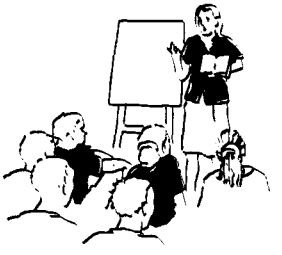
WHERE THERE IS NO VET

Bill Forse

How to use this book



When you get this book:

Read the list of CONTENTS at the beginning. This tells you what each chapter is about and gives the page numbers for the different subjects discussed.

To look up a disease or other health problem:

1. Look at pages 371–380 at the end of the book. This is an INDEX that lists, in the order of the alphabet, all the subjects in this book. Under many subjects there will be other things to do with the subject (for example, under *birth* are listed: normal, problems in, signs of, etc.).
2. Check the list of CONTENTS. When you find what you want, turn to the pages shown.

If you do not understand the meaning of some of the words in this book:

Look for the word in the WORD LIST on page 363 at the back of the book. Words explained in the Word List are written in *italics* the first time they are used in a chapter or section of text.

Before using any medicine:

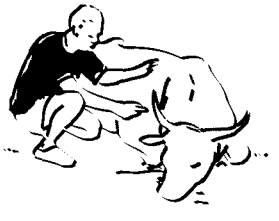
Always look at pages 311–352 for information on uses, dosage, risks, and precautions. An A-Z of medicines is also included on medicines for particular problems.

To be ready for emergencies:

1. Keep the basic equipment listed on pages 9-13 handy in the house or in the village.
2. Study this book **before** it is needed, especially Section 4, Chapter 9, Emergencies and first aid and Section 6 on Signs of disease.

To help keep your animals healthy:

Carefully study Section 3 on Healthy animals and how to keep animals healthy at different stages in their life.



To improve the health of animals in your community:

Organise a meeting of your neighbours, to study this book and discuss the health problems of animals in the community. Use Section 2 of the book to share your knowledge and give training sessions. Study Section 5 on How to prevent and control disease. Discuss with your neighbours how everyone in the community can help to control things such as parasites and infections to make all the animals healthy.

Where There is No Vet

Bill Forse

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ACP-EU Technical Centre for Agricultural and Rural Cooperation

The ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA) was established in 1983 under the Lomé Convention between the African, Caribbean and Pacific (ACP) States and the European Union Member States.

CTA's tasks are to develop and provide services that improve access to information for agricultural and rural development, and to strengthen the capacity of ACP countries to produce, acquire, exchange and utilise information in these areas. CTA's programmes are organised around three principal themes: strengthening facilities at ACP information centres, promoting contact and exchange of experience among CTA's partners and providing information on demand.

Through its co-publishing programmes CTA improves the access of readers in the ACP (African, Caribbean and Pacific) Group of States to information on agricultural and rural development. The Centre has provided support to the origination, production and distribution of *Where There is No Vet* in order to further this objective.

CTA, Postbus 380, 6700 AJ Wageningen, The Netherlands.

Oxfam

Oxfam GB is a member of Oxfam International, a group of autonomous, non-profit development agencies. Oxfam believes that all people have basic rights: to earn a living, and to have food, shelter, health care and education. Oxfam works to overcome poverty and social injustice through the empowerment of partner organisations and communities to achieve sustainable development and livelihoods, irrespective of nationality, race, political system, religion or colour.

Oxfam GB supports community-based animal health schemes in many countries in Africa, Asia and Latin America, through the provision of training for local livestock owners, support for village pharmacies, and participation in vaccination and disease-monitoring programmes.

Oxfam GB has supported the publication of this book through funding and facilitating the author in his research, as part of Oxfam's commitment to the development of sustainable livelihoods in communities around the world.

Contributors to this book

So many people have helped with this book that trying to mention them all would be to risk leaving someone out by mistake. I thank all these people for their kindness and generosity in sharing their knowledge.

Some people have made comments or contributions that I have been able to use more or less directly in the book, all of these have been welcome and I am very grateful for them.

Contributors to this edition include: Gezu Bekele, Farm Africa, Ethiopia; Boubakar Ly, A.P.E.S.S., Burkina Faso; Ousman Ba, A.D.F., Senegal; Jimmy Okot, Oxfam, South Sudan; Bryan Hartley, Kenya and Tanzania; Mbaye Bernard Sene, Senegal; Djimtoloum Guetein Doyo, S.E.C.A.D.E.V., Chad; Abou ag Assibit, T.A.S.S.A.G.H.T., Mali; Yero Doro Diallo, A.R.E.D., Senegal; Rashid Maksoud, Pakistan; Fisseha Meketa, S.C.F. (USA), Ethiopia; Alex Kirui, H.P.I., Kenya; Sam Gonda, Oxfam, Uganda; Seif Maloo, I.L.R.A.D., Kenya; Evelyn Mathias, I.I.R.R., Philippines; Jacob Wanyama, I.T.D.G., Kenya; Abdou Sarr, Oxfam, Senegal; Darlington Akebwai, Oxfam, Kenya and Uganda.

Rhône Mérieux contributed advice and help with parts of the section on medicines: Peter Jeffries, (Trypanosome medicines) France; Chris Schermbrucker, (Vaccines) England.

I hope that new editions will improve this book and keep it up to date. I will be grateful for any comments or information that could make a new edition better. I would also like contributions from around the world to include in a future edition. Please contact me at the publisher's address: Macmillan Publishers Ltd., Houndmills, Basingstoke, Hants, RG21 6XS, UK.

Bill Forse

For my father and mother.

Contents

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.

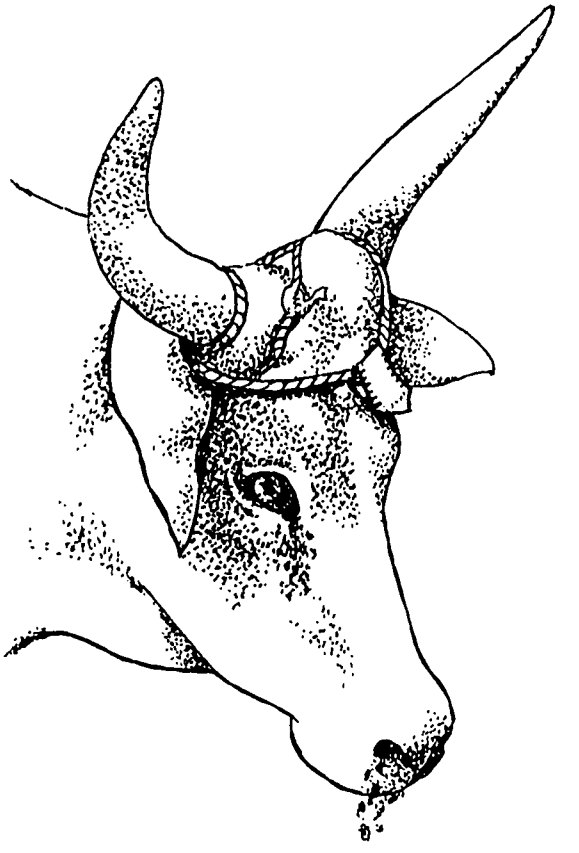
How to use different sections of the book

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:

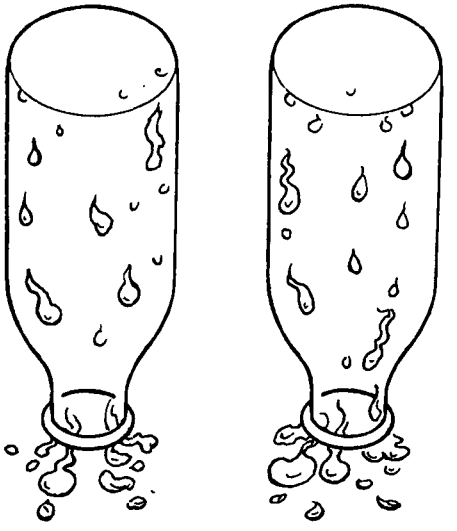
- They should keep away from sick animals.
- They should cover any wounds or scratches they have while they handle animals.
- They should wash themselves carefully after handling animals.

Diseases that come from milk

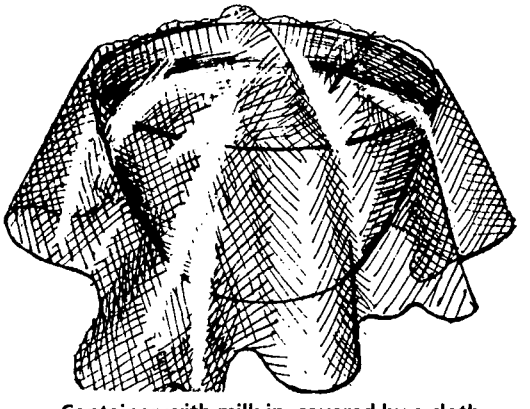
Some diseases that people get, such as *brucellosis* (p. 239) and *tuberculosis* (p. 205) come from *microbes* (p. 88) that come out in an animal's milk. Microbes also get into milk from the air, the hands of a milker, an animal's skin or from dirt in the place where animals are milked. **Microbes breed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

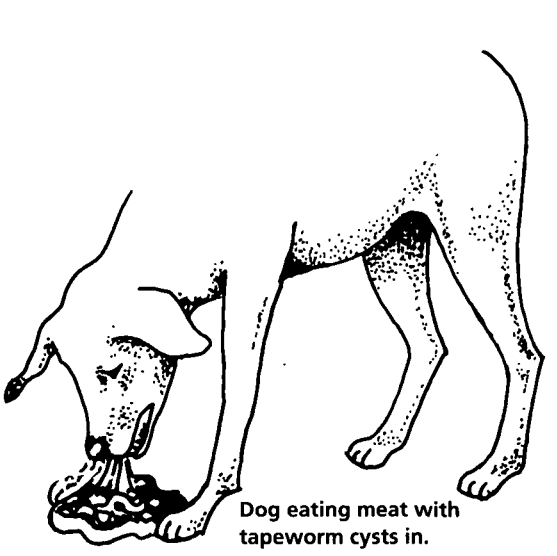
Hydatid disease

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].)

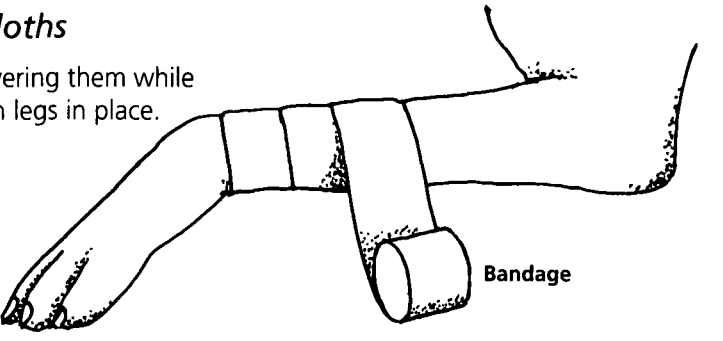
3 Vet equipment and medicines

Basic equipment

The following equipment is useful for anyone who keeps animals.

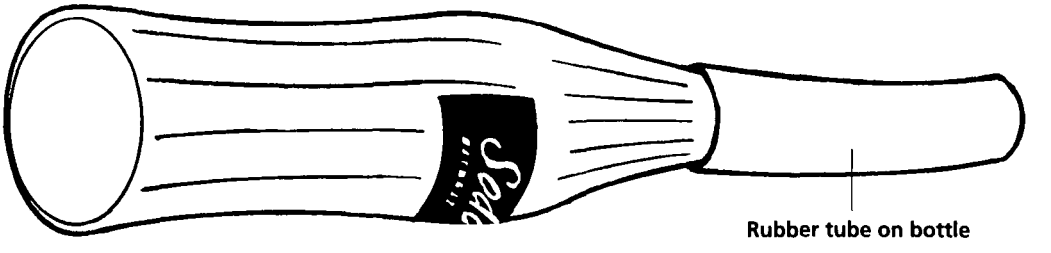
Bandages and clean cloths

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.



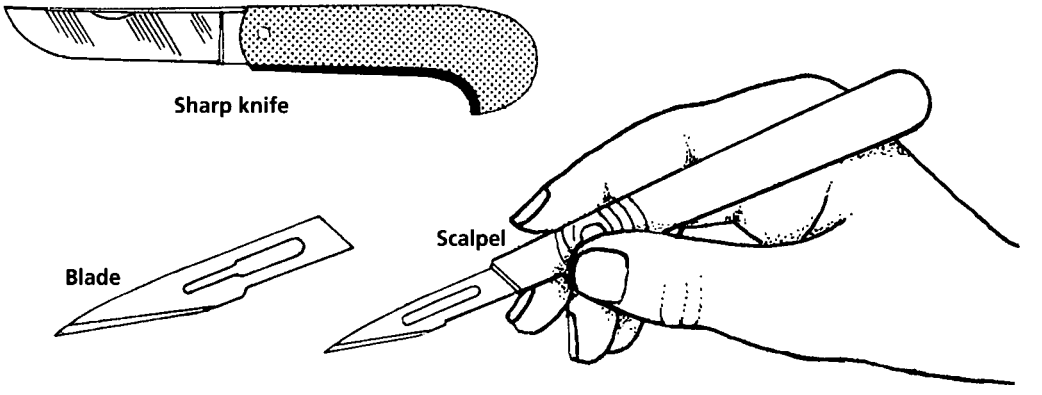
Container for sterilising equipment

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.

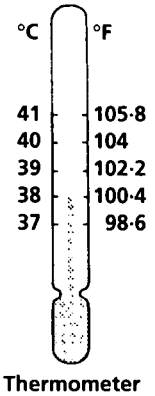
Rope

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.

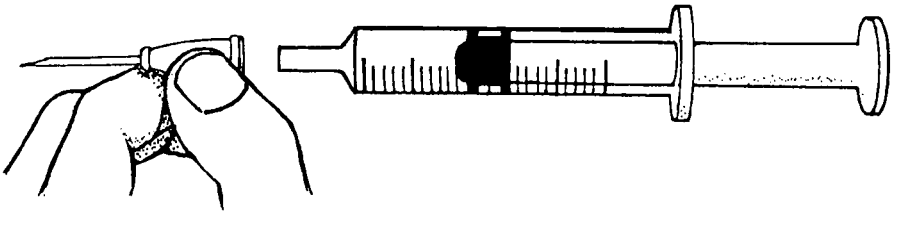
Thermometer



Thermometer

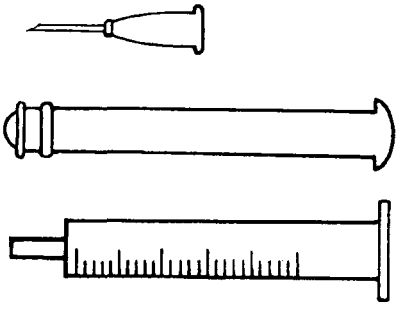
For taking an animal's temperature (p. 110). A case to keep the thermometer in will help stop it breaking.

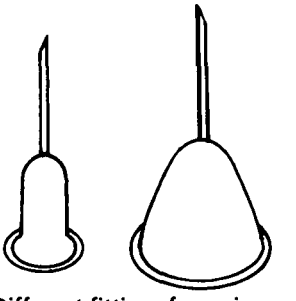
Syringes and needles for injections (p. 318)



- 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 x 3 cm for sheep and small animals, 16 g x 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.

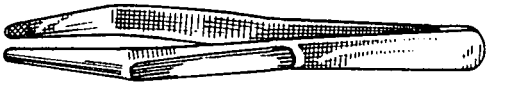
Castrating tools (p. 79)

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

Burdizzo

Forceps

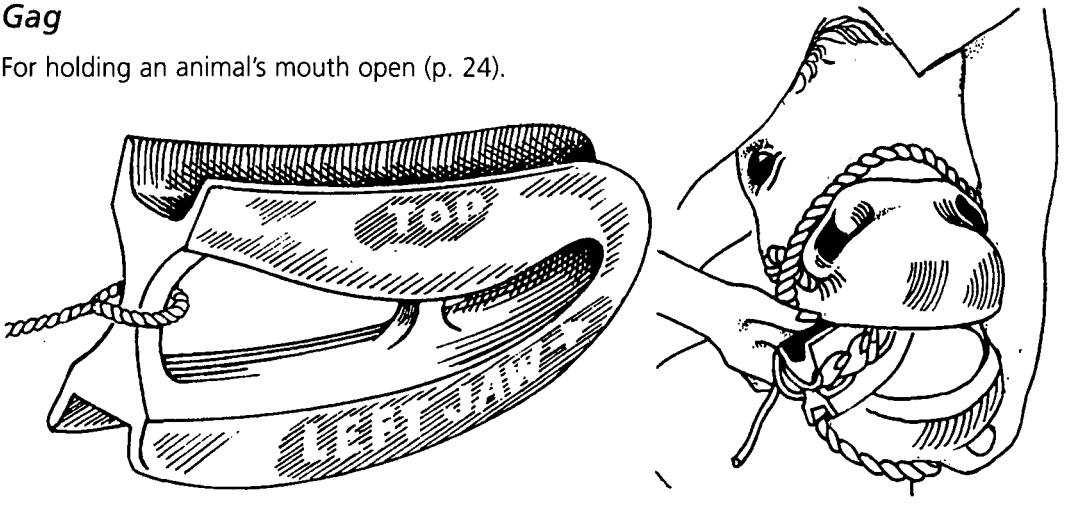
For holding skin and flesh for stitching – *suturing* (p. 70), holding needles to stitch tough skin (p. 72), or clamping blood vessels to stop bleeding (p. 68).



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 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:

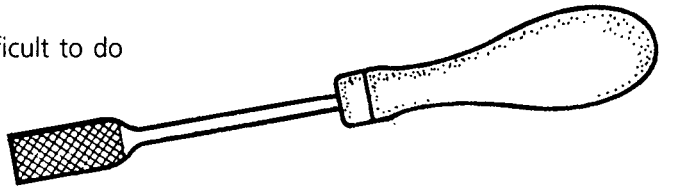
Size 00	Very thin.	
Size 0	Thin.	For small animals and small wounds.
Size 1	Medium.	For large animals and thicker skin.
Size 2	Thick.	For large animals with thick skin.
Size 3	Very thick.	For large animals with very thick skin.

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).

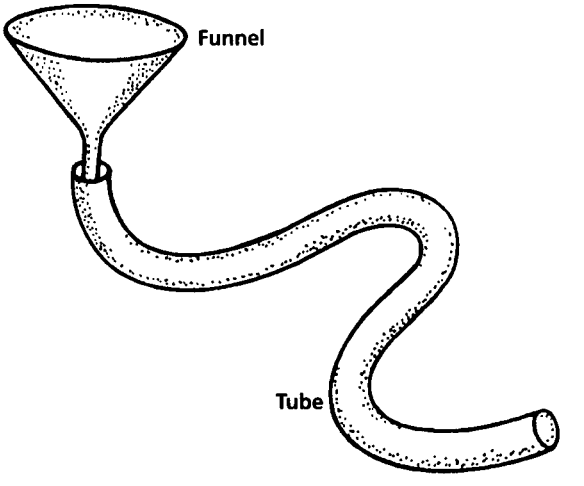


Scissors

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).

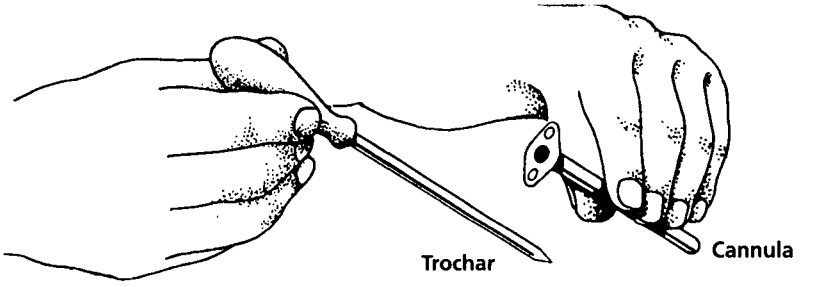


Tape measure

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 *bloat* (p. 216)
Disinfectant.	Disinfecting places/things.
Glucose or sugar.	Rehydration fluid.
Insecticide powder/sprays.	*Parasites* (p. 103) on the body.
Magnesium sulphate.	Constipation and poisoning.
Salt.	Antiseptic/rehydration fluid.
Worm medicine.	*Worms* (p. 94) and *flukes* (p. 99).

Extra medicines

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

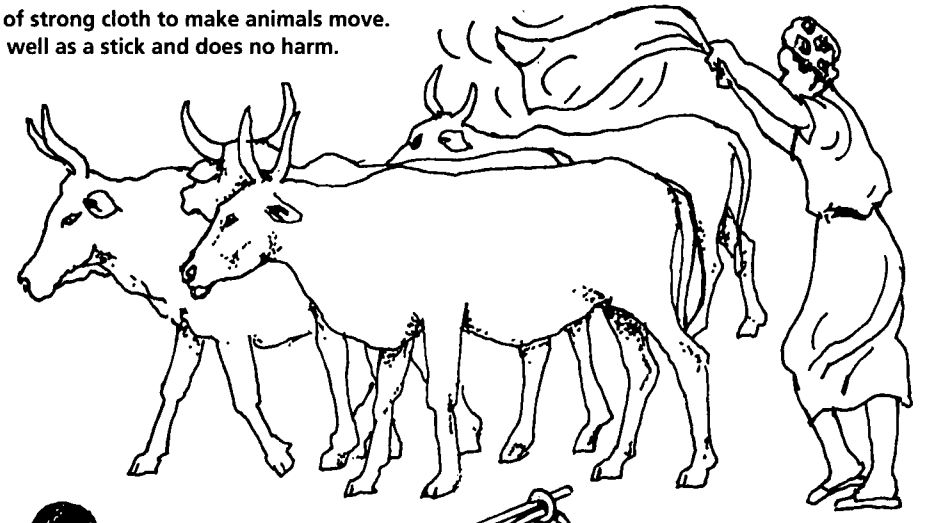
Special medicines and vaccines are needed for diseases that happen in your area, such as medicine for *trypanosomosis* (p. 334).

4 How to handle animals for treatment

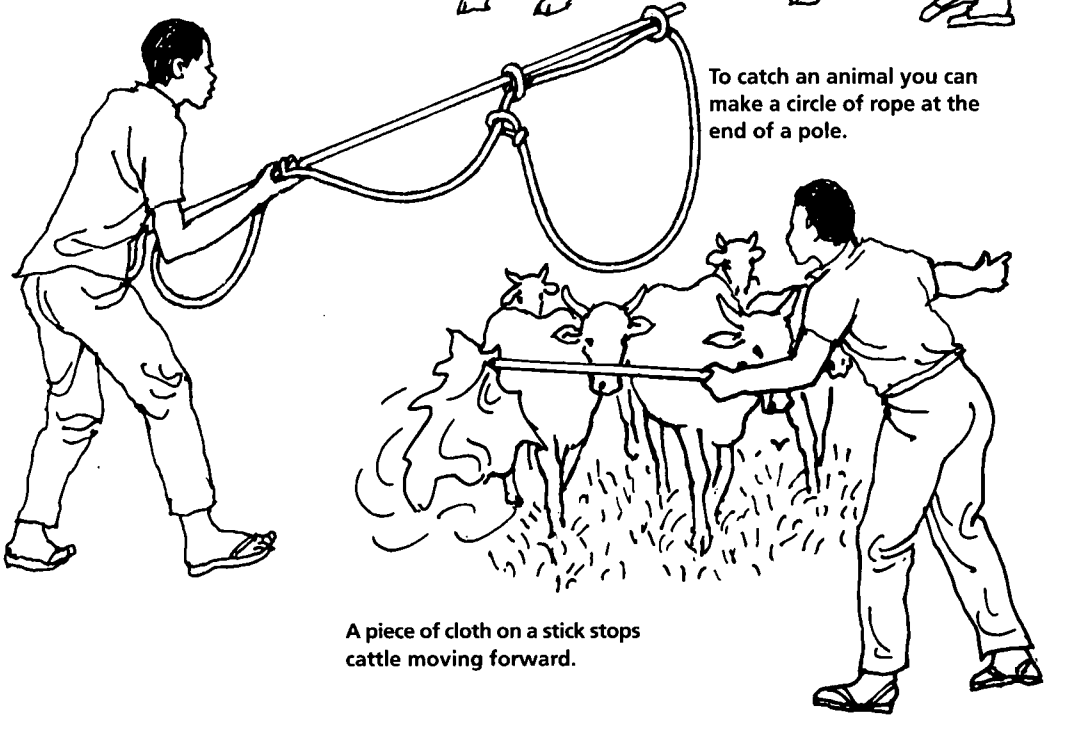
Cattle and buffaloes

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.

