh ground every few days, so that the chickens inside can grade and find some of their own food in the form of grass, insects and worms.

iii. Intensive method

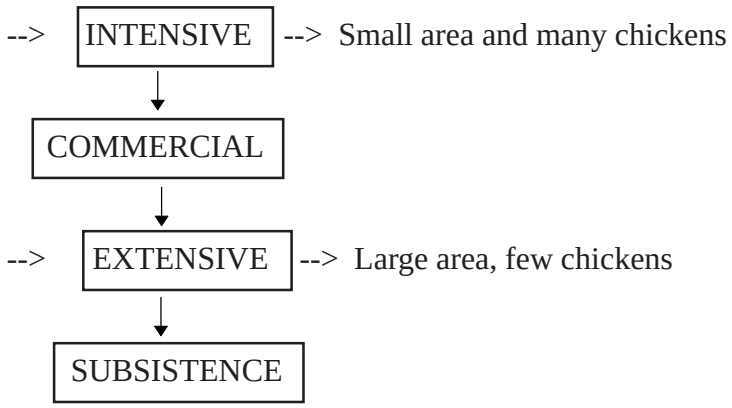
a. Step litter house

1. Many birds are kept in a house
2. House equipped with feeders, drinkers, laying boxed and roosts
3. Chickens move in the house
4. The floor is covered with litter made of dried grass, saw dust, wood shaving etc.
5. The litter is stirred regularly and more is added on top. The litter heats up as a compost heap and destroys disease organisms
6. Once a year the litter is removed and used as compost, fresh litter is then put

b. Battery system

1. Each bird has a little rage for itself for the whole laying period.
2. The floor is sloping slightly so that when the egg is laid, it rolls down into a wire trough.
3. Food is given in feeding troughs fitted outside the cages. The chicken can take their heads out and feed.
4. Water and medicine are given automatically to the chickens

* In a house about 500 chickens can be kept.



Health and disease

Prevention is better than cure

The value of one bird is small since a bird is short-lived. Therefore it is usually cheaper to cull-kill it and eat - if it gets ill.

Sign of health and disease

It is possible to tell when animals is sick just by look at it:

A healthy chicken

1. Looks alert and lively
2. Has bright eyes and a red comb
3. Walks normally
4. Scratches the ground or litter looking for food
5. Look around carefully at all the bird if any are sick or lame or do not eat.
6. Control pests and diseases
7. Record the number of eggs collected/sold and the work-done everyday.

A sick chicken

1. Looks dull and miserable
2. Has dull eyes and dull comb
3. Keeps still and doesn’t to get up
4. Does not look for food

System of management of chickens

1. Extensive
2. Semi-intensive
   a. house and run
   b. movable fold or ark
3. Intensive
   a. deep litter
   b. battery

Extensive

- The chickens are not restricted in any way.
- They can wonder in the field as they like. There should be a house for roosting at night and for laying-eggs
- These are common in villages in Vanuatu.

Advantage

a. No overcrowding

b. No expensive wing etc...

c. Chickens have plenty of exercise

d. Smaller food cost as they obtain grass, weeds, kitchen wastes freely

Disadvantage

a. Close supervision is not easy

b. Eggs may be laid all over the place

c. Chicken may get into crops and spoil them

d. Easy prey to wild animals (dogs, cats and pigs)

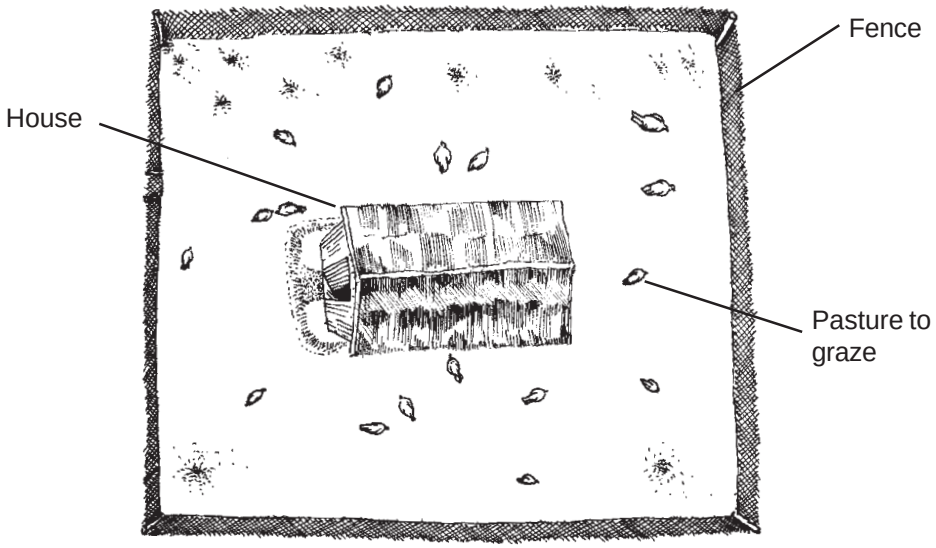
e. A breeding policy is not easy unless roaming cocks are kept away

f. Disease can be easily caught from other flocks.

Semi-Intensive

The birds are restricted in movement.

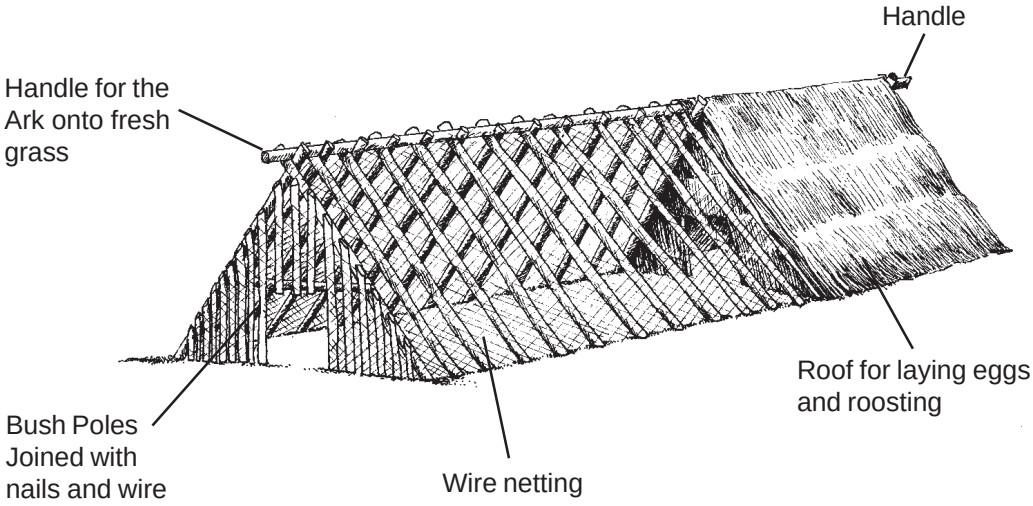
a. House and Run



This consists of an enclosure in wire-netting with a roofed house for **laying** and **roosting**.

