

Section 1 **About this book and how to use it**

1 Introduction

This book is for anyone who keeps animals and for people who help, advise or teach others who keep animals.

The book aims to help you to keep healthy animals – or help others to keep healthy animals – in places where there is no vet or veterinary services are not easily available. It also helps you to work out what is wrong with an animal and tells you what to do about it. It will help you to talk to veterinary and other animal health services. If you understand diseases and treatments better you will find it easier to work together with others to keep animals healthy and to ask for better animal health services.

People keep animals in many different ways, in houses or out on open rangeland, for example (see p. 2). People who keep animals out on open rangeland can do things such as moving their animals a long way to different pasture that more settled farmers cannot do.

The book gives examples of ways to treat and prevent disease in different places so that you can find one suitable for your area.

Animals

This book describes the health and disease problems of some of the kinds of animals important to farmers and herders:

Cattle

Buffaloes (These are the domesticated **Water buffaloes**, not wild **African buffaloes**.)

Camels

Horses, mules and donkeys (Mules come from a male donkey and a female horse. A 'Hinny' comes from a male horse and female donkey.)

Sheep

Goats

Pigs



It also describes a few important problems of:

Dogs **Rabbits**

The descriptions usually start by describing what could happen to any kind of animal but use cattle as an example. Then they tell you what is different about other animals.

Birds The book mostly describes chickens but other types of birds, e.g. ducks, geese, turkeys, guinea fowl, quail and pigeons, get similar diseases and you can usually treat them in the same way. The book describes a few important diseases these other birds suffer from.

Plants

The book gives the names of some useful or poisonous plants. There is not room in this book for pictures of the many useful or poisonous plants around the world. To identify plants correctly you need skilled help or a book with pictures of the plants that grow in your area – even the same plants can look different in each place where they grow. The scientific names of plants will help you to look them up in another book to find out what they look like. See page 359 for one of the books which can help you to identify plants.

How to look after useful plants

Some of the plants mentioned in this book only grow in a few places and often only a few plants grow there. To encourage plants to survive:

- Only take the part of the plant that you need and avoid damaging the rest of the plant.
- Leave enough plants to produce seeds and to grow again another year.
- Grow the plants yourself so that you can harvest them – you can collect seeds and plant them or grow some plants by cutting shoots off and planting them.

Words

This book has been written in fairly basic English, so that people without much formal education (or whose first language is not English) can understand it. Important words that the reader may not understand and that look like *this (in italics)* are explained somewhere else in the book. If a word in *italics* has a page number (e.g. p. 123), after it, then the word will be explained on the page shown. If there is not a page number shown you will find it in the Word List or the Index at the end of the book. (The scientific names of plants and *microbes* are also in italics and in smaller type.)

We have used common words that everyone uses and not scientific words wherever possible. When there is not a common word for something – there is not one for many diseases – a scientific word is used.

There are spaces after the names of diseases, plants and some other things for you to write in your local names for them in your own language.

A skilled worker

A 'skilled worker' is anyone who has the knowledge and ability to deal with a particular problem. Sometimes it is a veterinary surgeon. But it can be anyone else who has been

trained. A person trained to give an injection into a *vein* is a skilled worker. If you have been trained to do this or some other task then **YOU** are a 'skilled worker' for that kind of task.

This book tells you when it is important to get a more skilled person to help you and what they could do to help. For example, a skilled worker could use difficult medicines that are not in this book or could help you with a programme to control disease.

This book tells you how to recognise some diseases. Many diseases are difficult to recognise so the book tells you if a skilled worker could tell one disease apart from others by looking at a *blood smear* with a microscope. (The book assumes that you do not have a microscope). We also warn you if a task would be difficult even for a skilled worker! This information should help you to decide if it is worth going far to get a skilled worker.

How to use different sections of the book

Section 1: 'About this book and how to use it' explains how to look things up in the book and tells you what basic equipment you need.

Section 2: 'Sharing your knowledge' tells you how to teach others what you know.

Section 3: 'Healthy animals' follows the life of an animal and describes mating, pregnancy, birth and the baby animal.

Section 4: 'Emergencies and simple operations' tells you about first aid and some simple operations.

Section 5: 'How to prevent and control disease' is about infection and how to avoid it or control it if it happens.

Section 6: 'Signs of disease'. Use this part of the book when you see something wrong with an animal. It will help you to work out which disease an animal might have. For example, if you see an animal coughing and breathing noisily, turn to the section on 'Breathing' (p. 128) under Chapter 16, 'A quick guide to signs of disease and what they mean' to find problems and diseases that usually cause signs like these. This tells you which pages in Section 7 to turn to for more details.

Section 7: 'Diseases and problems and what to do about them' is arranged in the same groups as the signs of disease are in Section 6. It gives details about each disease or problem. One disease often has many names even in the same language! This book always uses the same name for each disease but gives another common name for it if there is one. This section tells you if a disease only happens in certain areas so that you can tell if it is likely to happen where you are. It tells you which animals get each disease and whether people can get it. It describes the signs of a disease in the order you usually see them if possible. It tells you how a disease spreads, where it comes from and what causes it. It tells you how to prevent a disease and what to do about it if it happens.

Section 8: 'Medicines' tells you how to use medicines properly. It gives details about many common useful medicines. You may not be able to get many of the medicines described. But these are the medicines you are most likely to find so you will probably be able to look up details about the medicine you have.

Section 9: 'Where to get more help' gives a guide to some books and organisations that may help you.

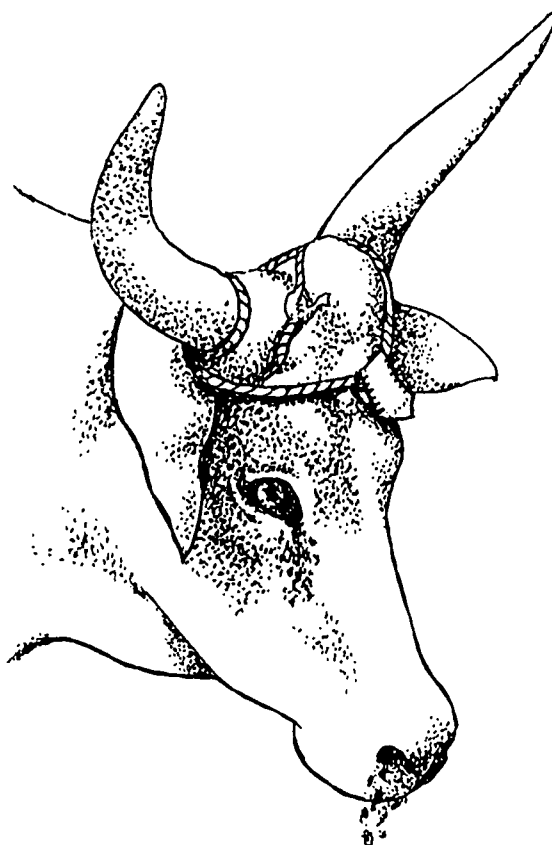
The **Word list** tells you what the words in *italics* which do not have a page number after them mean.

Treatments and techniques

This book recommends many effective medicines and treatments. Some of these treatments, such as the use of *antibiotics* (and the risks that go with them), are well understood by science. The book also describes some 'traditional' local treatments and ways of carrying them out that are not well understood by science. These treatments and methods are very useful and important. They are included in this book along with scientifically understood ones because:

- They are ways of dealing with problems that do not need expensive imported medicines or equipment that can be hard to get. Some of these treatments do not work as well as modern treatments but many of them are useful. I have tried to ensure that the ones described in the book might work and are not harmful.
- They work for the people who use them and may be useful examples for people in other places. These examples may encourage you to continue using or to improve methods that you already use. I trust people to continue using only the methods that work well for them.
- You can often use traditional local treatments and modern medicines at the same time.

The keeper of the sick animal in the picture has given it an antibiotic to treat an infection. He has also tied a leather bag to its horns. Inside the leather bag is a prayer written on a piece of paper. The animal keeper believes this will help the animal recover. These are two very different ways to make an animal healthy. Each deserves respect. They do not work against each other when they are used at the same time.



WARNING

Some beliefs are wrong and some ways of treating animals do not work. Some are dangerous or distressing for an animal. I have tried not to include any of these, except to warn against them, e.g. *rabies* (p. 260).

Some of the traditional treatments and methods described are not well understood. The risks of using them are not well understood either. We cannot be sure that any of these treatments work or be held liable for any problems that come from using them.

Neither are we responsible for any problems that come from the correct or incorrect use of any modern medicines, vaccines or methods which are described in the book.

2 Diseases that people get from animals

You can read more about diseases that people get from animals and what to do about them in the book *Where There is No Doctor* – you can often get it from the same place that you got this book (p. 359).

WARNING

People get many diseases from animals and some of them are serious. Get help from a medical worker if you think a sick person has a disease that came from animals. Tell medical workers about the animals a sick person has been near. Tell them what you think is wrong with the animals – as you would tell a veterinary worker (p. 47).

Some diseases that people get from animals, such as *rabies* (p. 260) and *tuberculosis* (p. 205), are very serious and you need medical help for them. Others are less serious, for example, *ringworm* (p. 180), and you can treat them yourself. A person may have signs of disease like the signs an animal has, e.g. *ringworm*, but sometimes the signs are different, e.g. *Rift Valley fever* (p. 289). The treatment for people may be like the treatment for animals but it is often different. Always try to get medical help.

People with AIDS, HIV, SIDA

People who have AIDS (Acquired Immune Deficiency Syndrome) have special problems with diseases that come from animals. The *virus* that causes AIDS makes their *immunity* very weak so they cannot fight off infection (p. 89).

People with AIDS get diseases from animals more easily than other people do. They also get diseases from animals that healthy people almost never get. For example people with AIDS can get types of *tuberculosis* (p. 205) that usually only animals or birds get.

People who have AIDS/HIV (Human Immunodeficiency Virus) need to be very careful to avoid getting diseases from animals:

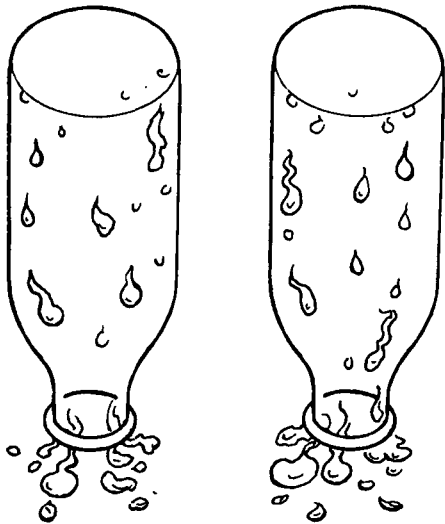
- They should keep away from sick animals.
- They should cover any wounds or scratches they have while they handle animals.
- They should wash themselves carefully after handling animals.

Diseases that come from milk

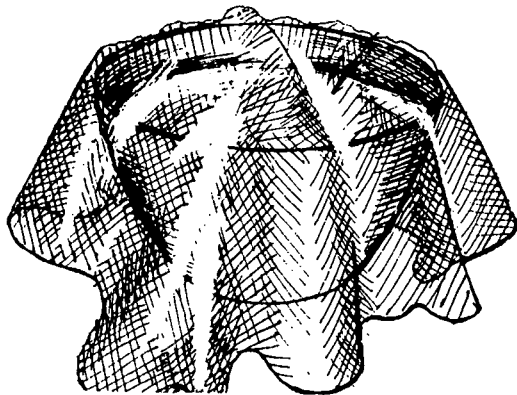
Some diseases that people get, such as *brucellosis* (p. 239) and *tuberculosis* (p. 205) come from *microbes* (p. 88) that come out in an animal's milk. Microbes also get into milk from the air, the hands of a milker, an animal's skin or from dirt in the place where animals are milked. **Microbes breed very fast in warm milk.**

How to treat milk to stop diseases

- Heat milk and keep it very nearly boiling for twenty minutes then let it cool before drinking it.
- Do not drink milk from sick animals.
- Keep the place where animals are milked clean.



- Keep the milk clean. Only put milk into clean containers. Wash milk containers clean and put them upside down so the water comes out and they dry. Some herders clean milk containers by smoking them over a fire. Smoke kills some *microbes*.



Container with milk in, covered by a cloth.

- Cover a milk container after you have filled it.

- If you can cool milk down (preferably to below 4°C) as soon as possible after milking, it will keep for longer.

Tapeworms that people get from animals

People can become sick when they get *tapeworms* from animals. Animals do not usually become sick even when they have tapeworms. There are many kinds of tapeworms and they cause different problems. The two most common are **hydatid disease** and **taenia**.

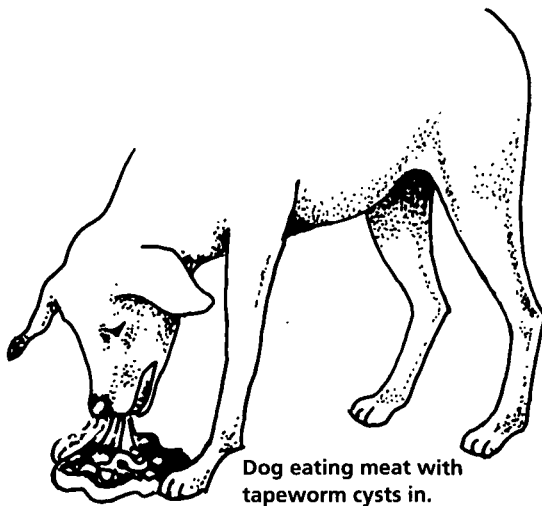
Hydatid disease

People become sick with hydatid disease when they have a *hydatid cyst* somewhere in their body. This is the *cyst* of an adult tapeworm that lives in dogs. Sometimes this tapeworm cyst is large, it can be bigger than a man's head. These cysts can be in any part of the body, even in the brain. They are usually in the lungs or liver. People with hydatid cysts inside

them can become sick and even die. Animals occasionally have hydatid cysts. They may become weak but they do not usually become sick or die.

People and animals get hydatid disease when they eat food *contaminated* with tapeworm eggs from dogs' faeces. They also get tapeworm eggs from wet soil around water holes. The adult tapeworms [*Echinococcus*] are about 1 cm long. They live in a dog's *intestines*. They produce eggs that come out in the dog's faeces after about two months. Dogs get infected with young tapeworms by eating uncooked flesh with hydatid cysts in it. These cysts can live in dead flesh for about two months.

There is no effective treatment for tapeworm cysts. Sometimes surgeons can operate on people to cut hydatid cysts out. (See: 'Ways to control hydatid disease' [p. 102].)



Dog eating meat with tapeworm cysts in.



Dog depositing faeces near vegetables and a child touching the dog.

Taenia

People get one common tapeworm [*Taenia solium*] from cysts in cattle, another [*Taenia saginata*] from cysts in pigs. People get tapeworms when they eat uncooked meat with these tapeworm cysts in it. **Always remove anything that could be a tapeworm cyst from meat. Cook meat properly.** People with tapeworms produce tapeworm eggs in their faeces. These eggs can infect animals. (see 'Ways to control most tapeworms' [p. 101].)

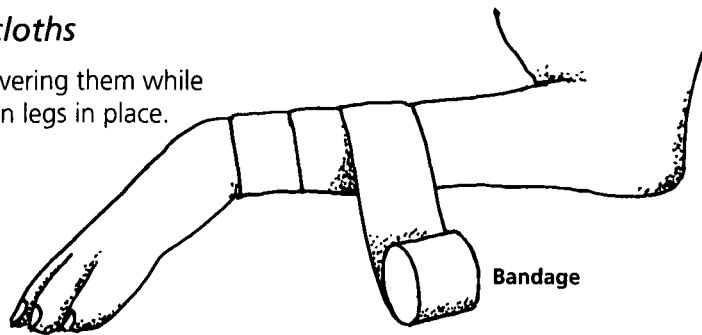
3 Vet equipment and medicines

Basic equipment

The following equipment is useful for anyone who keeps animals.

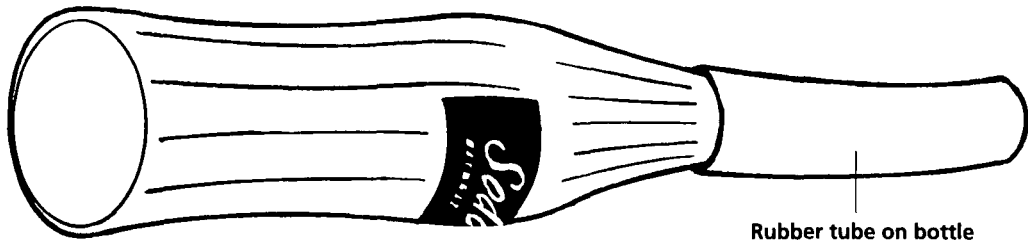
Bandages and clean cloths

For cleaning wounds and covering them while they heal. For holding broken legs in place.



Bottle

Use a bottle for giving medicines by mouth. A soda bottle is good. Putting a rubber tube over the end helps stop it breaking.



Container for sterilising equipment

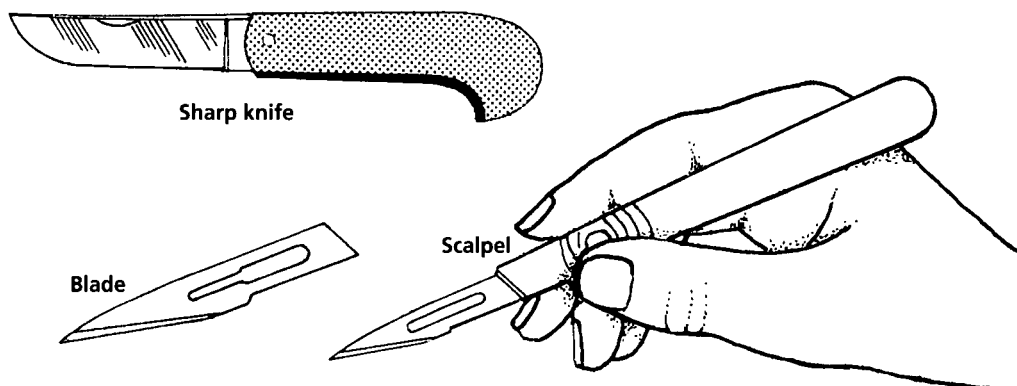
A cooking pot with a lid will do.

Container for sterilising



Knife

A very sharp knife, razor blade or scalpel for simple operations. A scalpel is better than a sharp knife; it has a handle with blades you can throw away. New blades are *sterile* and very sharp. A strong knife is useful for trimming feet (p. 86).



Paper and pen

For keeping records.

Rope

A thin rope is useful for tying up animals and for helping to pull out baby animals (p. 55). A halter (p. 15) is easy to make from some rope and is better for holding animals.

A *twitch* (p. 19) is easy to make from some rope and a stick and is good for controlling horses.

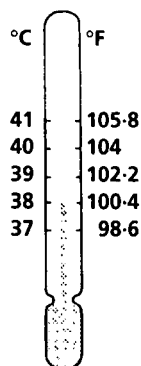
A thick rope – at least 10 metres long is useful for putting large animals on the ground (p. 17).

Soap or soap flakes

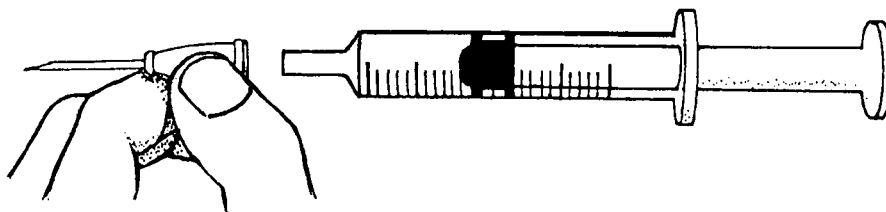
For washing hands and arms and helping with difficult births.

Thermometer

For taking an animal's temperature (p. 110). A case to keep the thermometer in will help stop it breaking.



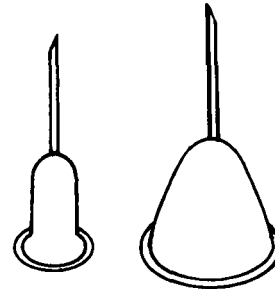
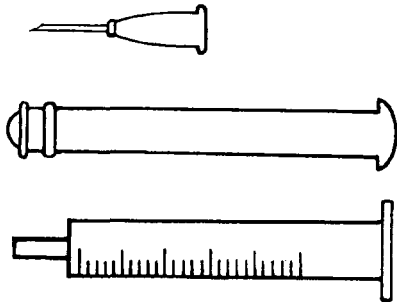
Syringes and needles for injections (p. 318)



Thermometer

- Syringes have different types of fitting at the end. Make sure you have needles that fit your syringes.
- Useful syringe sizes are 10 ml, 20 ml and 50 ml.
- You can boil some syringes to *sterilise* them and use them again but some plastic syringes cannot be boiled.

- A syringe with no needle is useful for measuring liquids, giving medicine by mouth (p. 317) and cleaning wounds and abscesses (p. 186).
- Useful needle sizes are: 18 g × 3 cm for sheep and small animals, 16 g × 4 cm for cattle and large animals.



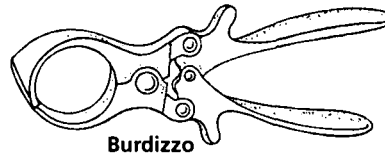
Different fittings for syringe

Extra equipment

With this extra equipment a skilled worker could carry out all the activities in this book.

Castrating tools (p. 79)

- Large Burdizzo tool for cattle.
- Small Burdizzo tool for sheep and goats.
- Rubber rings for sheep and goats.



Burdizzo

Forceps

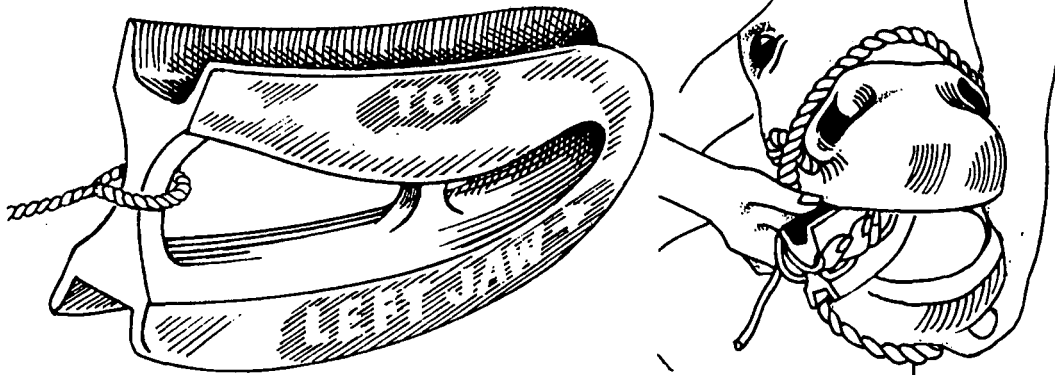
For holding skin and flesh for stitching – suturing (p. 70), holding needles to stitch tough skin (p. 72), or clamping blood vessels to stop bleeding (p. 68).



Forceps

Gag

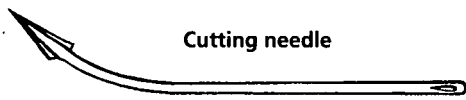
For holding an animal's mouth open (p. 24).



Glass microscope slides

For making *blood smears* (p. 118).