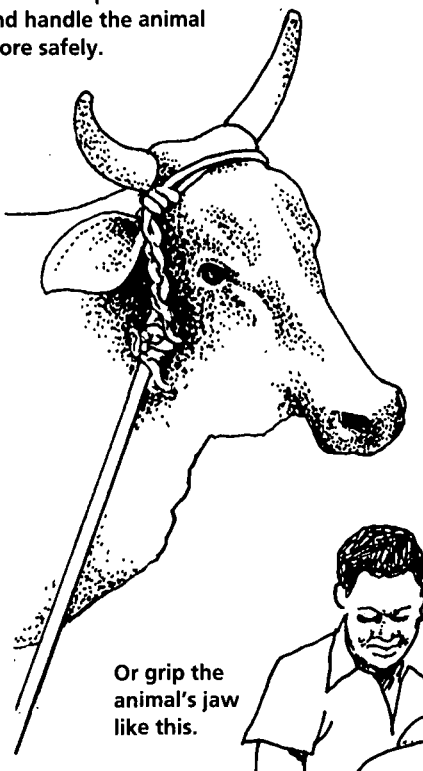


To catch an animal you can make a circle of rope at the end of a pole.

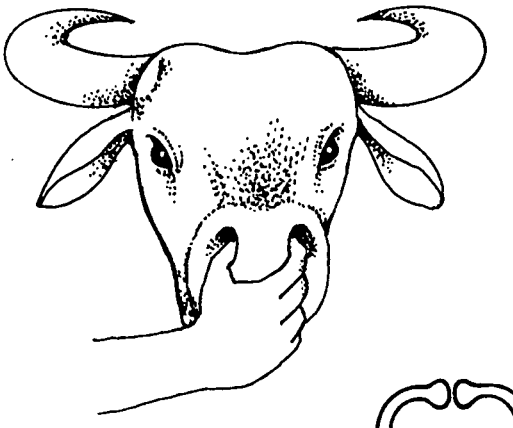


A piece of cloth on a stick stops cattle moving forward.

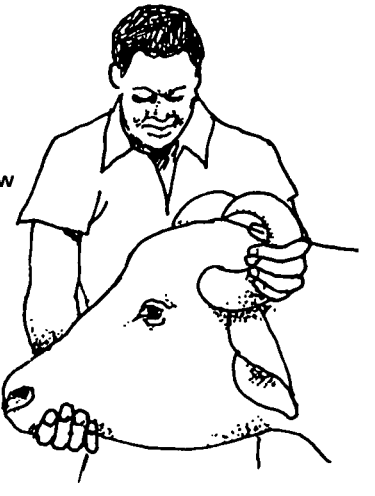
People in Burkina Faso leave a long stick tied to the horns to manage bad-tempered cows. It helps them catch and handle the animal more safely.

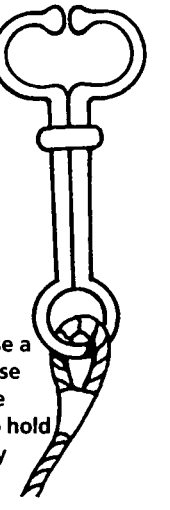


For animals that don't have horns or that resist being held by them, put your fingers in its nose like this. Pull the head close to you to hold it firmly.

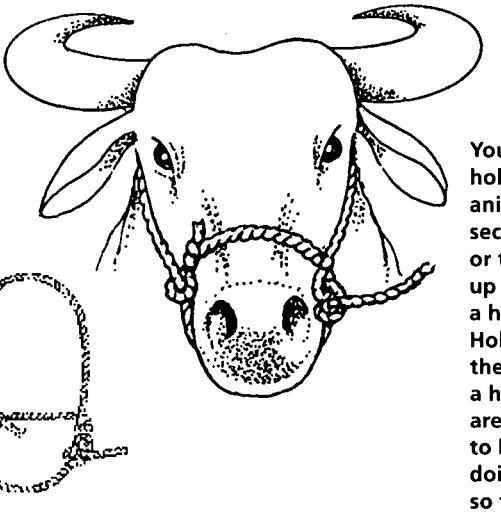


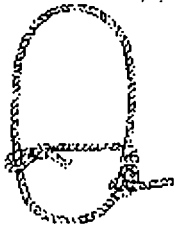
Or grip the animal's jaw like this.

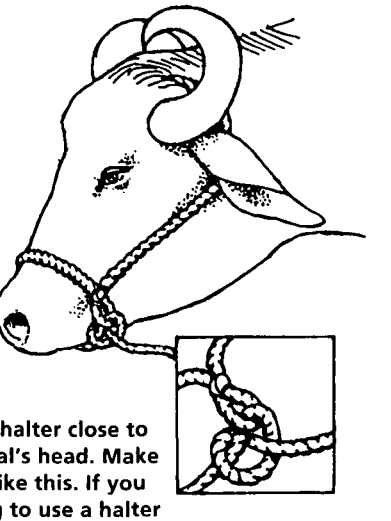




Some people use a tool like this nose ring with a rope attached to it to hold the nose of very strong cattle or buffaloes.

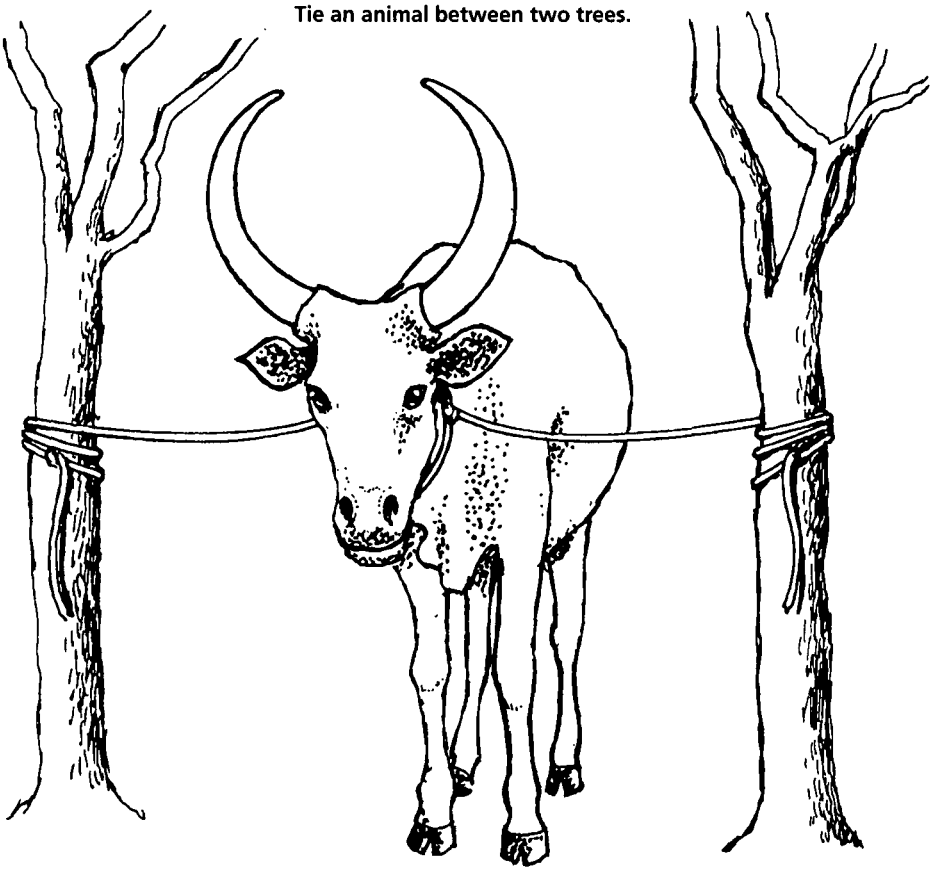


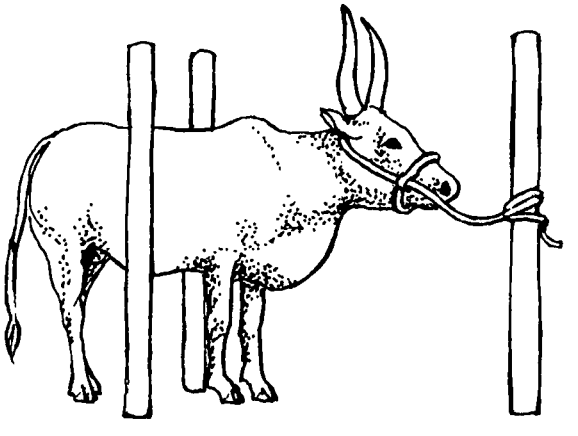




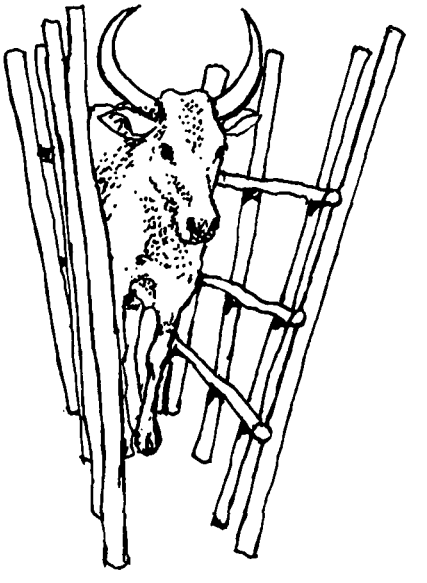
You can hold an animal securely or tie it up with a halter. Hold the halter close to the animal's head. Make a halter like this. If you are going to use a halter to hold an animal, start doing it when it is young so that it gets used to wearing one.

Tie an animal between two trees.





Use three poles to hold an animal.

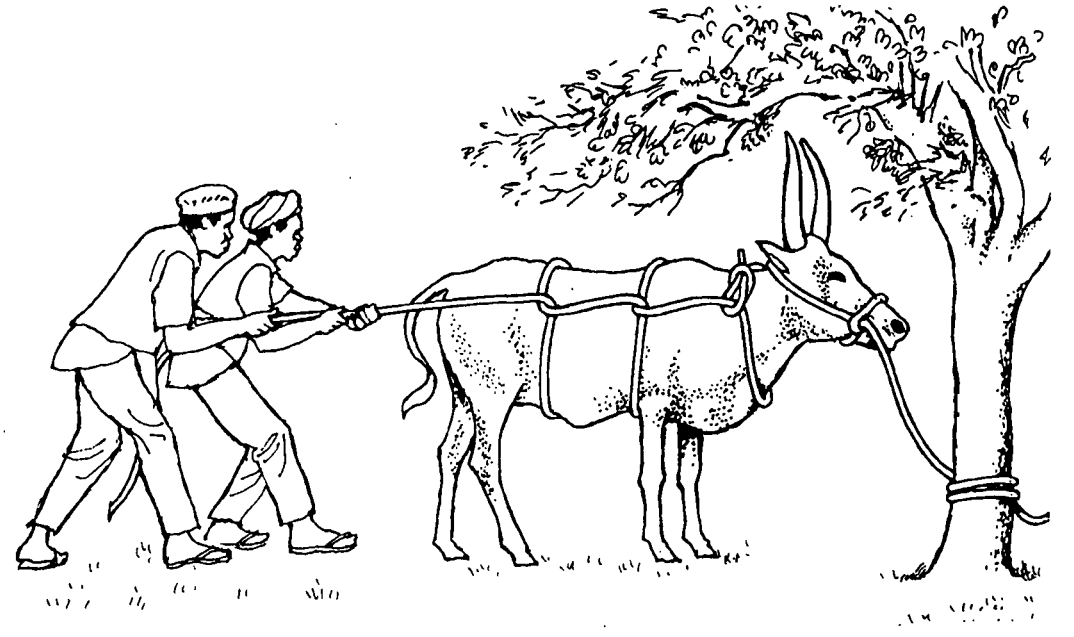


Make a simple race and crush.

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).



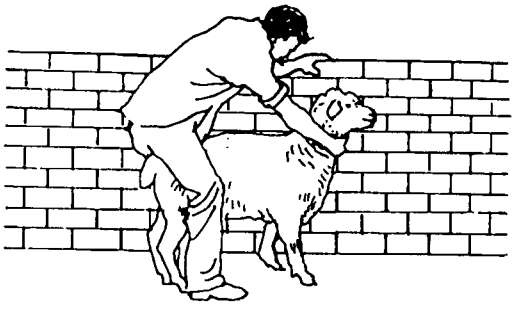
Camels

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

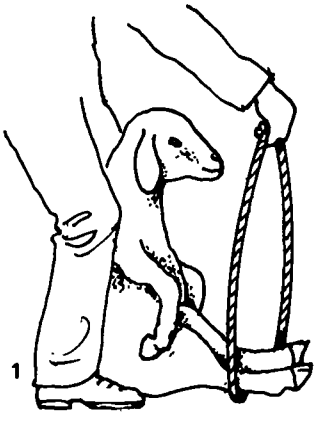
- To hold a big camel you need two people. Fit a head rope first and tie the legs together, then grip both lips. Pull and twist the tail for extra control.
- Hold a camel for a short time by tying a rope to the back leg and pulling it over the front of the hump to the other side.
- To control a camel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

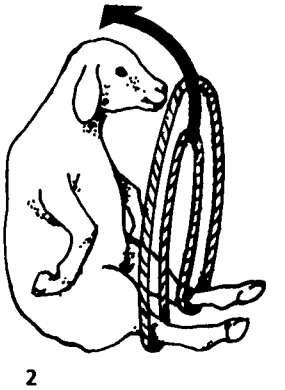
Sheep

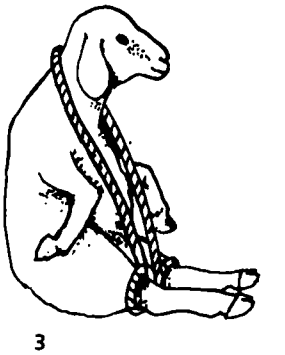
Push a sheep against a wall and hold it with your legs. In an open place hold it like this.

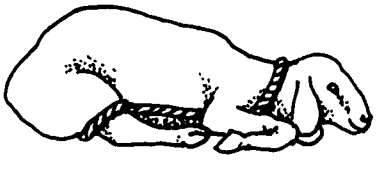


- Tie a sheep up with just a loop of rope or use a curved piece of metal to keep a sheep lying down (see below).

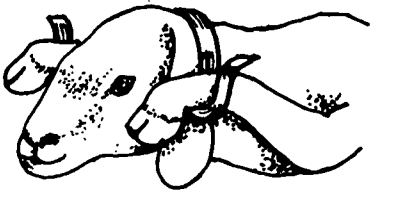








Tie up a sheep with a loop of rope.



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

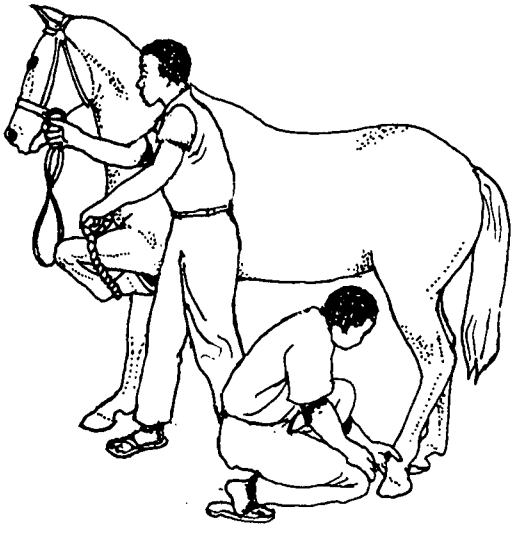
Use a rope or collar round the neck to hold a goat.

- 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.

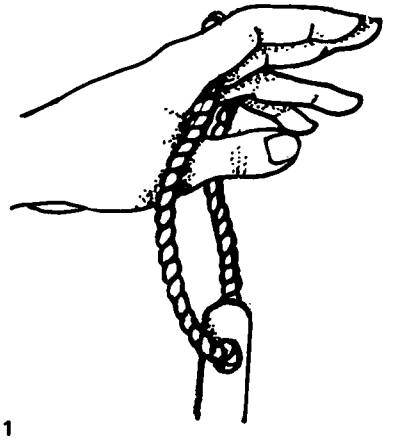
Horses, mules and donkeys

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.

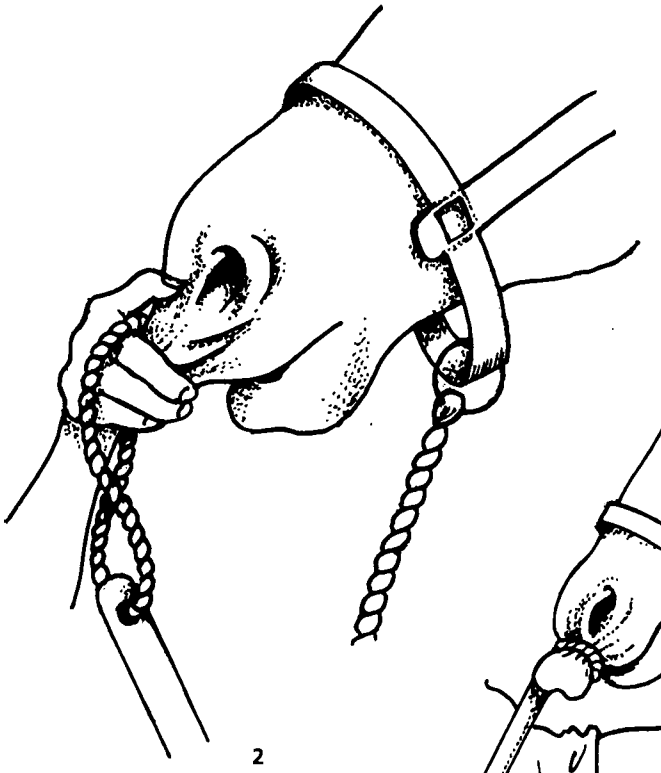
- You can hold a horse, mule or donkey with a head collar or a halter. To stop the animal kicking, lift one leg on the same side that you want to work on – a few horses can stand on two legs and still kick!



- **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



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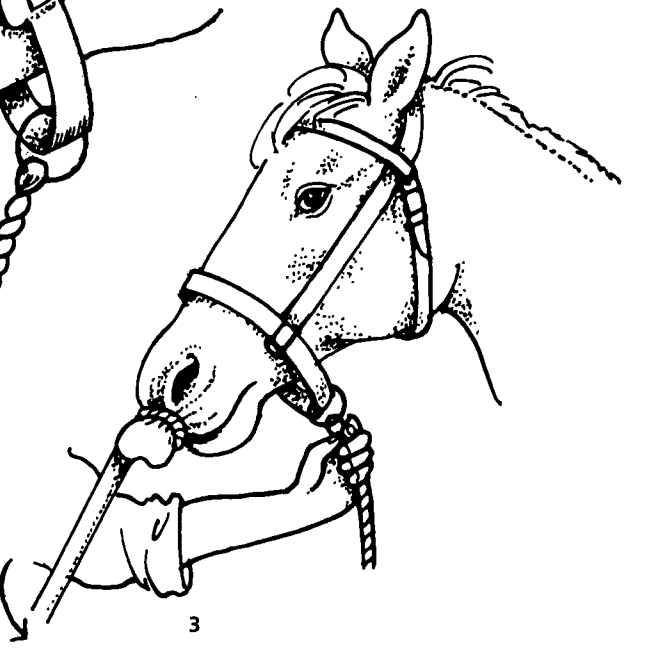
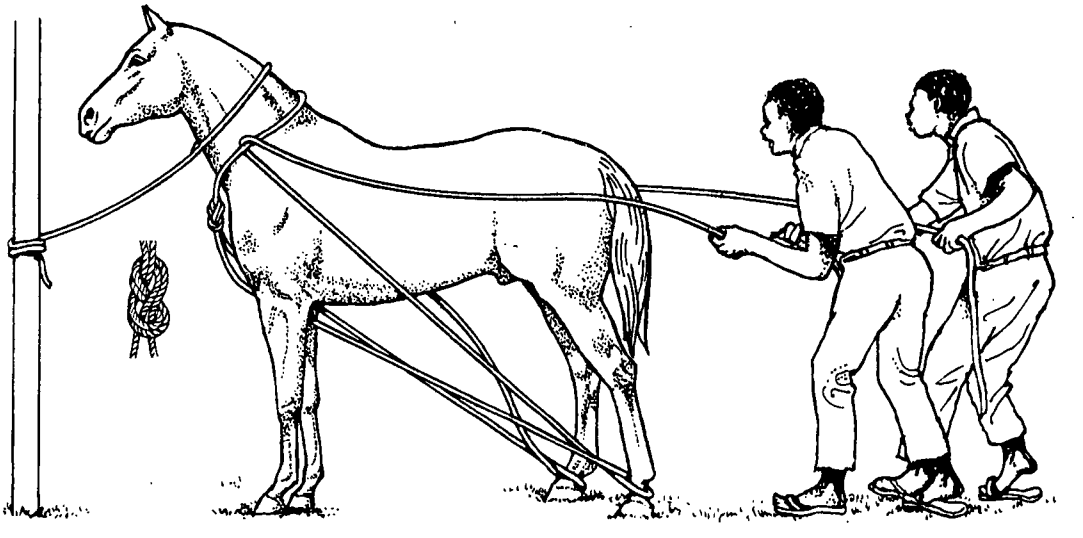


3

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

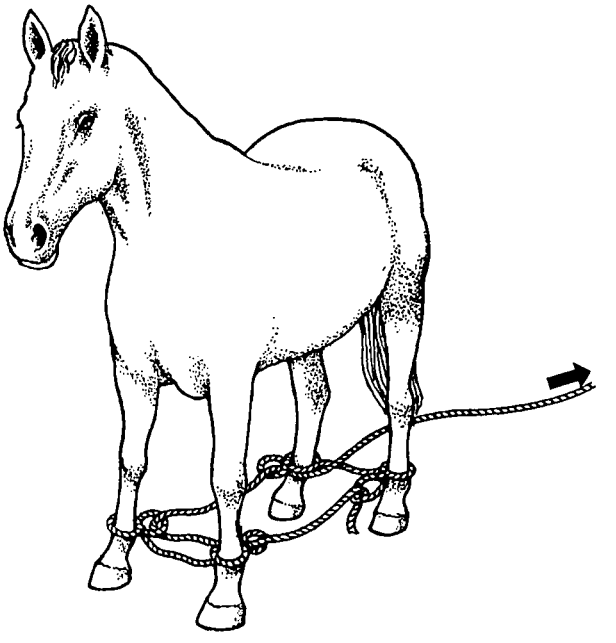
1 Using a long rope

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.