They graze and look for food in the **pasture** food and water must be given to the chickens.

b. Moveable fold or Ark



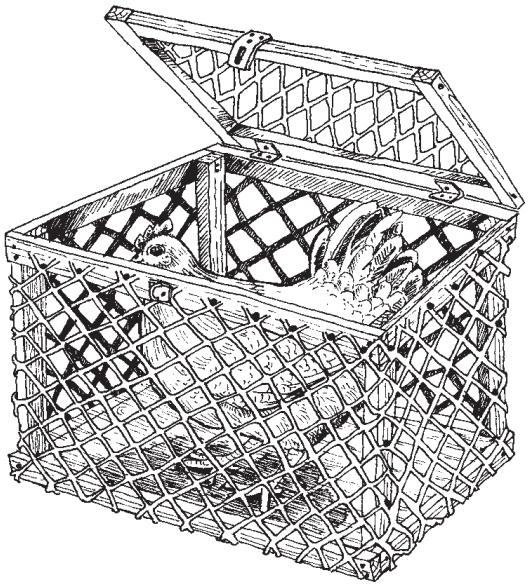
Practical Work

Aim: to test for broodiness in hen

1. Put a broody hen in a trap nest for 36 hours. Provide her with feed.
2. Raise the trap above the ground slightly, to let cool air circulate under the hen. If she has been broody this will help her forget the warm nest. She might begin to lay again.
3. If the hen lays, put her back with the flock.
4. If she does not lay, she must be *culled* and *slaughtered*. Because this shows she may not lay any more eggs *materials required*: hen (broody), trap nest, feed.

   Cull means to remove and animal from the flock because it is no longer productive, also it is also management.

   Slaughter means killing an animal for food.



Trap Nest made of wire neting walls and floor

Broodiness

A hen becomes broody when she stops laying eggs and sits on them.

Signs of a broody hen

1. The hen sits on her eggs trying to hatch them
2. She will not leave the nest
3. If she is approached she gives a “treat display” ruffling her feathers
4. If an Egg is placed near her, she pulls it under with her beak.
5. If you lift her up she feels light in weight because she has not been eating.

A hen will become broody if she has a lot of eggs in the nest. Prevent it from becoming broody you can keep removing some eggs making sure that at least 2 eggs remain in the nest if you remove all eggs from the nest the hen will leave the nest and make another one.

Feeding Chickens

Like all animals, chickens need a **balanced diet**, throughout their lives.

a sufficient supply of each of the main foods:

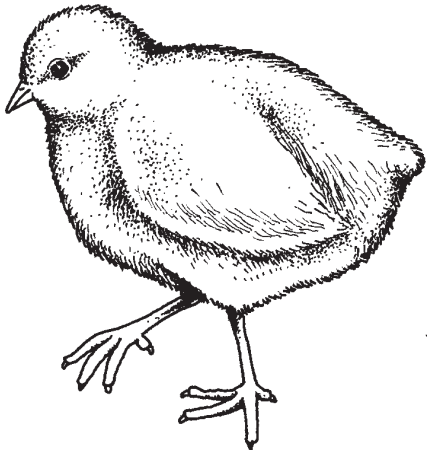
- protein - body building
- carbohydrate} energy foods
- fats
- minerals } protective foods
- vitamins

Chickens feeds supplied by **millers** are prepared with all these nutrients in them. The *proportions* differ according to the age and size of the bird for example:

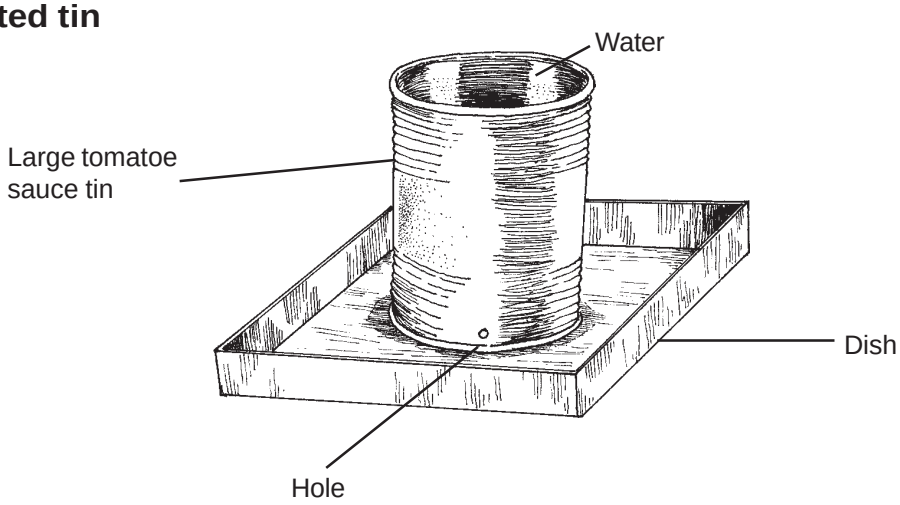
Chicken starter mash

Is for chickens from one day old to five weeks. It is finely ground, so that young chick can eat it easily and it contains plenty of protein minerals and vitamins to build up flesh (meat) and bones.

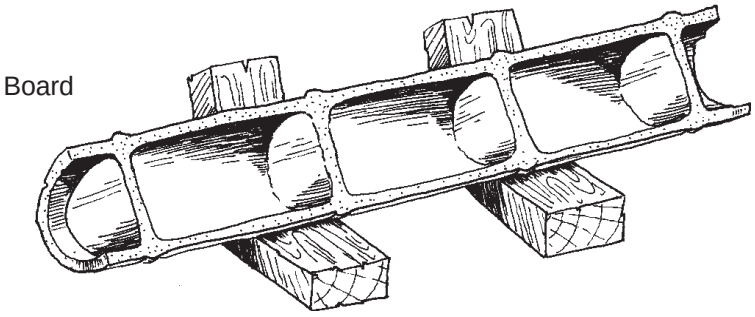
1. A day old chick



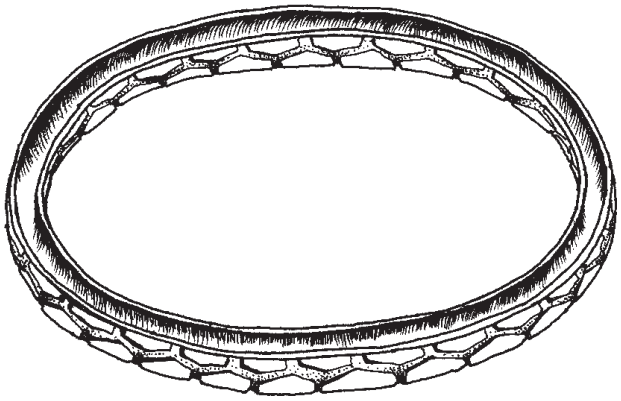
2. Inverted tin



3. Trough made from split bamboo nailed onto boards



4. Water through made from a spit motor tyre



Feeder and drinkers most be cleaned regularly to avoid any risk of disease.

It produces **BILE**. Important in digestion of fats and oils.

There are two types of break down:

1. Physical - teeth/gizzard
2. Chemical - digestive juice - enzymes

Caeca

The cellulose found in green plants, grasses is digested.

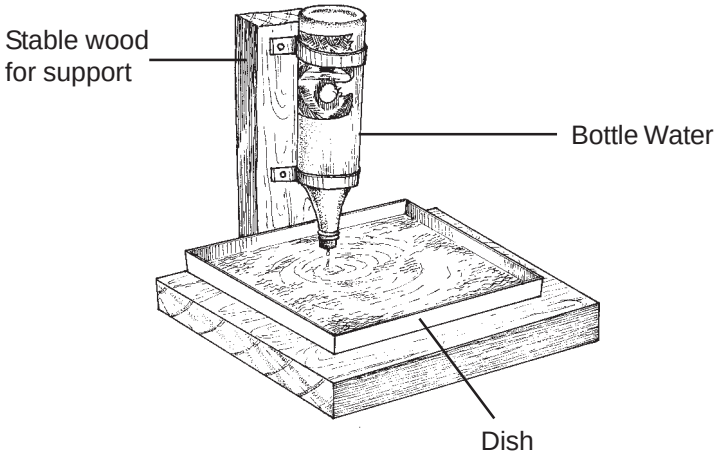
Feeding troughs (feeders)

These need to be stable, easy to clean and big enough for all the birds (chickens). Birds should not be able to get in them.