Needles and stitching material (thread) for stitching wounds (p. 70)



Cutting needle



Round needle

- Cutting needles are best for skin, round needles are best for muscle.
- Nylon stitching material for stitching skin (p. 71).
- Absorbable stitching material (sometimes this is called 'catgut'), for stitching deep inside wounds. This material is strong for 5–10 days then the body slowly absorbs it until it disappears.
- Suture material sizes:

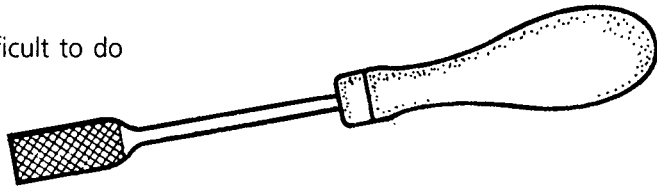
Size 00	Very thin.	
Size 0	Thin.	For small animals and small wounds.
Size 1	Medium.	For large animals and thicker skin.
Size 2	Thick.	For large animals with thick skin.
Size 3	Very thick.	For large animals with very thick skin.

Pliers or clippers

For cutting teeth or nails. It is difficult to do this job without pliers or clippers (p. 85).

Rasp

For filing horses' teeth. It is difficult to do this job without a rasp (p. 85).

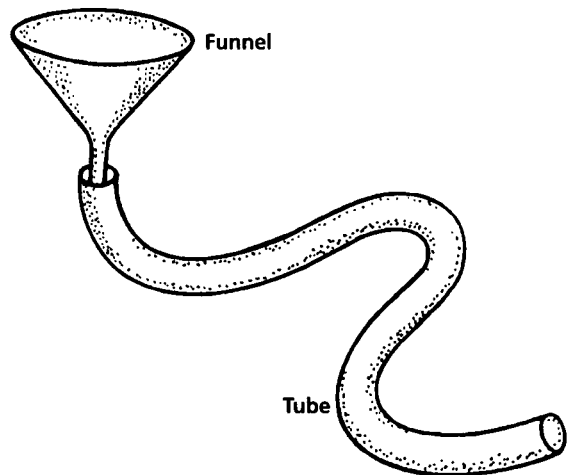


Scissors

Scissors are very useful for many tasks but you can often use a sharp knife instead.

Stomach tube

For giving large amounts of liquid medicine by mouth (p. 318).



Funnel

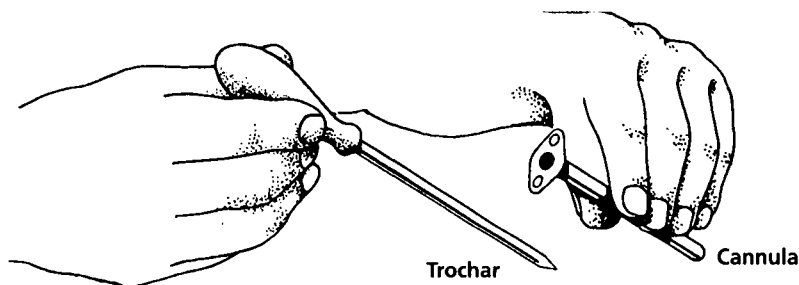
Tube

Tape measure

For measuring animals to estimate their weight. You can use a length of rope instead and measure the rope against the ruler in the back of this book.

Trochar and cannula

For making a hole into the *rumen* to treat *bloat* (p. 215). You can do this with a sharp knife but it is safer for the animal if you use a *trochar* and *cannula* (p. 216).



You do not need all of these things, you can do a lot with just your hands or a sharp knife, but all of these things would be useful to have.

Basic medicines

You do not need all these medicines but they would all be useful for treatments described in the book. If you do not have the medicine suggested in this book you can often use something that you do have instead. (See Section 8 'Medicines' [p. 311].)

Medicine	Useful for:
Antibiotic spray or powder.	Putting on wounds.
Antibiotic injection.	Treating infections.
Antibiotic for giving by mouth.	Treating infections.
Antiseptic.	Putting on skin/wounds.
Bloat medicine.	Treating <i>bloat</i> (p. 216)
Disinfectant.	Disinfecting places/things.
Glucose or sugar.	Rehydration fluid.
Insecticide powder/sprays.	<i>Parasites</i> (p. 103) on the body.
Magnesium sulphate.	Constipation and poisoning.
Salt.	Antiseptic/rehydration fluid.
Worm medicine.	<i>Worms</i> (p. 94) and <i>flukes</i> (p. 99).

Extra medicines

Medicine	Useful for:
Antibiotic ointment or drops.	Putting in eyes or ears.
Antibiotic for the <i>uterus</i> .	Treating infections.
Antihistamine.	Treating allergies.
Sodium bicarbonate.	Rehydration fluid.
Vitamin B.	Treating: <i>anaemia</i> (p. 268), <i>poisoning</i> (p. 301).

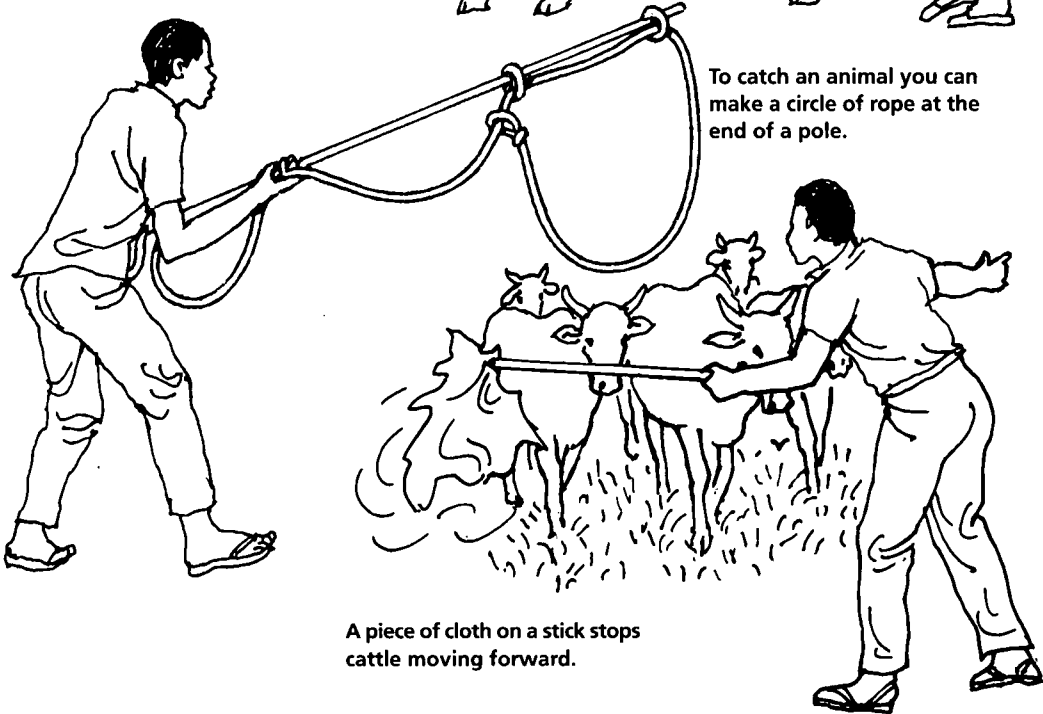
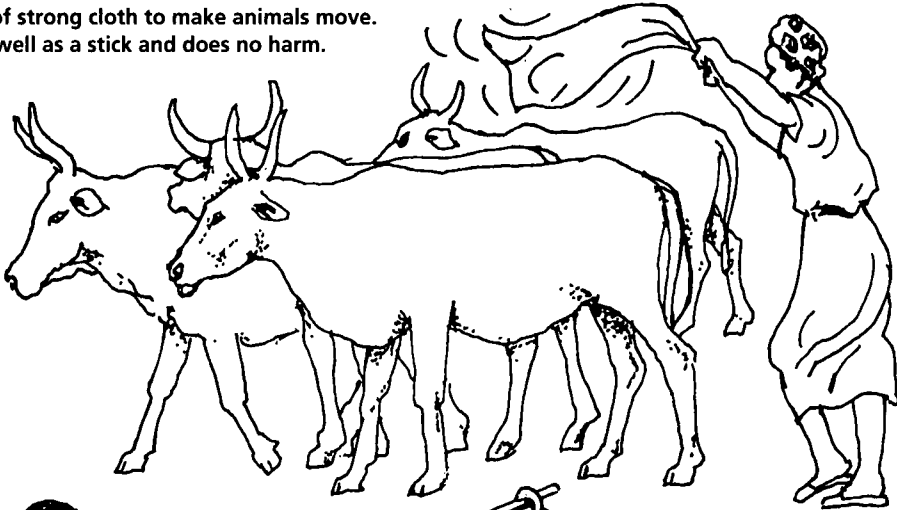
Special medicines and vaccines are needed for diseases that happen in your area, such as medicine for *trypanosomosis* (p. 334).

4 How to handle animals for treatment

Cattle and buffaloes

The drawings below show different ways of handling cattle or buffaloes so that they can be moved or held safely (to be treated) when ill.

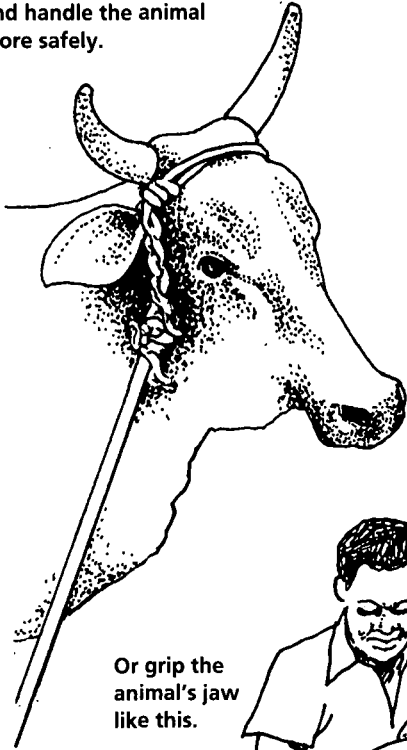
Use a strip of strong cloth to make animals move. It works as well as a stick and does no harm.



To catch an animal you can make a circle of rope at the end of a pole.

A piece of cloth on a stick stops cattle moving forward.

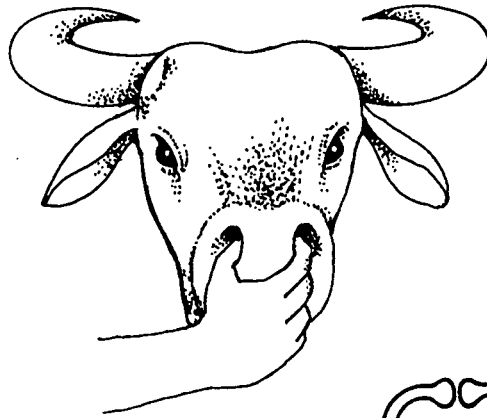
People in Burkina Faso leave a long stick tied to the horns to manage bad-tempered cows. It helps them catch and handle the animal more safely.



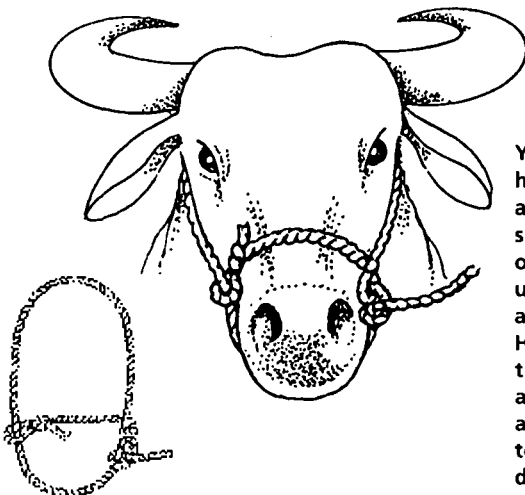
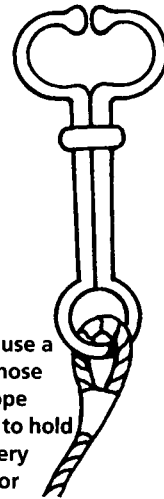
Or grip the animal's jaw like this.



For animals that don't have horns or that resist being held by them, put your fingers in its nose like this. Pull the head close to you to hold it firmly.

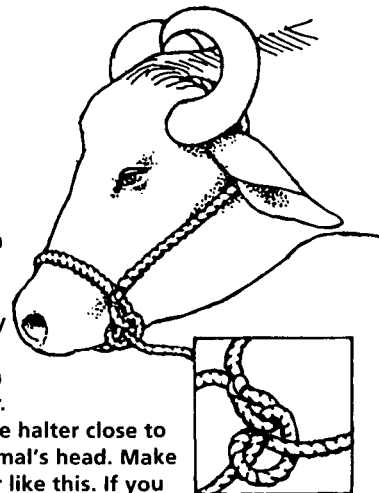


Some people use a tool like this nose ring with a rope attached to it to hold the nose of very strong cattle or buffaloes.

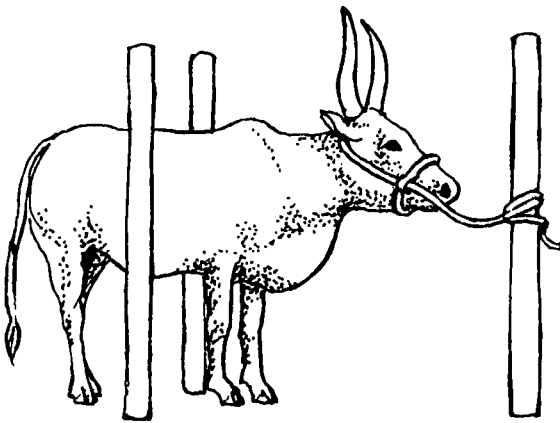
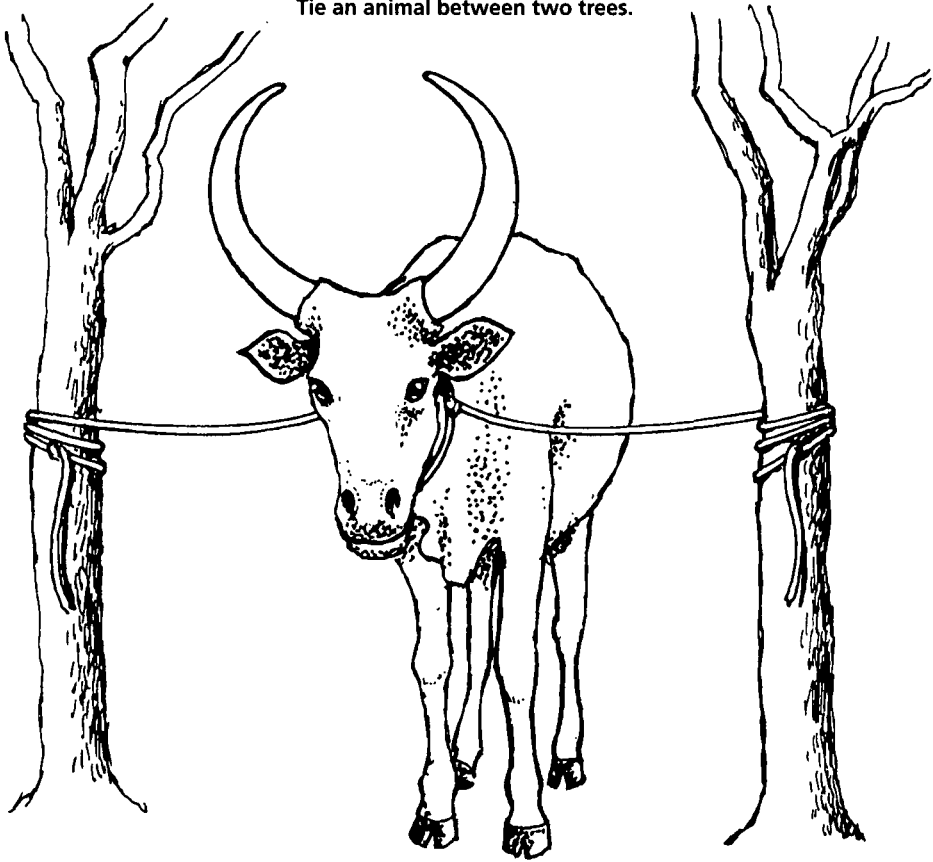


You can hold an animal securely or tie it up with a halter.

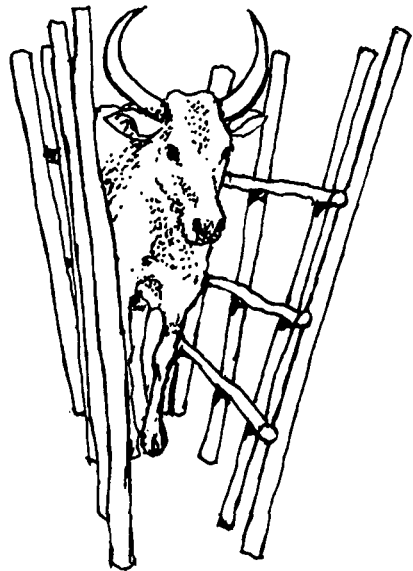
Hold the halter close to the animal's head. Make a halter like this. If you are going to use a halter to hold an animal, start doing it when it is young so that it gets used to wearing one.



Tie an animal between two trees.



Use three poles to hold an animal.

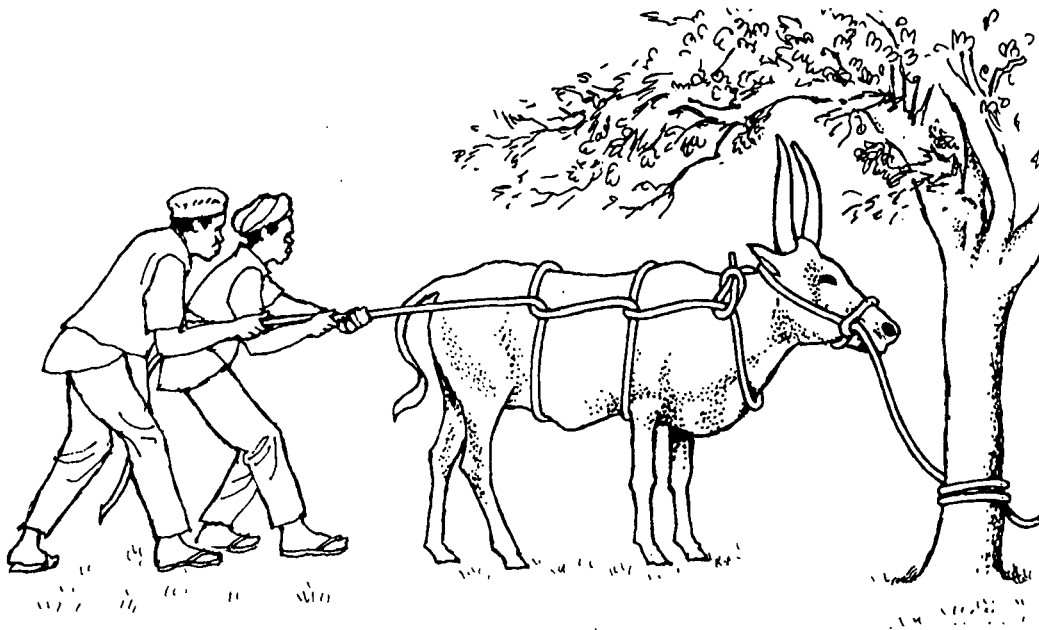


Make a simple race and crush.

How to put adult cattle down on the ground with a rope

Get three or four strong people to help.

- Choose a place where the ground is soft.
- Tie the animal's head low down near the ground with a short rope or a halter.
- Make a big loop in one end of a thick rope about 15 metres long. Make the loop with a knot that does not slip.
- Put the loop over the animal's head. Then pull the rope over the animal's back and put it round the body just behind its front legs and just in front of the back legs.
- Pull on the rope with two or three people.
- As soon as the animal lies down at least one strong person should hold its head firmly on the ground to stop it getting up again. Tie its legs to stop it kicking.
- Only keep the animal on the ground long enough to treat it as quickly as you can. Animals kept lying on their sides for long may get *bloat* (p. 215).



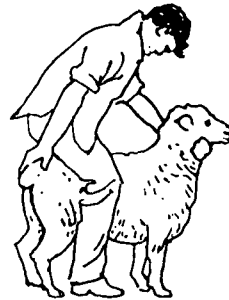
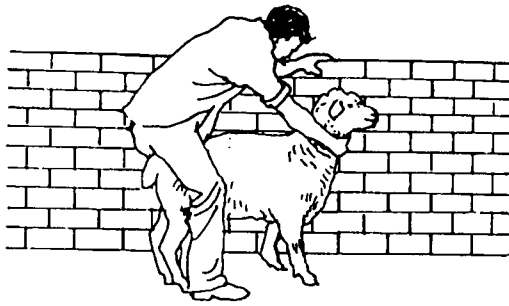
Camels

One person can hold a small camel by the top and bottom lips or the lower jaw and the ear.

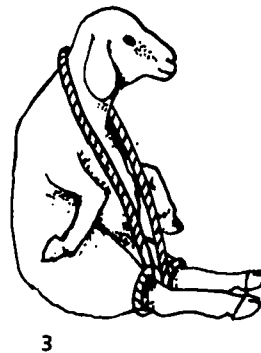
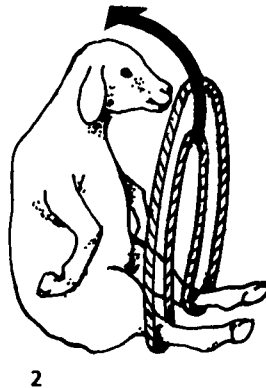
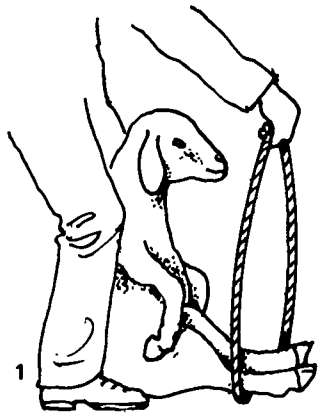
- To hold a big camel you need two people. Fit a head rope first and tie the legs together, then grip both lips. Pull and twist the tail for extra control.
- Hold a camel for a short time by tying a rope to the back leg and pulling it over the front of the hump to the other side.
- To control a camel to treat the udder or to control one that resists being milked, tie the back legs together above the hocks.

Sheep

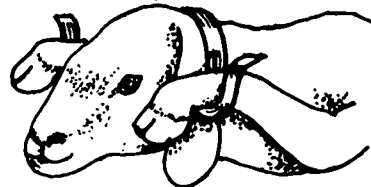
Push a sheep against a wall and hold it with your legs. In an open place hold it like this.



- Tie a sheep up with just a loop of rope or use a curved piece of metal to keep a sheep lying down (see below).



4
Tie up a sheep with a loop of rope.



Keep a sheep down with a piece of metal.

- To secure a sheep for examination or treatment stand on the animal's left and hold it under the jaw with your left hand. Hold a fold of skin in front of the animal's back right leg with your right hand (1). Lift the sheep and put it on its bottom then hold it like this (2).



Hold a fold of skin.