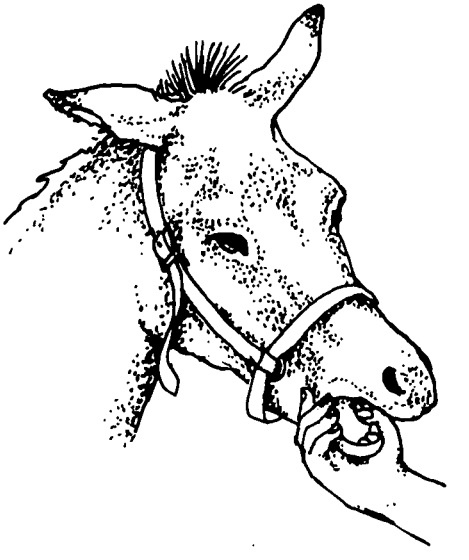


Donkeys

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).

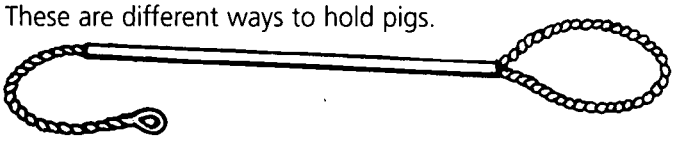
1



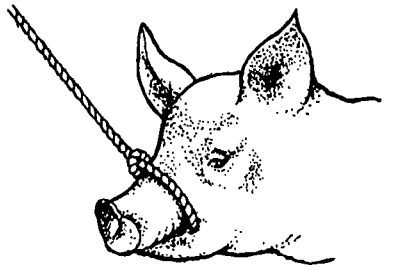
2

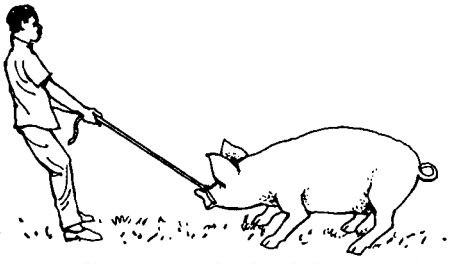
Pigs

These are different ways to hold pigs.

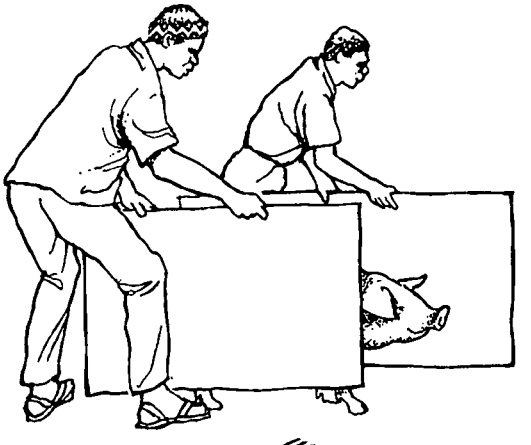


For very dangerous pigs, use a loop with a stiff handle like this.

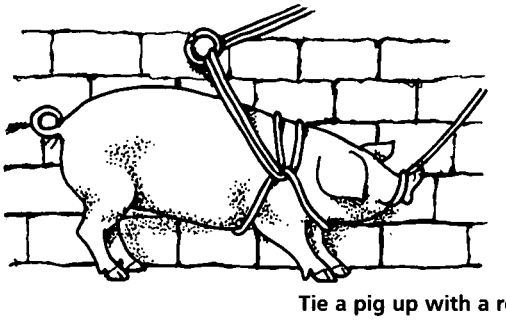


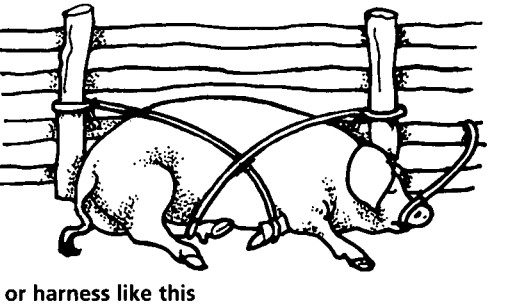


Catch and hold large pigs using a loop of wire or stiff rope. Stand behind the pig and put the loop over the pig's nose into its mouth. Slide the loop over the top jaw till it is just behind the tusks then tighten it and lift a little. The pig will pull back and you can hold it securely. To tie the pig 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.

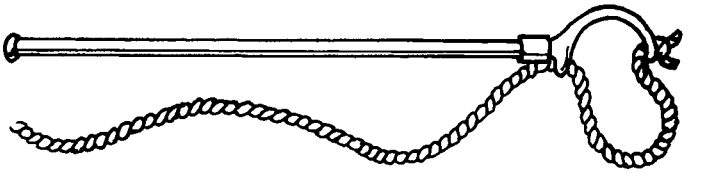




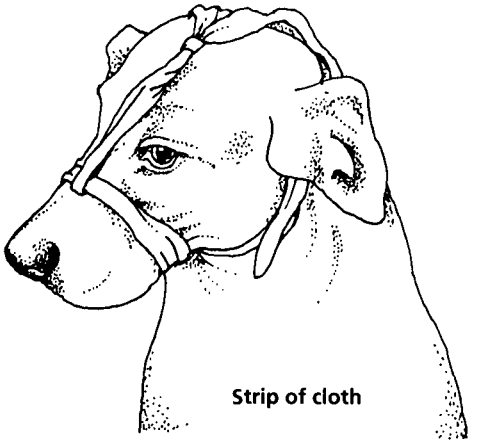
Tie a pig up with a rope or harness like this

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.



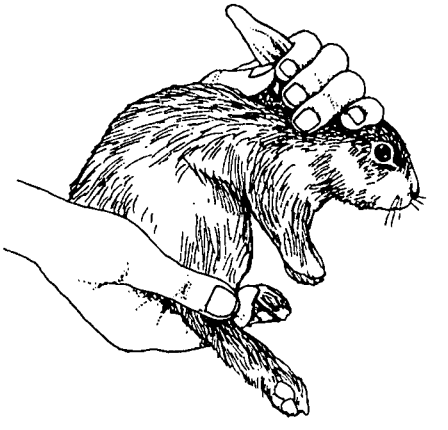
- Tie a dog's mouth shut to stop it biting, using a thin rope or strip of cloth like this.



- 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.

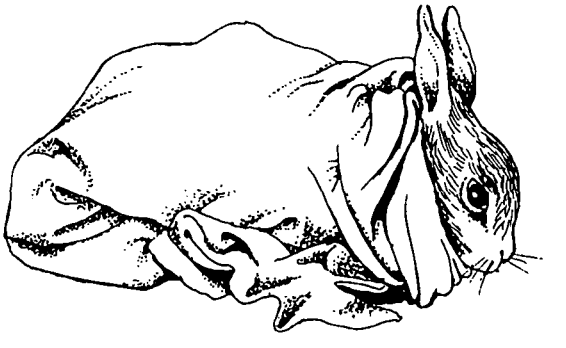
Rabbits

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**.



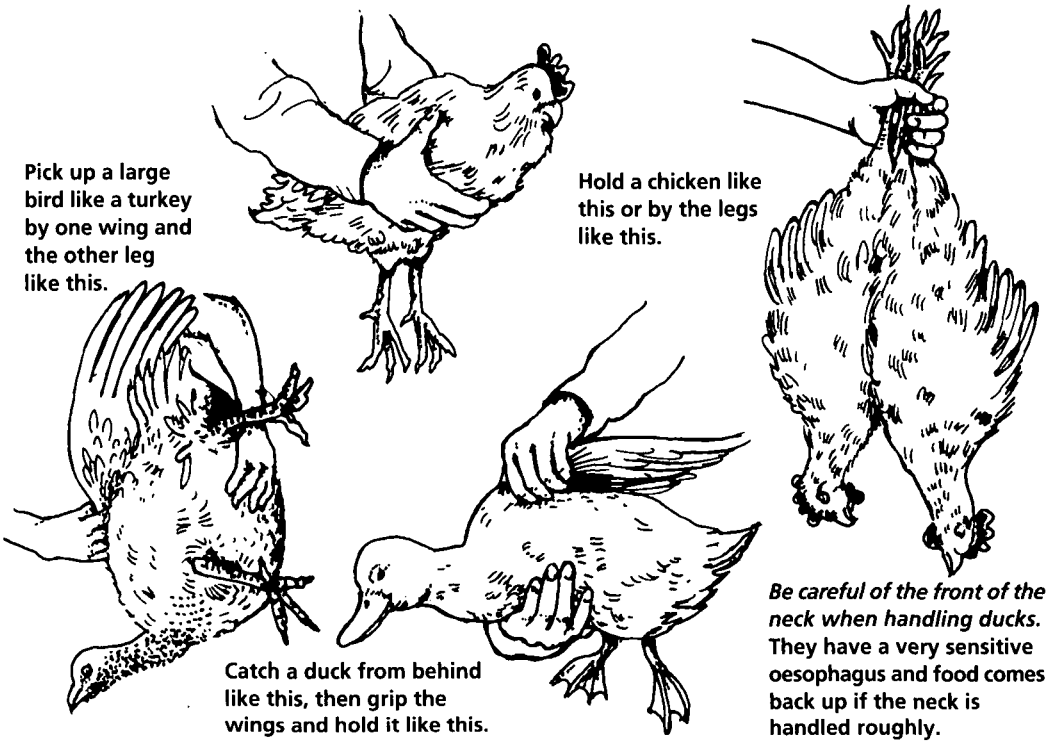
- Hold a rabbit with its head under your arm or hold it with one hand under the back legs.

- 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.



Pick up a large bird like a turkey by one wing and the other leg like this.

Hold a chicken like this or by the legs like this.

Catch a duck from behind like this, then grip the wings and hold it like this.

Be careful of the front of the neck when handling ducks. **They have a very sensitive oesophagus and food comes back up if the neck is handled roughly.**

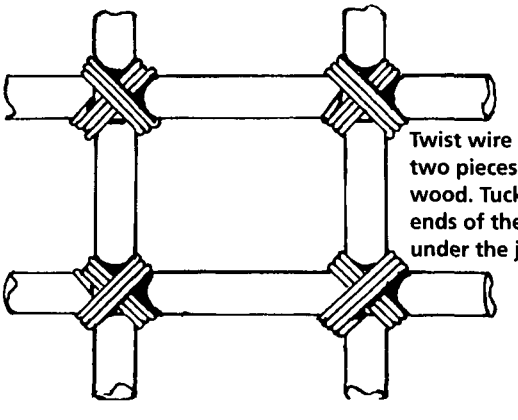
How to open an animal's mouth

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.

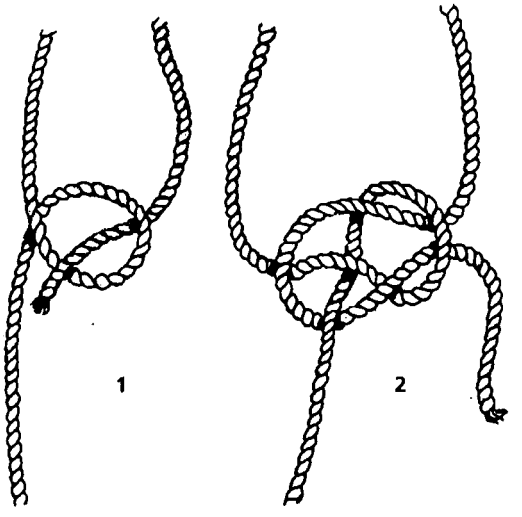
For horses there are more complicated and expensive gags. However, you can make a gag with four pieces of wood and some wire. The wire should be twisted firmly round each join in the wood. Make sure the ends of the wire are tucked under the joins so they do not harm the animal.



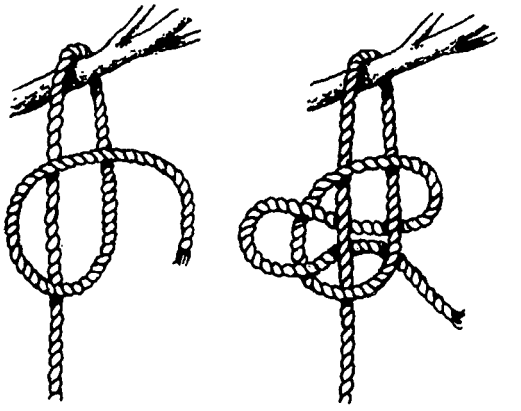
Twist wire round two pieces of wood. Tuck the ends of the wire under the join.

Some useful knots for tying up animals

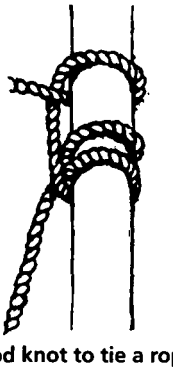
There are many different types of knots. The three shown here are the most useful ones for tying up animals.



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



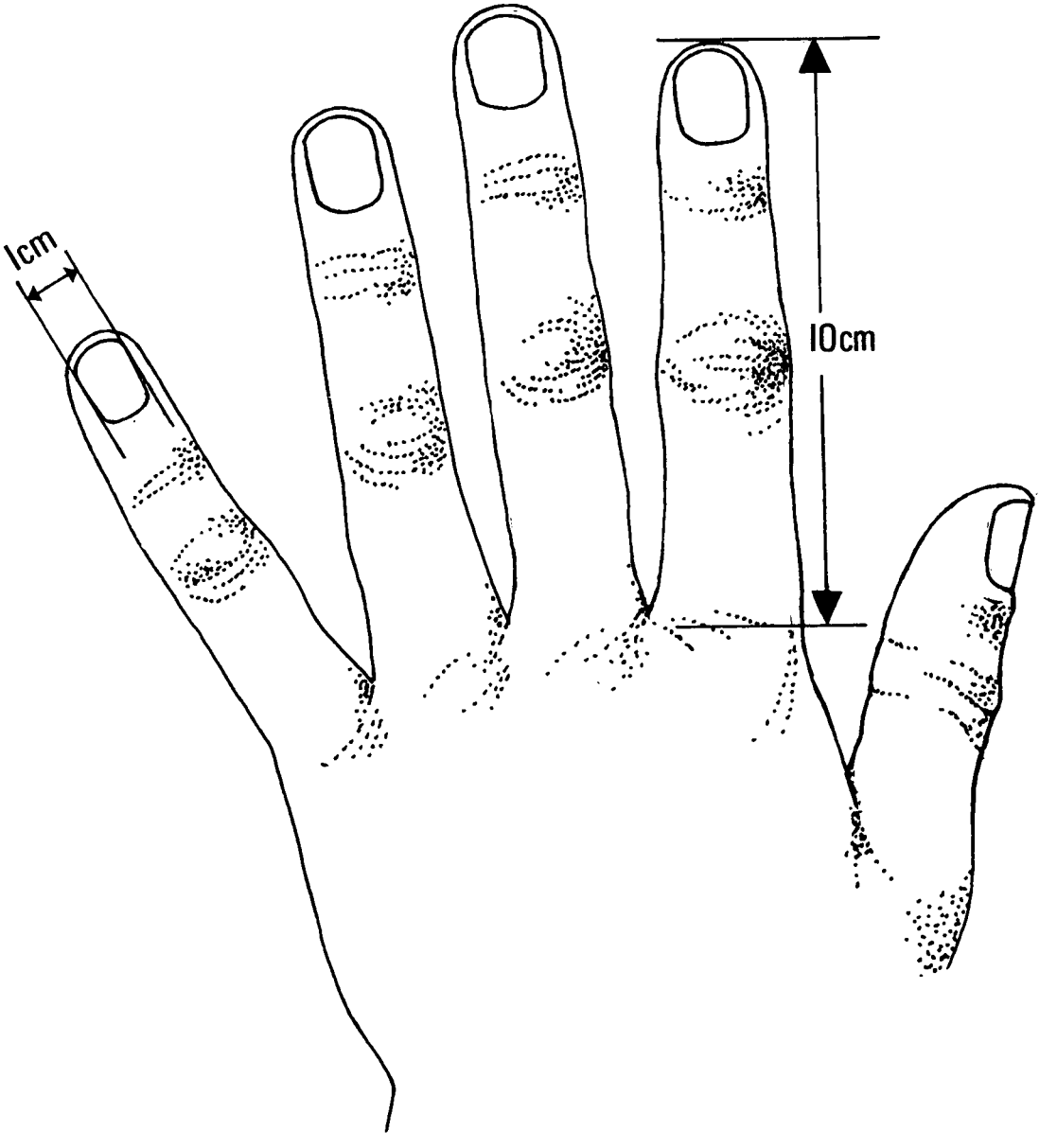
Use a knot that you can undo quickly when you tie an animal up to treat it.
You may want to let the animal go quickly if it falls down or struggles. This is also a good knot for tying the legs together when you put an animal on the ground. You can release the legs quickly when you want the animal to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



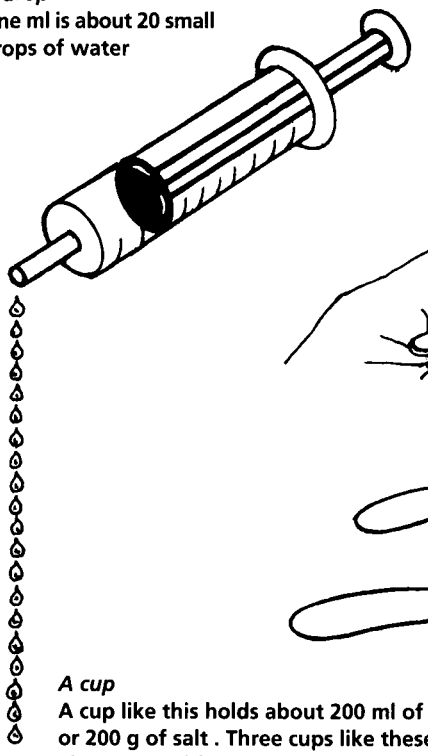
This is a good knot to tie a rope to a pole or tree.
It will not slide down the pole.

5 How to measure liquids and solids

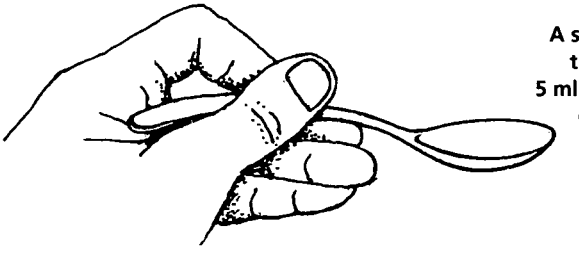
Your hand is useful for measuring things. When this book describes something like a 'handful' or a 'pinch' it uses a hand like this (my hand life-sized); the little finger nail is 1 cm across and the first finger is 10 cm long. If your hand is much bigger or smaller adjust these kinds of measurements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



A drop
One ml is about 20 small drops of water



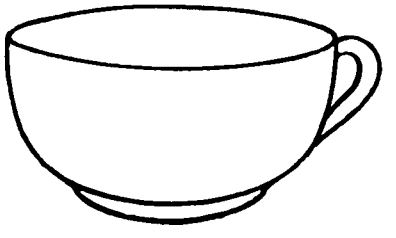
A spoon
A small spoon like this holds about 5 ml of liquid or 5 g of salt or 3 g of ground cereal



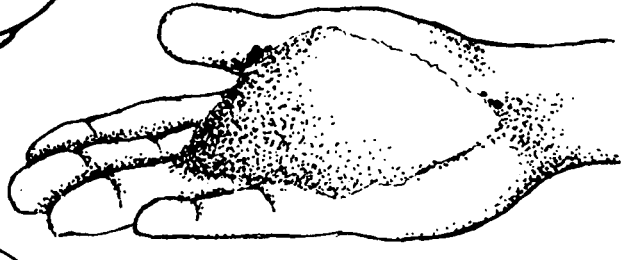
A medium spoon like this holds about 10 ml of liquid

A large spoon like this holds about 20 ml of liquid

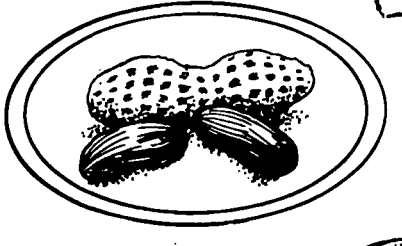
A cup
A cup like this holds about 200 ml of liquid or 200 g of salt . Three cups like these hold about 600 ml (one pint) of liquid



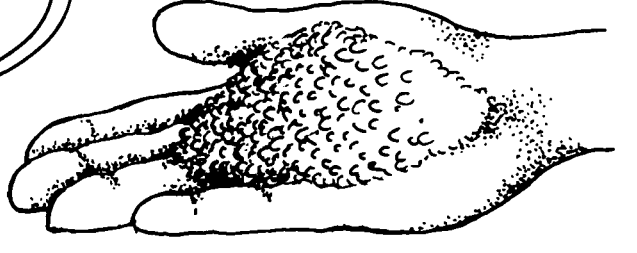
A handful
Salt heaped on a hand like this weighs about 50 g

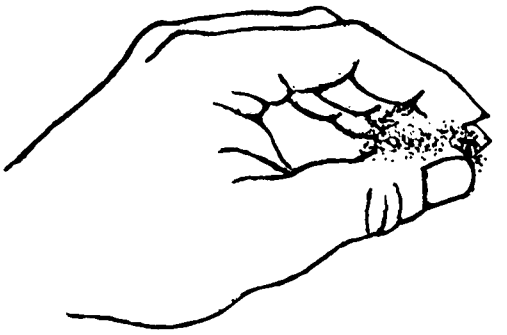


Two groundnuts like these weigh about one gram (1 g)

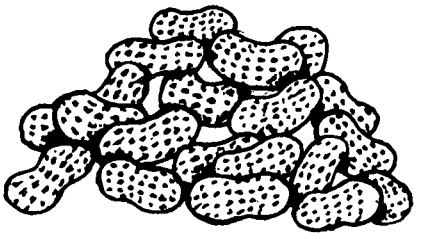


Grain or ground cereal heaped on a hand like this weighs about 30 g

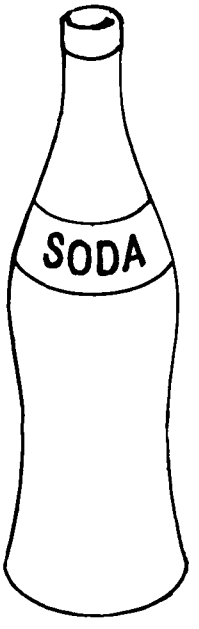




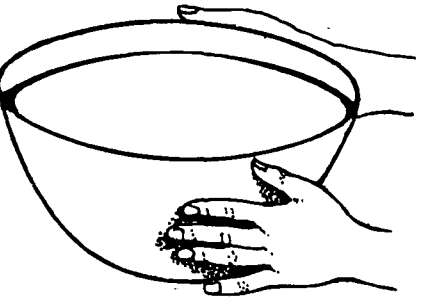
A pinch of salt like this weighs about 1 g



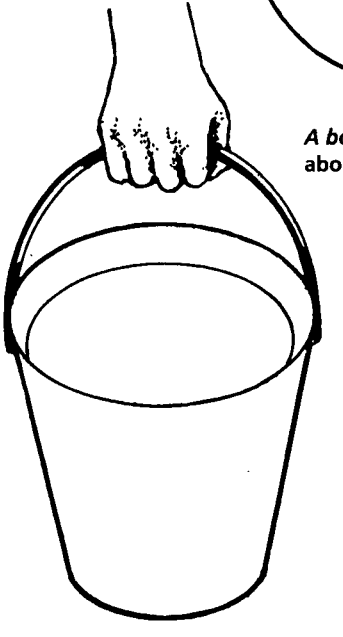
Twenty groundnuts weigh about 10 g



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.