Drinking troughs (feeders)

Able to supply clean water which cannot be soiled by the birds walking in it, the supply must continue replenish a very nail crew trough, only just wide enough to drink out of.

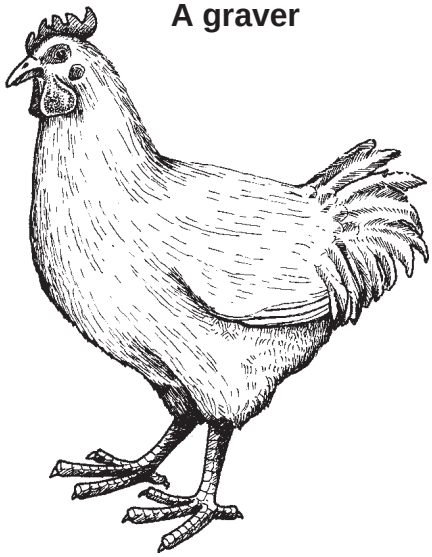
1. The Inverted Bottle or tin makes good supply tanks



2. Growing mash

Is for hens from five weeks to pant-of-lay (18 - 21 weeks). It has slightly less protein in it but more carbohydrate to provide the energy that active young babies need.

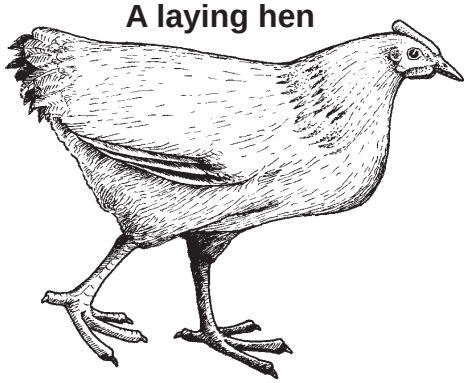
A graver



3. Laying mash

Is for hens that are producing eggs. It contains plenty of protein and minerals necessary for producing eggs and eggs shells. Less carbohydrate is included, because the birds are not so active and they should not be allowed to get too fat.

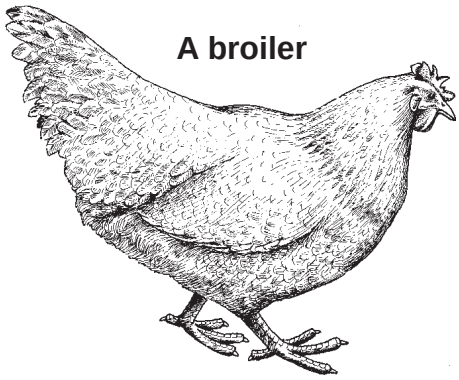
A laying hen



Broiler mash

Is for birds bed for meat production. It is rich in protein and carbohydrate to provide the food materials needed for rapid *growth* a *energy production*.

A broiler



Water
- Must be available to all chickens all the time
- It must be clean, fresh water
- Drinkers must be regularly cleaned

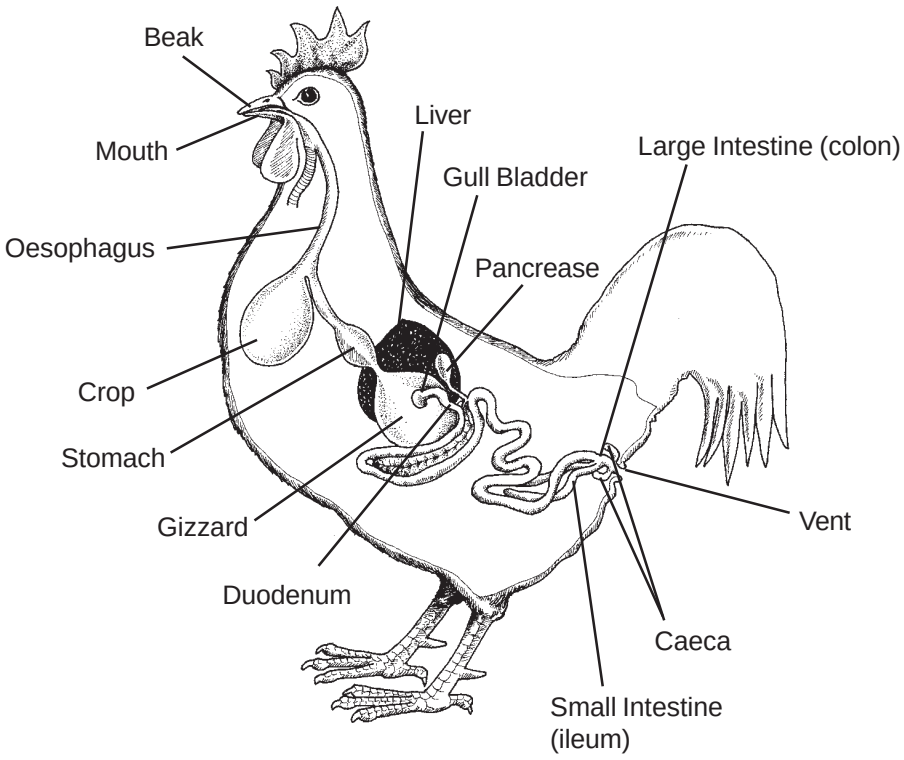
A laying hen should never be without water.

Crit
- Small pieces of stones most be given to chickens. This is swallowed and kept in the Gizzard where it helps to **grind** the food.

Working with Chickens

1. Never surprise them.
2. Move slowly inside the chicken house.
3. Keep to regular routine everyday:
    a. feed
    b. water
    c. clean the feeders & drinkers
    d. collect the eggs

Digestive system of a Hen



It's digestive system has a different structure. The parts function as follows:

Alimentary canal:		That runs from the mouth to the vent. The alimentary canal and the organ joining it make up the digestive system of the animal.
1.	**Beak:**	This is used for picking. The food is eaten quickly and swallowed whole.
2.	**Oesophagus or Gullet**:	the food passes down to the crop though this tube.
3.	**Crop:**	This stores the food and softens it.
4.	**Proventriculus or Stomach:**	This produce gastric juice, including and weak hydrochloric acid to digest protein food.
5.	**Gizzard:**	Grit (Small pieces of stone) is swallowed by a hen and held here with a help of the muscular walls of gizzard. The ????? grinds the food.
6.	**Duodenum:**	This is the first part of the small intestine.
7.	**Pancreas:**	This produces pancreatic juice which has many enzymes to digest the food. It secret digestive juice which help to break down food.
8.	**Gall-Bladder:**	Bile is made up by a liver, stoned in the gall bladder and released in duodenum.
9.	**Ileum or Small Intestine:**	This is also produces enzymes to finish the *digestion* of food. It allows the soluble food to be *absorbed* into the blood. Enzymes produce digestive juice.
10.	**Caeca:**	There are two close tubes doing the ileum.
11.	**Colon or Large Intestine**:	Here water is reabsorbed. The colon is very short.
12.	**Vent**:	The *foeces are passed* out from here.
13.	**Liver:**	This is the largest organ in the body It stores a to large amount of blood It stores the excess digested food like sugar It produces **urea**

Digestion

Digestion is the process by which an animal breaks down food, so that it can be absorbed into the body. The process takes place in the gut or

A Broody Hen

- Sits on a hen trying to hatch them stops laying eggs.
- She feels light in weight because she has not been eating
- This condition is known as **broodiness**
- A broody hen can be used for **incubation**, making eggs, hatch chicks.
- If a broody hen is not needed then she is kept in a trap nest with some food and water for a few days. Good ventilation is needed.