Goats

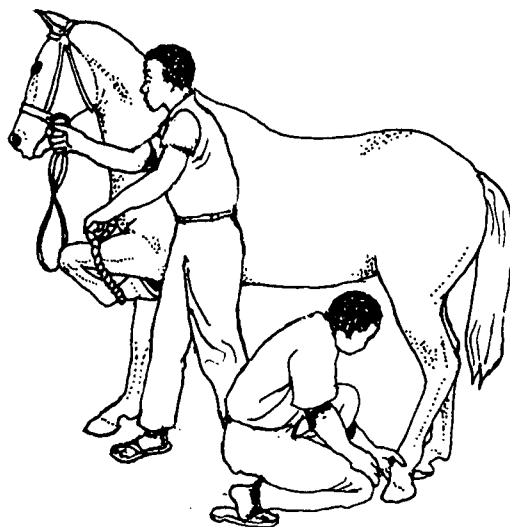
Use a rope or collar round the neck to hold a goat.

- You can trim a goat's feet while it is standing up. Tie the goat's head up and lift the foot you want to trim.
- If you move goats (or sheep) in a lorry make sure to fill the lorry or put something in the lorry so they are close together and do not fall over.

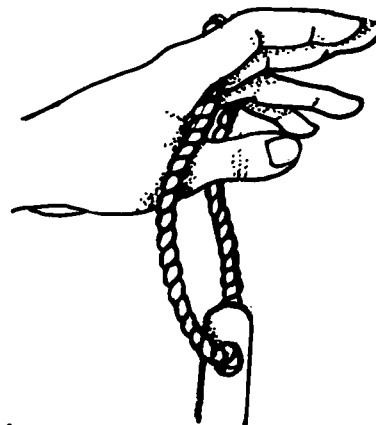
Horses, mules and donkeys

Approach the animal quietly from the front and to one side where it can see you. Talk to it so that it knows you are there and you do not surprise it. Touch the animal first on the lower neck and shoulder.

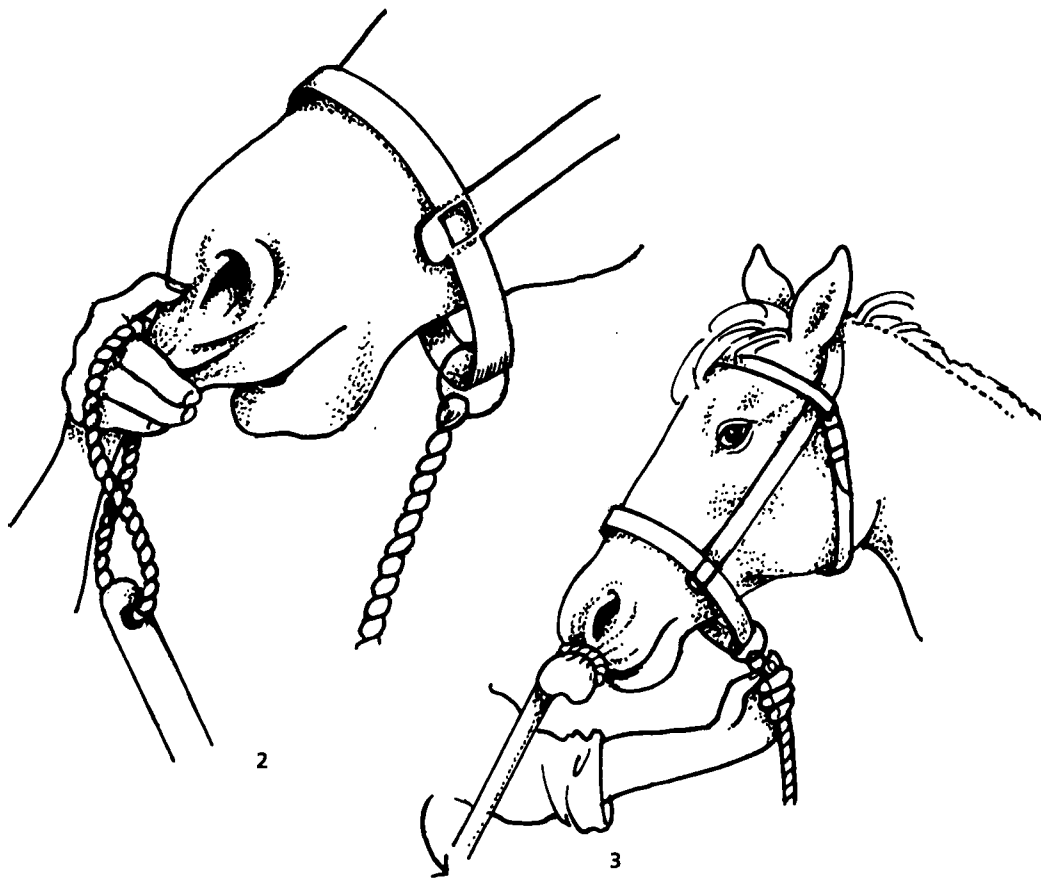
- You can hold a horse, mule or donkey with a head collar or a halter. To stop the animal kicking, lift one leg on the same side that you want to work on – a few horses can stand on two legs and still kick!



- **Always stand up with your back to the animal's head when you pick up a leg.** If you have to work behind a horse, mule or donkey, it is safest to put something solid but soft between you and the animal.
- Distract the animal while you give it an injection or other treatment by twisting a fold of skin on the neck.
- To make a horse calmer, put a cloth over its head.
- Make a *twitch* to control a horse, mule or donkey by tying a loop of rope about 30 cm long through a hole in the end of a stick (1). To use the twitch, put your hand through the loop and grab the animal's nose (2). Slide the loop over the nose and twist the stick to tighten the loop (3).



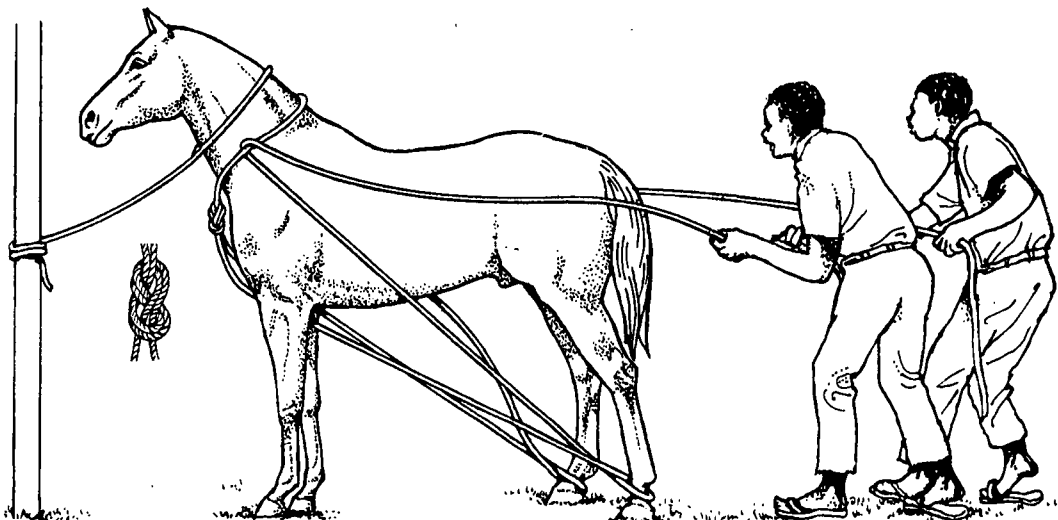
1



How to put a horse, mule or donkey on the ground

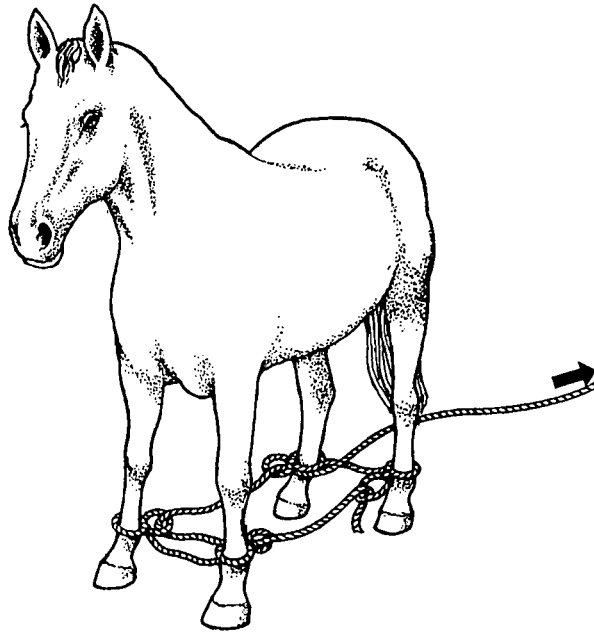
1 Using a long rope

Tie the animal's head up with a short rope or halter. Make a big loop in the middle of a thick rope about 15 m long. Make the loop with a knot that does not slip. Put the loop over the animal's head. Pull both ends of the rope between the front and back legs. Pull the ends round the back legs and back through the loop round the neck. Pull the ends out behind the animal. Pull on each end of the rope with one or two strong people. The animal feels its back legs pulled forwards and lies down.



2 By tying the legs together

Tie the front legs together and tie the back legs together with ropes leaving a loop of rope on each like this. Put a long rope through each loop so that the rope comes back out behind the animal. Pull on the rope so that the legs are pulled together and the animal lies down. As soon as the animal lies down at least one strong person should hold its head firmly on the ground to stop it getting up again. Keep the legs tied to stop the animal kicking.



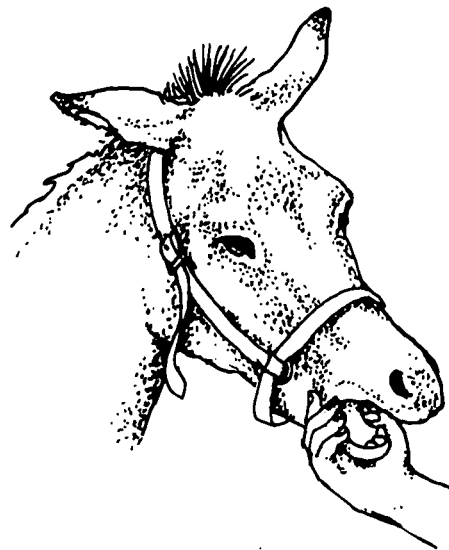
Donkeys

Male donkeys live in pairs or small groups. If you need to treat one donkey, keep the pair or small group together.

- You can usually hold a donkey with one arm under the head and one over the neck (1).
- The foot of the donkey is very sensitive so do not grip it too tightly above the hoof.
- To open a donkey's mouth hold the lower jaw with one hand (2).



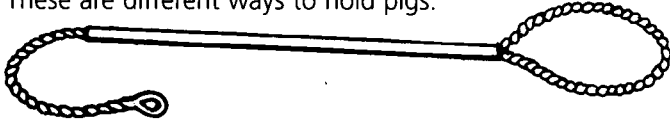
1



2

Pigs

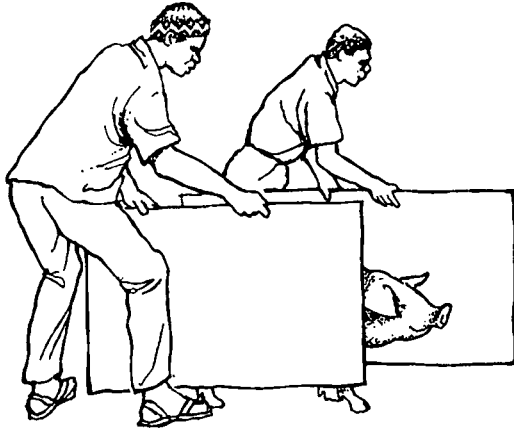
These are different ways to hold pigs.



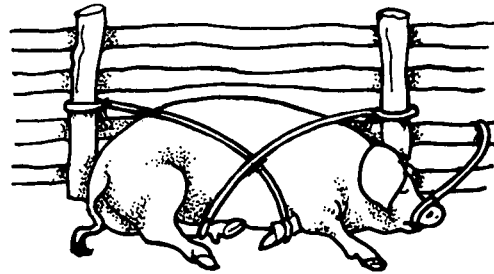
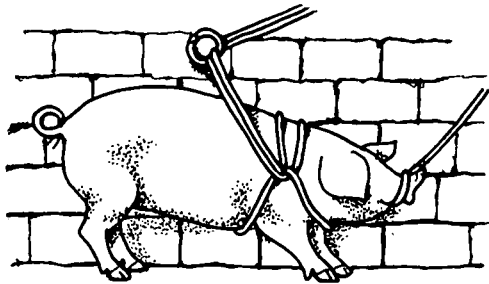
For very dangerous pigs, use a loop with a stiff handle like this.



Catch and hold large pigs using a loop of wire or stiff rope. Stand behind the pig and put the loop over the pig's nose into its mouth. Slide the loop over the top jaw till it is just behind the tusks then tighten it and lift a little. The pig will pull back and you can hold it securely. To tie the pig more securely, tie another rope over the whole nose to keep the jaws closed and stop the first rope sliding off.



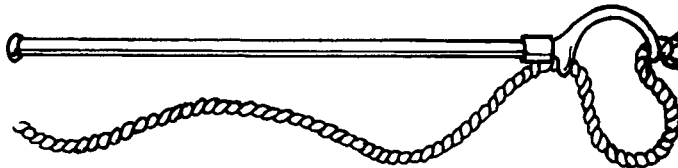
To move a large pig, hold a board on each side of the pig's head. It will move forwards. You can also move large pigs with one board and a stick.



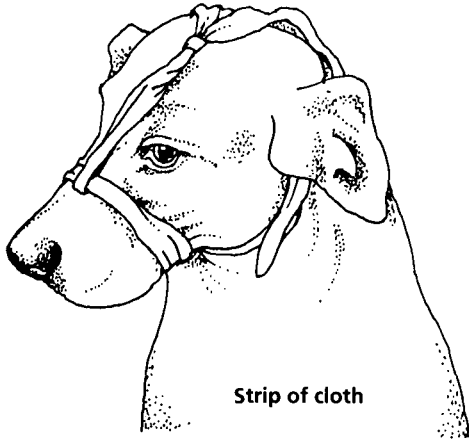
Tie a pig up with a rope or harness like this

Dogs

For very difficult or dangerous dogs, make a dogcatcher. Slide the loop over the head and pull it tight. Then put another loop over the dog's head and pull the other way.



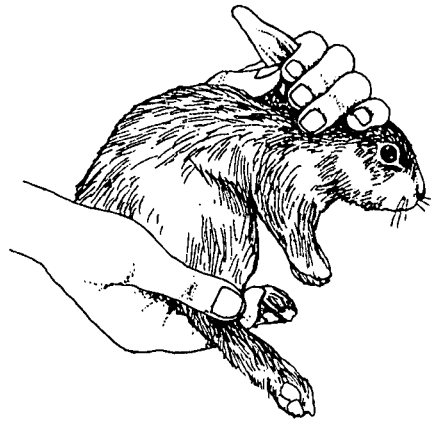
- Tie a dog's mouth shut to stop it biting, using a thin rope or strip of cloth like this.
- To hold a sick dog carry it like this. If it struggles hold it tighter and closer to your body, with an arm around the dog's neck.



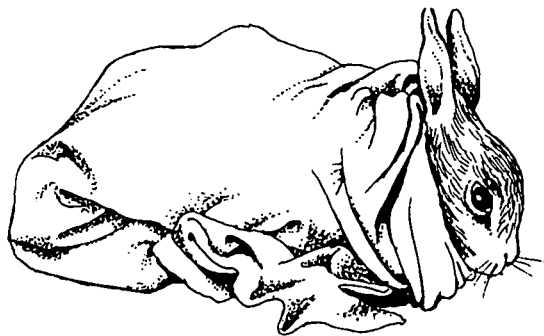
Strip of cloth

Rabbits

Catch a rabbit by holding the skin over the neck. You can put your hand around the ears at the same time like this. **Do not hold a rabbit just by the ears, you will damage it.**

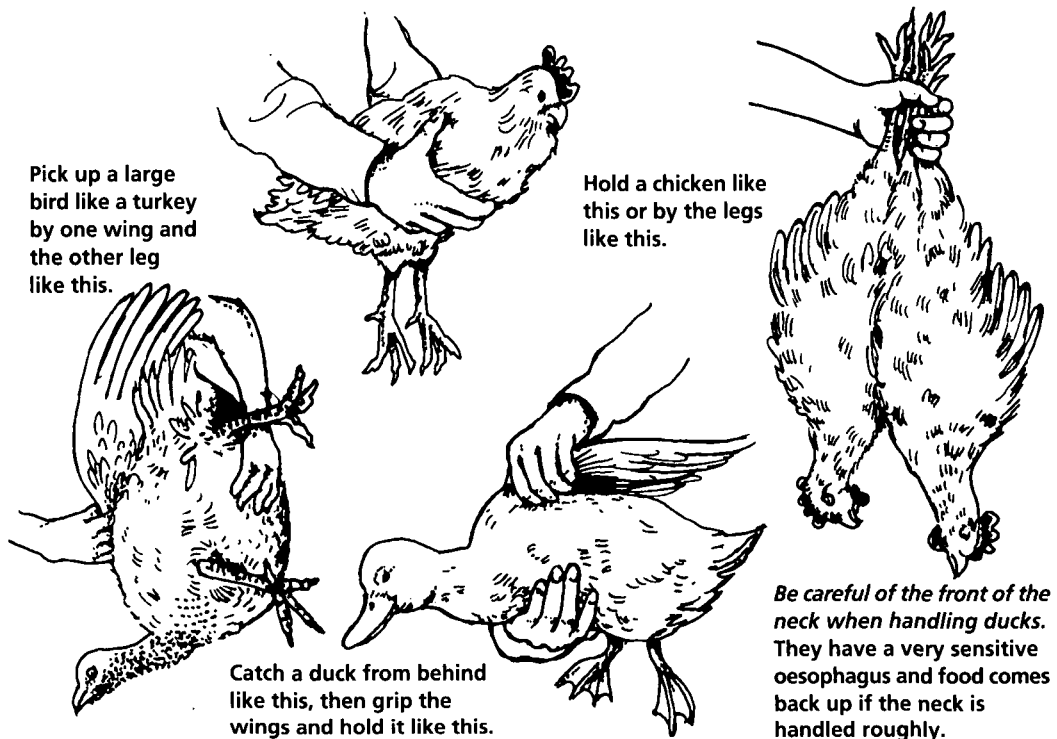


- Hold a rabbit with its head under your arm or hold it with one hand under the back legs.
- One person can hold a rabbit securely for treatment by wrapping it in a cloth like this.



Birds

There are different ways of holding birds, depending on what type of bird it is.



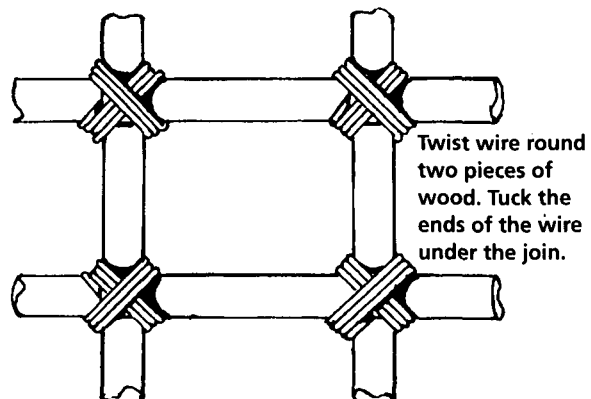
How to open an animal's mouth

Put your hand in to the side of the mouth behind the front teeth and grip the tongue firmly. Pull the tongue out to one side. It is easier to do this with a horse because of the shape of its tongue. It is not so easy for other animals. The tongue is slippery so it helps to hold it with a cloth. Also see page 316.

To hold the mouth open using a gag

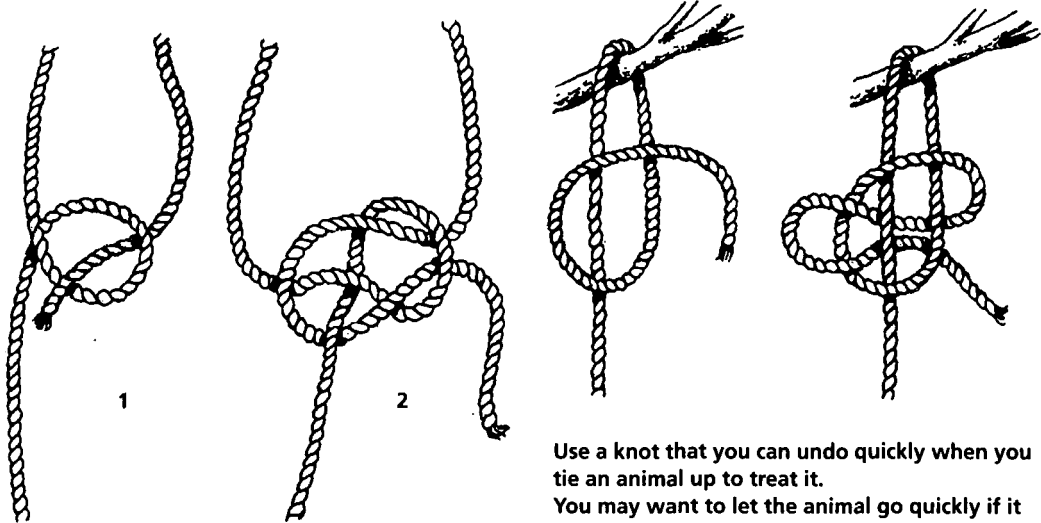
There are different sorts of gags that work for different animals. One type can be seen in the diagram on page 11. For cattle use a gag that goes in the side of the mouth. Keep a small rope tied to the gag to pull it out.

For horses there are more complicated and expensive gags. However, you can make a gag with four pieces of wood and some wire. The wire should be twisted firmly round each join in the wood. Make sure the ends of the wire are tucked under the joins so they do not harm the animal.



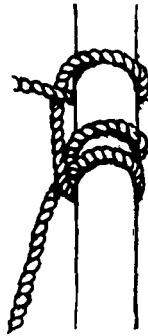
Some useful knots for tying up animals

There are many different types of knots. The three shown here are the most useful ones for tying up animals.



Fixed knots that do not become tight are useful for putting a rope round the neck of an animal.