Flip chart

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.

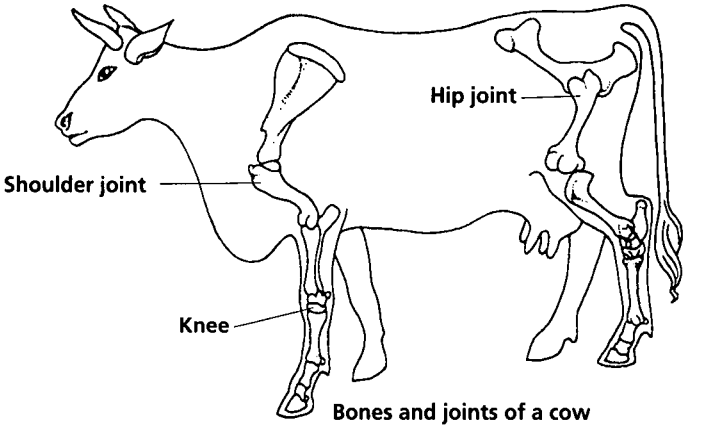
Kill the animal (p. 87) and open it carefully without cutting into the *stomach* or *intestines*.

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

Movement

Bones

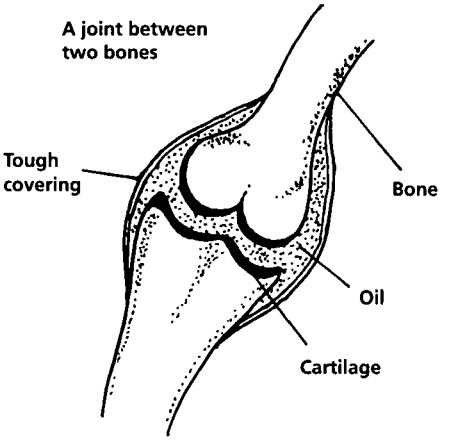
Bones are mostly made of minerals: calcium and phosphorous.



Bones and joints of a cow

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.

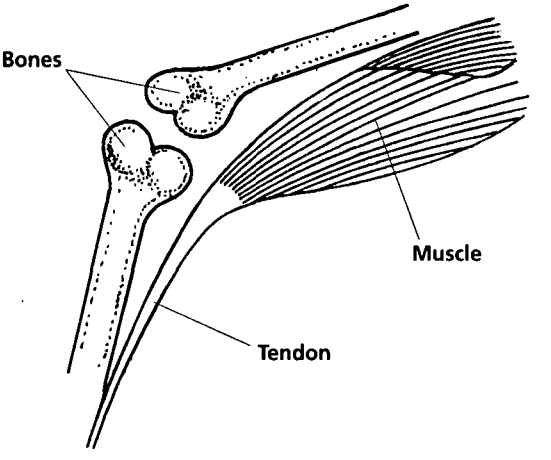
The inside of most bones is usually red/grey; this is where *blood cells* are made.



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*.

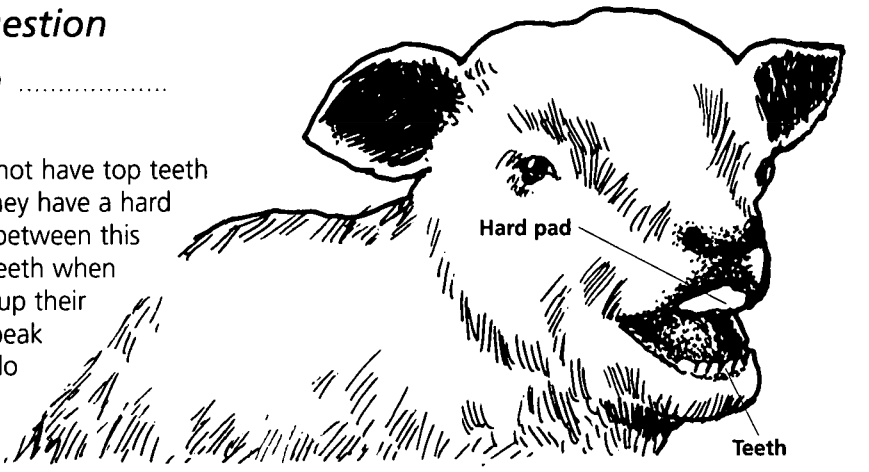
Muscles work by contracting and becoming shorter. When they become shorter they pull the bones together. You can feel the muscles in your arm contract when you move it. This is how an animal moves. Some muscles are very large, for example, the muscle in the back leg.



Eating and digestion

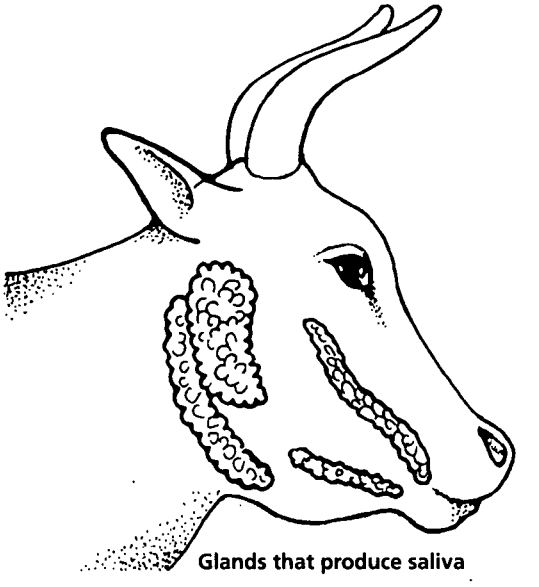
Mouth and teeth

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.



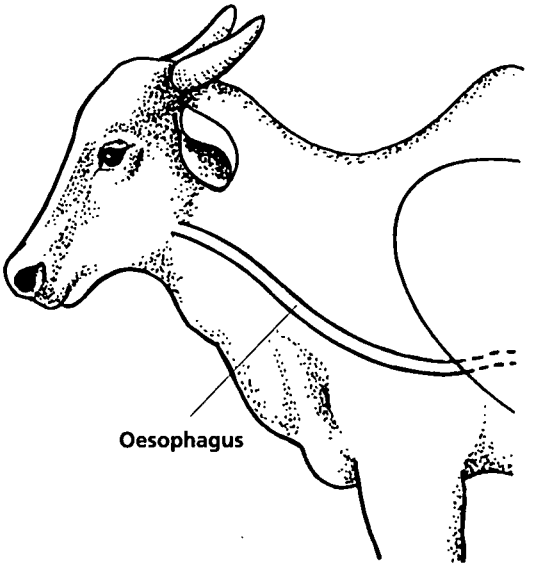
Saliva

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.

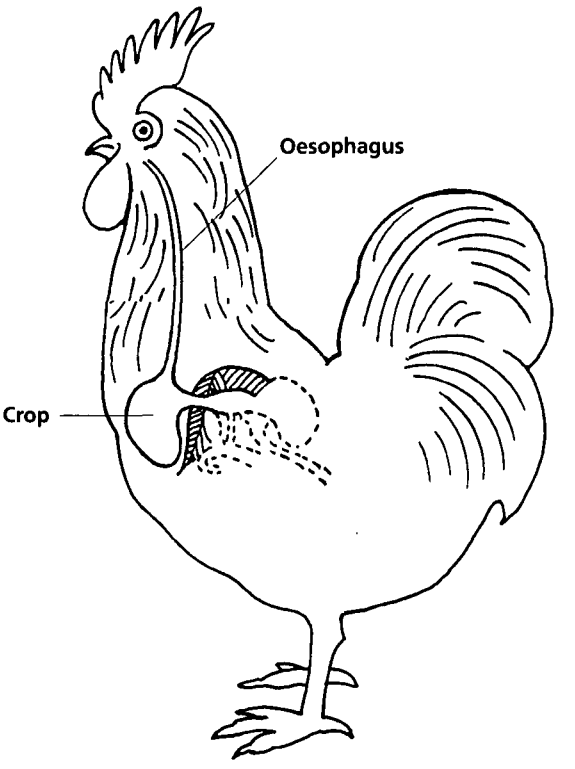


Oesophagus

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.

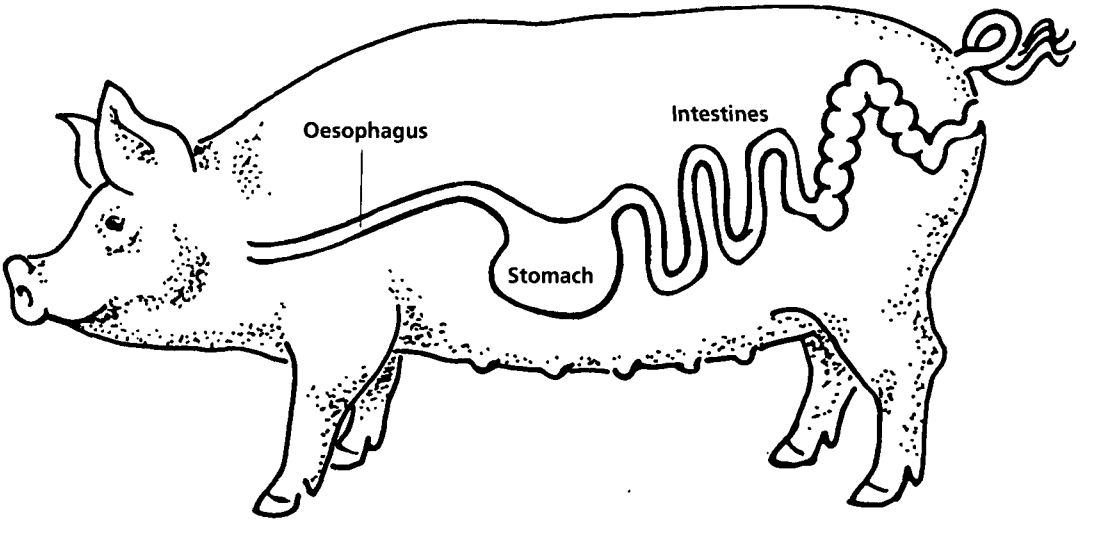


Birds The food that most birds swallow goes into the *crop*. The crop is a special sac on the way down the oesophagus where food can be stored. You can feel the crop in the neck when it is full after a bird has eaten. In the crop the food is mixed with saliva that starts to *digest* it. (Ducks do not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

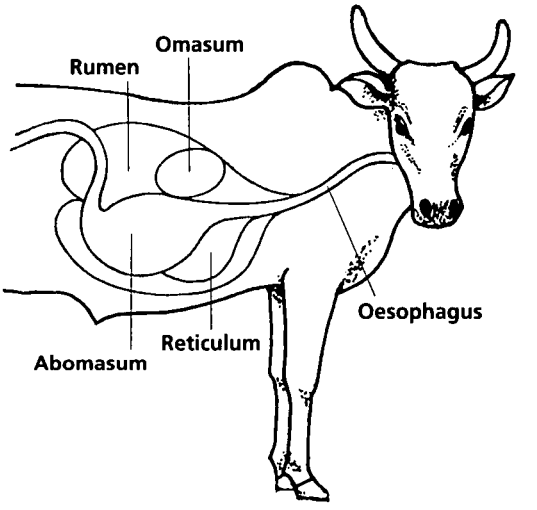


Stomach

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.

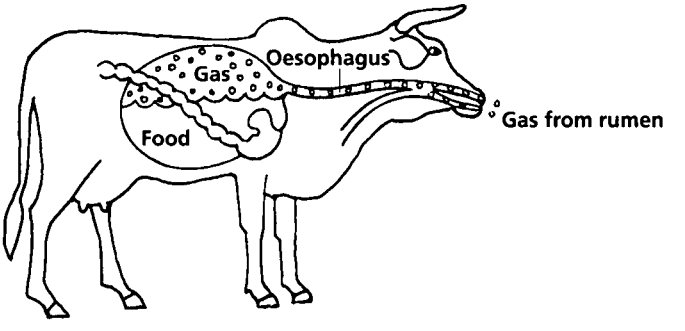


Cattle, buffaloes, sheep, goats and camels These animals are called *ruminants*. They have four 'stomachs' called the *rumen*, *reticulum*, *omasum* and *abomasum*. (Only the fourth stomach, the abomasum, is like the stomach of other animals.) Ruminants use the extra stomachs to help digest tough fibres 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.



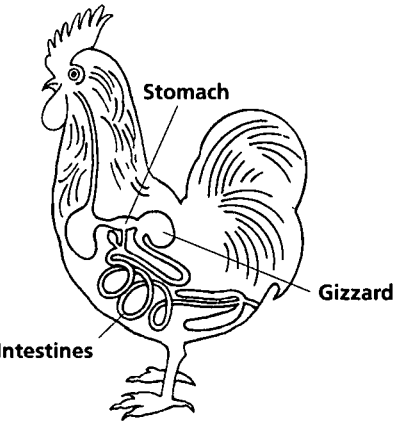
When an animal ruminates, some food that has been mixed with liquids in the rumen comes back up the oesophagus into the mouth and is mixed with saliva. The animal chews this thoroughly with the back teeth and swallows it again. Inside the rumen and reticulum food is broken down by helpful microbes. This 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.



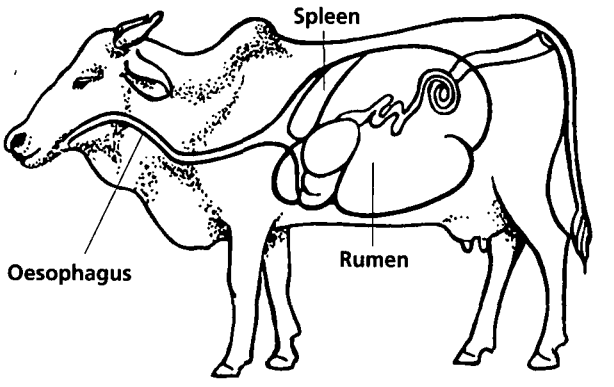
Horses, mules, donkeys, pigs, dogs and rabbits These animals have only one stomach.

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.

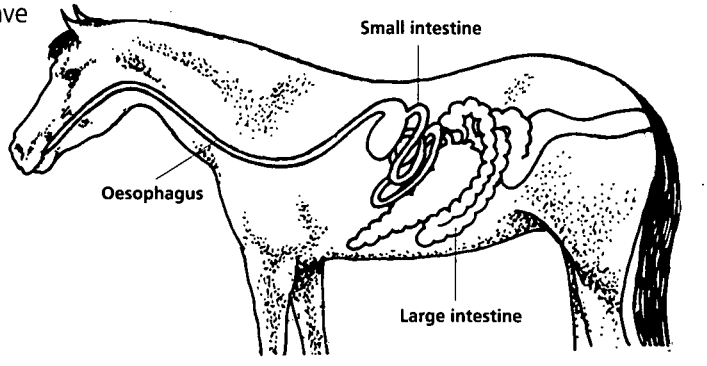


Intestines

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

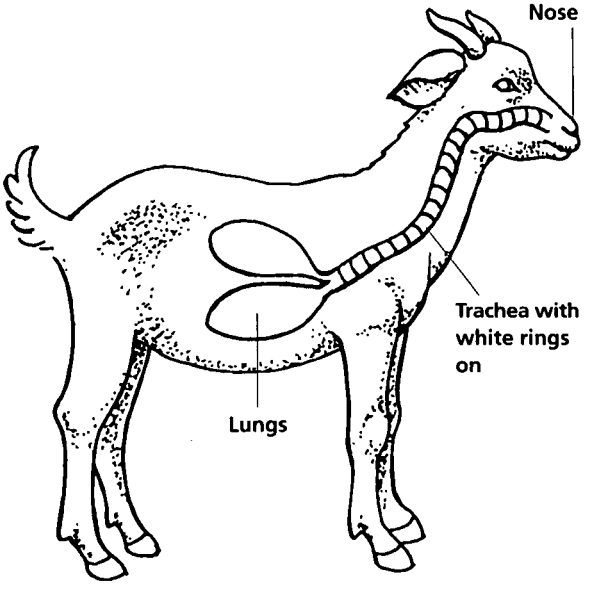
The *gall bladder* stores bile produced by the liver before it goes into the intestines. Bile is a dark green/yellow liquid that mixes with food in the intestines and helps to digest fat.

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.

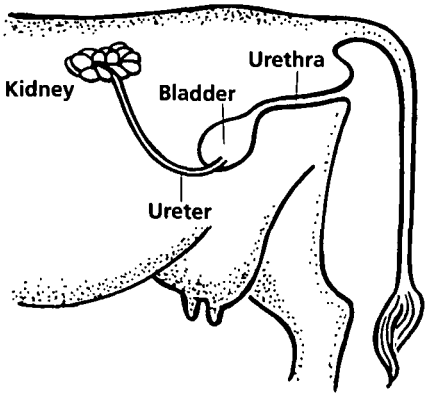
Urine

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.

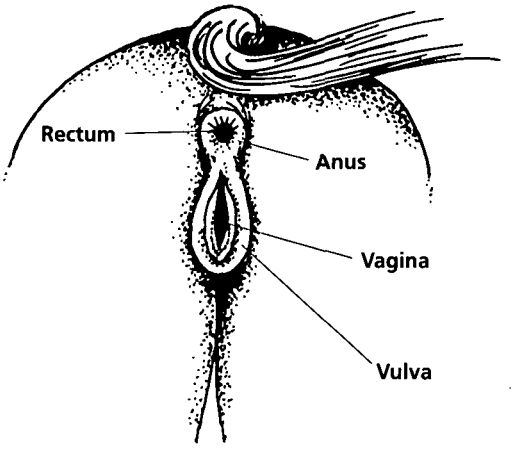
Bladder

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

Reproduction parts

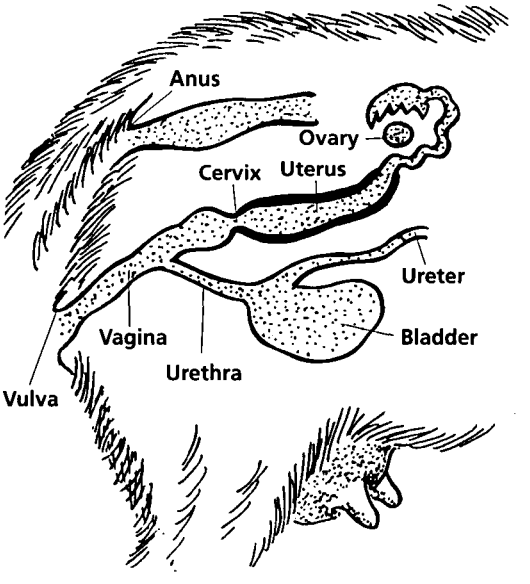
Vulva and vagina

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

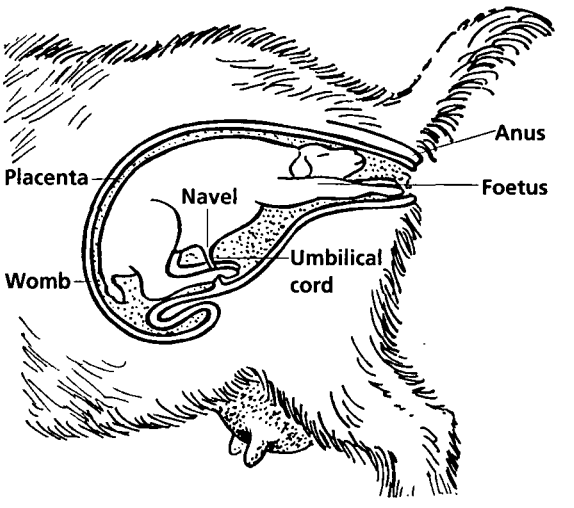
The *ovaries* are attached to the uterus by tubes. The ovaries produce female *sex-hormones* called oestrogen and progesterone that make an animal have a heat period (*oestrus*) when she will allow males to mate with her. These hormones also prepare the uterus for pregnancy and keep an animal pregnant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

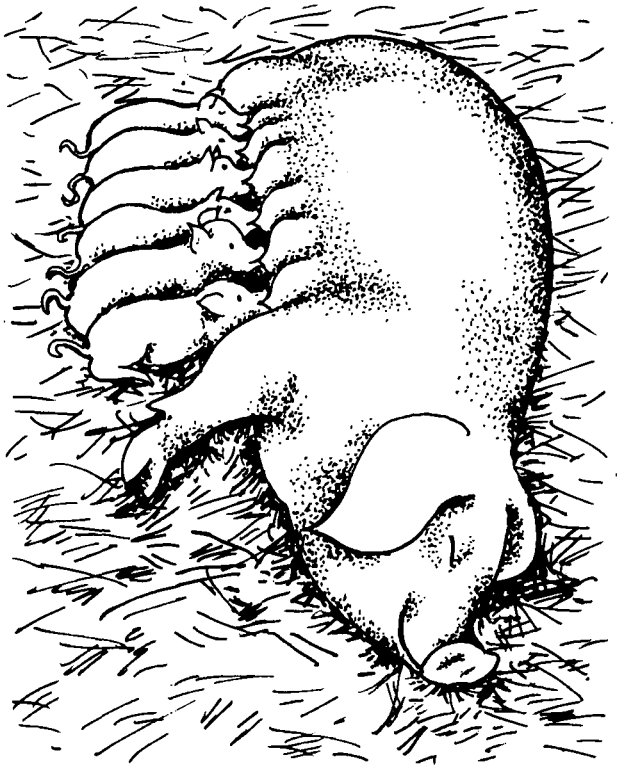
Birds Tiny eggs inside a bird's ovaries start to grow larger when a bird becomes sexually mature. The yolk of an egg grows for seven to ten days in the ovary then goes into the tube that connects the ovaries to the uterus. The egg stays in the first part of this tube for 20 minutes and is fertilised 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



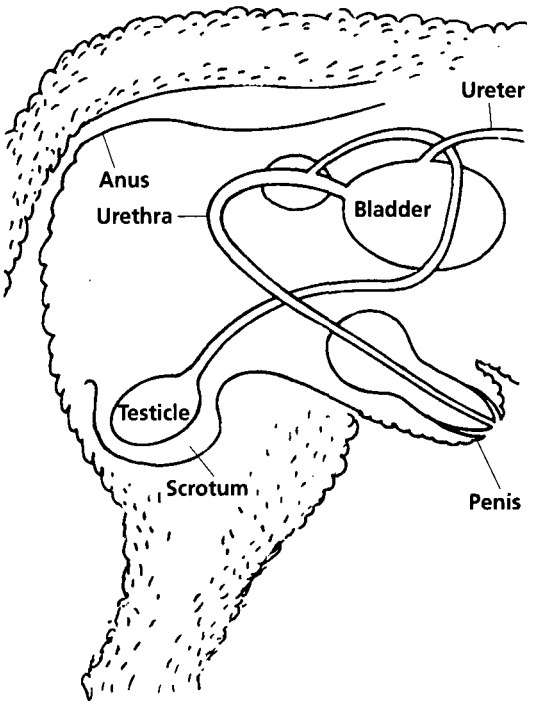
The soft spongy parts of the udder are the *glands* that produce milk. The udder is divided into separated parts. Animals can have infection in one part of the udder but not in the other parts. The back parts of the udder are larger and produce more than half the milk. A small amount of milk is stored 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