  After some days she will start laying eggs.

Breeds of Chickens

1. Wild breed - (jungle foul)
2. Egg laying breed (layers)
3. Heavy breed (broilers)
4. Dual-purpose breeds
5. Cross-breeds (hybrids)

1. Wild Breed

- breeds only once a year. Lays a **clutch** of up to 22 eggs, then sits on them to **incubat**e them.
- it than broods for as long as necessary until the **chicks** are independent.
- from this breed have originated many different types of poultry with specific characteristics purposes.
- from this wild breed we get:
  - eggs-laying
  - heavy
  - dual -purpose
  - cross-breed by the help of scientist.

2. Egg-laying breed

- these lay most eggs buy don't **fatten** well to make much meat.
- They are rarely broody and make poor-sitters and tend to be **excitable**.

examples: white leghorn
black leghorn

Steps in doing the job

Handle a female bird

Key points

a. Shorter comb

b. No presence of tail sickle

c. Shorter neck hackles

d. No presence of spur (depends on type of breed)

e. Shorter wattles

f. More fluffy abdomen

g. Shorter beak

h. Shorter ear lope

3. Heavy Breeds

- these birds may not be such good layers, but have **more meat**.
- They are less-excitable, and make **good mothers**.

Examples:

KIR--> rhode--> island--> red.

4. Dual-purpose Breed --> [Dual means Both]

- these have a combination of the characteristics layers and broilers.

Example:

light--> sussex--> L.S.

5. Cross Breeds

• [hybrids] pure breeds

• RIR Cock x L.S hen

HYBRIDS - (CROSS-BREED)

- This is the name given to chickens whose parents are of different pure-breed

- The hybrids are resistant
  a. hardier, stronger, more resistant, more better meat & eggs
  b. more vigorous to climate and pest and diseases
  c. more productive than the pure-breed parents.

- pure-breed x pure-breed = hybrid
  hybrid x hybrid = can not be done, result will be very weak and bad.

- Hybrids themselves are not used for breeding and so their eggs are only for **eating**.

Improvement of stock

- Most local provide very few *eggs* in a year and only give a **carcass** remove legs, feathers & intestines with very little meat one it.

- Improvement is possible on this lines:

  1. Better management
  2. Better feeding
  3. New blood
  4. Better breeding
  5. Cross - breeding

Better feeding

Feeding is done with **rations** worked out according to the exact requirement for maintenance and production of meat and egg.

Food
- starter pellets
- graver pellets
- layer pellets

Better management

a. Regular feeding and watering

b. Keeping houses and runs clean

c. Control and treatment of pest and diseases

d. Keeping records

Better breeding

a. Selection and culling is done with a stock regularly

b. Only best birds are preserved for breeding

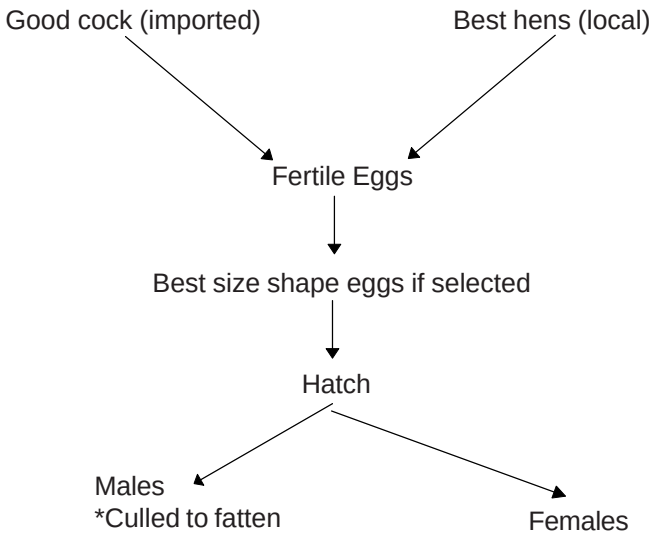
c. Only good cocks are allowed to run with the hens

d. Cocks and hens not needed for breeding are separated, allowed to fatten and sold or slaughtered

e. Eggs for hatching most be of the right size and shape and of the selected breed for the area

f. Only eggs from hens which lay well should be hatched.

A breeding plan



New blood

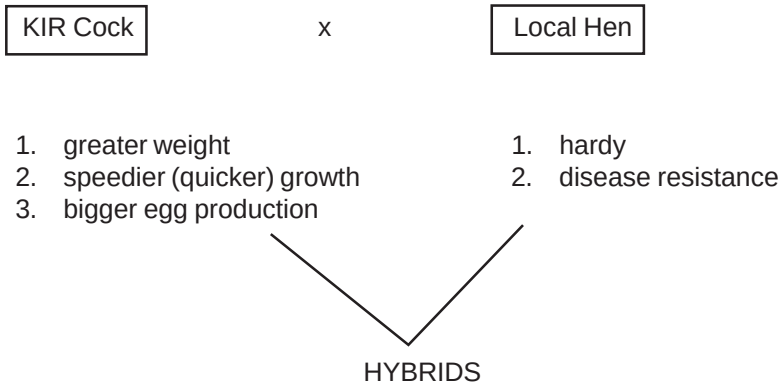
It is good to introduce new stock into the flock.

Example:

A R.I.R cock brought in from outside can greatly improve the existing stock.

Cross breeding

If an *introduced* improved breed such as the R.I.R is bread with the local hens, the diseases resistance and hardiness of the local hen is combined with the greater weight, speedier growth and bigger egg production of the imported breed.



Fertilization in Chicken

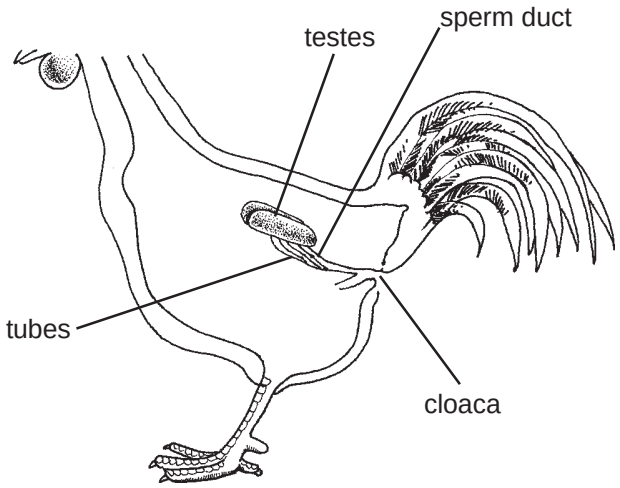
Fertilization is the union or joining of the male sperm with the female egg to make it grow into a chicken.