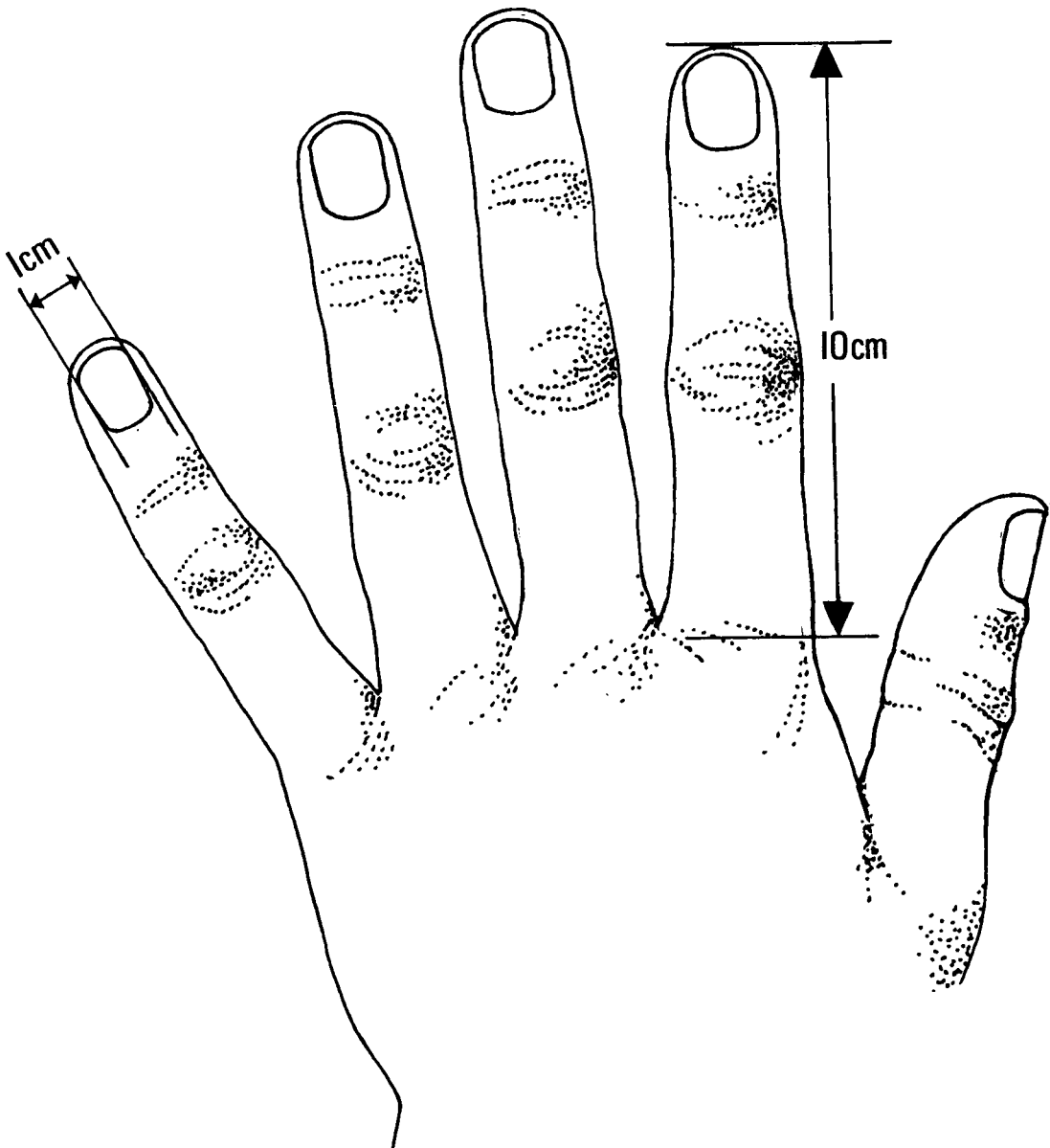
Use a knot that you can undo quickly when you tie an animal up to treat it. You may want to let the animal go quickly if it falls down or struggles. This is also a good knot for tying the legs together when you put an animal on the ground. You can release the legs quickly when you want the animal to get up.



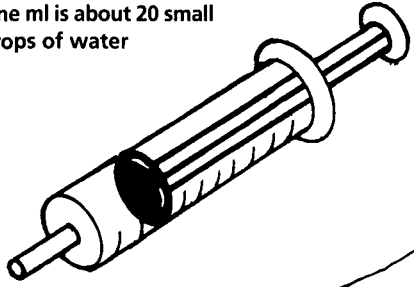
This is a good knot to tie a rope to a pole or tree. It will not slide down the pole.

5 How to measure liquids and solids

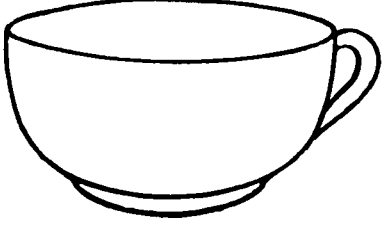
Your hand is useful for measuring things. When this book describes something like a 'handful' or a 'pinch' it uses a hand like this (my hand life-sized); the little finger nail is 1 cm across and the first finger is 10 cm long. If your hand is much bigger or smaller adjust these kinds of measurements a little.



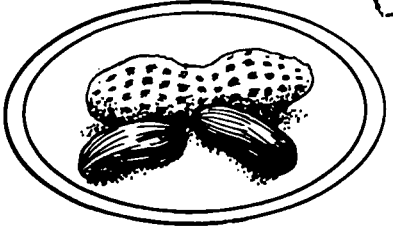
A drop
One ml is about 20 small drops of water



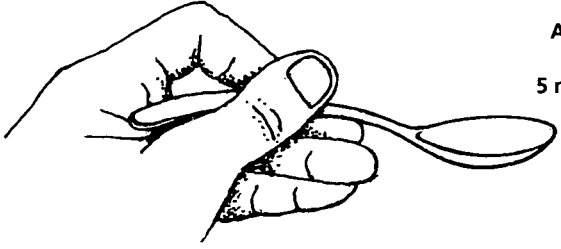
A cup
A cup like this holds about 200 ml of liquid or 200 g of salt. Three cups like these hold about 600 ml (one pint) of liquid



Two groundnuts like these weigh about one gram (1 g)



A spoon
A small spoon like this holds about 5 ml of liquid or 5 g of salt or 3 g of ground cereal



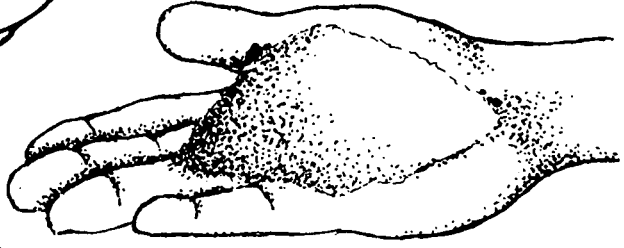
A medium spoon like this holds about 10 ml of liquid



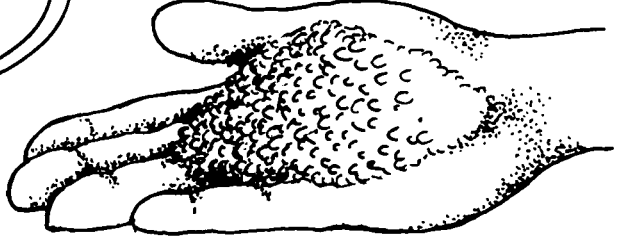
A large spoon like this holds about 20 ml of liquid

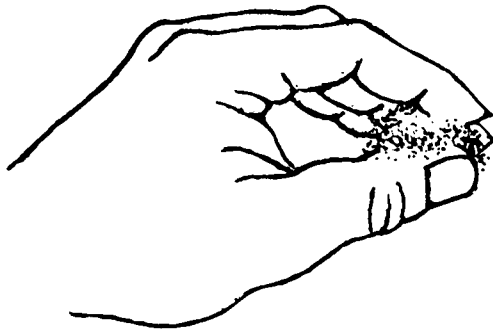


A handful
Salt heaped on a hand like this weighs about 50 g

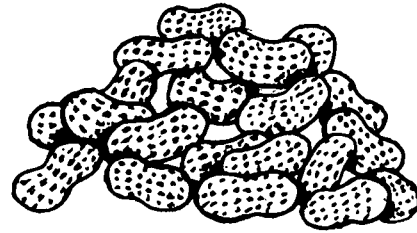


Grain or ground cereal heaped on a hand like this weighs about 30 g

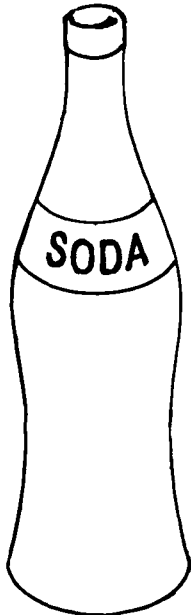




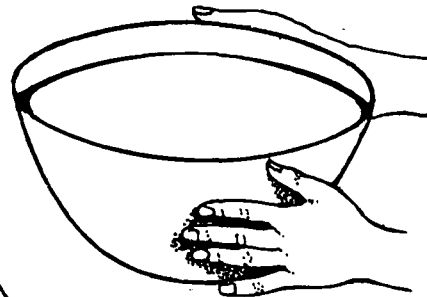
A pinch of salt like this weighs about 1 g



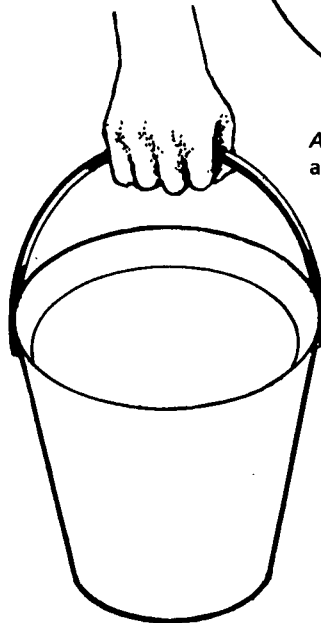
Twenty groundnuts weigh about 10 g



A soda bottle usually holds 300 ml



A bowl like this holds about 5 litres



A large bucket like this holds about 10 litres

1 litre of water weighs 1 kilogram

To weigh out a kilogram balance the thing you want to weigh with a litre of water.

Measurements of weight, volume and length may be shown either in metric units or imperial units. Tables to convert the measurements can be found on the inside of the back cover of this book.

Section 2 **Sharing your knowledge**

6 Ways to share your knowledge using this book

Share your knowledge with others to help them keep their animals healthy. Then they will be able to work together with you to control disease. You can use this book to help other people learn more about their animals – about how to stop them becoming sick, how to recognise what is wrong with them and how to treat them when they are sick.

Most people who keep animals know a lot about them already. But even animal keepers who already know a lot about their animals need to learn how to recognise and treat a disease that is new to them. They also need to learn about new medicines and methods for treating animals and preventing disease.

Good training gives people confidence. It helps them to realise how much they already know and to use their knowledge. One way to share knowledge is to organise training sessions.

How to plan a training session

- Decide what the training session will be about. Work out what you expect the trainees to be able to do after the session. Example: 'The trainee will be able to give injections into the muscle', or 'The trainees will be able to recognise an animal with rinderpest.'
- Decide how long the session will be. Keep it as short as possible.
- Arrange a good place to do the session.
- Get the materials you need for the training session:

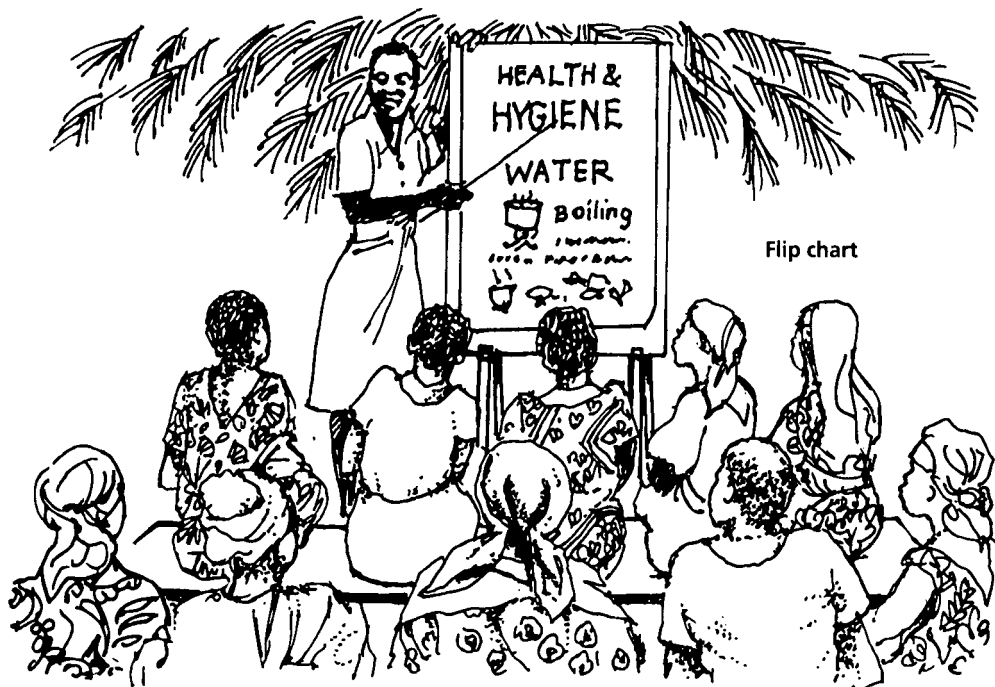
A board or flip chart with big pens.

Prepare any drawings you need. You can use the ones from this book.

Notebooks and pens for the trainees to use.

Equipment, e.g. syringes or medicines.

Animals.



How to give a training session

Introduction to the session

- 1 Get the trainees to take an active part in the training wherever possible. **People learn things most by doing them, they learn a little by being shown things and they learn even less by listening.**
- 2 At the beginning of the session, introduce yourself to the trainees and get each of them to introduce themselves to the others.
- 3 Tell the trainees exactly what you expect them to learn about and explain what you expect the trainees to know and to be able to do at the end of the session. Example: 'At the end of this session you



will be able to use a needle and syringe to give injections into muscle. You will be able to calculate and measure a correct dose of medicine and give the injection safely.'

- 4 During the training session use simple language that people understand, do not use difficult technical words. Only tell the trainees important things that they really need to know. Do not give them too much information that is confusing and difficult to learn. Ask the trainees questions and they will have to think about the answers – it does not matter if they give a wrong answer, you can correct them. This way they will learn more than they will just by listening to you.

Activities

- Ask the trainees questions and put their answers up on a board. Do this quickly – it does not matter if the answers are wrong. Organise the answers and correct them and add things they have left out. Then use these answers to start discussion.
- Use the diagrams in this book to help the trainees understand things. It helps to copy the drawings onto something bigger so that a group of trainees can all see them.
- Ask trainees about the local names for things like diseases; there are spaces in this book to fill in the local names if you want to.
- Show the trainees quickly how to do a task without talking to them. They can see what they will learn.
- Show them again, this time explaining each stage of the task, for example putting the needle on the syringe.
- Get the trainees to tell you what they are doing while they practise a task, especially if the task is difficult.
- Get each trainee to do the task at least once.
- Make sure the trainees have each practised tasks they have learned. Get each trainee to demonstrate the tasks they have learned.

At the end of the session, ask questions to check that the trainees have understood and learned the things you told them they would know by the end of the session. If they have not understood you may need to retrain them or change the session for the future. Ask the trainees about more training they want and plan future training in discussion with them. Tell them that you will visit them to see how useful they are finding the training they have just had and to help them with any questions they have. Do not say you will visit them to test them.

Examples of training sessions you could make using this book

1 **Parts of the body** (below) and **How to tell the age of an animal** (p. 43). It is useful to teach people about the different parts of the body, what they do, what they look like when the animal is healthy and what they look like when the animal has a disease, as well as knowing how old an animal is.

2 **How to use vaccines** (p. 353). You could teach the trainees about vaccines and how they work, then give details about the vaccines they need for the diseases in their area.

Other training sessions could be on **How to make blood smears**, **How to give injections**, **How to control flies**, for example. There are many other topics in this book which could be taught in a training session.

Training session: Parts of the body

Get a suitable animal that you can kill from a local animal keeper or market. When you have looked through the body of the animal, trainees can eat the meat if they wish.

Sometimes it is useful to take trainees to a place where many animals are killed to find pregnant animals that have been killed at different stages of pregnancy to show the trainees the *uterus*, *placenta* and *foetus*.

You will need more than one training session to teach trainees about the whole body. Perhaps you could do one training session on the chest and another on the abdomen.

As you look at the body you can discuss what looks normal and what things would look like if the animal had a disease.

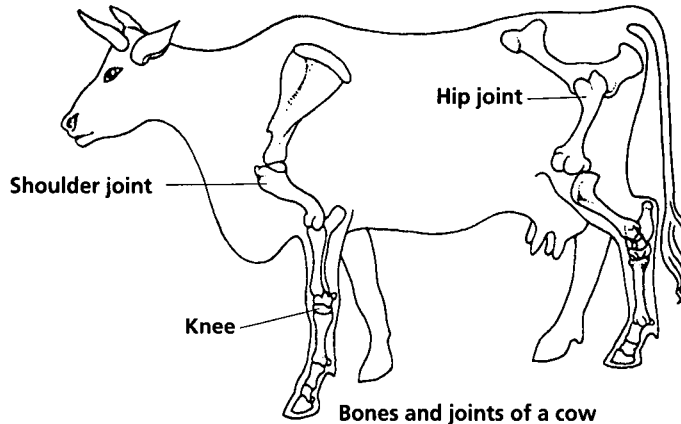
Kill the animal (p. 87) and open it carefully without cutting into the *stomach* or *intestines*.

In a training session, drawings in this section could help you to explain the parts of the body and what they do.

Movement

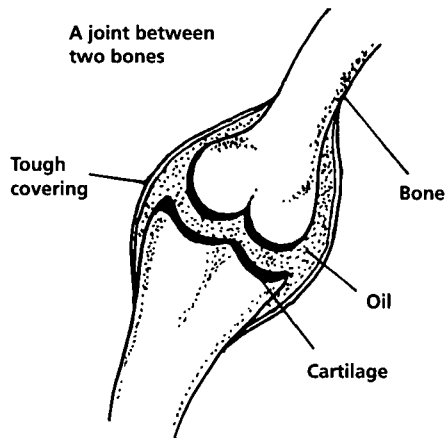
Bones

Bones are mostly made of minerals: calcium and phosphorous.



The end of a bone where it joins another bone is softer than the rest of the bone, and shiny. The *joint* where two bones meet is covered with a tough covering. The joint is full of oil that helps the bones slide against each other easily. This helps to stop bones from wearing out.

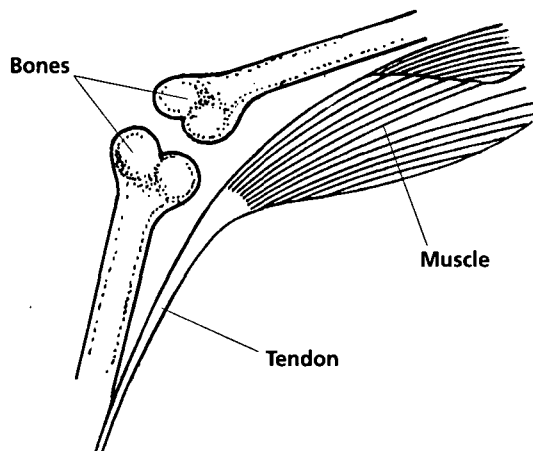
The inside of most bones is usually red/grey; this is where *blood cells* are made.



Muscles

The red flesh of the body is *muscle*. Most muscles are attached to a bone at each end. Some muscles pull bones by a *tendon*.

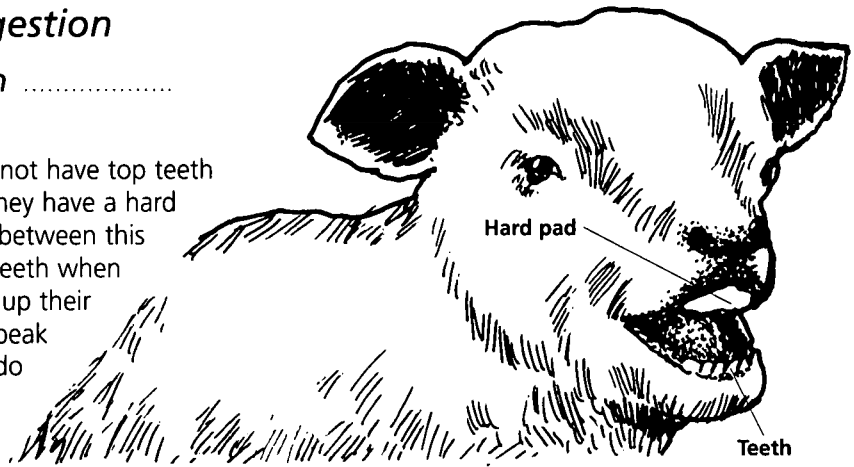
Muscles work by contracting and becoming shorter. When they become shorter they pull the bones together. You can feel the muscles in your arm contract when you move it. This is how an animal moves. Some muscles are very large, for example, the muscle in the back leg.



Eating and digestion

Mouth and teeth

Ruminant animals do not have top teeth in the front, instead they have a hard pad. They bite plants between this pad and the bottom teeth when they graze. Birds pick up their food whole with the beak and swallow it. They do not have teeth.



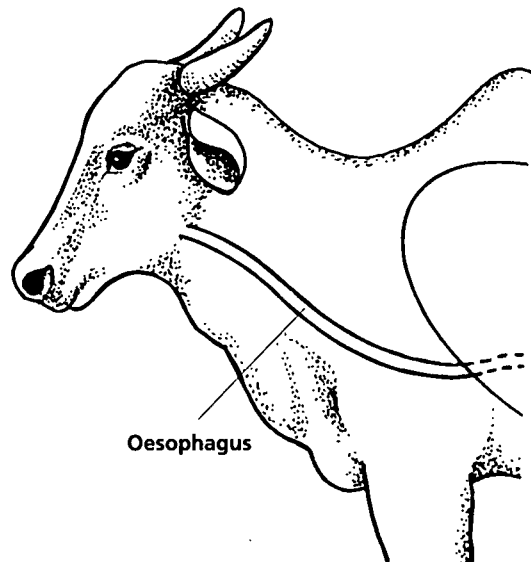
Saliva

Special *glands* around the mouth make *saliva* that comes out into the mouth. Ruminant animals produce a lot of saliva. Large cattle can produce more than 50 litres of saliva every day. Saliva has special chemicals in it that start digesting food.

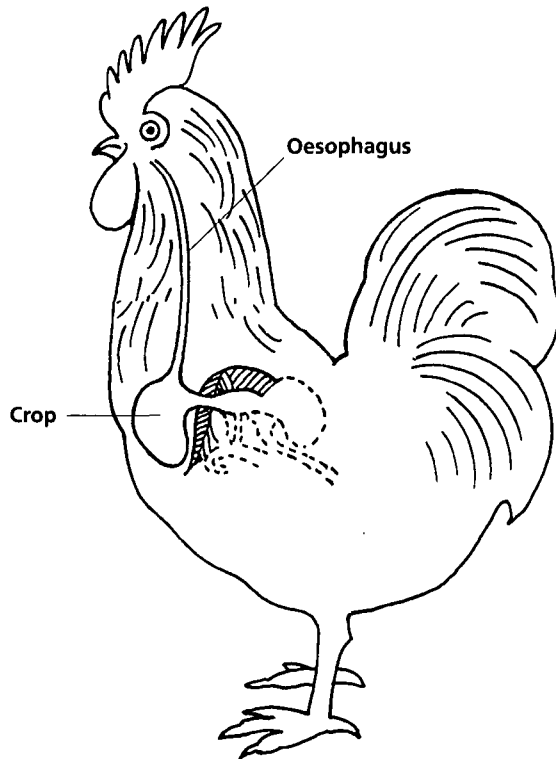


Oesophagus

This is a tube leading from the mouth to the *stomach*. The tough wall of the *oesophagus* has muscles in it that squeeze food down into the stomach.