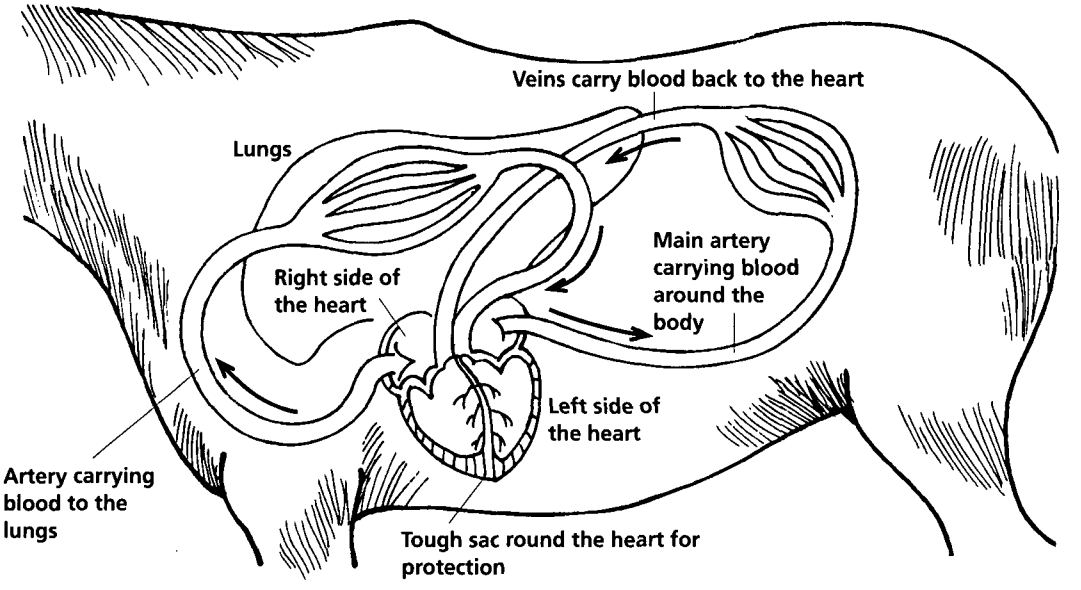
Blood is mostly made up of water with chemicals such as salt, in it, and red cells and white cells. *Red blood cells* make the blood look red and they carry oxygen from the lungs to all parts of the body. When the cells are full of oxygen, after they have been through the lungs, they are bright red.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

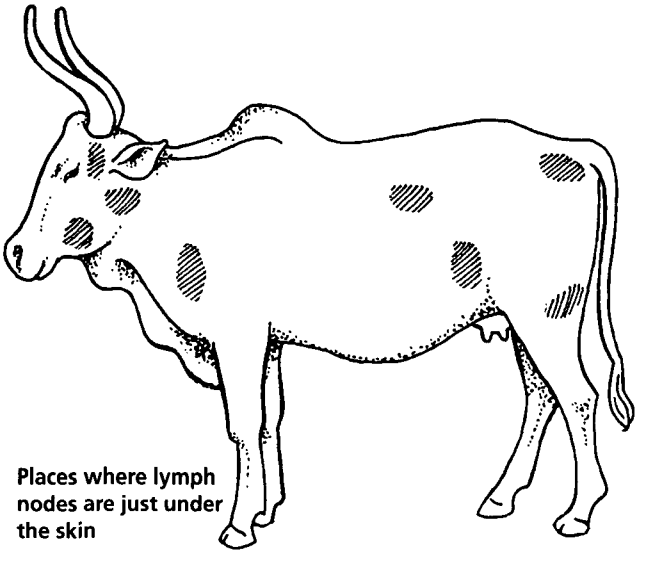
The tough sac you can see around the heart protects it. This sac normally fits closely over the heart. When an animal is sick, for example, with *heartwater* (p. 257), the sac may have much fluid in it.

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.

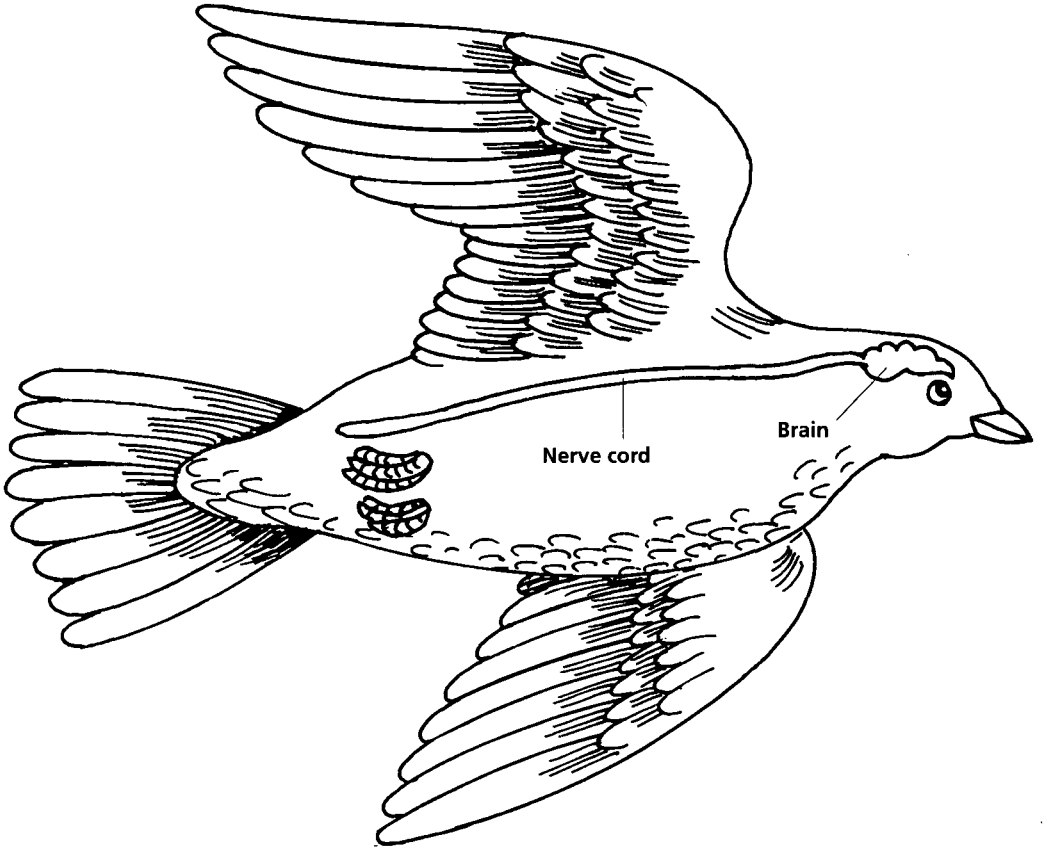
Behaviour

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

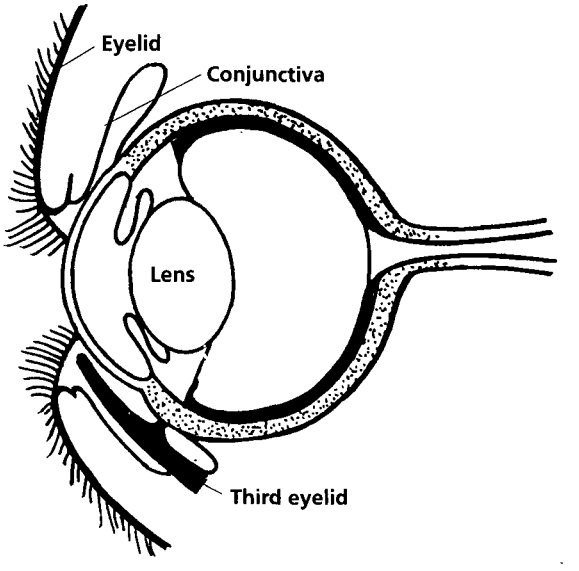
Nerves look white. Nerves from the brain go inside the spine to the tail. Nerves come out of the brain and the spine and go to all parts of the body. They carry messages from the body to and from the brain. This is how the animal feels things. Special very large nerves go from the eyes and ears to the 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.



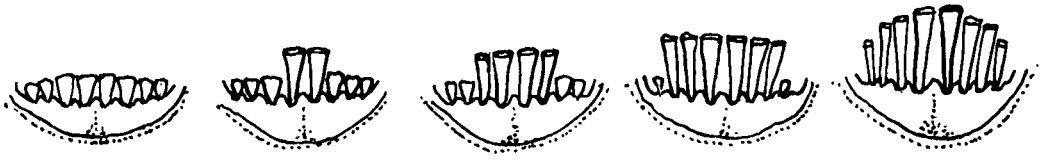
Training session: How to tell the age of an animal

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.

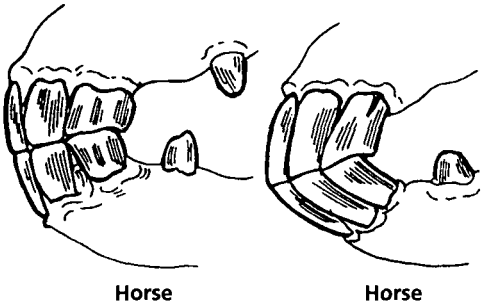


All temporary - under 12 months | **One pair permanent teeth - about 15 months** | **Two pairs permanent teeth - 1-1 1/2 years** | **Three pairs permanent teeth - about 2 1/2 years** | **Four pairs permanent teeth - over 2 1/2 years**

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).



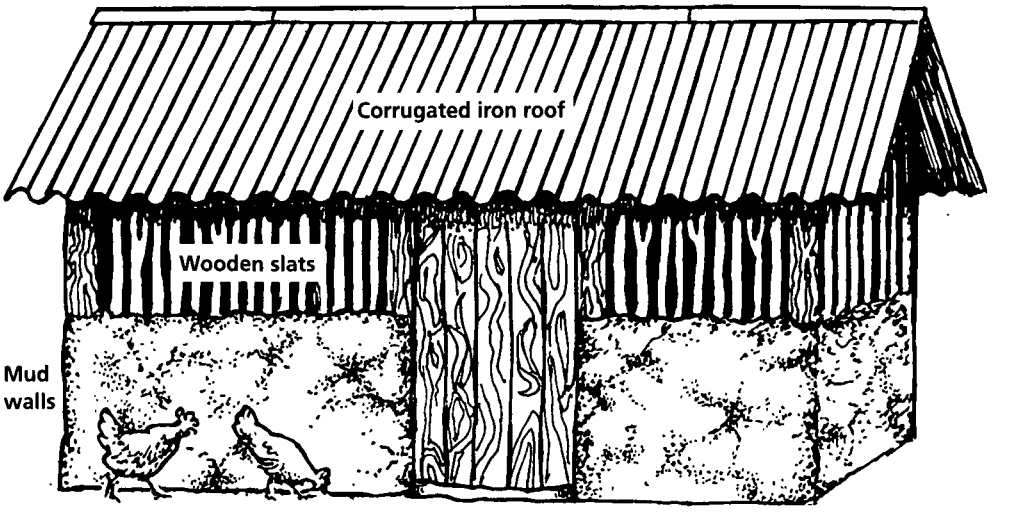
Horse about seven years old | **Horse about thirteen years old**

Section 3 Healthy animals

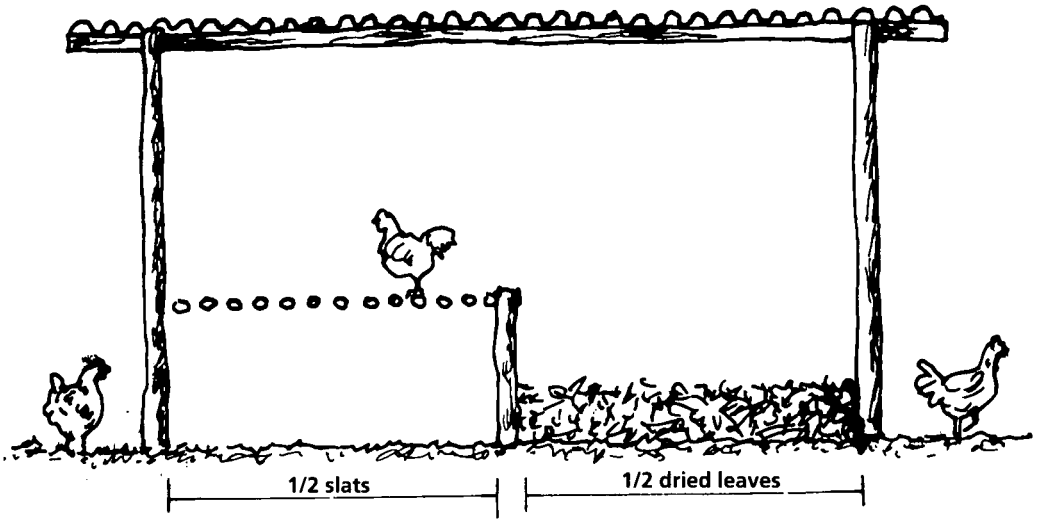
7 Taking care of animals

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.

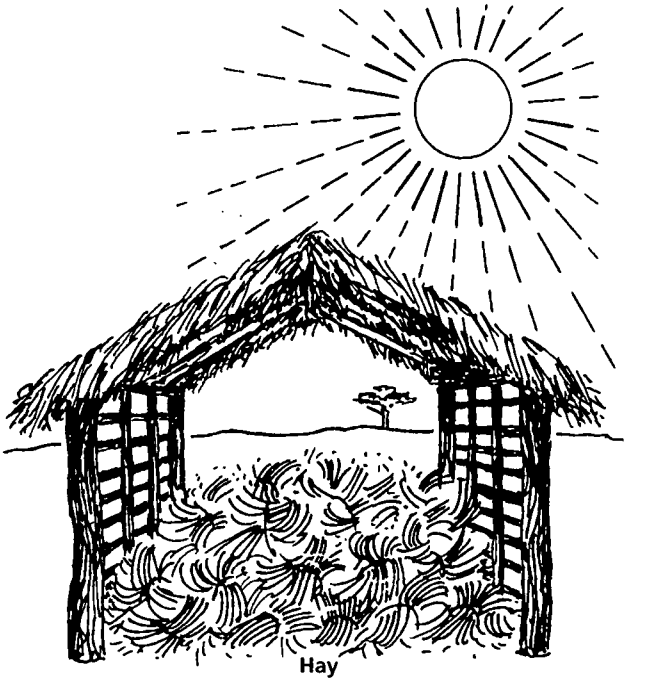
When to buy minerals

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**.



Hay

How to improve poor quality food

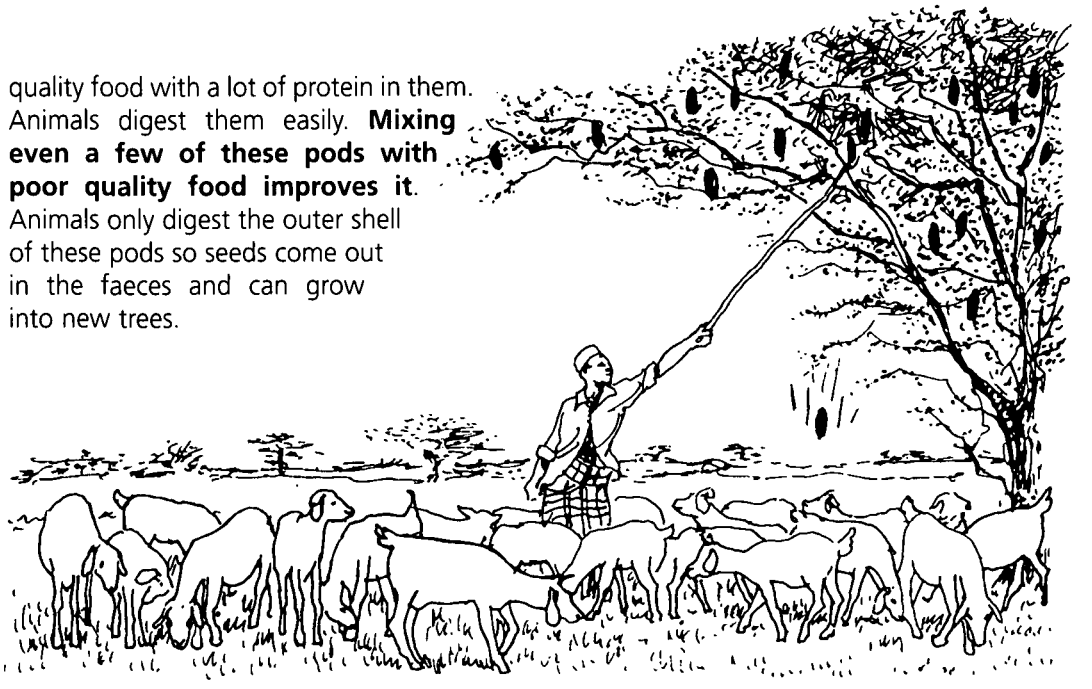
Animals get most benefit from good quality food they can easily digest. Poor quality food, such as dry old grass, provides little energy. It fills the animal up and stops it eating more to get the energy it needs. Much of it is wasted and comes out in the faeces. You can make poor quality food much better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

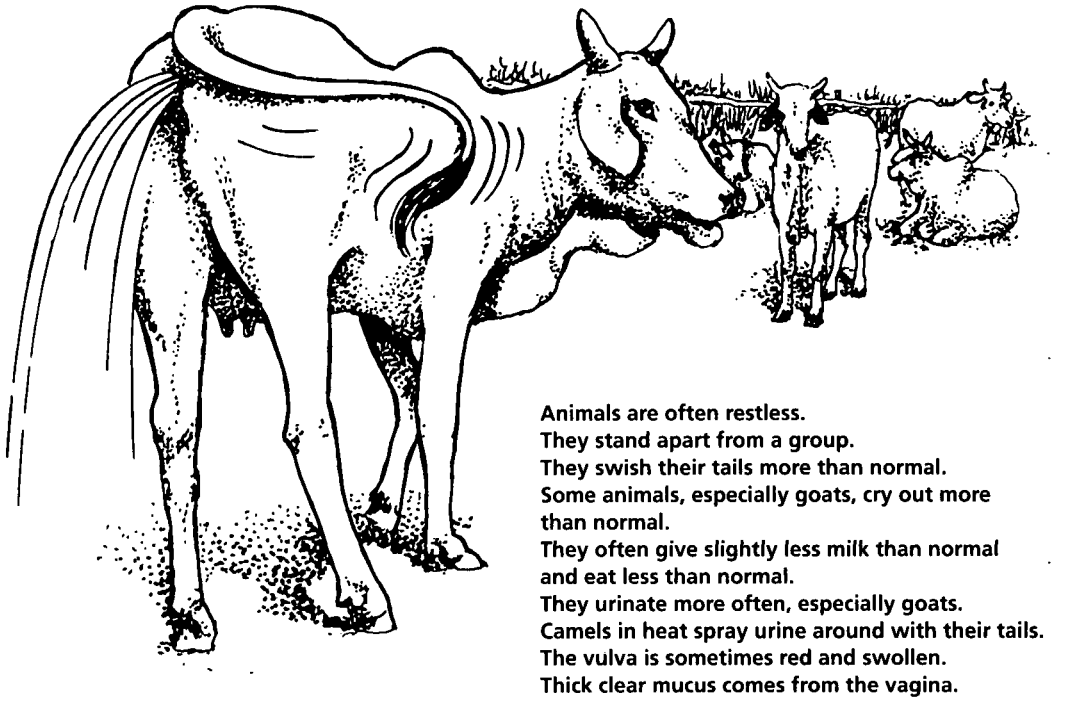
How to tell when animals are in heat

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.

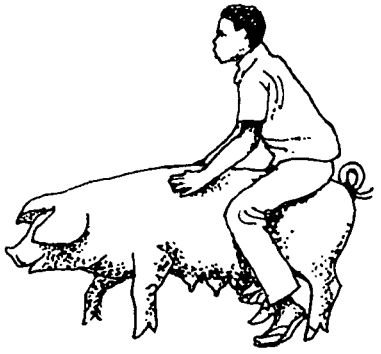
signs of heat. So if you are breeding them at hot times give them shade and allow them to wallow often.

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

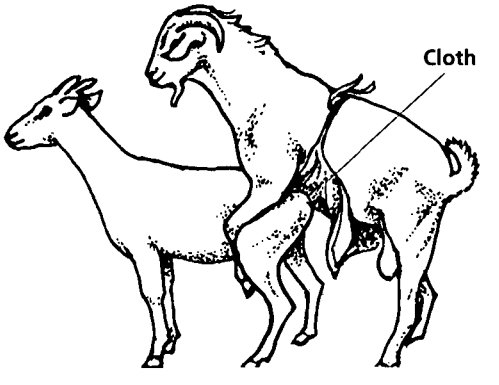
Some animals, especially pigs, do not have a heat period again so soon if their young are still taking milk.

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.



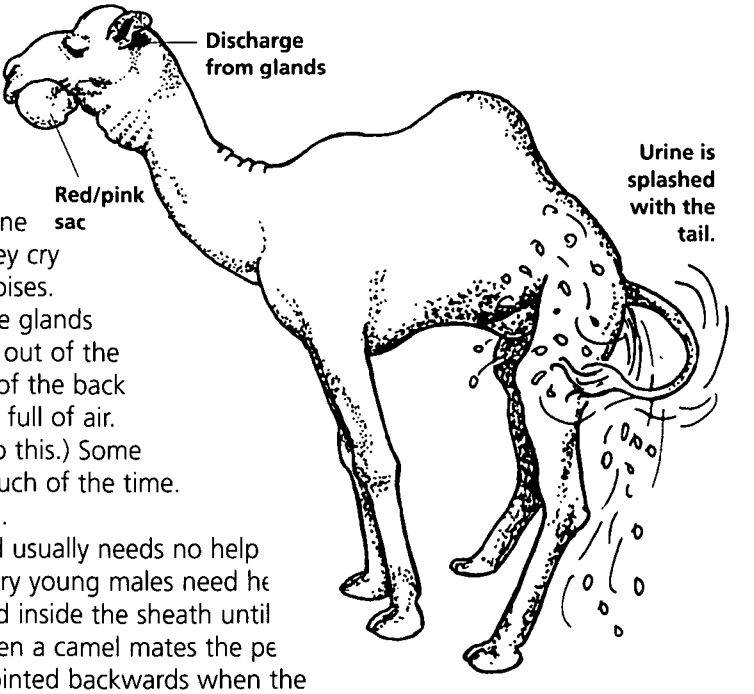
Sheep Mate the second day they are in heat. One male sheep can mate with about 40 females. Sometimes young male sheep have problems mating with fat-tailed females. Help them by moving the female's tail to one side.

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.

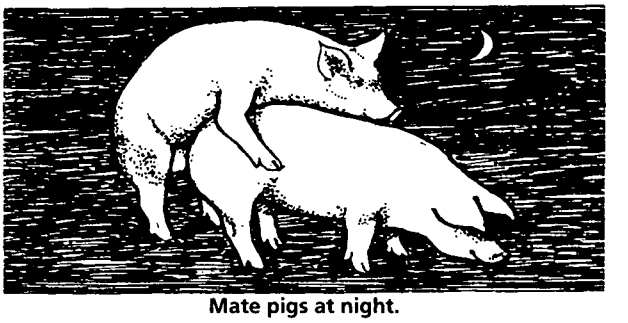
In the mating season male camels fight other males and attack people. They stand with their legs spread out and splash urine over their backs with their tails. They cry out a lot and make low gurgling noises. They also have a *discharge* from the glands on the head. A red/pink sac comes out of the mouth. 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 he to mate. A camel's penis is attached inside the sheath until camel is about three years old. When a camel mates the pe 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.