Egg formation

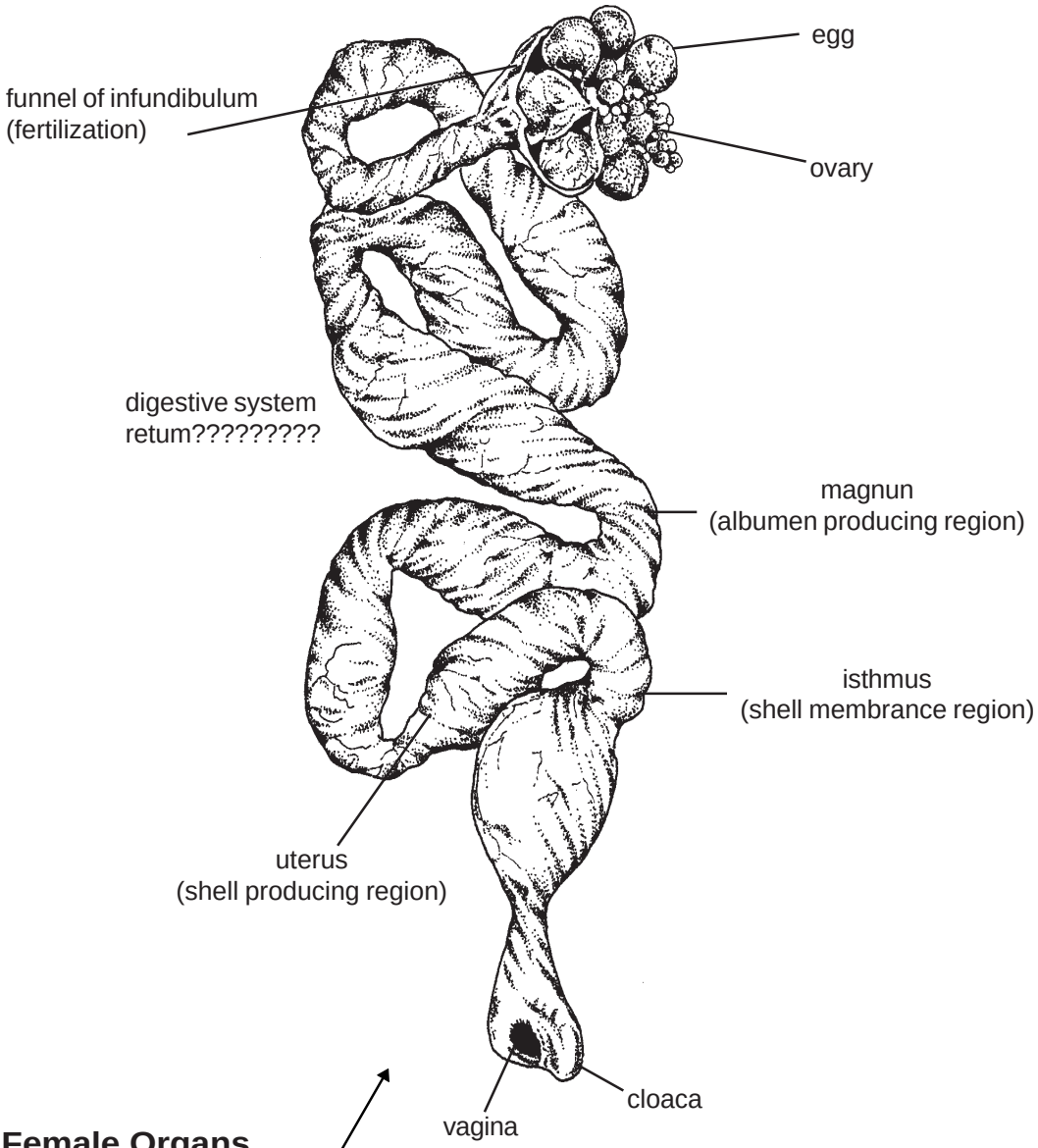
The male chicken is called **rooster** or **cock**. Inside his body are two pale yellow organs called **testes** which make the *fluid* or *semen*. This semen contains many small things called **sperm** which can join with an egg and make it grow into a chicken.

There are small tubes coming from the testes. These tubes take the sperms to the **cloaca**. The sperms are kept there until the rooster mates with a hen.