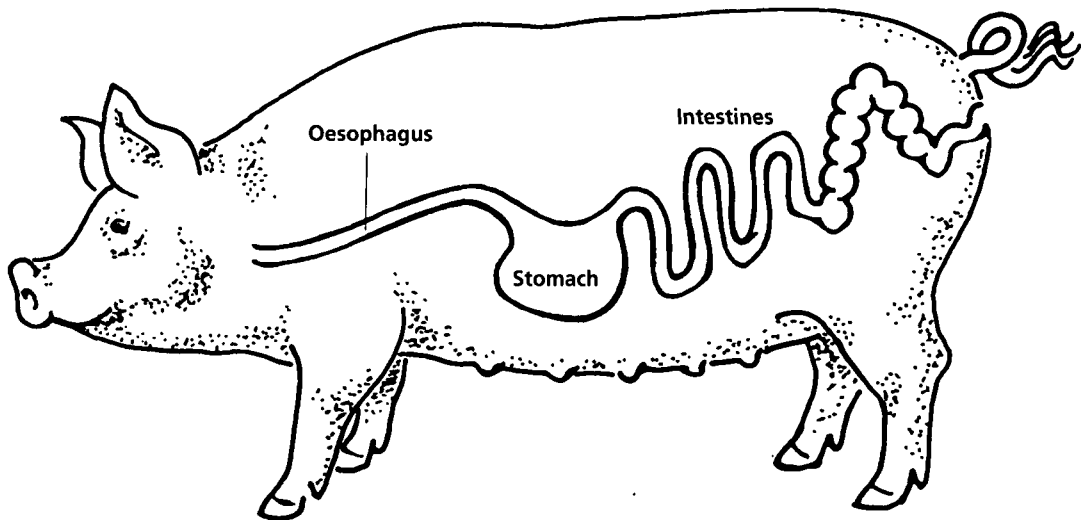


Birds The food that most birds swallow goes into the *crop*. The crop is a special sac on the way down the oesophagus where food can be stored. You can feel the crop in the neck when it is full after a bird has eaten. In the crop the food is mixed with saliva that starts to *digest* it. (Ducks do not have a crop.)



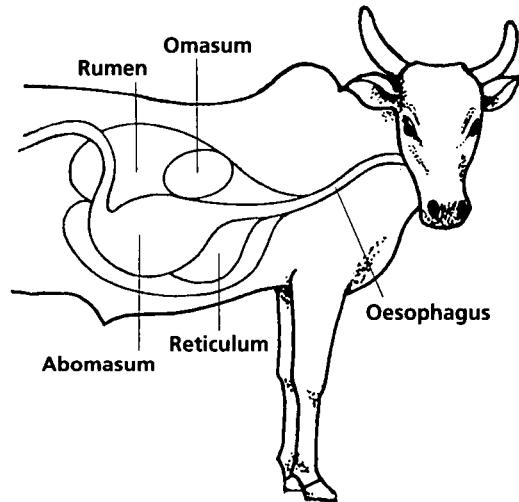
Stomach

Animals that mostly eat meat, such as dogs, cats and lions, and animals that eat many things including meat and plants, such as pigs and people, have one stomach. Animals that mostly eat plants either have more than one stomach or they have a special part of the *intestine* to help them digest the fibres in plants. The stomach produces chemicals that mix with food. They help to break it down into nutrients the animal can absorb from the intestine.



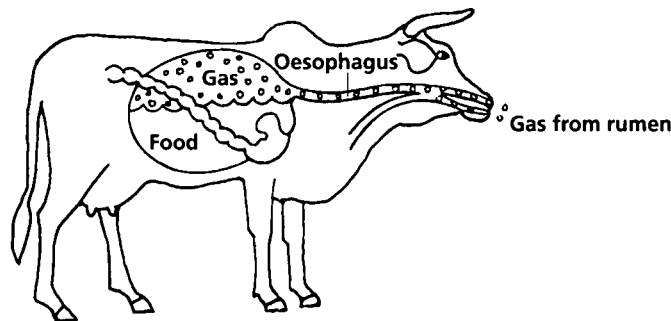
Cattle, buffaloes, sheep, goats and camels

These animals are called *ruminants*. They have four 'stomachs' called the *rumen*, *reticulum*, *omasum* and *abomasum*. (Only the fourth stomach, the *abomasum*, is like the stomach of other animals.) Ruminants use the extra stomachs to help digest tough fibres in the plants they eat. When food is swallowed it goes into the *reticulum* and the *rumen* first. When they are full the animal *ruminates* – the *rumen* contracts and mixes the food inside it. Animals only *ruminate* properly when they are not frightened or disturbed. They often lie down to *ruminate*.



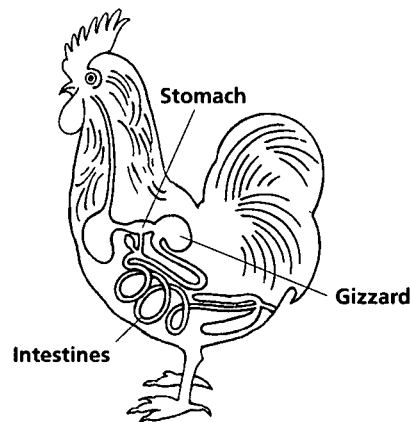
When an animal *ruminates*, some food that has been mixed with liquids in the *rumen* comes back up the *oesophagus* into the mouth and is mixed with saliva. The animal chews this thoroughly with the back teeth and swallows it again. Inside the *rumen* and *reticulum* food is broken down by helpful microbes. This produces a lot of gas which the animal quietly belches out about once every minute. From the *rumen* food goes into the *omasum* where the animal absorbs water from it. Then it goes into the *abomasum*. The *abomasum* produces chemicals that help digest the food.

When ruminants are born the *rumen* is not developed. New-born ruminants only use the *abomasum* to digest milk. They cannot digest fibrous plants. As the animals get older and start to eat fibrous food, the food stimulates the *rumen* to grow and the animals start to *ruminate*.



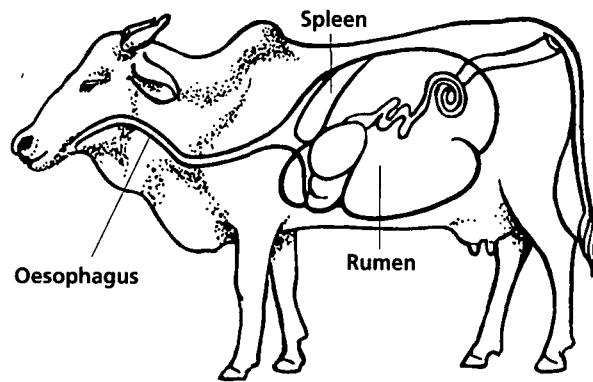
Horses, mules, donkeys, pigs, dogs and rabbits These animals have only one stomach.

Birds The food goes from the crop into the stomach then into the *gizzard*. The *gizzard* has thick walls made of strong muscles. Inside the *gizzard* are small stones that the bird has eaten. The *gizzard* contracts regularly and the stones help the bird to grind up hard food. A bird needs these stones if it eats whole grains but if it only eats soft food it does not need them. Finely-ground food from the *gizzard* goes into the *intestines*.



Spleen

The *spleen* is full of blood. It filters microbes out of the blood when an animal has severe infection and produces *antibodies* that help the animal fight off disease.

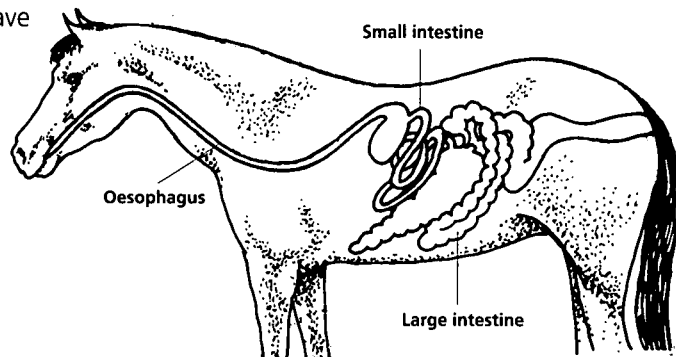


Intestines

The *small intestines* break down food into nutrients that go through the intestine into the blood. The blood carries them to the liver.

The *large intestines* absorb water from food into the blood.

After nutrients and water have been taken from food it goes on into the *rectum* and comes out of the *anus* as *faeces*.



Horses, mules, donkeys, pigs and rabbits These animals have a special part of the intestine called the *caecum* that helps them digest grass and fibrous plants.

Liver

The liver produces *bile* and stores nutrients taken from food the animal has eaten. It changes the nutrients into sugar and chemicals that other parts of the body need. It also makes some poisons harmless.

Gall bladder

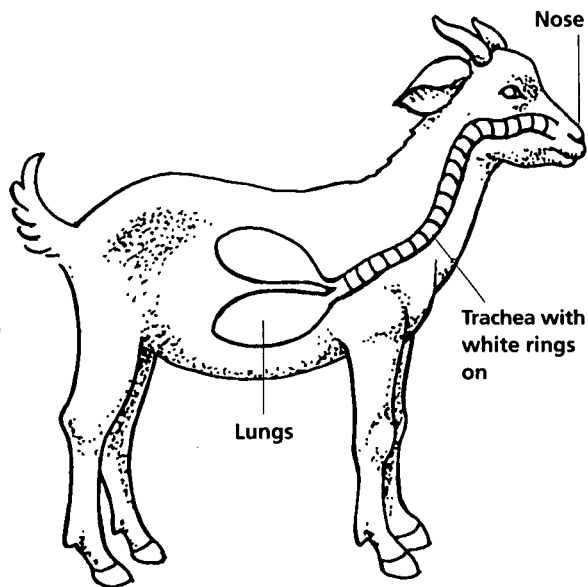
The *gall bladder* stores bile produced by the liver before it goes into the intestines. Bile is a dark green/yellow liquid that mixes with food in the intestines and helps to digest fat.

Breathing

Animals breathe because they need to get oxygen from the air. In the lungs, blood takes oxygen from the air. The air that animals breathe out has much less oxygen in it than normal air. Animals also cool themselves down by breathing out air. Dogs do not have sweat *glands* all over their bodies. They often breathe in and out fast to cool themselves down.

Trachea and bronchi

The tough white rings you can see in the diagram in the *trachea* keep it open. This lets air rush through it to and from the lungs. The trachea splits into two *bronchi*. Each *bronchus* takes air to and from one of the lungs. The bronchi have many branches that get smaller and smaller, like the branches of a bush, until they are too small to see. Each of the smallest branches ends in a tiny sac that fills with air when an animal breathes in. These sacs of air, that are too small to see, have tiny blood vessels around them. Blood absorbs oxygen from the air as it flows round the outside of these sacs.



Lungs

Lungs are soft because they are full of the tiny sacs of air at the ends of the branches of the bronchi. Try blowing into the trachea and you will see the lungs get larger as they fill with air. Cut into the lung and you will see how the branches of the bronchi become smaller and smaller.

Diaphragm

The thick sheet of muscle behind the lungs is the diaphragm. When this contracts it makes the chest bigger and helps pull air into the lungs.

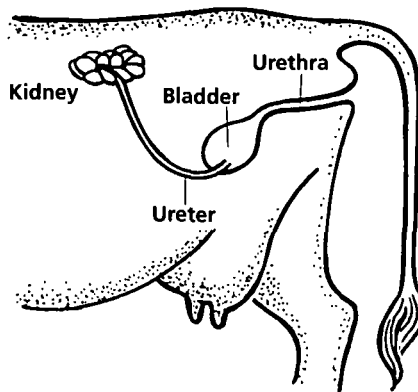
Urine

Kidney

The kidneys take poisons out of the blood. The poisons are waste chemicals left after food has been digested. Urea is left over after the body has digested protein from food. The poisons are filtered out with some water, as urine, and go through a tube to the *bladder*.

Urine

Urine has other chemicals in it, such as salt, as well as urea. An animal uses its kidneys to keep the right amount of water in its body. When the body has plenty of water in it the urine is usually pale and there is much of it. When the body has only very little water and the animal does not get much to drink the urine is often dark and there is only a little of it.



Birds Birds do not pass urine. Urine from the kidneys is mixed with the faeces and they come out of the bird mixed together.

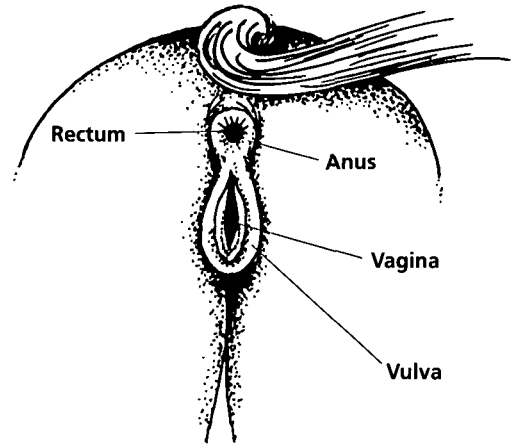
Bladder

Urine goes from the kidney into the bladder and is stored there until the animal *urinates*.

Reproduction parts

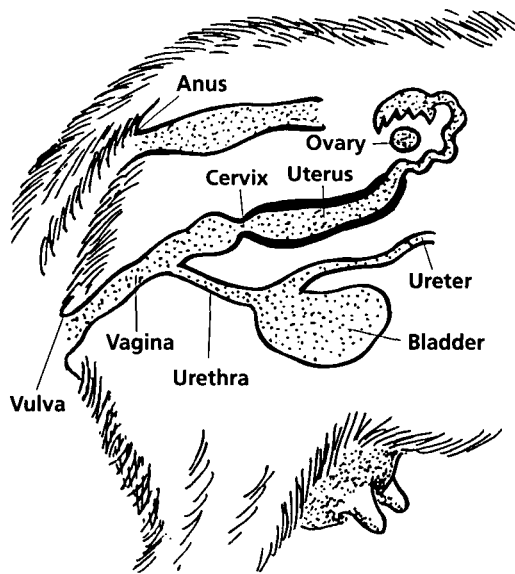
Vulva and vagina

The *vulva* and the *vagina* protect the *uterus*. The uterus is also protected by the *cervix* which is only open when an animal has a *heat period* or is about to give birth.



Uterus

The uterus has thick walls made of muscles that stretch a lot to hold a *foetus* when the animal is pregnant.



Ovaries

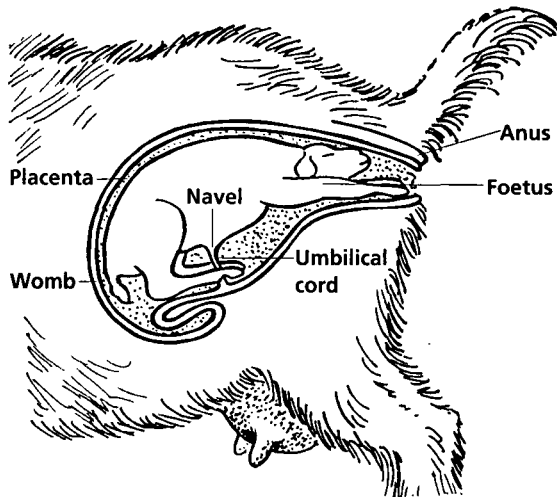
The *ovaries* are attached to the uterus by tubes. The ovaries produce female *sex-hormones* called oestrogen and progesterone that make an animal have a *heat period (oestrus)* when she will allow males to mate with her. These hormones also prepare the uterus for pregnancy and keep an animal pregnant after she has been mated.

Female animals have many tiny eggs in the ovaries when they are born. Sex-hormones make one or more of these eggs grow and be released from the ovary into a tube that leads to the uterus. As an egg goes down the tube to the uterus it may be fertilised by a sperm. Then the egg sticks to the wall of the uterus and the *placenta* develops around it.

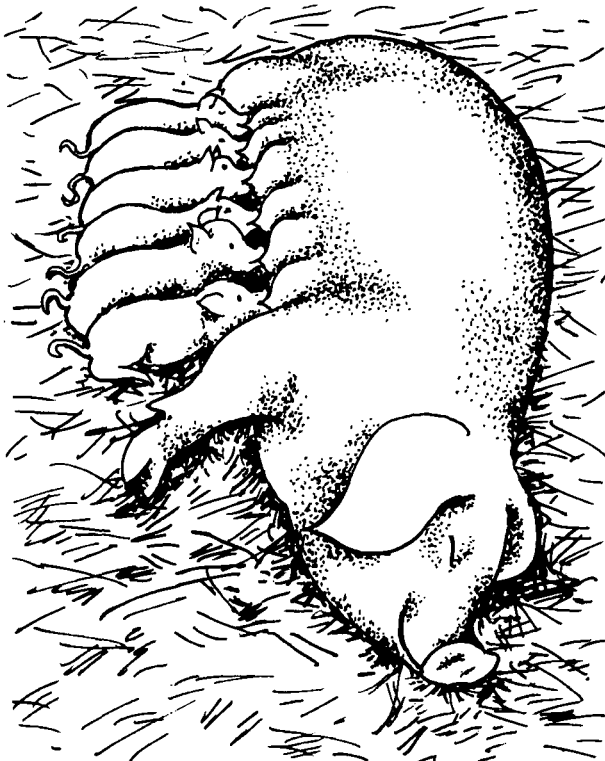
Birds Tiny eggs inside a bird's ovaries start to grow larger when a bird becomes sexually mature. The yolk of an egg grows for seven to ten days in the ovary then goes into the tube that connects the ovaries to the uterus. The egg stays in the first part of this tube for 20 minutes and is fertilised by a sperm if the bird has mated. In the next part of the tube it stays for about three hours and the white part of the egg starts to form round it. The egg goes into a narrow part of the tube before the uterus and stays there for one to two hours while a thin skin forms round the white of the egg. Then the egg goes into the uterus where it grows larger (more like the shape of an egg you see laid) and the shell grows round the egg. The egg is in the uterus for about 18 hours.

Placenta

Blood from the foetus goes to and from the placenta through blood vessels that come out of the *navel* in the *umbilical cord*. In the placenta blood from the foetus takes nutrients from the blood of the mother.



Udder



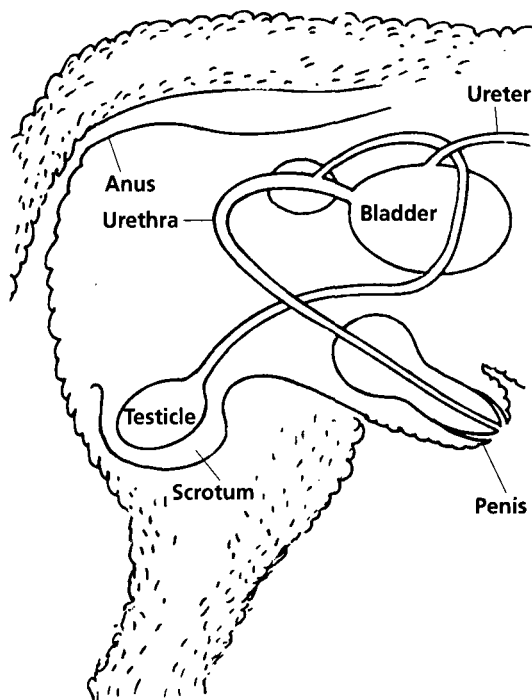
The soft spongy parts of the udder are the *glands* that produce milk. The udder is divided into separated parts. Animals can have infection in one part of the udder but not in the other parts. The back parts of the udder are larger and produce more than half the milk. A small amount of milk is stored in the teat until a young animal or a person takes it. Milk only flows from the udder when a young animal stimulates the mother by sucking a teat or when a person milks the animal. When animals are frightened and disturbed they do not release milk. The udder goes on producing milk until the pressure inside it increases. If milk is not taken out by a young animal or a person this pressure stops the animal producing any more milk, but when milk is taken out the animal produces more milk.

Testicles

The *testicles* are inside a sac of skin called the *scrotum*. The testicles produce *sperm*. Sperm, mixed with fluid from other glands, come out of the *penis* when the animal mates. When the animal mates the bladder is closed so the sperm are not mixed with urine which might damage them. Sperm go into the vagina of a female from the penis. They move through the cervix and uterus to fertilise eggs that the female has released.

The testicles also produce a male sex-hormone called testosterone. It makes animals grow up with male features, such as larger muscles or bigger horns. It makes animals have a desire to mate and makes sperm develop in the testicles.

Birds Birds do not have a scrotum. Male birds have testicles inside their body.



Parts to do with blood

Blood

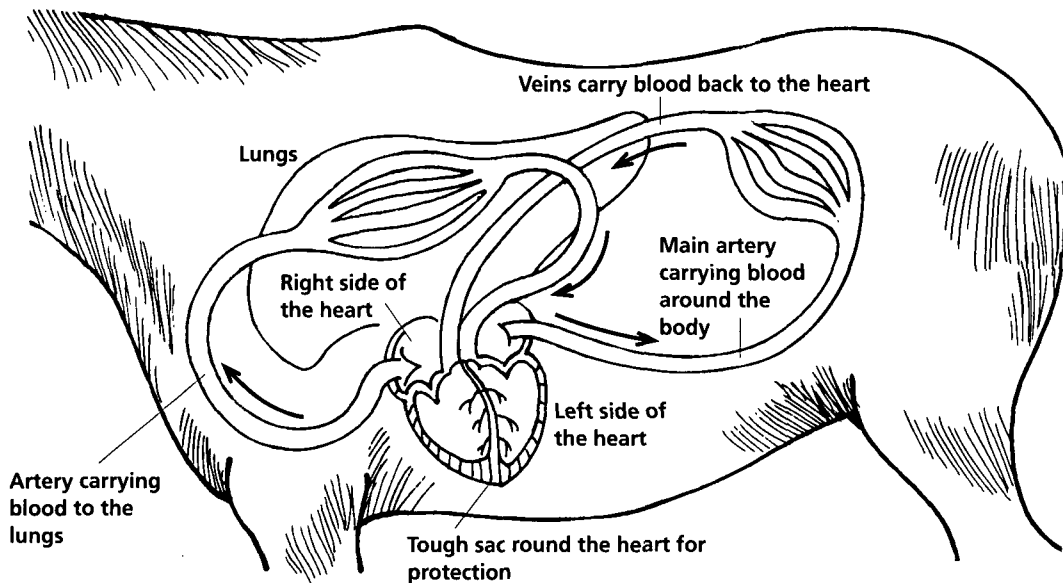
Blood is mostly made up of water with chemicals such as salt, in it, and red cells and white cells. *Red blood cells* make the blood look red and they carry oxygen from the lungs to all parts of the body. When the cells are full of oxygen, after they have been through the lungs, they are bright red. When red blood cells have given the oxygen they carry to parts of the body, they are dark red.

There are not so many *white blood cells* but they are very important in helping the animal to fight infection and parasites. Some white blood cells attack microbes and eat them up. Other white blood cells make special chemicals, called *antibodies*, that kill microbes.

Heart

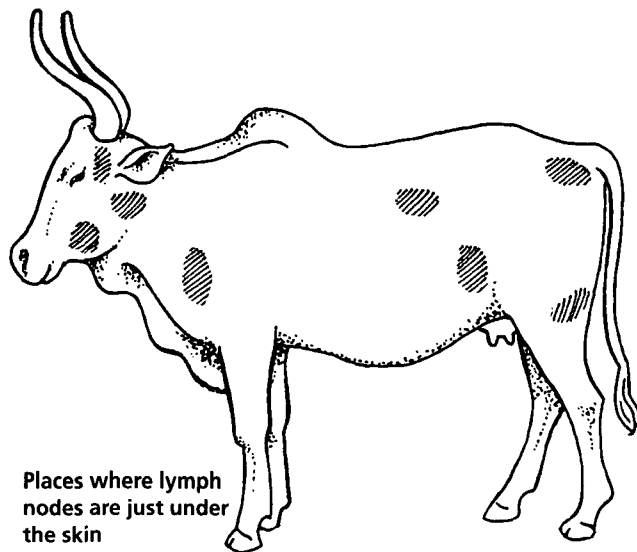
The tough sac you can see around the heart protects it. This sac normally fits closely over the heart. When an animal is sick, for example, with *heartwater* (p. 257), the sac may have much fluid in it.