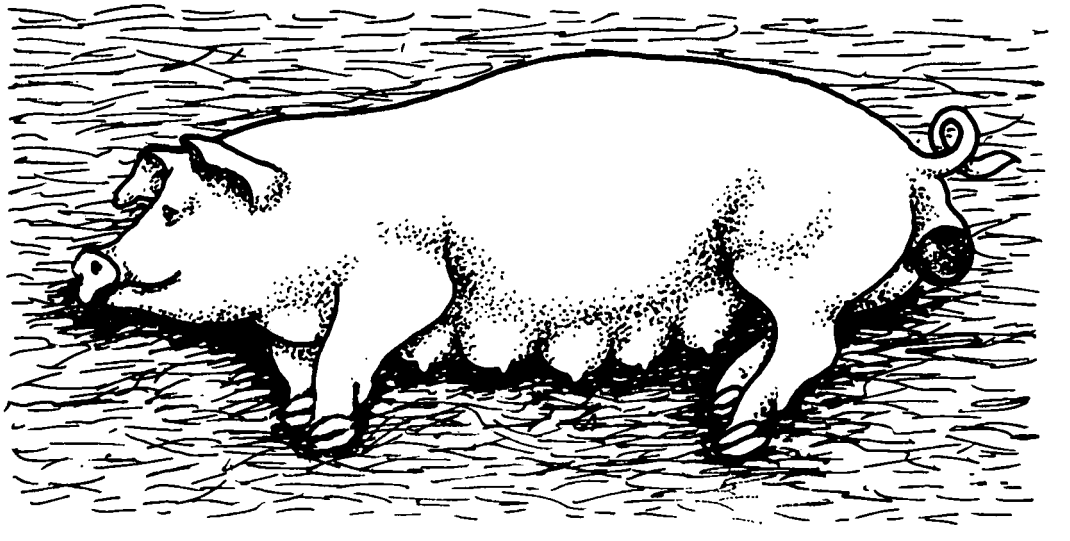
Pigs Two weeks before birth the udder and teats swell. In animals that have not given birth before, the udder swells 6–7 weeks before birth. One day before birth the udder becomes very red. You can squeeze a little watery milk from the teats.

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

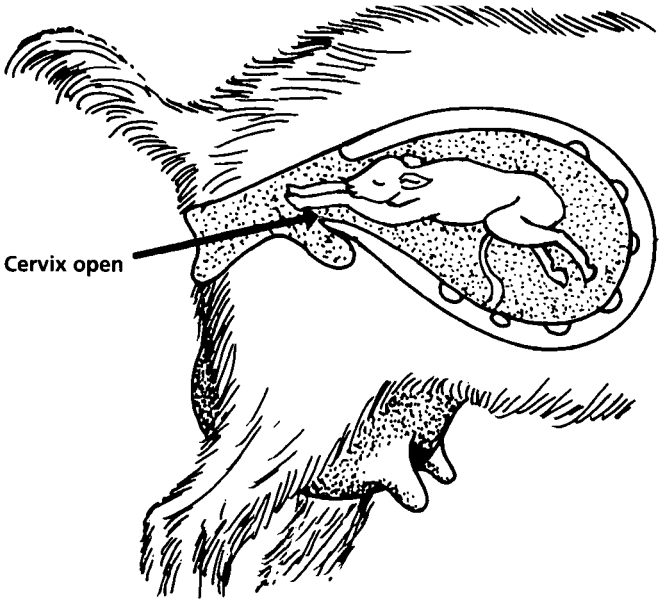
What happens when an animal gives birth normally

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:

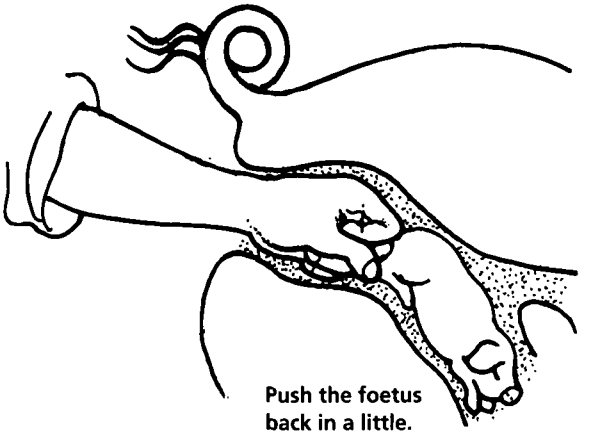
- Clean water.
- Soap and brush for washing hands.
- Soap flakes or other lubricant.
- Clean cloths for drying hands.
- Ropes.

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.**



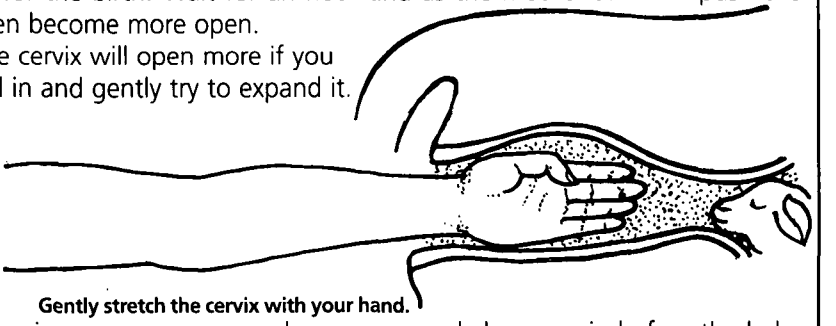
Push the foetus back in a little.

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.



Gently stretch the cervix with your hand.

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.

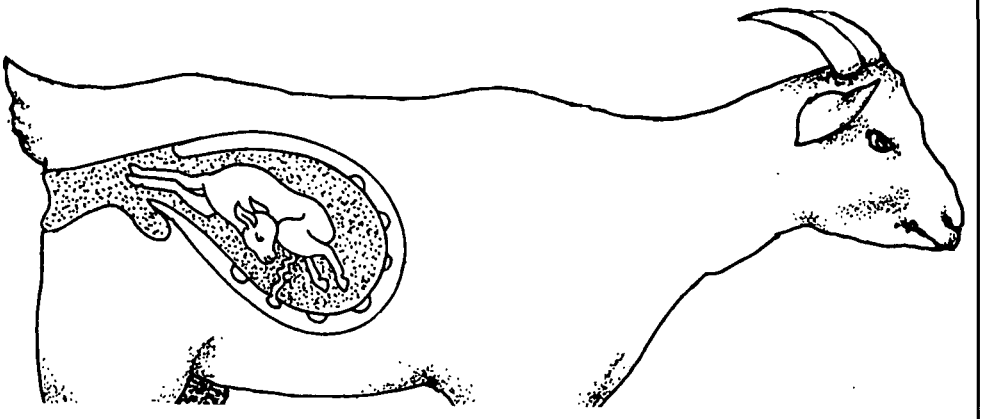
- If the baby has died and the cervix is still closed there is usually a foul smell. It is difficult to treat this.
- It may help if you put antibiotics into the uterus while the foetus breaks up and rots inside and eventually comes out.

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

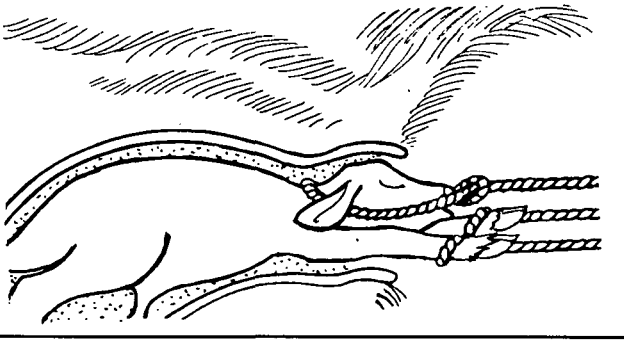
- If the cervix is open enough to put your arm through, grab a part of the foetus and try to untwist it.
- Or make the animal lie down (p. 17). Hold part of the foetus and roll the animal over to untwist the uterus. Sometimes it helps to roll the animal even if you cannot grab part of the foetus.

Problem: Two front feet come, but no head

- Push the baby back inside a little.



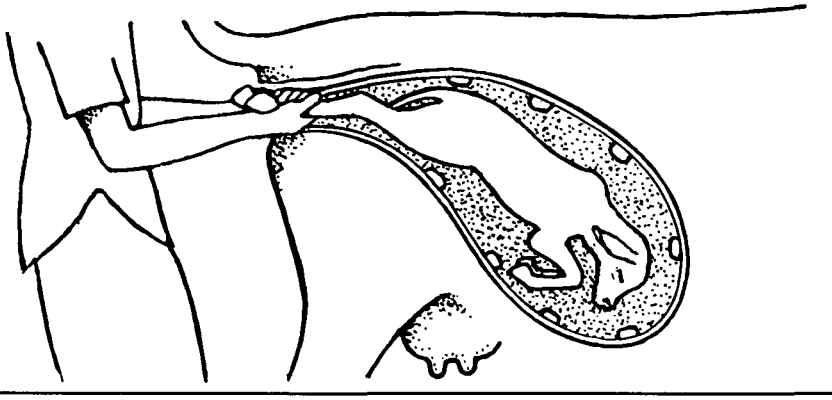
- Grip the mouth or nose and pull the head towards you. You can use a rope to help pull on the jaw. Sometimes it helps to put a rope round the head and then you can help pull on the head as the baby comes out. Make a loop in a rope with a slip knot (p. 25). Put the rope behind the ears and let the knot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



Problem: Two back feet come first

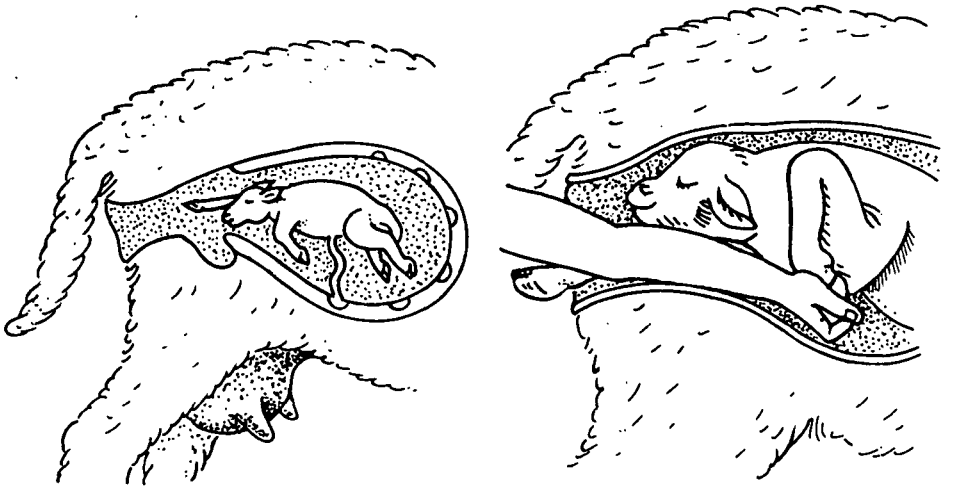
Most animals give birth to a foetus in this position quite easily with no help. But watch the mother closely and if the birth takes too long or she seems to have difficulty:

- 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.



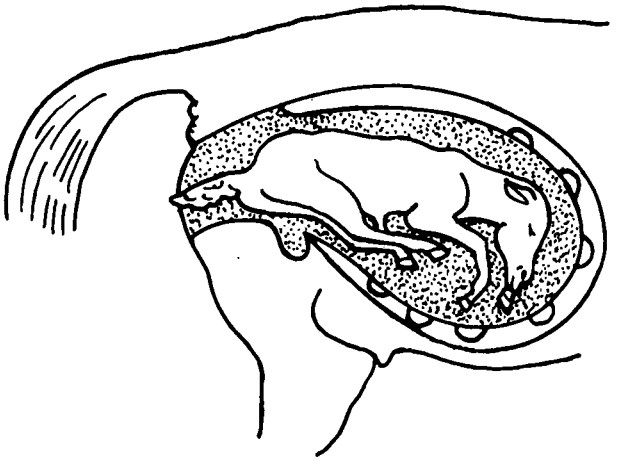
Problem: **The head comes, but one or two front legs do not**

- 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.

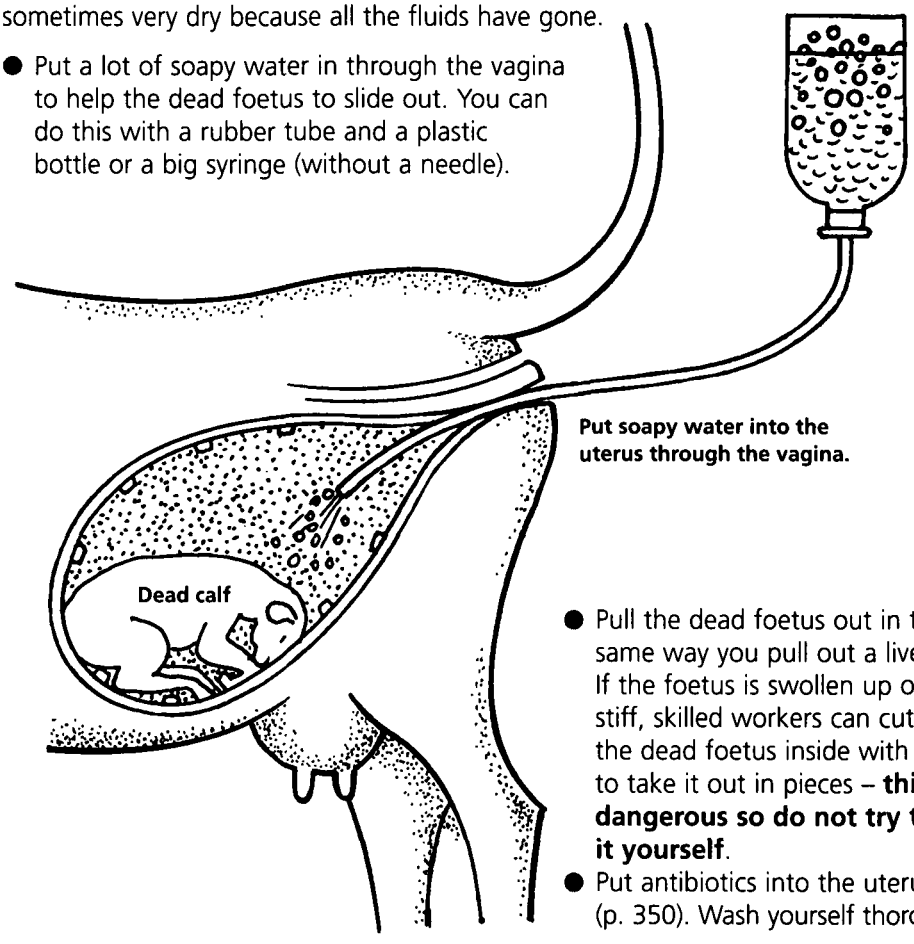


- Find the foot and cup your hand round it to protect the uterus. Pull the foot back up into the vagina. If the animal pushes when you try to do this you can get another person to push the foetus back in.
- As soon as you have both back legs in the vagina tie a rope on each of them and pull firmly. Pull 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).



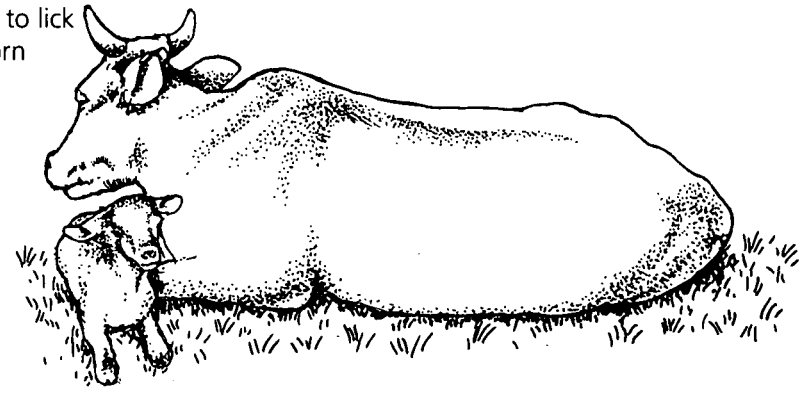
Put soapy water into the uterus through the vagina.

- 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.)

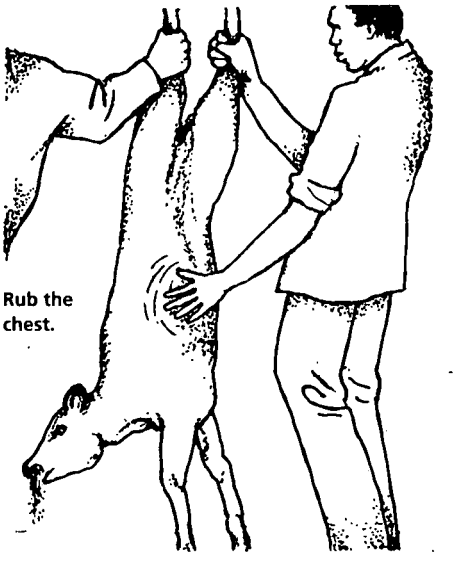


Rabbits Do not touch the new-born with your hands for at least a day after they are born. Check there are no dead babies and push them away with a stick if there are. (Baby rabbits cannot see until they are about 20 days old.)

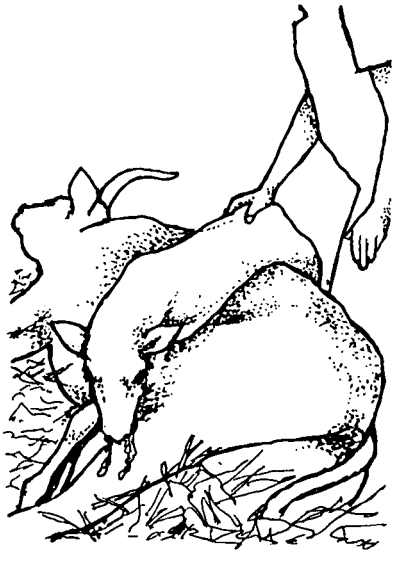
Problem: A new-born animal is not breathing

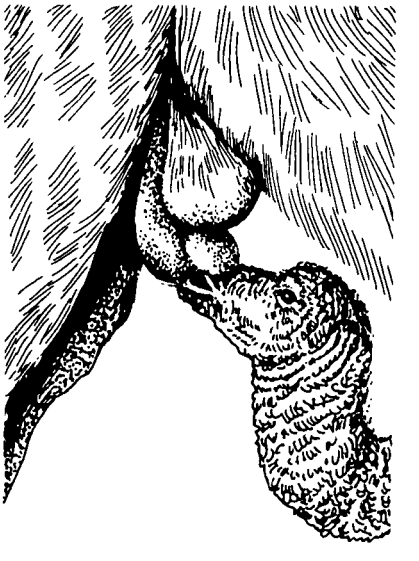
Some new-born animals are very weak, especially after a difficult birth. They often have much fluid in their lungs that stops them breathing normally.

- 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.



Rub the chest.



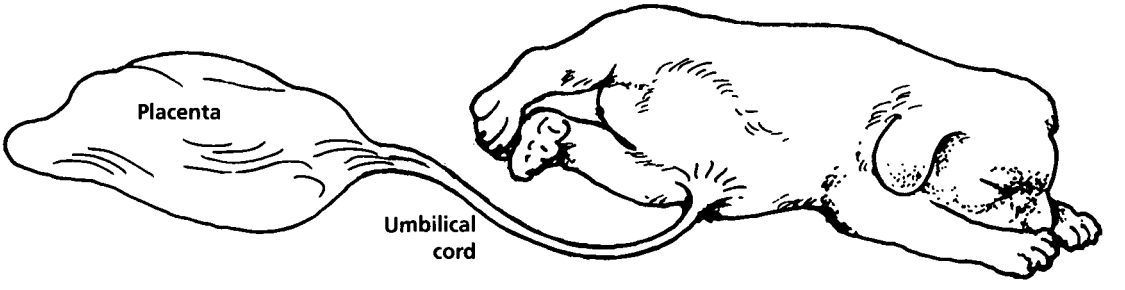


What to do after birth

- 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

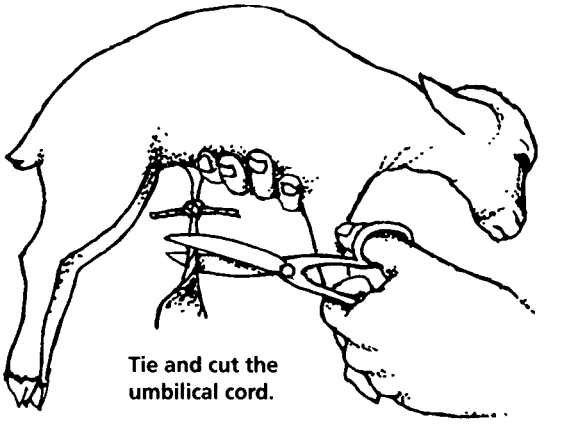
Animals that give birth early, have twins, have difficulty giving birth, are poorly fed or sick are likely to keep the placenta for too long. If the placenta and foetal membranes have not come out within 12 hours after birth you might have to treat the animal (p. 242).

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

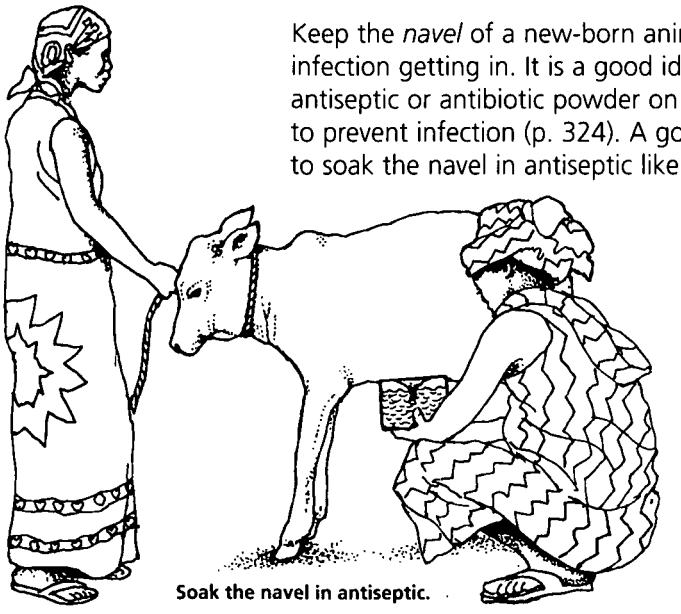
The *umbilical cord* usually breaks on its own and is not a problem. If a long cord is still attached to the new-born animal tie a *sterile* string round it and cut it to about 3 cm long.



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.



Soak the navel in antiseptic.

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.