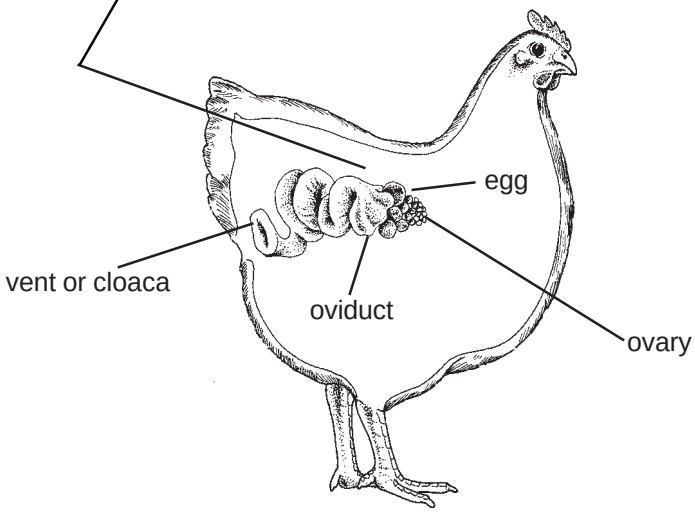
Male Organs



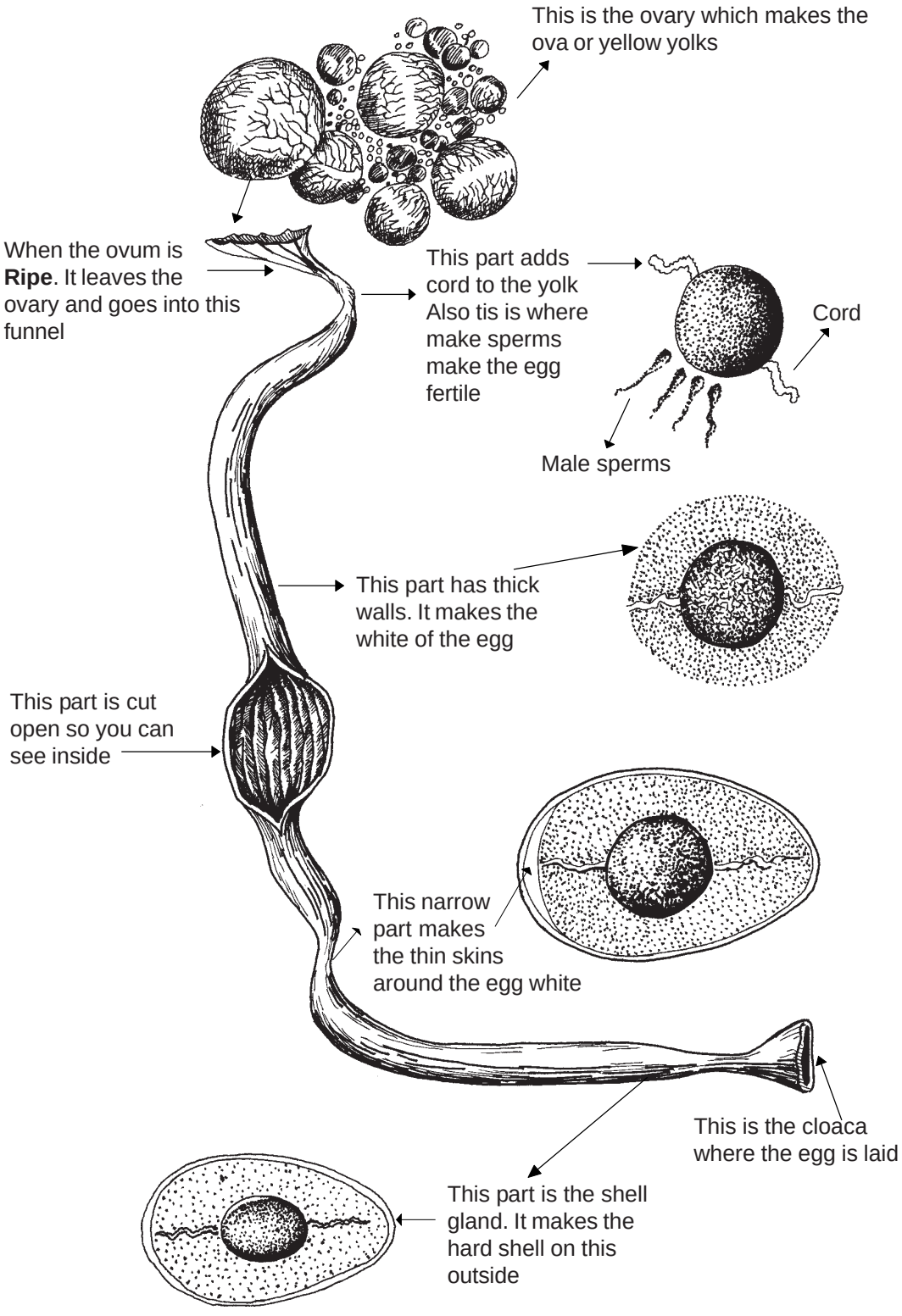
Female Organs



Female Organs

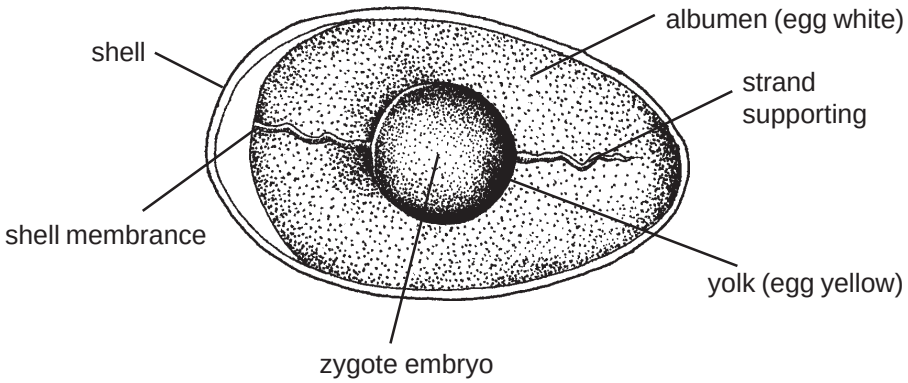


The Oviduct and the making of an egg



Funnel which stores the sperm

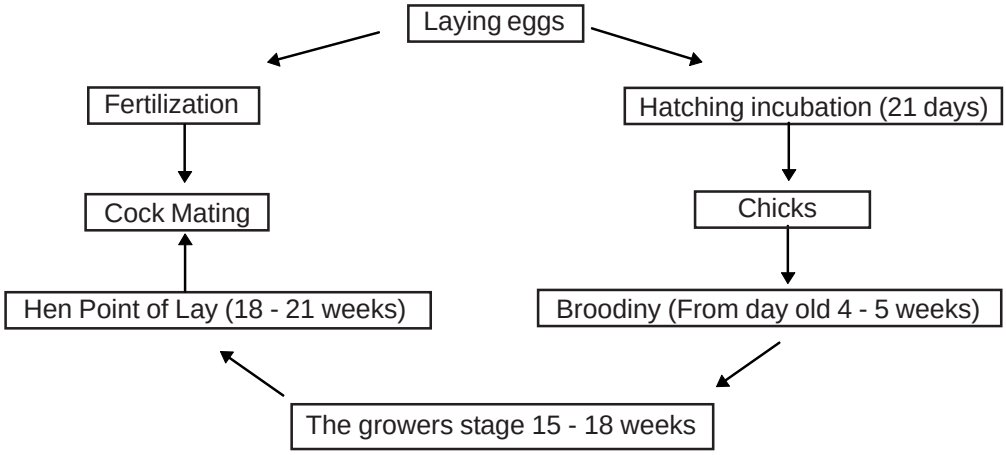
- In the magnum the albumen is added during the 3 hours stay.
- The isthmus some albumen, mineral, salts, water and shell membranes added.
- In the uterus (shelling gland) the shell is put into the egg. The egg stays in the uterus p for a period of 18 - 21 hours.
- The egg passes in the **vagina** just prior to laying from the time of **ovulation**, to laying, the egg takes about 24 hours.



Order of producing eggs

1. O -
2. F -
3. M - magnum
4. I - isthmus
5. U - uterus
6. V - vagina
7. C - clocoa

Life Cycle of a chicken



Laying of eggs

A hen usually lays one egg/day. She usually works for a proper place to lay a latch of eggs, before she sits on it for incubation. A hen which sits on her egg for hatching is called a *broody hen.* Unfortunately when the hen is broody she will not lay anymore eggs.

To avoid broodiness

- Remove eggs every day and so to leave only 1 or 2 eggs on the next.
- Use of artificial egg
- Select good breed which do not exhibit (so much) the tendency of broodiness.

Signs of hen in lay

A hen in lay should have the following characteristics:

1.	Comb	-	large/bright red
2.	Face	-	bright red
3.	Vent	-	enlarge, smooth, moist, bluish white
4.	Pubic boons	-	(Thin), pliable, spread apart
5.	Abdomen	-	expanded, soft, pliable
6.	Plumage	-	worm soiled

The female chicken is called a **hen**. Inside its body is an organ called **ovary** which makes the yellow part of the egg or yolk. In the ovary the yolk grow bigger. When one of them is big enough, it breaks away from the ovary and goes into a long tube. It first goes into a funnel at the end of this tube, then into a narrow part.

In this narrow part the sperms are waiting and one of them will join with the egg so it can turn into a chicken.

Another thing that happens in this narrow part is that two cards are tied onto the yolk. Next the eggs goes into a tube with thick walls. This part makes the white of the egg and puts it around the yolk. Then the eggs goes through a narrow part where two thin skins are formed around the egg. After that the eggs goes through a narrow part where two thin skins are formed around the egg. After that the egg goes into the shell gland which is a tube with thick walls, here the hard shell is formed around the egg.

When the egg is hard, the hen may sit on it and keep it warm. Then a chicken may grow inside the egg.

- Male sex organs --> 2 **testes** (sing. testes)
  Each testis produces the male gametes --> **sperm**
- Female sex organs--> 1 functional **ovary**
  The ovary produces female gametes --> **eggs** or **ova** (sing. ovum)
- No oestrus cycle

N.B. Hen can lay eggs without mating with a cock but these eggs are **infertile**. Only eggs produced after mating are **fertile** and these can develop normally to produce a chick.

To brood --> broods - brooding

Brood --> hen stops laying eggs and just wants to sit on the eggs and look after them.