If you cut the heart open you can see where the blood comes in from the lungs. You can see the thick muscles of the left side of the heart that squeeze blood out around the body through *arteries*. Blood comes back from the body in *veins* and goes into the right side of the heart and is pumped out to the lungs. The right side of the heart is smaller because it is not such hard work pumping blood out to the lungs as it is pumping it all round the body. Each time the heart beats the muscles relax and let blood back in to the heart. Then the muscles contract and pump blood out to the lungs and round the body again.



Lymph nodes

Animals have *lymph nodes* in many places in the body. Some of the lymph nodes are just under the skin. When an animal is healthy the lymph nodes are small grey/white lumps. But sometimes when there is infection lymph nodes swell up and become hard. Then you can easily see them and feel them just under the skin. **They are a useful sign of disease.** Sometimes when lymph nodes become infected they have abscesses in them (p. 186). Lymph nodes filter out the microbes killed by white blood cells when an animal has an infection.



Lymph is a clear/yellow fluid that comes from the blood – it is the liquid part of blood with some white cells but no red cells in it. It comes out of very small blood vessels all round the body and flows through the parts of the body. It is collected by many small *lymph vessels*. Lymph vessels are small and difficult to see. The lymph vessels carry lymph to the lymph nodes, then the lymph goes back through lymph vessels into the veins.

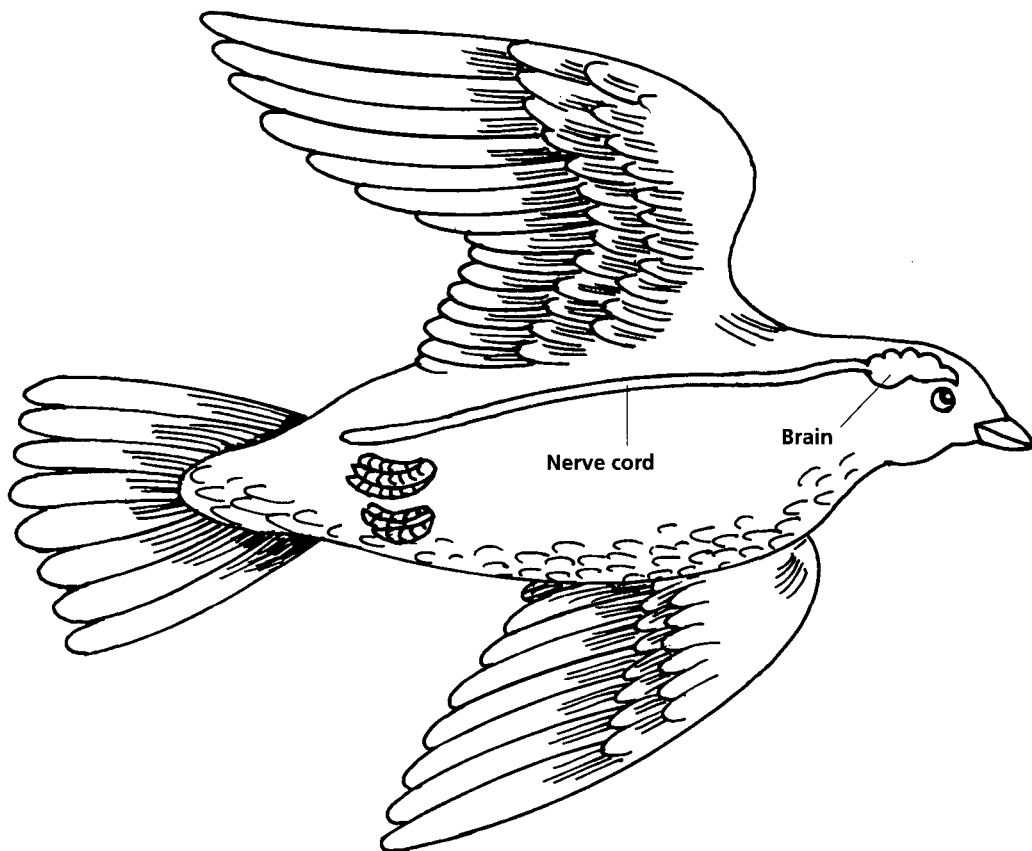
Behaviour

Brain

The brain lies inside the hard bone of the skull of the head, which stops it from being damaged too easily. The brain controls everything that happens in the animal's body.

Nerves

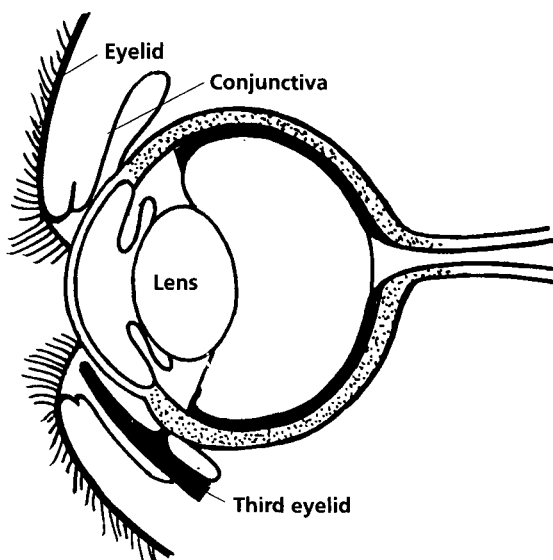
Nerves look white. Nerves from the brain go inside the spine to the tail. Nerves come out of the brain and the spine and go to all parts of the body. They carry messages from the body to and from the brain. This is how the animal feels things. Special very large nerves go from the eyes and ears to the brain to carry messages that let the animal see and hear things. Nerves also carry messages to tell different parts of the body what to do.



Eyes

The eye is covered with a thin skin, the *conjunctiva*, that goes over the eye and under the eyelid. It protects the eye. Inside the eye a lens focuses light onto the back of the eye. The back of the eye is called the *retina*. It is sensitive to light and sends messages along nerves to the brain that let the animal see. In the corner of the eye (nearest the nose) is a fold of conjunctiva that can come partly across the eye, this is called the *third eyelid*.

This session could be split into a number of useful training sessions.



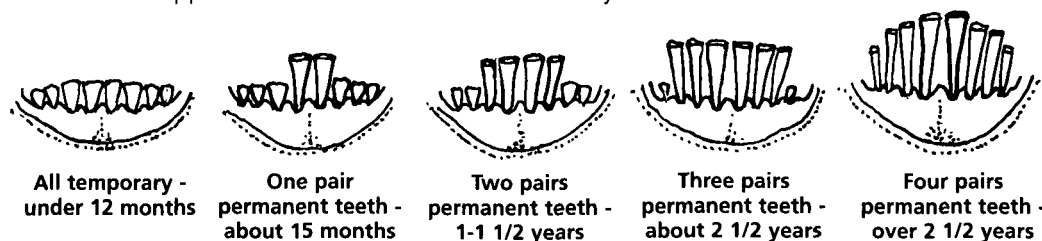
Training session: How to tell the age of an animal

Just looking at an animal to see if it 'looks' young or old usually lets you estimate the age well enough to treat it effectively. You can look at its teeth for a more accurate guide. You can estimate the age of a young animal to within about six months by looking at its (temporary) front teeth.

Young animals have temporary teeth that fall out as they get older. They are replaced by permanent teeth. Temporary teeth are usually small and a different shape from permanent teeth which are usually larger and more straight sided (see diagram). The middle pair of teeth are replaced first, then the others on each side as the animal grows older.

Camels From 2–3 months old camels have six (three pairs) of temporary teeth that overlap. By the time the camel is two years old the teeth have grown apart.

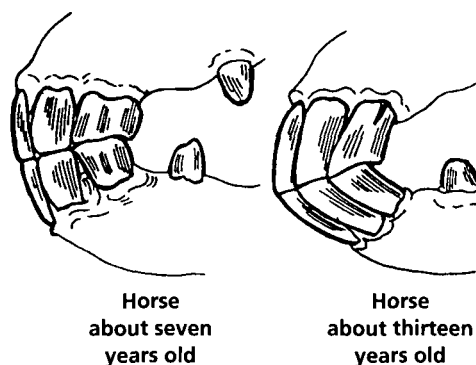
Horses, mules and donkeys (Mules' and donkeys' teeth are like horses'.) Male horses have an extra tooth, called a canine, on each side between the front and back teeth. These appear when the animal is about four years old.



Approximate ages in years when temporary teeth are replaced by permanent teeth

	Cattle	Buffaloes	Sheep/Goats	Horses	Camels
First pair	2	3	1	2 1/2	4 1/2
Second pair	2 1/2	3 1/2	2	3 1/2	5 1/2
Third pair	3	4 1/2	3	4 1/2	6 1/2
Fourth pair	3 1/2	5	3 1/2	-	-

It is not possible to tell the age of older animals accurately. You can guess the age approximately because the permanent teeth wear down as the animal becomes older, but this depends very much on what the animal eats. As horses get older their front teeth wear down and meet at a smaller angle (see diagram).

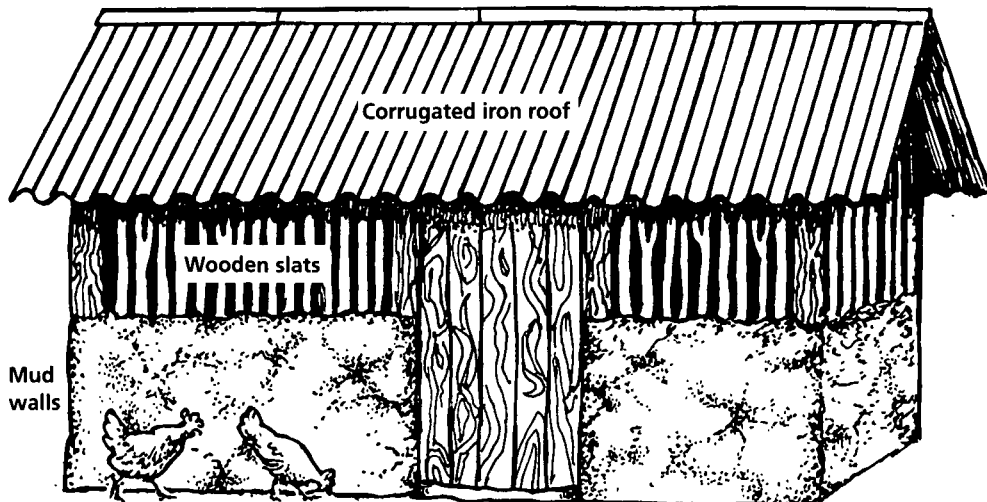


Section 3 **Healthy animals**

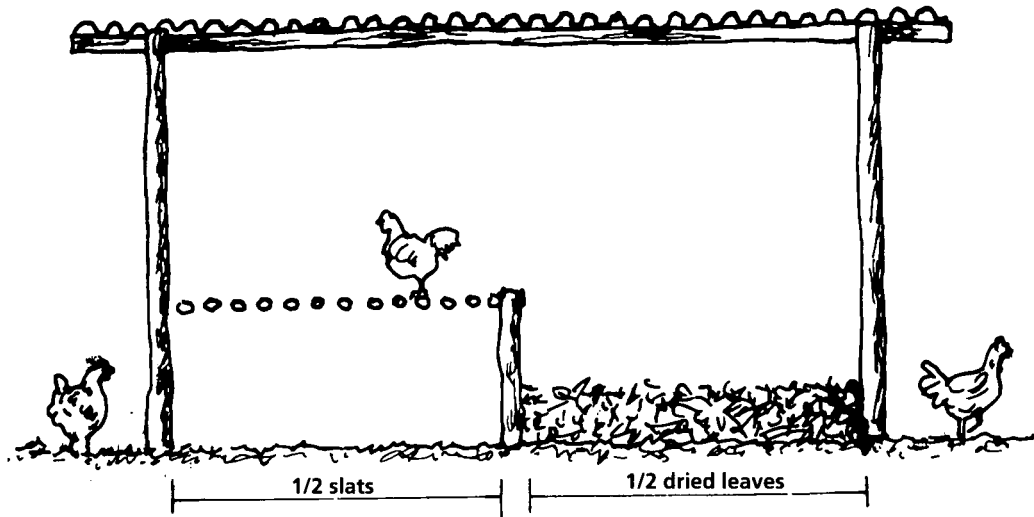
7 Taking care of animals

Many people let animals, and especially birds, look after themselves. Provide a better place for them to live, give them better food and water and **you will easily get back more than it costs you**. You will get more milk, meat, eggs, offspring or work from the animals and they will not get disease and die so often.

Keeping animals or birds in enclosures or houses protects them from many predators but they easily get diseases and produce little if they are not kept in good condition.



- Keep animals' houses clean and remove faeces often. Faeces attract *flies* (p. 158) and have *worm parasites* in them (p. 218).
- Make a pile out of the faeces you remove. You can use the pile as fertiliser to put on crops after it has rotted.
- As faeces rot they become hot and the heat kills most *microbes*, fly eggs and *parasites*. Mix the pile of faeces often to make sure all of it gets hot.
- Avoid building the pile near water or in a place that becomes flooded as this will allow infection to spread through the water.



How to feed animals well

- Give food and water at regular times evenly through the day. Don't let animals become so thirsty that they drink a large amount all at once. Remember that they need more water when they give birth or produce milk.
- When an animal changes to different food, make the change gradually. When you buy a new animal find out what it has been eating and only change from that slowly.
- Mix food thoroughly so that animals cannot select good bits and leave the rest. Use several different types of food. Then the animals will eat more and the food is more likely to have a good mixture for giving energy, for growth and with most minerals in it.

Foods for energy include: good pasture or forage, and grains, such as: maize, rice and other cereals.

Foods for growth include: Grass and other plants, especially when they are green; plants that have a lot of protein in them, such as lucerne or berseem; oilseed cake; cottonseed cake; groundnut cake; soyabean cake; fishmeal.

- Give the best quality feed to: pregnant animals, females that produce milk, young growing animals, female animals used for breeding and animals that work.
- Give horses water **before** you feed them dry food. This helps to stop them getting *colic* (p. 217).
- Let animals, especially horses, rest after working hard and give them water **after** they cool down.
- Make sure animals have enough salt and minerals. Minerals are chemicals that come from the soil. The plants that animals eat get minerals from the soil, but plants that grow on ground that lacks minerals also lack them. So sometimes animals do not get enough minerals in the food they eat (p. 229). Then you need to give more, as a *supplement*, especially to young animals growing fast, pregnant animals and animals producing milk.

The minerals that animals need most are: phosphorus, calcium and magnesium. They also need very small amounts of other minerals including: iron, iodine, cobalt and copper. Birds that lay eggs need a lot of calcium. Start feeding extra calcium to birds a few weeks before they start to lay eggs. Some people in Niger gather shells from the river as a supply of grit and calcium.

When to buy minerals

Make sure that animals get enough good quality food before you decide to buy minerals – remember that store keepers often encourage people to buy minerals when they do not need them. Animals suffer if they do not have enough minerals (p. 229) but **they suffer much more often because they do not have enough good food.**

How to make good hay and other forage

Some people in West Africa have worked out good ways to make forage in dry places. They make hay by putting grass in a bundle or stack and shade the stack from the sun. This lets the wind dry the forage rather than letting the sun dry it. The sun can dry it too much and it will not be such good food.

- Make hay from young grass while it is still green. After grass and other plants have flowered and become brown they are tough and not so easy for an animal to *digest*. Or make forage from trees that have leaves at the end of a dry season when little else is available.
- Give animals clean forage. Clean out stale forage and **don't put dirty forage that has fallen on the ground back on top of clean forage in a trough.**



How to improve poor quality food

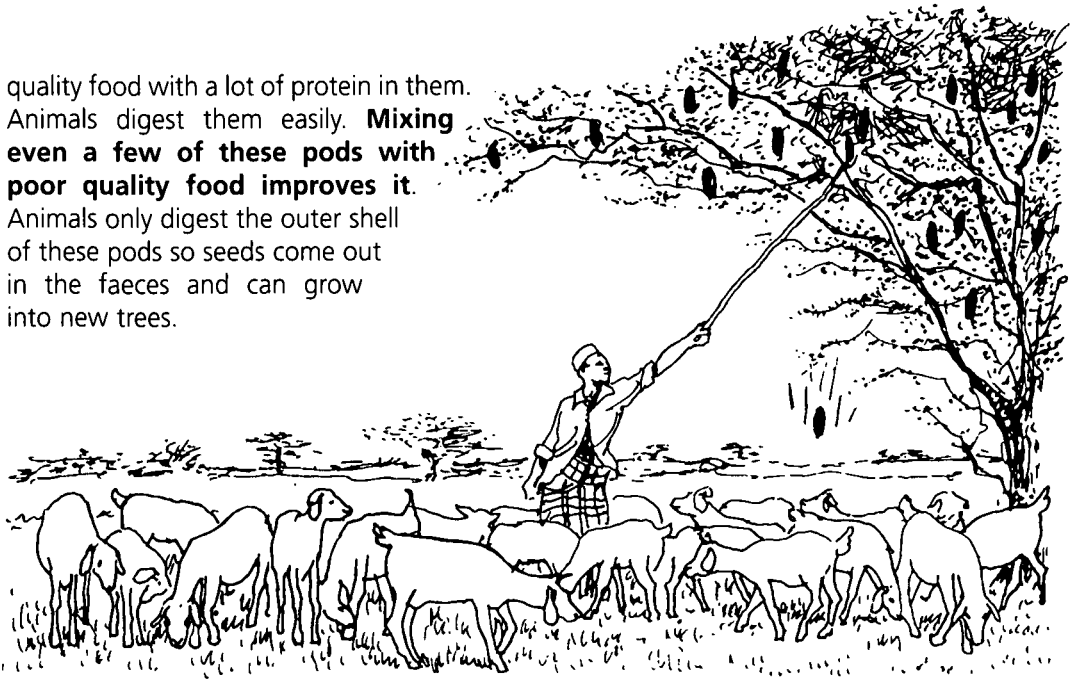
Animals get most benefit from good quality food they can easily digest. Poor quality food, such as dry old grass, provides little energy. It fills the animal up and stops it eating more to get the energy it needs. Much of it is wasted and comes out in the faeces. You can make poor quality food much better with only small expense:

- Grow protein crops, such as berseem or lucerne. These plants are very digestible and animals like eating them. **You can make very poor quality food much better by mixing as little as one tenth of good food with it.** Even a handful of good quality food, such as berseem or lucerne, well mixed with dry straw makes it much better food. Animals eat the straw while looking for the good bits. (Chopping food up finely encourages animals to eat more but it does not make the food better quality.)
- Ask if you can graze animals on fields where people have harvested crops. Animals can eat what is left after the harvest and put manure back on to the ground.

These are some ways that people improve food quality:

- People in Syria make a feed they call 'Tibn'. They mix small amounts of salt and berseem with chopped straw.
- People in Ethiopia mix buttermilk with straw.
- People in Senegal use long poles to shake pods down from acacia trees [*Acacia tortilis*]. People in many countries add pods from these trees to forage. The pods are good

quality food with a lot of protein in them. Animals digest them easily. **Mixing even a few of these pods with poor quality food improves it.** Animals only digest the outer shell of these pods so seeds come out in the faeces and can grow into new trees.



How to buy healthy animals

Try not to buy animals from very far away. They often bring diseases and easily become sick with diseases that local animals resist. They may be much more productive than local animals but they will not be easy to keep healthy. Ask a **local** skilled worker to help you examine the animals. Veterinary and other skilled workers from far away may not understand diseases and problems in your area.

How to tell skilled workers about your animals

Keeping and recording all, or even some, of this information is useful. It will help you tell a skilled worker about your animals if you need to.

Things that identify the animal:

Name / number / brand / other mark _____

Colour _____

Date of birth _____

Sex: Male / Female _____

Things that have happened to the animal:

Has it been vaccinated? What for and when? _____

What sort of vaccine was used? _____

The batch number of the vaccine (written on the bottle) _____

How was the vaccine given? _____

When to vaccinate again _____

Has it been dipped or sprayed? What with and when? _____

Has it had diseases? Which disease and when? _____

Has it had medicines? Which medicines and when? _____

Has the animal been mated? With which animal, when? _____

Has the animal produced young? How many and when? _____

8 How to keep animals healthy at different stages in their life

Heat (Oestrus)

Heat – or the 'heat period' – is the time when a female animal will allow a male to mate with her and is when mature females can become pregnant. When a female is in heat, her ovaries release eggs into the uterus.

Age when animals first have a heat period

Cow	8–20 months
Buffalo	10–20 months
Camel	24–36 months
Horse	12–36 months
Donkey	10–15 months
Sheep	6–12 months
Goat	6–12 months
Pig	4–7 months
Rabbit	3–7 months
Dog	7–9 months
Male animals mature at about the same ages.	

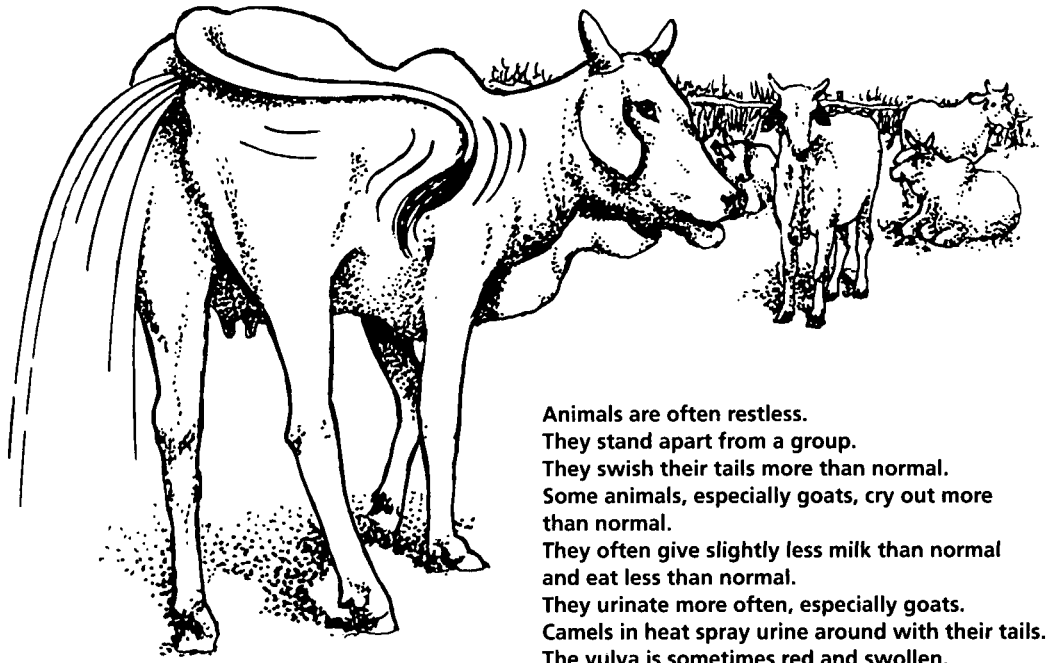
How to tell when animals are in heat

The best time to look at animals to see if they are in heat is early in the morning or in the evening. Do not disturb the animals when you are looking at them. It is more difficult to see if an animal is in heat when females are tied up or kept in a house. Let them out if possible with other animals twice a day and watch them. **Heat sometimes only lasts for 12 hours or less, so watch for signs of heat at least every six hours.**

- Animals in heat are often restless, they stand apart from a group and swish their tails more than normal. Some animals, especially goats, cry out more than normal.
- They often give slightly less milk than normal and eat less than normal.
- They urinate more often, especially goats. Camels in heat spray urine around with their tails.
- The *vulva* is sometimes red and swollen.
- Thick clear mucus comes from the *vagina*. When red mucus comes from the vagina it is too late to mate an animal.
- Animals in heat will stand still and let a male mate with them.