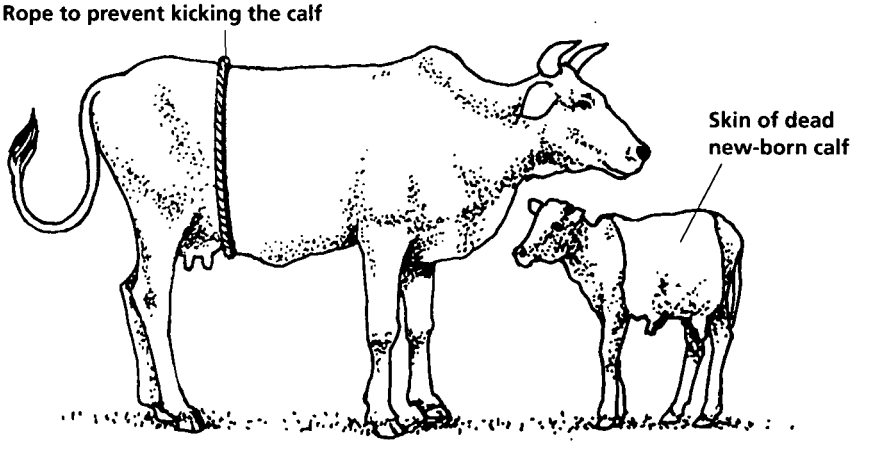
WARNING

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).

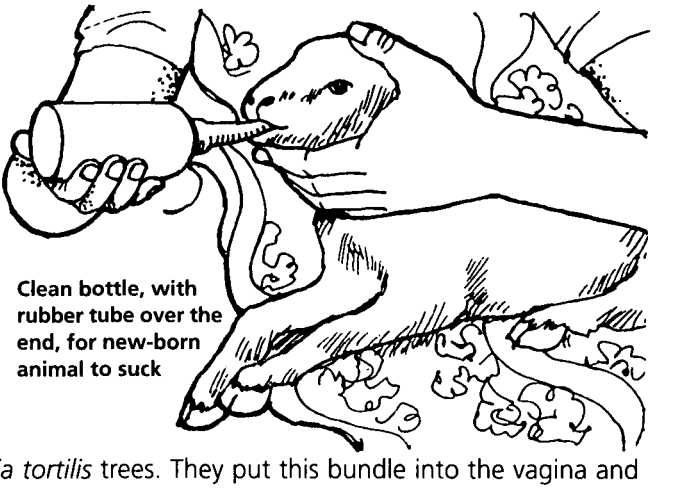
New-born animals with no mother

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.



- 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.



- 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.

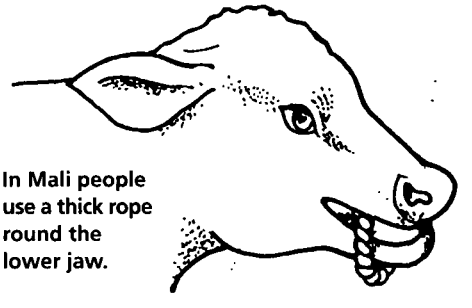
Weaning

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.

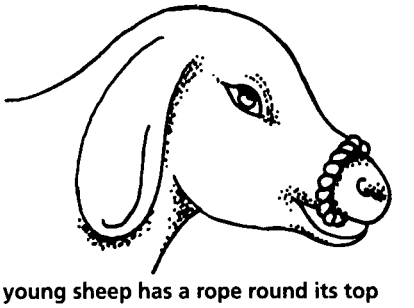
When young animals drink less milk and eat dry food they need more water to drink.

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.

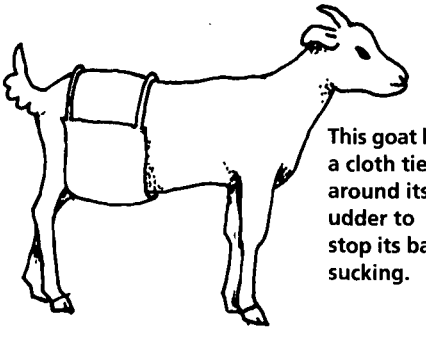
These are some ways people stop young animals taking milk from their mothers.



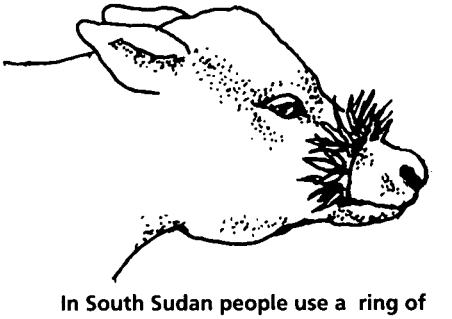
In Mali people use a thick rope round the lower jaw.



This young sheep has a rope round its top jaw to stop it sucking.



This goat has a cloth tied around its udder to stop its baby sucking.



In South Sudan people use a ring of thorns round the upper jaw.

Section 4 Emergencies and simple operations

9 Emergencies and first aid

In an emergency give the best treatment you can **immediately.** You may not have time to get skilled help straight away but it is a good idea to get skilled help as soon as you can. Some emergency treatments are difficult to do well, such as stitching large wounds. After you have treated an emergency a skilled worker can still check what you have done and help you with more difficult treatment if it is needed.

THESE PROBLEMS NEED EMERGENCY TREATMENT IMMEDIATELY:

Breathing has stopped

If an animal is not breathing start treating it immediately.

EMERGENCY TREATMENT

- Look in the mouth. Remove anything that stops the air getting in.
- Put the animal's neck straight out.

● Make the animal breathe by pushing on the chest or blow into its mouth. Do this about ten times a minute.

When an animal has a bad accident, such as being hit by a truck, and is badly injured the first thing to do is to make sure it can breathe.

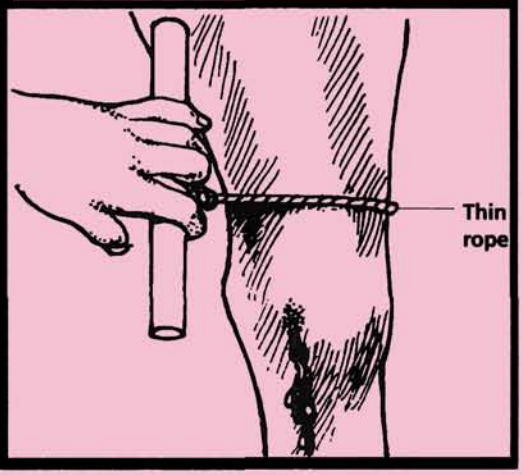
Bleeding

Stop severe bleeding as soon as possible. A small amount of bleeding is not a problem and the flow of blood may help to clear away infection but if an animal continues bleeding for more than a few minutes or loses a lot of blood it will need emergency treatment.

How to stop bleeding from a wound

EMERGENCY TREATMENT

● Keep the animal as quiet as possible. Do not let it run around bleeding. Restrain it and do not let people or other animals disturb it. This will lower the blood pressure and help to stop the bleeding.
● Pour clean, cold water over the wound. The cold helps to stop bleeding. If it does not:
● Press a clean, wet cloth or your hand over the place that is bleeding.
● Press hard and keep pressing for about a minute.
● Put pressure over the wound itself or between the wound and the heart.
● Release the pressure and see if the bleeding has stopped. If it has not, press again. Most bleeding stops after a few minutes.
● Rarely, severe bleeding from a leg or the tail does not stop. Tie a thin rope above the bleeding. Tighten the rope with a stick through the knot until the bleeding stops. Loosen the rope about every ten minutes to see if the bleeding has stopped. Never leave the rope tight for more than 20 minutes.



How to stop bleeding inside the body

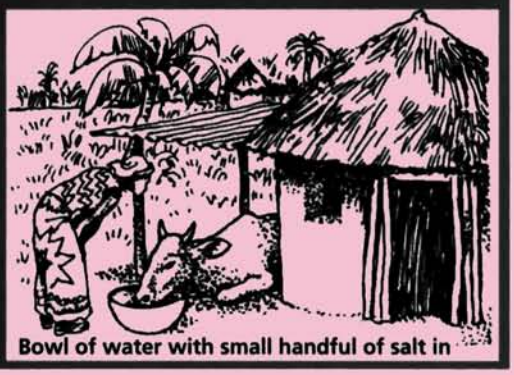
Animals can bleed inside where you cannot see it. They bleed inside after very severe injuries or when the uterus is damaged after a difficult birth. Animals that bleed inside can lose very much blood and become weak.

Signs

- They breathe very fast.
- The *mucous membranes* are white.
- Sometimes the animal dies.

EMERGENCY TREATMENT

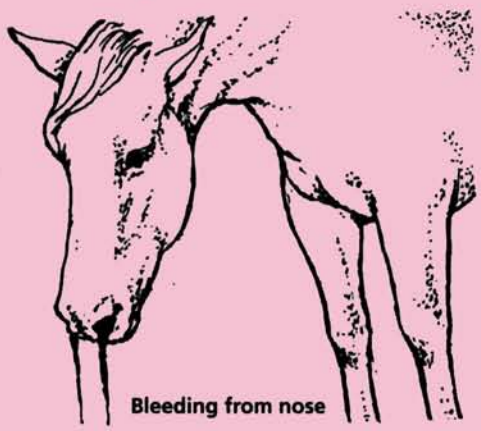
- Let the animal lie down in a quiet place, do not disturb it.
- Give it water to drink. It helps to put a small handful of salt in a bowl of water.
- If the bleeding comes from the vagina or uterus after a difficult birth put a large clean cloth soaked in cold water into the vagina. Take the cloth out after 1–2 days.



Bowl of water with small handful of salt in

Some animals die because they bleed so much inside. Often there is nothing you can do to stop this, but even when an animal loses a lot of blood it is still good for meat when it is dead.

Bleeding from the nose



Bleeding from nose

Blood coming from the nose happens after severe injury but can also be a sign of infection in the trachea or lungs (p. 128).

EMERGENCY TREATMENT

- Keep the animal quiet.
- Put cold water over the nose or hold a cold wet cloth over it.

Other ways to stop bleeding

Some medicines help to stop bleeding. People use aloe plants [*Aloe* species] to stop bleeding. They put clean pieces of the flesh of aloe leaves into deep wounds. Juice from aloes makes veins and arteries contract. People in India put the powdered dry bark of mango trees [*Mangifera indica*] on a wound to soak up blood and to stop bleeding.

Sometimes you can stop bleeding by burning a wound with a hot iron.

Skilled workers sometimes can find an artery that is bleeding and tie it or clamp it to stop it bleeding.

More about bleeding

Blood coming from *veins* is dark red/black. It usually comes slowly from a wound and stops on its own or is easy to stop. Blood coming from *arteries* is bright red and sometimes sprays out fast from a wound. Bleeding stops naturally when blood clots and because broken arteries and veins close themselves off. As an animal loses a lot of blood its *blood pressure* falls and bleeding slows down but it may not stop. Animals can lose a lot of blood and still survive.

Blood in the milk is usually a sign of an infection of the *udder* (p. 244).

Choking

When something is stuck in the *oesophagus* an animal may need EMERGENCY TREATMENT, see *choke* (p. 228).

Collapse or shock

When an animal loses a large amount of blood or suffers much *stress*, for example from poisoning, severe injury or burns, it may collapse and become very weak or unconscious. This is called 'shock'.

Signs

- An animal with shock usually has pale *mucous membranes*.
- It breathes very fast, and the heart beats very fast.
- The body temperature is below normal.

EMERGENCY TREATMENT

- **Look for signs of bleeding – from the skin or inside the animal – and control any bleeding you find (p. 66).**
- **Keep the animal quiet, keep people and other animals away from it.**
- **Shelter it from the hot sun but keep it warm.**

These signs are very serious and skilled workers give large injections of fluids into a vein to help save the animal.

Poisoning

Poisoning can be very severe and will need EMERGENCY TREATMENT. See Treatment for poisoning (p. 302).

Wounds

What to do about wounds

- Stop any bleeding (p. 66).
- Clean the wound. Clean wounds will heal. Wounds with infection will not. Clip hair or wool away from the edges of the wound. Wash the wound. Use plenty of clean water.

Boil the water first and let it cool. It helps to add salt or mild antiseptic (p. 324) to the water. Dry the wound with a clean cloth.

- Put a wound dressing or antibiotic powder on the wound (p. 324). Wounds can let infection get into an animal's body and that makes the animal sick. Some diseases, such as *tetanus* (p. 263), get in through wounds. When there are many flies use a wound dressing that repels flies or kills fly eggs and larvae (p. 326).
- Encourage wounds to drain and pus to come out. Pus is made up of dead white blood cells that have killed microbes. It must come out of the body for the animal to recover.

If a wound does not heal and becomes black and smells bad, cut away the dead flesh. Wash the wound with antiseptic and treat the wound with antibiotic powder.

How to bandage wounds

- If the wound is in a place that will stay clean, leave it open to the air and it will heal faster. Leave wounds open if possible but you may need to cover a wound to keep it clean.
- Put a piece of clean cloth directly onto the wound.
- To make a piece of cloth clean to put on a wound, boil it then dry it in the sun somewhere where it will not get dusty.
- Hold the piece of cloth on the wound with clean bandages or strips of cloth.

Piece of cloth to be boiled in water

Dry the cloth in the sun.

Place the cloth on the wound then bandage over it.

WARNING

Be careful a bandage is not so tight it stops blood flowing, for example, into a leg. Take the bandage off every day or two to check the wound for infection and put a clean bandage back on. If the bandage becomes wet and dirty replace it with a clean one.

How to stitch wounds

If a wound is very wide you may need to stitch it. To find out if a wound needs stitches see if the edges come together by themselves or you think the edges will come together as the wound heals naturally. If the edges will not come together you may need to stitch the wound.

Be aware that the animal will be in pain and you will have to hold it securely before you stitch a wound. Skilled workers often use local anaesthetics (p. 348) to stop pain.

If a wound is deep but the edges come together it is best not to stitch it. Especially if the wound is infected, leave it open so that pus and liquid can drain out of it. Wounds made by the bites of other animals are often deep and infected, do not stitch them.

If you decide to stitch a wound, do it before the wound is 12 hours old. Fresh wounds heal better. **Do not stitch old infected wounds.**

If an old wound is not healing and you need to stitch it you must first clean away infection. This is difficult and you may need skilled help. First cut away any scabs and dead flesh. Dead flesh is usually grey/brown. Cut until you see clean pink/red flesh with some clean blood coming from it, then stitch the wound.

Try to bring the edges of the wound together.

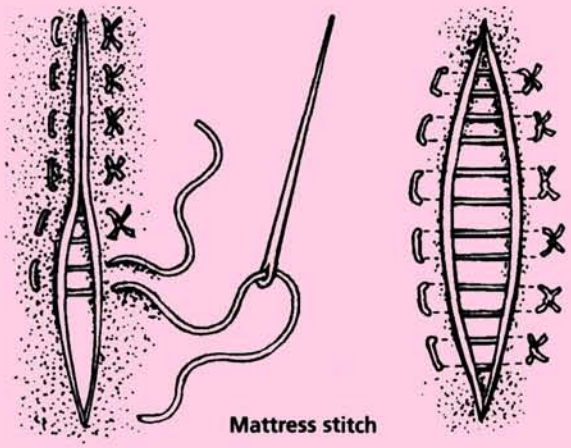
To stitch a wound:

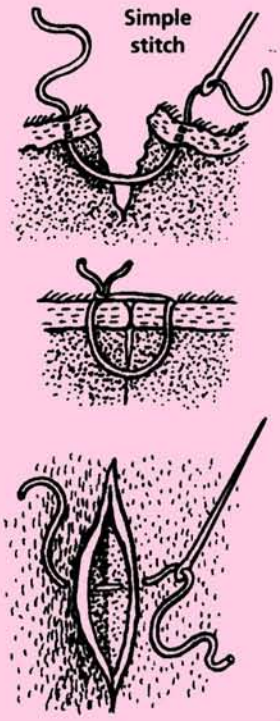
- It is best to use special nylon stitching material (*suture*). If you do not have this, use thin thread or fishing line. Make sure the material and needle are *sterile*. To sterilise things boil them for 20 minutes and let them cool or put them in strong disinfectant, such as alcohol, for 20–30 minutes (p. 325). To stitch deep flesh you need special stitching material, for example 'catgut', that the body will absorb and you will not have to remove.
- The wound must be clean. Shave wool or hair around the wound. Wash away any hairs that get in the wound with clean water or antiseptic (p. 324). Wash your hands very well with water and soap.
- If the skin you are stitching is very bruised and torn it may not heal properly. Cut away badly damaged skin and stitch through healthy skin.
- Make the first stitch across the middle of the wound, then make enough stitches to close the whole wound but leave a small gap at the lowest end to let pus drain away if the wound becomes infected while it heals.
- Stitch the edges of the wound together with stitches like one of these:

Cut away scabs and dead flesh round the wound.

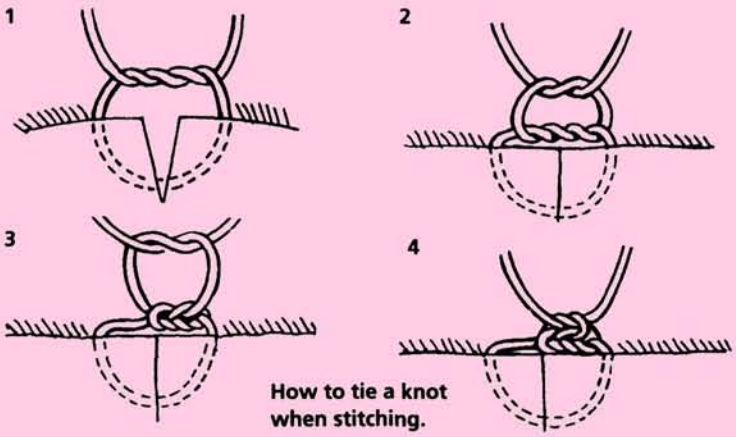
Simple stitch
Push the needle through both edges of the wound and tie the knot to one side of the wound.

Mattress stitch
Push the needle through both edges of the wound then back again and tie the knot on one side. This is a very strong stitch. It is good for animals with thick skin and large wounds.


Mattress stitch



- *Tie a good knot like this:*
  Do not tie the edges of the wound too tightly together. Skin swells as it heals and the stitches will become tighter. To stitch animals with thick skin it helps to use pliers or forceps to hold the needle. Always disinfect the tool as well as the stitch material and the needle.



How to tie a knot when stitching.

- After you have stitched a wound, wash away any blood and put on a wound dressing (p. 324).

Check to see that wounds are healing every day. If the wound becomes very infected, remove the stitches, wash the wound and leave it open to drain.

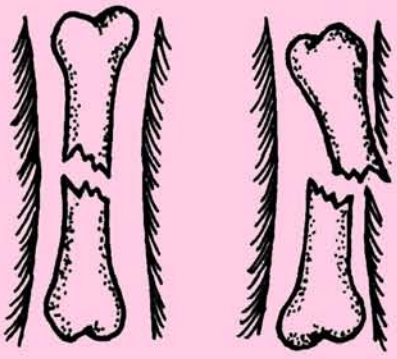
Take out stitches after 10–14 days, when you think the edges of the wound have healed together. Cut through the stitches with a very sharp knife (or scissors) near the knot and pull on the knot.

Burns

- Wash the burnt place with lots of clean, cold water as soon as possible.
- Wash with mild antiseptic (p. 324).
- Put on a wound dressing (p. 326) to kill fly eggs and infection. If the burn is large or severe give an antibiotic injection (p. 328) to prevent infection.
- Check the burn every 2–3 days. Keep the part that has been burnt clean to stop infection. If there is a lot of pus because of infection, wash the burnt place and put on more dressing.

Broken bones

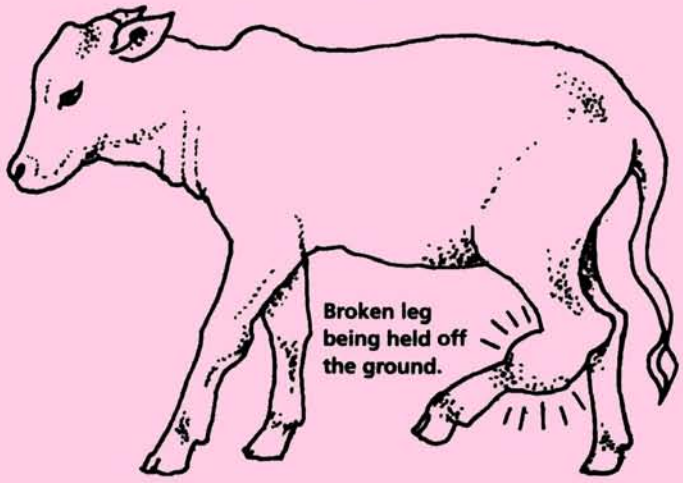
Sometimes a leg looks broken and occasionally bone even sticks out through the skin but it is not always easy to tell if a bone is broken.



Broken bone comes through the skin.

Signs

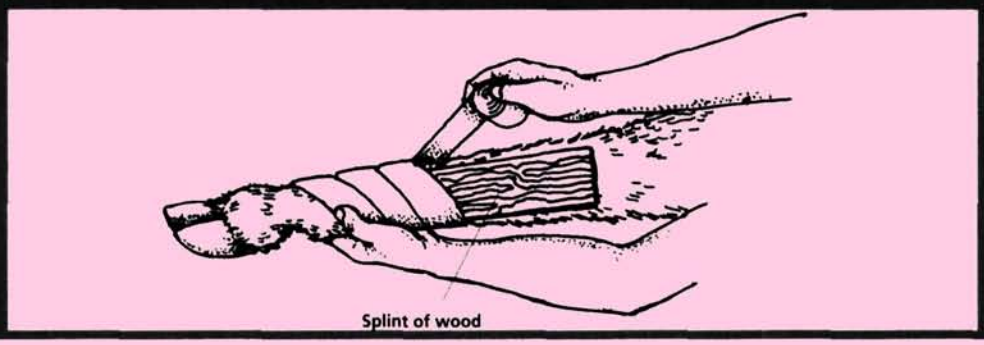
- The animal is suddenly lame and cannot walk normally. It usually holds a broken leg off the ground and does not put any weight on that leg.
- There is swelling around the break and often you can feel the broken ends of the bone touching each other. You can hear a grinding noise as the broken ends touch.



Broken leg being held off the ground.

EMERGENCY TREATMENT

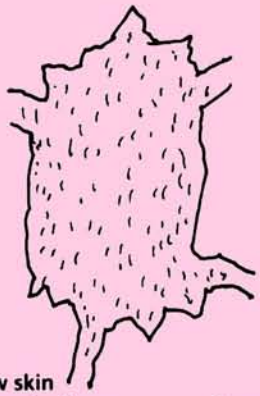
- Keep the animal quiet and stop it moving around.
- Stop any bleeding (p. 66).
- If the bone has come through the skin clean the wound (p. 69) and give antibiotic by injection (p. 328).
- Arrange the leg so that the broken ends of the bone touch in their normal position as nearly as you can.
- Use a piece of wood – a splint – tied to the leg so that the bones stay in position.



Splint of wood

People fix broken bones in place in many ways. In Pakistan people use strips of cloth dipped in mud and egg white. In Mali people tie the bark from a tree around the leg. In Kenya they use the raw skin of a goat. As the skin dries it shrinks and becomes hard, holding the broken bones in place.

Cloth dipped in mud and egg white - Pakistan



Raw skin of goat - Kenya

Tree bark - Mali

However you hold the bones in place, check every day that the fixing is not too tight. Feel the leg further down and if it is cold or very swollen, loosen the fixing and carefully tighten it again but **keep the leg in the same position**.

Leave the fixing on, to hold the bones in place, for at least 10–14 days for a young animal or 3–4 weeks for an adult animal.