Mating

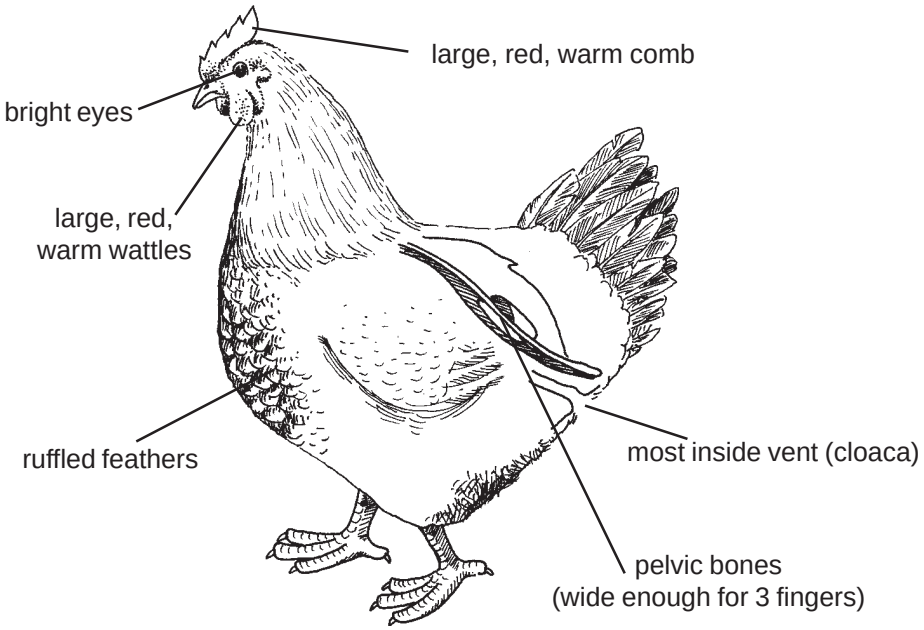
- Union of the hen with the roaster (cock)
- The sperms are passed from the vent of the male to the vent of the female
- The male to the vent of the female
- The sperms swim to the **oviduct**

Fertilization

- Fusion of the sperm with the eggs (ova)
- In the oviduct, one sperm uses with the egg cell to produce a **fertilized** egg
- Fertilization takes place in the **infundibulum**

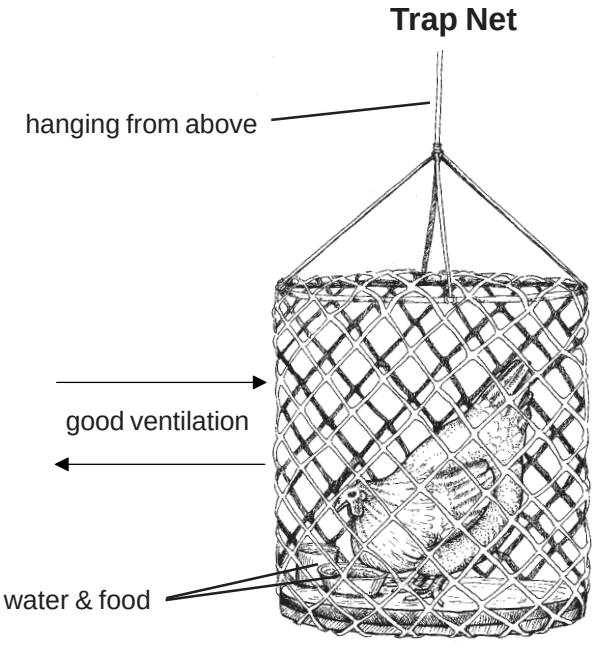
Points to look ? a layer

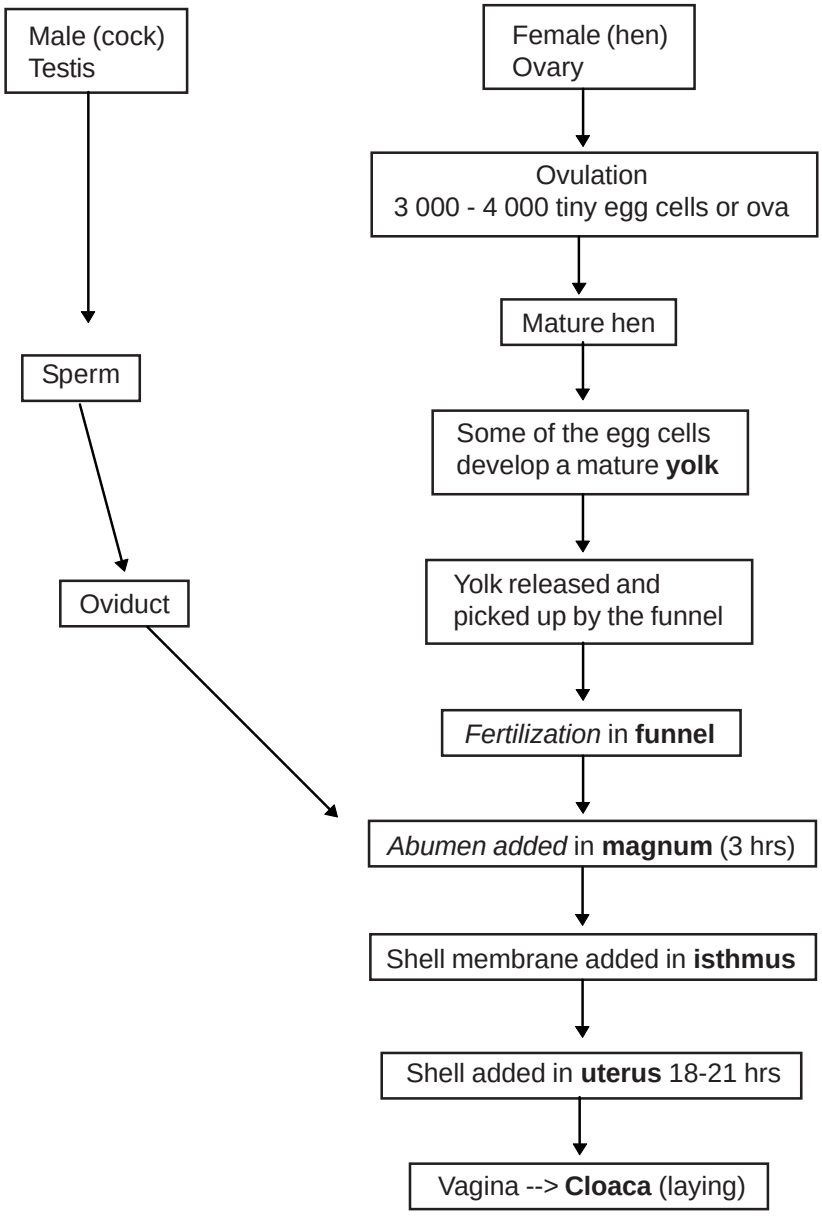
How to tell if a bird is '*in lay*'.



Trap nesting

To be sure a hen is not laying you must isolate it for a few days in a *separate* cage or **trap nest**.