As soon as an animal is in heat put her with the male you want her to mate with.

Cattle and buffaloes It is not so obvious when buffaloes are in heat as when cows are. Most buffaloes are in heat at night. When it is very hot, buffaloes do not have many



Animals are often restless.
They stand apart from a group.
They swish their tails more than normal.
Some animals, especially goats, cry out more than normal.
They often give slightly less milk than normal and eat less than normal.
They urinate more often, especially goats.
Camels in heat spray urine around with their tails.
The vulva is sometimes red and swollen.
Thick clear mucus comes from the vagina.



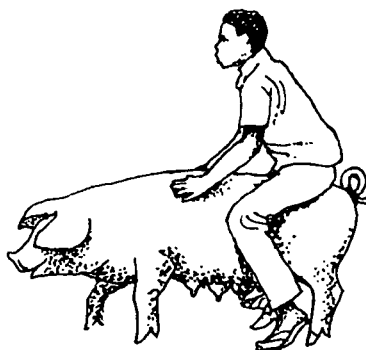
signs of heat. So if you are breeding them at hot times give them shade and allow them to wallow often.

Sheep and goats It is sometimes hard to see when a sheep is in heat. If a male sheep is kept with a group he will find the females that are in heat. Goats sometimes come in heat again after only four to six days at the start of a breeding season.

Horses and donkeys (mules do not breed) often come in heat at the beginning of a wet season.

Camels only come in heat when they are stimulated to do so by male camels.

Pigs Test for heat by taking a male pig close to the female. She will go towards the male if she is in heat. She often puts her ears up. Or test for heat by pushing on the female's back and try to sit on her. If she stands still she is in heat. This test does not work so well with pigs that have not given birth before.



Rabbits do not have heat periods like other animals. Females will mate at any time and release eggs into the *uterus* after they have been mated.

The length of the heat period, how often it happens and when it starts again after birth

Heat period	Lasts for:	Happens every:	Starts again after birth:
Buffalo	2–24 hours	11–30 days all year	40–60 days
Camel	3–6 days	20–28 days seasonally	20 days/next season
Cow	1–48 hours	18–24 days all year	20–60 days
Goat	1–3 days	17–23 days seasonally	next season
Horse	2–12 days	18–28 days seasonally	5–15 days
Donkey	2–7 days	15–20 days seasonally	5–15 days
Pig	1–3 days	14–35 days all years	3–9 days
Sheep	1–3 days	12–19 days seasonally	17 days/next season
Dog	18–25 days	6 months	6 months

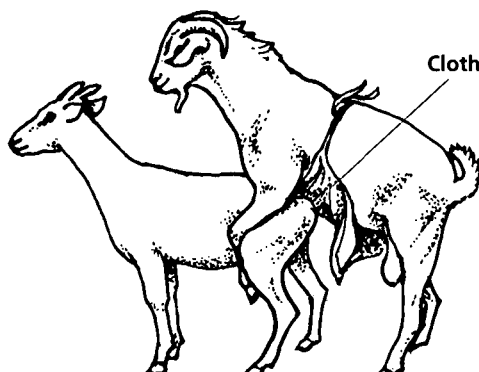
Some animals, especially pigs, do not have a heat period again so soon if their young are still taking milk.

Mating

Do not disturb animals while they are mating. Wait until a male is strong and well grown before you use him for mating. It is a good idea to mate animals so they have offspring in a wet season when there is plenty to eat.

Cattle Mate as soon as you see them in heat. Mate the animal within 12 hours after you see the heat signs. Zebu cattle are sometimes in heat for less than two hours, so observe them often and mate them rapidly. If males are kept tied up away from females all night they may not be able to mate soon enough.

Goats Mate the second day they are in heat. Expect one male to mate with 20–25 females each breeding season. People stop a male goat (or sheep) from mating at the wrong time by tying a thick piece of cloth round his body so that the cloth hangs down.



Sheep Mate the second day they are in heat. One male sheep can mate with about 40 females. Sometimes young male sheep have problems mating with fat-tailed females. Help them by moving the female's tail to one side.

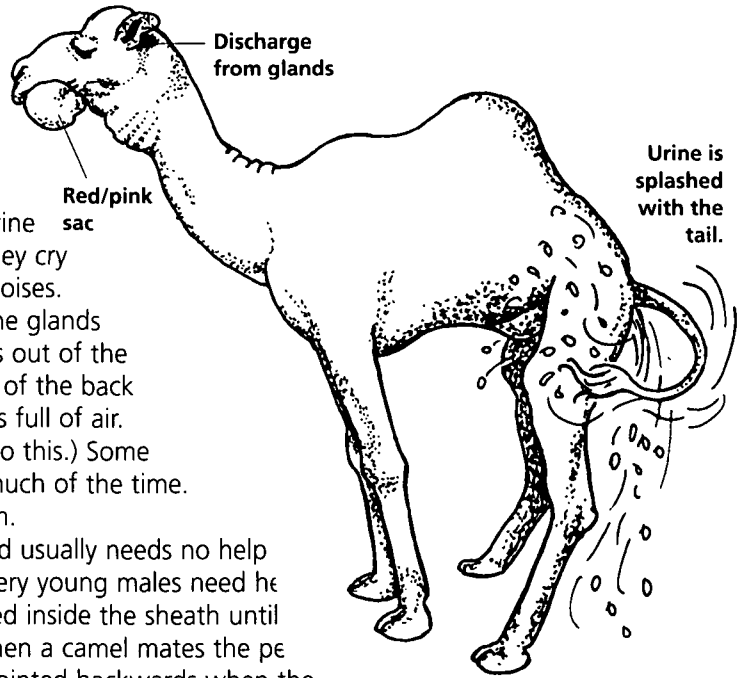
Horses and donkeys Mate them the day before the female stops being in heat. This is difficult to arrange but a female is usually in heat for five days so mate her as soon as you see her in heat and mate her again 2–3 days later (donkeys 1–2 days later).

Do not mate horses the first time they come in heat. Mate horses the first time they come in heat after giving birth if the birth was normal and there is no infection.

Camels usually have a mating season in a wet season when there is good pasture.

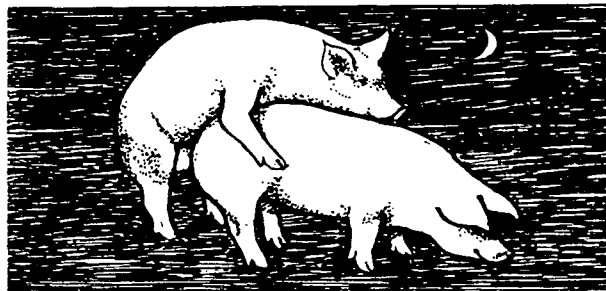
In the mating season male camels fight other males and attack people. They stand with their legs spread out and splash urine over their backs with their tails. They cry out a lot and make low gurgling noises. They also have a *discharge* from the glands on the head. A red/pink sac comes out of the mouth. This sac is part of the roof of the back of the mouth that the camel blows full of air. (Camels with two humps do not do this.) Some old male camels behave like this much of the time. They are a nuisance. Castrate them.

Mating takes 10–20 minutes and usually needs no help so leave them alone. Sometimes very young males need help to mate. A camel's penis is attached inside the sheath until camel is about three years old. When a camel mates the penis is pointed forwards, though it is pointed backwards when the camel urinates.



Pigs Mate at the end of the day when you first notice heat. Mate her again the next day if she is still in heat. Do not use males more than once a week to start with. Mature males can mate 20–40 times every month. Use a smaller male for small females and females that have not been mated before. Males over three years old are usually too large and aggressive to use.

Do not mate a pig the first time she is in heat or she will become thin and only have a few, small offspring.



Mate pigs at night.

Rabbits A female can mate again a few days after giving birth but it is better to wait to mate her until her young are one month old. Take the female to the male for mating. You need one male for about 15 females. The male will go on mating for about seven years.

Birds Use one male bird to about ten female chickens. Keep more than one male with large groups of birds.

Artificial insemination

Some people do not let animals mate naturally. Skilled workers take semen from a very good male. Sometimes they store it (frozen) for a time and then they put it into a female.

Artificial insemination helps you to get a better quality male than is available locally. It can let one very good male make thousands of females pregnant. The semen from each natural mating could be collected and used to inseminate more than fifty females.

Pregnancy

Animals that do not come in heat are usually pregnant. Skilled workers can tell if large animals are pregnant by putting their arm into the *rectum* and feeling the developing *foetus* inside the *uterus*. With practice you can check for pregnancy yourself (especially after about 80 days). Ask a skilled worker to teach you how to do this.

Horses and donkeys usually have a large abdomen about three months before they give birth. Avoid using animals for work in the last three months of pregnancy.

Camels Many camel herders say that from about one week after a female camel becomes pregnant she lifts her tail when people go near her. Pregnant female camels run away if a male approaches them. They stop giving milk 1–3 months after they become pregnant.

Rabbits You can feel the young in the female's abdomen two weeks after she has mated if she is pregnant.

The length of pregnancy

	Pregnancy usually lasts for:	Pregnancy can range between:
	(Days)	(Days)
Buffalo	320	300–340
Cow	280	270–300
Camel (One hump)	390	340–410
Camel (Two hump)	405	360–410
Sheep	150	140–160
Goat	150	145–160
Pig	115	105–120
Horse	335	320–355
Donkey	365	350–380
Dog	63	60–70
Rabbit	31	29–31

Prepare an animal for birth a few weeks before you expect her to give birth.

- Stop taking milk from her at least 2–3 months before she gives birth.
- Give her enough good quality food. Do not give her so much food that she becomes fat. Make sure she moves around.
- Do not give vaccinations or medicines unless they are essential.
- Keep her away from strange animals.
- If she lives in a house make sure it is clean and provide a clean place away from other animals for her to give birth.

How to tell when an animal is about to give birth

There are a number of signs to watch for to tell when an animal is about to give birth.

- A few weeks before an animal gives birth the udder starts to swell.
- A few days or more before birth the animal often stands alone away from other animals.
- The teats and udder swell.
- The udder becomes tight.
- The *vulva* often becomes swollen and red, and sometimes a clear red/brown *discharge* comes from it.
- The animal develops a hollow on each side of the tail as the muscles around the pelvis and *vagina* start to relax.
- The animal starts to look distressed. She looks round at her side. She often lies down for a short time then gets up again.

Sheep and goats often lie down and stretch their head back when they are about to give birth. Goats giving birth for the first time are often distressed. Put another female close to one giving birth for the first time to calm her. Only help a sheep or goat if she has tried to give birth for more than about two hours or you can see a problem, such as only one leg coming out.

Horses and donkeys often have a little milk coming from the teats about a day before they give birth.

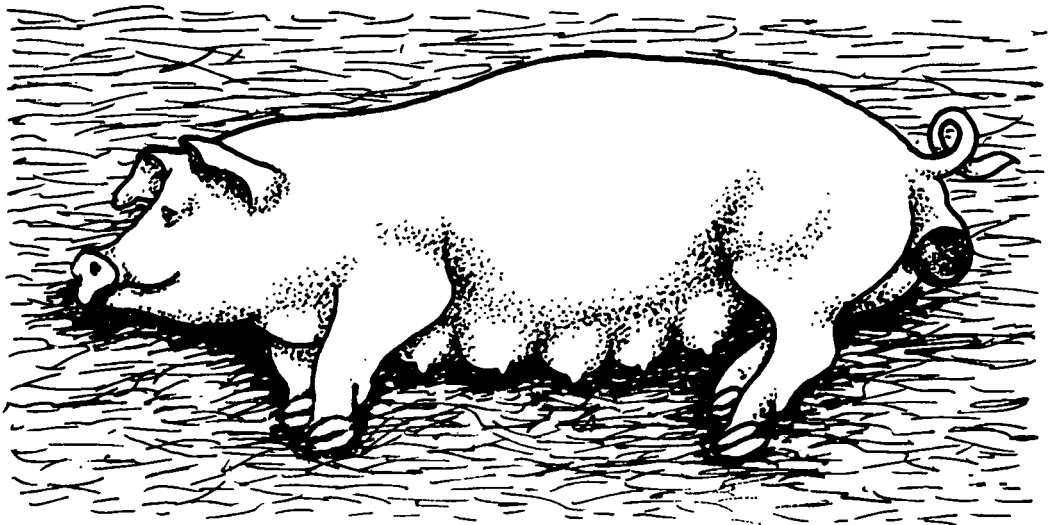
Pigs Two weeks before birth the udder and teats swell. In animals that have not given birth before, the udder swells 6–7 weeks before birth. One day before birth the udder becomes very red. You can squeeze a little watery milk from the teats.

A thick blood-stained discharge comes from the vulva about one hour before birth.

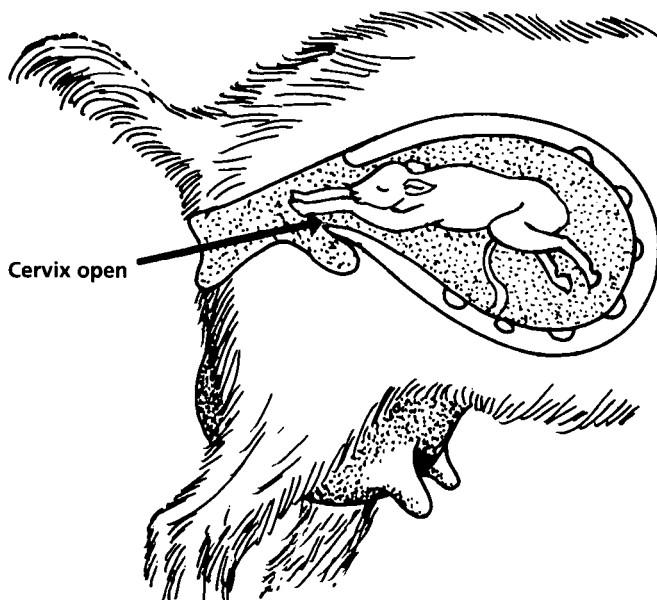
What happens when an animal gives birth normally

The stages of birth are described below.

- The *vulva* opens and a sac full of fluid comes out.



- The *cervix* starts to open. The cervix has been sealed tightly with thick mucus while the animal was pregnant. The cervix should be fully open about one hour after the animal starts to push.



- The *uterus* starts to contract and the contractions become stronger.
- The bag of water breaks. Yellow fluid comes out of it.
- Usually the two front legs and the head come out through the vulva first. Sometimes the two back feet and the tail come first. If the baby is not in one of these positions the mother needs help (p. 55).



- It is best to leave the animal alone to finish giving birth. But, especially with **horses**, when the head and shoulders have come, make sure the mouth and nose are clear of membranes so that the new-born animal can breathe.
- After the head, shoulders and chest have come out, the rest of the baby animal usually follows easily.



Pigs Usually one baby pig comes out every 10–20 minutes. The whole birth usually lasts 2–3 hours. Usually about one pig in every twenty is dead when it is born.

Things that go wrong with birth and what to do about them

Most animals give birth normally, often at night, and do not need any help at all. Leave them alone but watch for any signs of a problem. **Do not pull on the legs of a baby animal as soon as they appear.** It will not help and you might harm the mother or the baby animal. Only give help to most animals if birth is taking more than one hour. Then gently examine the animal to see what is wrong.

Horses and donkeys Give help if the animal is having contractions every few minutes and looks as if she is trying to give birth but no part of the new-born animal is coming out after half an hour. Or give help if the animal has normal contractions for 20 minutes but then looks tired and stops trying to give birth.

Pigs Give help if it is more than about an hour after the last baby pig came out and another has not come.

How to help an animal having difficulty giving birth

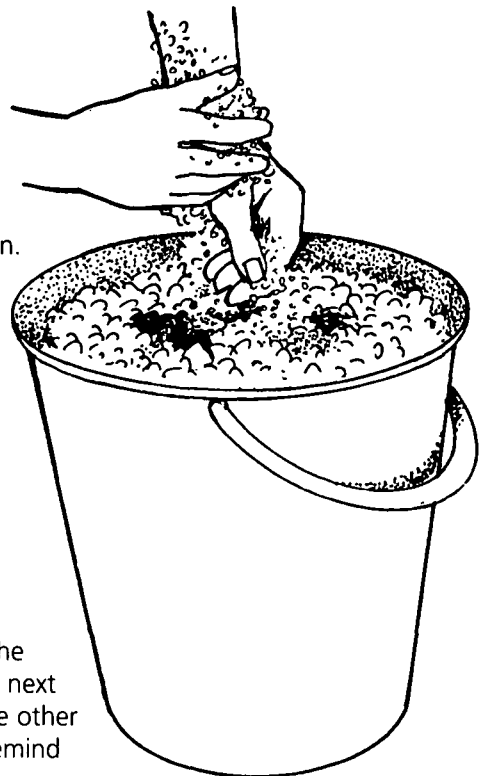
If you have to help with a birth these are some useful things to have:

- Clean water.
- Soap and brush for washing hands.
- Soap flakes or other lubricant.
- Clean cloths for drying hands.
- Ropes.

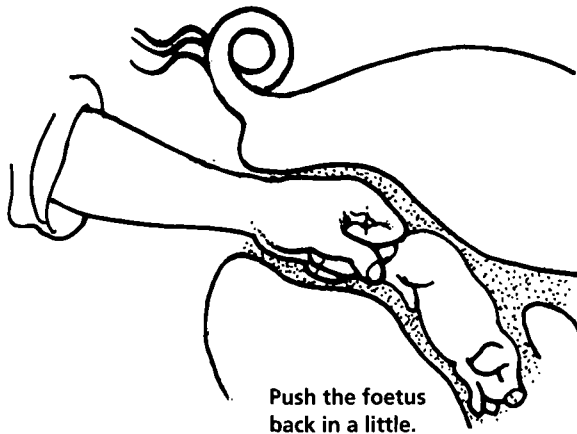
Before you help the animal make sure she is only loosely tied up and can easily lie down. You will have to put your hands into the *vagina* so **wash your hands and arms well. Cut your fingernails short.** Scrape some soap, if you have some, under your fingernails.

Use plenty of soap or vegetable oil as a lubricant to make your arm slide in easily.

- Lift up the tail and wash around the vulva.
- Put your arm in the vagina.
- Is the cervix open?
- Is the baby in the correct position for birth?
- If not, what position is it in?
- Feel the legs. Are they back or front legs? If the first joint you feel bends the same way as the next one it is a front leg, if the next joint bends the other way it is a back leg. (Look at the mother to remind yourself what the joints look like.)
- Do both the legs you can feel come from the same animal? There may be twins. Twins cannot come at the same time, one must come first.
- Sometimes the *foetus* is in the wrong position and it will be difficult or impossible for the mother to give birth to it. **Before the foetus can come out you have to put it in the right position for birth.** Then you can help by pulling on its legs with ropes if needed.



When you adjust the position of the foetus always be very careful not to make a hole in the uterus by pushing the teeth or a leg through it. **If you make a hole in the uterus the animal will have very severe infection in the abdomen and will probably die.**

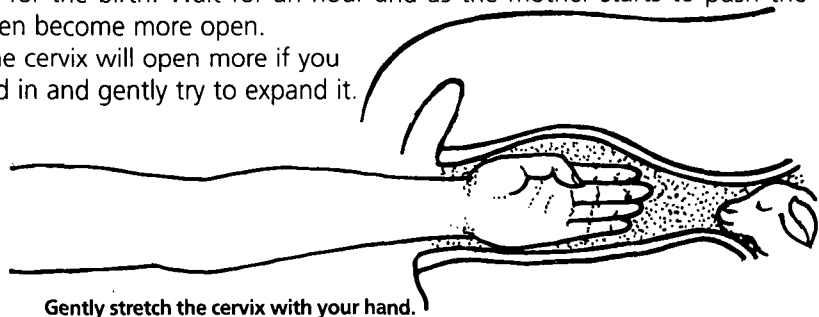


Before you can move the foetus into a better position push it back in a little first. This makes more room to move the legs and body into a good position for birth. When a **camel** has difficulty giving birth some people make a hole in the sand to lower the front legs, then they can push the foetus back more easily to rearrange it. After the foetus is in the right position for birth use more soap or vegetable oil to help the baby animal come out easily.

Pigs If you can feel a baby pig that is stuck try to pull it out. The mother will sometimes push harder when you put your hand in to examine her and a baby pig will come out.

Problem: The cervix is not open

- It is too early for the birth. Wait for an hour and as the mother starts to push the cervix will often become more open.
- Sometimes the cervix will open more if you put your hand in and gently try to expand it.



Sometimes the cervix never opens properly or opens and closes again before the baby is born. When that happens, usually the baby is dead. When it is impossible for the baby to be born normally by coming through the cervix, skilled workers can do an operation (Caesarean). They cut through the side of the abdomen and find the uterus. They cut the uterus open and take the baby animal out and sew the mother up again.

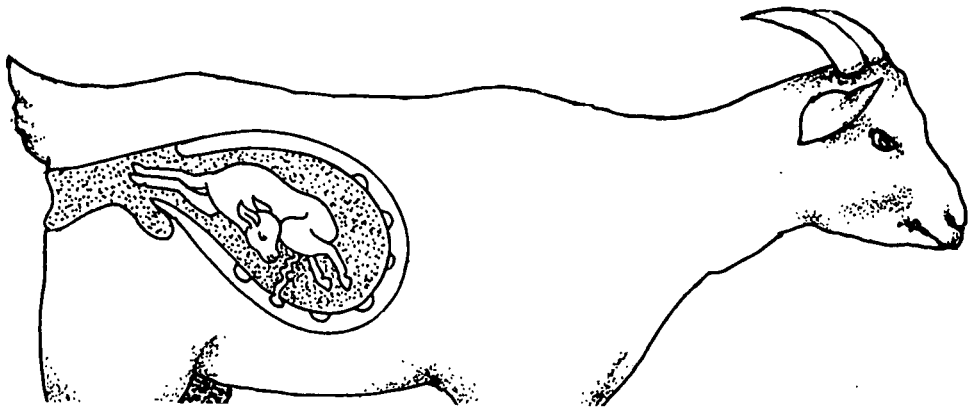
- If the baby has died and the cervix is still closed there is usually a foul smell. It is difficult to treat this.
- It may help if you put antibiotics into the uterus while the foetus breaks up and rots inside and eventually comes out.

Sometimes the cervix will not open because the **uterus is twisted**. This is difficult to treat.

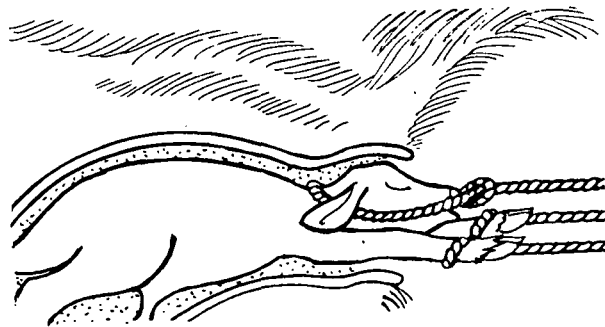
- If the cervix is open enough to put your arm through, grab a part of the foetus and try to untwist it.
- Or make the animal lie down (p. 17). Hold part of the foetus and roll the animal over to untwist the uterus. Sometimes it helps to roll the animal even if you cannot grab part of the foetus.

Problem: Two front feet come, but no head

- Push the baby back inside a little.



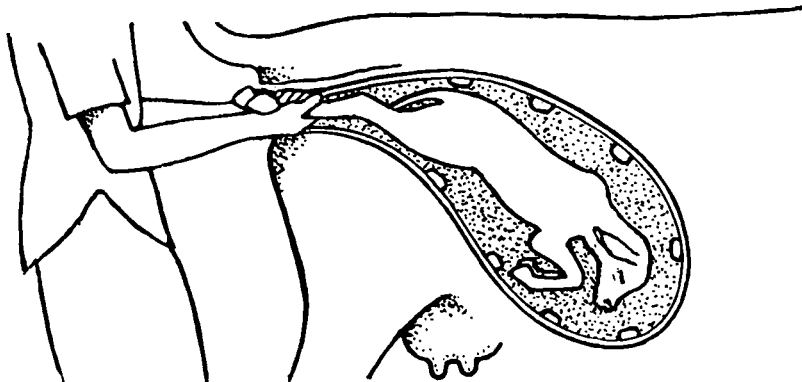
- Grip the mouth or nose and pull the head towards you. You can use a rope to help pull on the jaw. Sometimes it helps to put a rope round the head and then you can help pull on the head as the baby comes out. Make a loop in a rope with a slip knot (p. 25). Put the rope behind the ears and let the knot tighten in the baby's mouth.



Problem: Two back feet come first

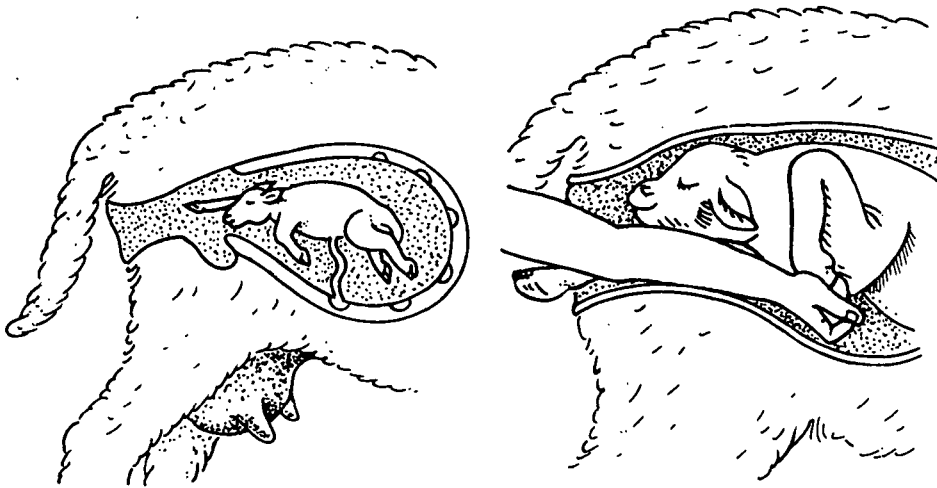
Most animals give birth to a foetus in this position quite easily with no help. But watch the mother closely and if the birth takes too long or she seems to have difficulty:

- Help by pulling on the baby's legs. It helps to get the foetus out quickly because the umbilical cord sometimes breaks and then the baby animal will need to breathe as soon as possible.



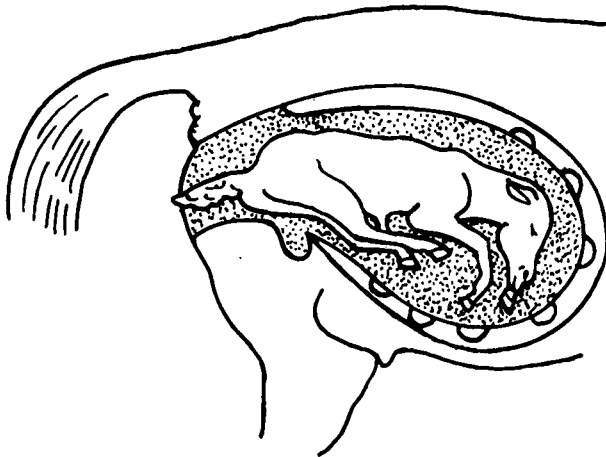
Problem: The head comes, but one or two front legs do not

- Put your arm in and gently bring the leg or legs up into the normal position. It is safest to put your hand over the foot as you pull the leg up to stop the foot going through the side of the uterus.



Problem: Only a tail comes

- Push the foetus back inside a little.
- Find the knee of one leg and pull it towards you.

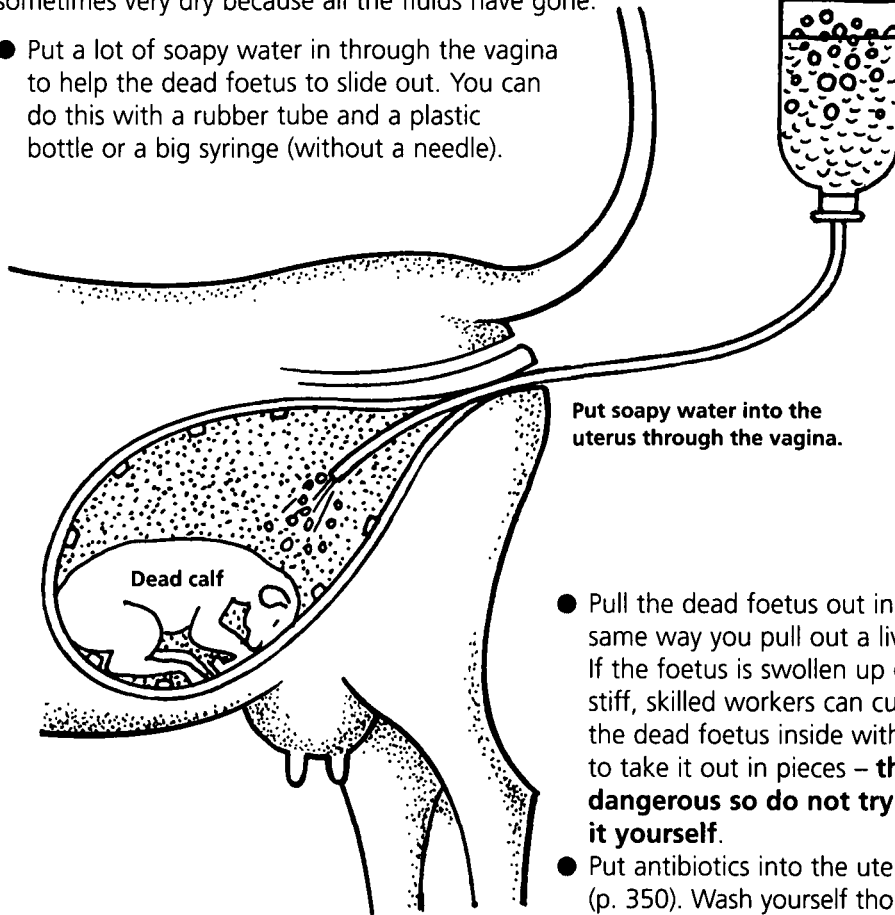


- Find the foot and cup your hand round it to protect the uterus. Pull the foot back up into the vagina. If the animal pushes when you try to do this you can get another person to push the foetus back in.
- As soon as you have both back legs in the vagina tie a rope on each of them and pull firmly. Pull at the same time as the mother pushes. Then let go and wait until she pushes again. Pull down towards the udder.

Problem: The foetus is dead and smells bad

Sometimes the foetus dies inside the mother and rots. When this happens it makes the uterus very weak and it is easy to make a hole in it. **Be very careful.** Also the foetus is sometimes very dry because all the fluids have gone.

- Put a lot of soapy water in through the vagina to help the dead foetus to slide out. You can do this with a rubber tube and a plastic bottle or a big syringe (without a needle).



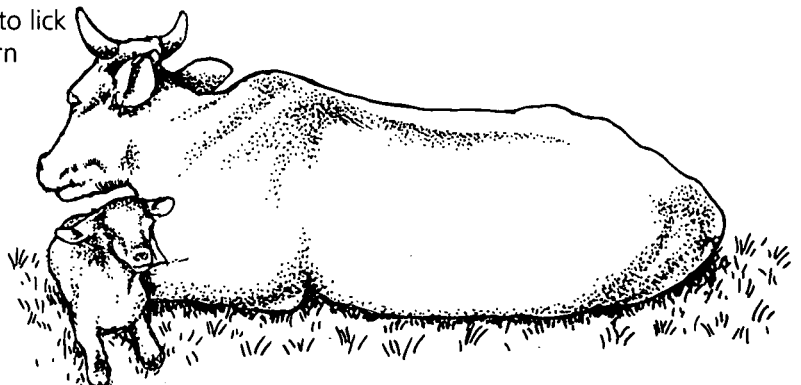
Put soapy water into the uterus through the vagina.

- Pull the dead foetus out in the same way you pull out a live one. If the foetus is swollen up or very stiff, skilled workers can cut up the dead foetus inside with a knife to take it out in pieces – **this is dangerous so do not try to do it yourself.**
- Put antibiotics into the uterus (p. 350). Wash yourself thoroughly.

What to do with a new-born animal

As soon as a baby animal is born, make sure that it is breathing.

- Clean mucus away from the mouth and nostrils by hand.
- Pull the new-born animal to where the mother can reach it easily to lick it dry and put the new-born so that it sits up. (Camels do not always lick their babies like cattle do.)

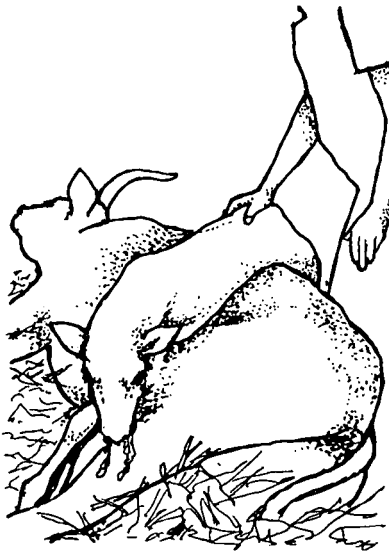
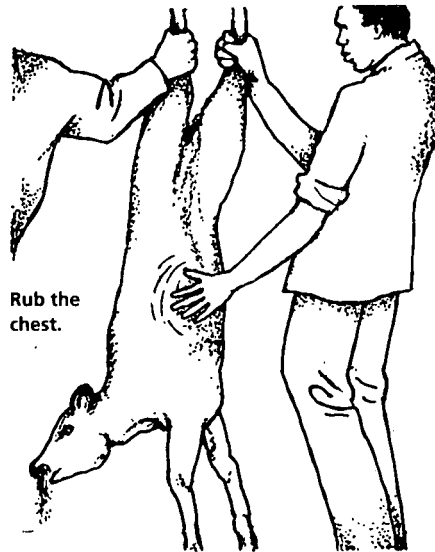


Rabbits Do not touch the new-born with your hands for at least a day after they are born. Check there are no dead babies and push them away with a stick if there are. (Baby rabbits cannot see until they are about 20 days old.)

Problem: A new-born animal is not breathing

Some new-born animals are very weak, especially after a difficult birth. They often have much fluid in their lungs that stops them breathing normally.

- If the baby is having difficulty breathing, hang it upside down. Rub the chest to make any fluid in the lungs come out of the nose.
- Lift the new-born animal up by the back legs for a minute or so to let mucus and fluid drain out from the lungs. You can hold the back legs of a small animal and swing it round to make mucus come out of the nose.
- Put the new-born animal over the back of its mother with its head down to help fluid drain out from the lungs.
- Put a piece of dry grass up the baby animal's nose. This makes it cough then it starts breathing.
- Make sure the baby animal sucks its mother's teat as soon as possible. When the mother feels a baby sucking, her brain releases a hormone called *oxytocin* into her blood that makes milk flow from the udder. It also makes the uterus contract and push the *placenta* out.

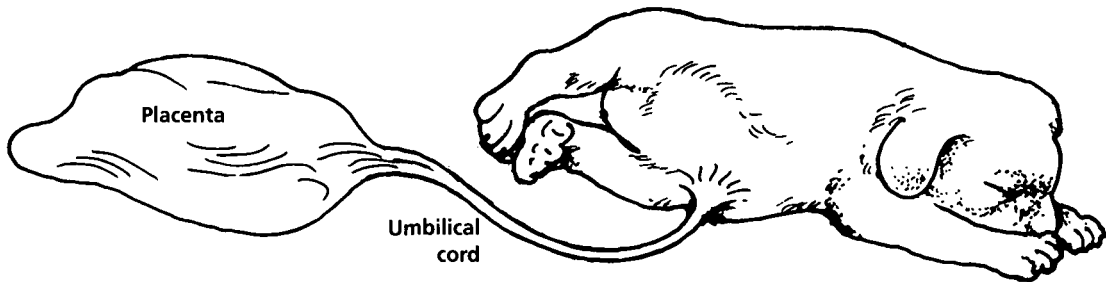


What to do after birth

- Give animals plenty of water to drink after they have given birth.
- Remember that animals like sheep and goats often have more than one offspring so check that there is not another foetus still to come.
- Check that milk comes from each teat. If there is no milk or milk does not come from enough teats for the number of young, you might have to encourage another mother to feed the new-born (p. 63).

The placenta

A short time after birth the placenta and the membranes – thin skins – that were around the foetus come out of the vulva. The placenta should come out in an hour or two.



Problem: The placenta and foetal membranes do not come out

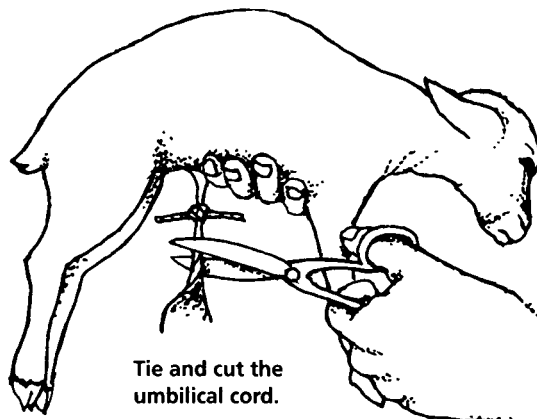
Animals that give birth early, have twins, have difficulty giving birth, are poorly fed or sick are likely to keep the placenta for too long. If the placenta and foetal membranes have not come out within 12 hours after birth you might have to treat the animal (p. 242).

Horses and donkeys If the placenta does not come out within a day there is a serious problem. Give an antibiotic injection (p. 329) and try and get some skilled help.

Pigs The placenta usually comes out after 20–30 minutes. Pigs often eat the placenta and baby pigs that are born dead. Sometimes the female is aggressive and bites and eats the baby pigs. Take the baby pigs away and keep them warm.

The umbilical cord

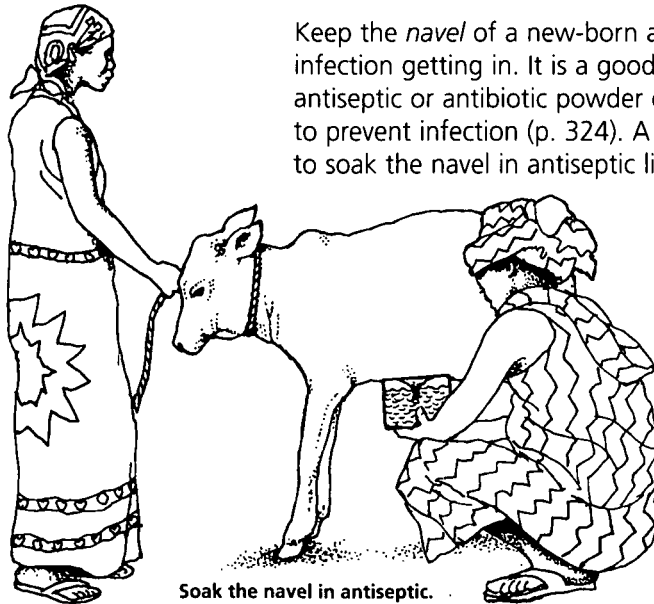
The *umbilical cord* usually breaks on its own and is not a problem. If a long cord is still attached to the new-born animal tie a *sterile string* round it and cut it to about 3 cm long.



Horses or dogs Sometimes the cord does not break on its own and the mother chews and pulls it to break it.

The navel

Keep the *navel* of a new-born animal clean to stop infection getting in. It is a good idea to put antiseptic or antibiotic powder on the navel to prevent infection (p. 324). A good way is to soak the navel in antiseptic like this.



Some people who have no antiseptic use clean wood-ash from a fire to dry the navel and repel flies.

In places where many animals often get infection through the navel it may be useful to give the baby animal an antibiotic injection (p. 328).

Colostrum

For the first 3–4 days after an animal gives birth it produces special milk called *colostrum*. It gives energy to baby animals. And colostrum has *antibodies* (p. 89) in it that help the baby animal to fight off infections.

A new-born animal can only use antibodies from colostrum within six hours after it is born. After the animal is about three weeks old it starts to make its own antibodies. **It is very important for a new-born animal to get enough colostrum to drink from its mother in the first few hours of its life.** Some people like to drink the colostrum too. But it is important not to take it all from the new-born animal. Many cattle herders do not take any milk for themselves from their cows for several days after the cows give birth so that there is plenty of colostrum for the new-born animals.

WARNING

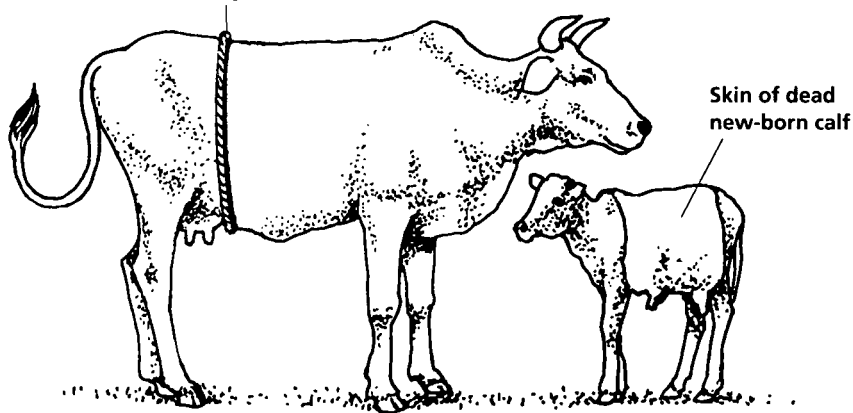
Some people do not let new-born animals have colostrum. They believe it is not good for them. They are wrong about this and the new-born animals suffer. Too much colostrum can give new-born animals *diarrhoea* (p. 211) but they rarely get too much. People often say the new-born animals are having too much but this is because they want more to drink themselves. If a new-born animal is too weak and cannot suck or drink give it some colostrum with a thin stomach tube (p. 318).

New-born animals with no mother

Sometimes an animal dies, or she does not produce enough milk or she has more young than she can feed. Then you have to encourage another mother who has lost her young to feed the new-born animal. To help a mother to accept a strange new-born animal:

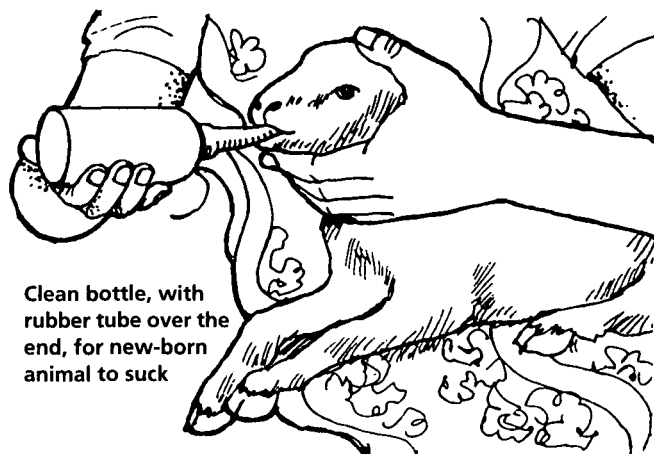
- Tie the mother up so she cannot kick or run away. Stop cattle or buffaloes kicking the baby animal by tying a rope round their middle.
- Rub the new-born animal with the placenta and membranes from a mother that has just given birth. Encourage the new mother to smell the strange new-born animal as soon as you have done this.
- Cut the skin from a dead new-born animal and tie it round the new-born animal that needs a mother, then introduce the strange baby to the mother of the one that died. You can also stuff some dried grass into the skin from a dead new-born animal and use this to fool the mother into letting her milk flow.

Rope to prevent kicking the calf



- If a slightly older animal needs a mother some people tie its front legs together so that it behaves more like an animal that has just been born.
- It is often not worth trying to get very sick or weak young taken by a different mother.
- Some people rub tobacco on the nose of the mother to make it more difficult for her to smell the strange new-born animal.

- Feed the new-born animal from a bottle 4–6 times a day. Use a clean bottle and clean it each time you use it. It is safer to put a piece of rubber tube over the end of the bottle. Give colostrum (p. 62) as soon as possible. Do not boil colostrum before you feed it.



Clean bottle, with rubber tube over the end, for new-born animal to suck

- People in Kenya encourage a cow to accept a new-born animal by making a bundle the size of a fist from the white part of the bark of *Acacia tortilis* trees. They put this bundle into the vagina and tie it to the tail. They leave it there for 24 hours to remind the cow of just having given birth and make her accept a new-born animal.

Cattle and buffaloes will drink from a bowl when they are a few days old. Put your fingers in the milk and make the new-born animal lick your fingers to teach it to drink.

Horses To feed a new-born horse mix half a litre of cow's milk with half a litre of water. Add three small spoons of sugar. (Also add a small spoon of fine ground cereal, such as maize or rice, and a small spoon of fine ground limestone if possible.)

Give half a litre every two hours for four days. As the baby grows give it more to drink but less often. At two weeks old give two litres every four hours.

Pigs To feed a new-born pig with no mother, mix half a litre of goat's milk with half a litre of water. Or mix half a litre of cow's milk with one litre of water and add 2-4 small spoons of fine ground cereal if possible.

Give half a litre or more every day.

Dogs To feed a baby dog up to two weeks old with no mother mix one litre of cow's milk with half a litre of water and add two small spoons of sugar. To feed baby dogs over two weeks old mix one litre of cows milk with one litre of water. Give every three hours until the young animal stops drinking.

Weaning

Weaning is the time when young animals stop drinking milk and start to eat other food. It is a very difficult time for a young animal. It needs to eat enough solid food to grow properly before it stops having milk. Give good quality food, such as good hay, to the young animal as soon as it will eat some. Solid food stimulates the *rumen* to develop. Some young animals start to eat solid food soon after they are one week old.

When young animals drink less milk and eat dry food they need more water to drink.

When you stop young animals taking milk but you still want to take milk for people to drink, keep the young animal near the mother to stimulate her to give milk.

These are some ways people stop young animals taking milk from their mothers.