		5. Difficult breathing 6. Yellowish diarrhoea	1. No treatment 2. Kill the whole ? 3. Vaccinate every ?
Merer's disease	Virus	1. Paralysis and death of chickens 2. Lumps on internal organs	1. No treatment 2. Vaccinate at one day old

Vice (Bad habits) of Chickens

a. Egg pecking

- Chickens eating their own eggs

* Cure by collecting your eggs regularly
OR
Cull the bird that is eating eggs

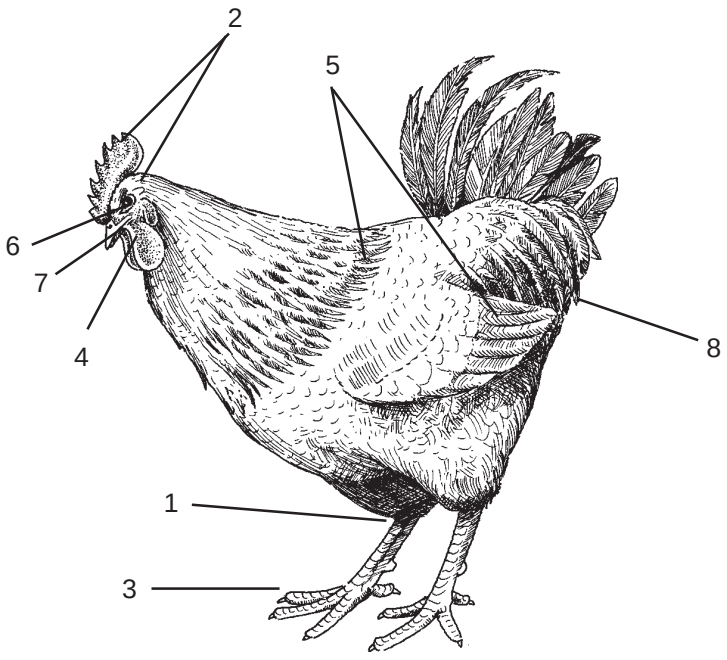
b. Cannbalism

- Chickens peck each other so much that bleeding or even death can occur
- The vice is made worse by over crowding or lack of food or water or an open wound on a bird which others can see.

* Cure by providing enough room for each bird, giving enough food and water and isolating wounded birds until their sores are healed.

????????? Where are the others 1? 2? 3? 4???????

5. Has smooth glossy feathers	5. Has dull, rough feathers
6. Breaths easily and quietly	6. Makes snoring or coughing sands as it breaths
7. Eats well good appetite	7. Has a poor appetite
8. No blood in the droppings	8. Blood in dropping



1. Alert and attractive
2. Bright eyes and comb
3. Walks normally
4. Looking for food
5. Smooth and glossy feathers
6. Normal breathing
7. Good appetite
8. Normal dropping

Marekers disease

Like other poultry diseases, Marek's disease is also very important in poultry. It is a virus which induce or cause viral cancer in poultry. The infections in this case occurring mainly in the nerve trunks of chicken, under five (5) months of age. So therefore Marek's disease can be susceptible so chicken under 2 - 5 months old.

Cause
Mareks disease is mainly cause by a virus called herpes virus.

Spread
Virus can spread diseases very easily and quickly, from one chicken to another and also from one place to another . Herpes virus can spread easily by:

i. Contaminated sheds
ii. Dust
iii. Feathers
iv. Social order (pecking)

Symptoms
The symptoms or signs of mareks disease are very important especially is poultry farmers. Symptoms can enables the farmers to effectively identify the infected birds from the healthy ones and take any preventive measures.

These symptoms are:

i. Lameness then paralysis of wings
ii. Birds often down with one egg forward and one leg back
iii. Blindness may occur

Treatment
At this stage there is no available treatment but we can control to reduce the effect of the disease on chickens.

Control
These are some controls that the farmer can carry out:

i. Vaccination of breeder flocks and day old chickens
ii. All in and out at the same time
iii. Though cleaning of sheds using disinfectant

Fowl pox

Fowl pox is a very important disease of poultry in Vanuatu. From time to time it sweeps through village poultry population in the country, and cause the death of many of them.

Birds of all ages are susceptible to fowl pox except the very young. Out breaks of fowl pox are seen occasionally in chicken a few weeks old with high mortalities but the disease is seen more in older birds.

Cause
Fowl pox is caused by a virus (pox virus)

Spread
The fowl pox virus is spread in two ways:

It could be spread by:

i. mosquitoes and biting insects example: ticks and lice which unfeathered parts of the bird.
ii. Contaminated poultry houses and infected litter

Symptoms
Swellings, like warts, appear on the comb, wattles, eye lids and sides of the face. Occasionally these wart-like growths are found in the corners of the mouth, inside the mouth on the lining of the oesophagus. Because of these, it will be affecting the feeding behaviour of the bird and starvation may follow causing mortality rates of up to 50%. The birds go of their feed so there is a great drop in growth rates and egg production. The infected birds will be much more susceptible to other diseases. Stress factors play an important part in this disease. For example worm infestations, unbalanced nutrition will increase the number of mortalities from fowl pox.

Treatment
At the present stage we have no satisfactory treatment against the fowl pox disease. However, there are a few control or preventive measures which we can apply to reduce or if not stop the occurrence of this disease.

Control
Poultry can vaccinated or given an injection to prevent fowl pox. Usually a "**mildstrain**" fowl pox vaccine is used - this can be done and used on birds of any age groups: The "**stab method**" is used when vaccinating. The birds are held, a wing is expanded and the vaccinating needle (which has be tipped into the vaccine) is pushed into the *wing web*.

There is also another type of fowl pox vaccine which is made up of a stronger stain of virus. This is called **standard** fowl pox vaccine and could only be used in *healthy birds over 6 weeks of age*.

After vaccinating the birds you have to go back 7 or 8 days later to check if it has been successful. To do this, check the point on the wing which you have injected, if the vaccination has work you will find a small white lamp where you pushed the vaccinating needle through the skin.

Control
With contaminate poultry houses and infected litters, the houses be disinfected wing or disinfectants which are intended for the destruction of viruses. The litter should be removed and burned the house thoroughly washed and disinfectant applied. After the disinfectant is applied a *resting period* should be followed before chickens could be use the houses again. (Resting period depends on the instructions given and specified on the instruction manual of the chemicals).

Proper hygiene measures should also be undertaken to avoid this disease example: Boots and hand gloves should be disinfected with a disinfectant at the entrance of the houses.

Example: of some chemicals used to disinfect infected houses are :

i. formalin and permanganate
ii. sulphur dioxide

Diseases
Any divination (change) from the normal life of a plant or animal is known as a disease.

Coccidiosis

Cause1
This is a disease caused by *coccidia* which are tiny organisms which can be seen only under microscope.

Types
There are many species (types) of coccidia. Each species like to live at different places in the intestine.

a. Caecal coccidiosis
This coccidiosis affect the blind gut of chickens.

Symptoms
Symptoms are usually seen when the birds are 3 - 6 weeks old, although sometimes older birds are affected.

Blood in the droppings is a characteristic sign. Some chicks die within few hours after this has appeared.

b. Intestinal coccidiosis

Intestinal coccidiosis occurs among older chickens but it is less severe than the caecal form.

Usually fewer birds die, but in severe cases, death may occur within the first appearance of ill-death.

Symptoms

There are several types:

i. Similar to those of caecal coccidiosis
ii. With other types small white spots and redness are often seen from the outside of the gut.

Prevention

i. Clean and disinfect all the uteruses and dropping boards.

ii. The litter should always be kept dry because the parasite survive in damp areas.

iii. Preventive drugs are normally added to the diet.

N.B. Preventive drugs won't work efficiently if the housing area is not kept clean.

Treatment

If the disease is recognized, ie. severe bleeding, this can be treated with either sulfadimerazine or sulfaquinoxaline given in drinking water.

N.B. Before treatment is began, all drinking water should be ? and replaced by water to which the recommended quantity of medicine has been added.

Sulfadimerazine 2g/l in drink water

Sulfaquinoxaline 0.25g/l in drinking water for 3 days twice at least 2 days interval.