It is only possible to put a splint on bones low down the leg. When a bone breaks high up in the leg or a large animal breaks a large bone it is usually best to kill the animal for meat. Even a bone high up in the leg might heal, though, if you can keep the animal rested for as long as possible.

Dislocated joints

Sometimes the joint between bones is damaged. The bones do not join together normally even though they are not broken.

You can often feel when a joint has been dislocated.

EMERGENCY TREATMENT

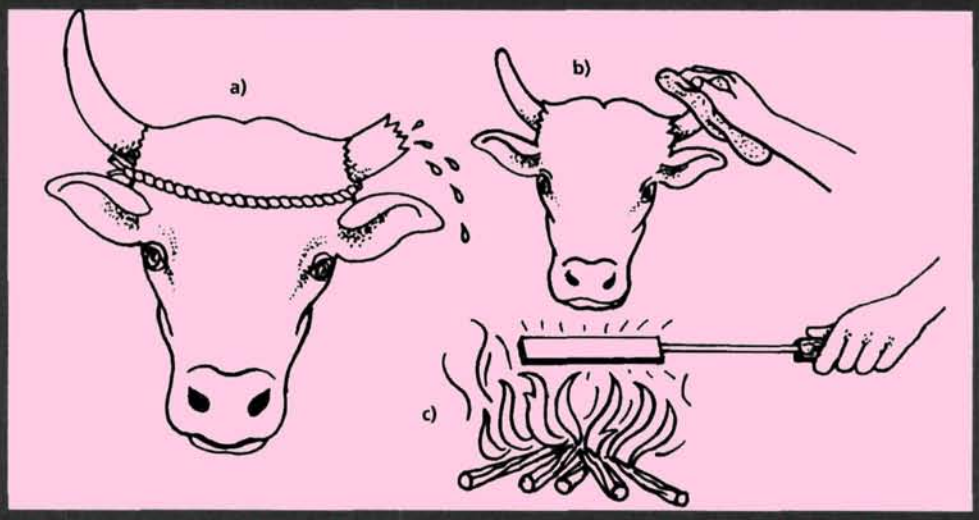
Keep the animal quiet in an enclosure. Then rest the animal until it recovers.

Broken horns

Broken horns can bleed severely.

EMERGENCY TREATMENT

- **Stop bleeding by:**
  - **a) tying a thin rope around the base of the horn or**
  - **b) by pressing a clean cloth onto the wound or**
  - **c) putting a hot iron onto the wound.**



- **Cut the damaged horn off the same way you would take off a healthy horn (p. 83).**
- **If a horn is broken near the end and there is little or no bleeding, file it smooth with a rasp or a knife.**

Colic – severe pain in the abdomen (horses especially)

An animal that is very distressed by severe pain in the abdomen (colic) needs **EMERGENCY TREATMENT** or urgent attention (see page 218).

A young horse with colic

Sudden swellings and lumps

These may need **EMERGENCY TREATMENT** or urgent attention (see page 186).

Prolapsed uterus

Sometimes the whole uterus comes out through the vagina. **THIS IS AN EMERGENCY. START TREATMENT IMMEDIATELY.**

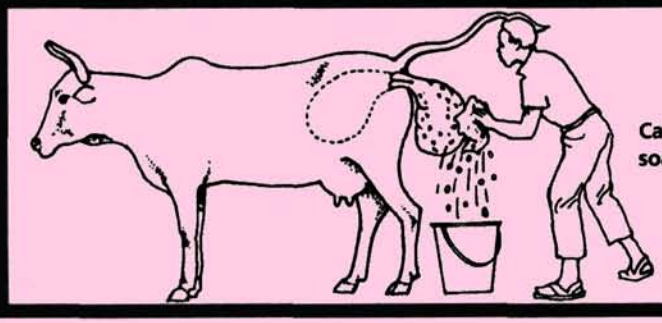
It is dangerous for an animal and difficult to put back. Get skilled help if you can. This happens to cattle, buffaloes, sheep, goats and occasionally other animals. It usually happens to old animals that had large babies and animals that had difficulty giving birth.

Signs

A few hours after an animal gives birth a very large swelling – the uterus – comes out through the vulva. You can often see parts of the placenta stuck to the uterus.

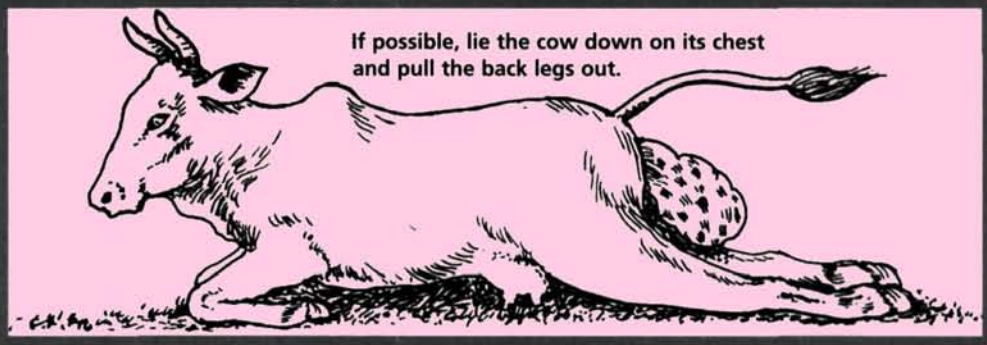
EMERGENCY TREATMENT

- Hold the animal to stop it running away. Keep dogs and chickens away from the animal. Give her clean water to drink.
- Clean the uterus with water or with soap or antiseptic and water. Keep the uterus off the ground and keep it wet with a large wet cloth.

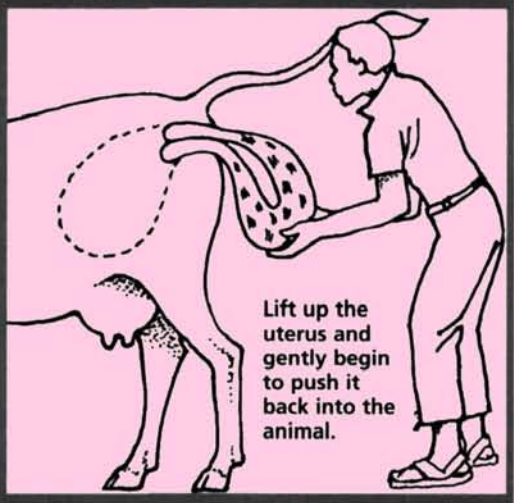


Carefully wash the uterus with soap, water and antiseptic.

● Remove pieces of placenta stuck to the uterus gently by hand if possible.
● Many people put about 1 kg sugar or molasses on to the uterus to make it smaller.
● A cow or buffalo has a large uterus. It is heavy and difficult to push back in when she is standing up.



If possible lay the animal down on its chest and pull the back legs out. This makes it much easier to put the uterus back. Get someone to sit on the animal's back and hold the tail up.
● If the animal is standing up make it stand with its head lower than its tail. Make the uterus slippery with soapy water. Carefully push the uterus back in, starting around the edges.

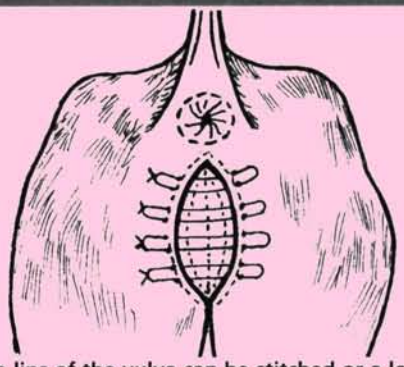


It is hard work and often takes more than half an hour. When you have pushed it back in make sure the uterus is back in its normal position by pushing with your arm. If your arm is not long enough use the base of a clean bottle.

- Put some antibiotic (p. 350) into the uterus. Give an antibiotic injection as well (p. 328).
- If the animal has been lying down, put her legs into position for her to get up. Encourage her to stand.
- Encourage the new-born animal to suck the mother as soon as possible. This makes the mother release a *hormone* (called *oxytocin*) into her blood that makes the uterus contract. Skilled workers can give oxytocin injections to make the uterus contract.
- Some people stitch or clamp the vulva closed. This sometimes helps to stop the uterus coming out again. Remove the stitches or clamp after 4–5 days.

Make sure the uterus is pushed all the way back in and is no longer 'inside out'.

Encourage the new-born animal to suck the mother as soon as possible.



The lips of the vulva can be stitched or a local method with ropes can be used to prevent the uterus from coming out again.

Birth difficulties

These may need **EMERGENCY TREATMENT** or urgent attention, sometimes by skilled workers (see page 55).

10 Simple operations

Many of these procedures are difficult to do well. Before you do any of them try to get skilled help or more training if you think you need it.

Castration

Always get a skilled worker to teach you how to castrate animals properly. **Bad castration is distressing and dangerous for an animal**. People castrate animals because it makes animals less aggressive and stops them fighting each other. They are easier to handle. It stops poor quality animals from breeding and stops males mating with immature or closely related females. Castrated animals grow faster and produce higher value meat. The meat from adult male pigs sometimes smells very strong but if you castrate them it does not smell.

It is usually best to castrate animals when they are a few days old – before they are weaned. Young animals recover quickly. But most people do not castrate working animals until they are older so that they develop some male characteristics and more strength. For example, many people do not castrate working oxen until after they have developed their hump.

Try to do castration in a dry season when there are not so many flies.

To castrate older animals get a skilled worker who is properly trained. It is more difficult and dangerous for the animal if you castrate them when they are older.

WARNING

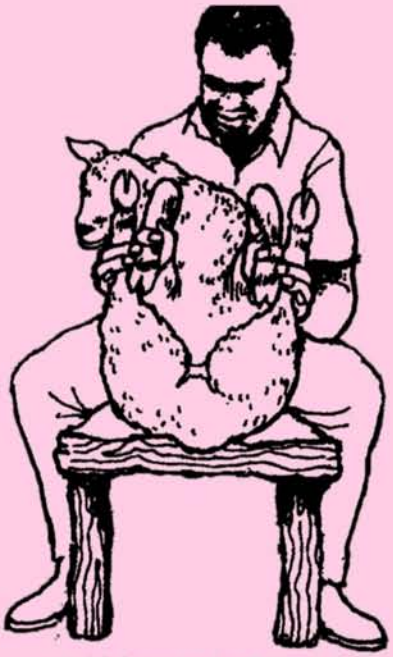
Do not crush the spermatic cord or the *testicles* with a hammer or stones. This usually causes the animal much pain and distress. There are safer and better ways to castrate animals.

Castration with a Burdizzo tool

This is a way to castrate animals with no bleeding. Done properly it is a safe method. There are large Burdizzo tools for cattle and smaller ones for sheep and goats. A Burdizzo tool should not be used for horses, mules, donkeys or camels.

Cattle, buffaloes, sheep and goats Use a Burdizzo tool (p. 11) on animals 2–3 months old.

- Hold the animal still.
- Squeeze one *testicle* to the end of the *scrotum*. Find the cord that comes from the testicle with your hand and hold the cord close to the skin.
- Put the Burdizzo jaws over the cord 2 cm above the testicle and close the jaws. Do the same thing again 1 cm higher. Then do the same with the other testicle. Make sure not



Hold the animal still like this.

to crush all the way across the scrotum in one line. And **be careful not to crush the penis** at the same time.

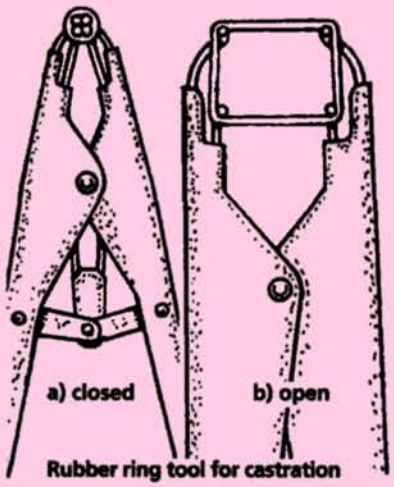
- Check after three weeks that the testicles have become smaller.

Castration with rubber rings

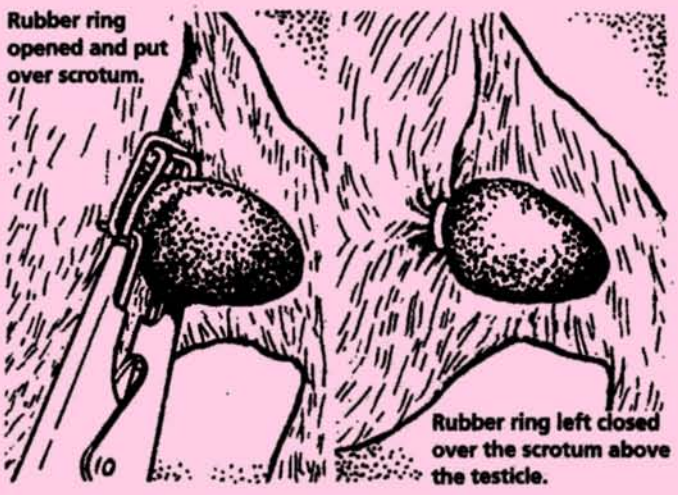
Sheep and goats This is a good way to castrate sheep and goats. Some people castrate cattle and buffaloes with rubber rings but the other methods of castration are better for them. Rubber rings are only good for very young animals up to a few days old.

- Hold the animal still (p. 18).
- Squeeze both *testicles* down to the end of the *scrotum*.
- Put the rubber ring over the scrotum with the special tool. Release the tool and leave the rubber ring behind. **Be careful not to get the penis inside the rubber ring.**

The scrotum should fall off after about two weeks.



Rubber ring tool for castration



Castration with a knife

This is a good way for people who are properly trained to castrate older animals.

Equipment:

Local anaesthetic with syringe and needle. (Preferable for older animals.)
Scalpel, very sharp knife or razor blade.
Clean water. (Preferably hot water with disinfectant (p. 324)).
Antiseptic or antibiotic powder.
Sterilise any equipment you use with boiling water (p. 71).

- Get help to hold the animal still (p. 14).
- Check the *scrotum to* see if there is any unusual swelling. If you find a swelling, suspect a *hernia* (p. 188) and **DO NOT CASTRATE THE ANIMAL.**
- Clean your hands and clean the skin of the scrotum. Wash the scrotum clean with soap and water or antiseptic (p. 324).
- Inject local anaesthetic (p. 348).
- Cut across the base of the scrotum on one side.
- Squeeze the *testicle* out through the cut.
- Different methods are used to remove the testicles. See under the animals listed below.
- Leave the wounds open and put antiseptic or antibiotic powder on them.
- After you have castrated an animal check that there is no bleeding from the scrotum after an hour or so and then daily for a few days. Do not worry about a few drops of blood but if there is a lot of bleeding try to stop it (p. 66). The wounds should stay open for a few days to let any pus or liquid come out. If the wounds seal up and there is much swelling, re-open them to allow drainage. If the wounds are infected and there is pus, clean them and wash them out as you would an abscess (p. 186).

Sheep and goats Pull steadily on the testicle until the cord breaks. Then do the same with the other testicle.

Cattle and buffaloes Pull firmly on the testicle and twist at the same time. Do this until the cord breaks. (Often 10 or more twists are needed.) You can help make the cord break by scraping with the knife.

For older and larger animals skilled workers pull on the cord then clamp it and tie it with a *suture*.

Horses, mules and donkeys Castrate horses when they are two months old. People often castrate horses when they are older but get a skilled worker to do this. It is possible to castrate horses until they are 2–3 years old. Castrating animals older than that is complicated and difficult and should only be done by a very skilled worker. Mules do not reproduce but they are sometimes aggressive because of *sex hormones* so people castrate them. Castrate horses, mules or donkeys by cutting with a knife and removing the testicle. Horses get *tetanus* (p. 263) very easily.

Make two cuts through the skin of the scrotum to the testicle with a scalpel.

Squeeze the testicles out through the cuts.

Twist the spermatic cord and pull firmly to break the spermatic cord

Leave the wounds open and put antibiotic powder on them.

To prevent tetanus:

- Wash yourself and the skin around the testicles carefully and use a knife that has been sterilised (p. 71).
- Vaccinate for *tetanus* a month before castration and again on the day of castration.
- Give an antibiotic injection on the day of castration (p. 328).

To castrate a horse:

- Hold the horse securely – skilled workers can give an injection to calm the animal. Make the horse lie down and tie the legs securely. (Some people do castration with the horse standing up.)
- Give a local anaesthetic (p. 348). Inject about 10 ml of anaesthetic on each side of the *scrotum*. Put it in a line just under the skin of the scrotum where you want to make the cuts.
- Inject about 10 ml of local anaesthetic through the skin into the cord as far away from the *testicle* as you can on each side.
- Make a cut each side where you put the local anaesthetic. Cut through to the testicles but not into the shiny white skin that covers them.
- Free the testicles from the scrotum until they are outside but still with the shiny white skin around them. Cut through the shiny skin of one testicle and pull gently on the testicle to free it.
- Tie the whole cord, including the shiny white covering, with absorbable (catgut) stitching material. Tie the cord two or three times to make sure it does not bleed. Cut through the cord. Do this with a red hot iron, or squeeze the cord with a clamp. Then cut it with a knife.
- Do the same with the other testicle

Camels Castrate working camels after they are four years old. It needs a skilled worker to do this. Skilled workers often give camels an injection to calm them before they castrate them.

- Make the camel lie down and roll him onto his right side. Protect the right eye. Secure all his legs with rope.
- Inject 20 ml of local anaesthetic into the cord and testicle on each side of the scrotum as you do for horses (above).
- Cut close to the line between the two testicles and pull out the testicle.
- Crush the cord. Tie the cord with absorbable – catgut – stitching material.
- Cut through to the other testicle through the same hole and remove it in the same way.
- Untie the animal's back legs first, roll the camel onto its chest to let it get up. Many people pray when they castrate camels and believe this helps the animal to recover.

Pigs Castrate pigs when they are 2–3 weeks old. One person should hold the pig securely with its head down by gripping the pig between the knees. Pigs often have *hernias* (p. 188) in the scrotum.

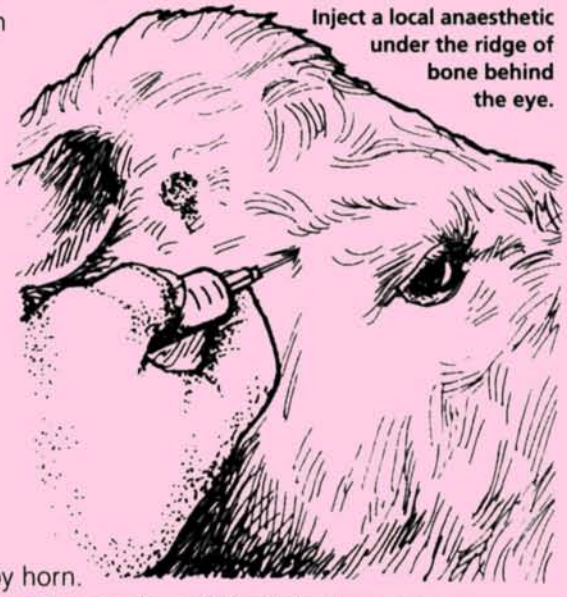
- Squeeze one testicle against the skin and cut through the skin of the scrotum into the testicle.
- Squeeze the testicle out through the cut and pull on it firmly but slowly until the cord breaks.
- Do the same with the other testicle.
- With older pigs, tie the cord off with absorbable – catgut – stitching material as you would for horses.

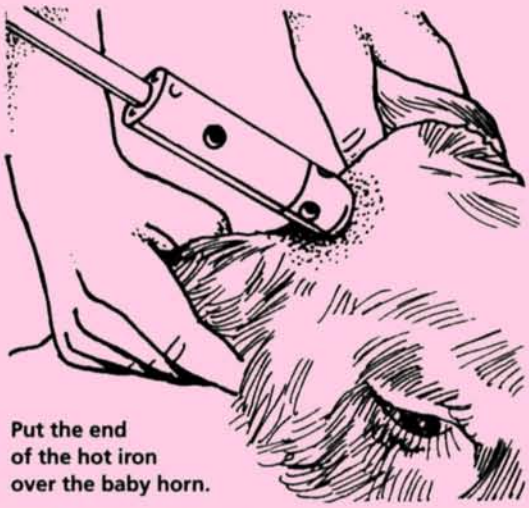
How to remove horns

People remove the horns of animals that live close together to stop them damaging other animals. Animals with no horns also need less space at a feeding bowl.

How to remove horns from young animals

- Remove the small developing horn when the animal is about one week old.
- Use a hot iron with a hollow end that fits over the baby horn. You can heat the iron in a fire but some modern irons are heated by gas.
- If the animal is much more than a week old give the animal a local anaesthetic (p. 348). Inject the anaesthetic about 1–2 cm deep under the ridge of bone just behind the eye. Pull back on the syringe first to check the needle is not in a *vein* (p. 40).
- Make the iron hot enough to easily burn a black ring on a piece of wood.
- Get someone to help you by holding the animal still.
- Put the end of the hot iron over the baby horn.
- Move the iron round and round for about 15 seconds until the baby horn is loose.
- Scrape the baby horn out completely.



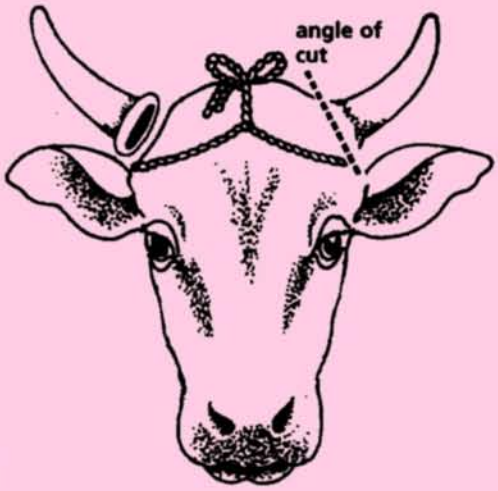


- The heat should seal the wound and stop any bleeding. If there is any bleeding put the iron on again for a few seconds.
- Put on a wound dressing that kills fly eggs (p. 326).

How to cut horns off adult animals

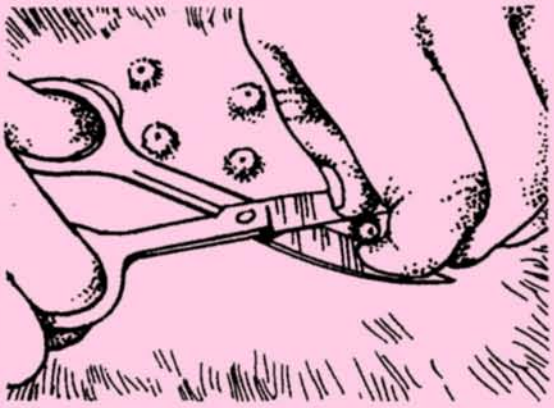
- Tie the animal up securely.
- Inject local anaesthetic (about 10 ml altogether) under the skin around the horn.

- Tie a piece of thin rope round the base of the two horns to stop bleeding and cut the horn near the skin with a saw. To help stop bleeding after you take the horn off, burn the cut surface with a hot iron.
- Put on a wound dressing that kills fly eggs (p. 326).
- Release the rope after a day or two if it has not fallen off.



How to remove extra teats

Sometimes female animals are born with more teats than normal. Check for this when the new-born animal is a day or two old. Extra teats can get in the way of milking when the animal grows up, and they sometimes get infection. It is useful to remove them. **Be sure you know which is an extra teat** – it is usually smaller and not in line with the others. When the animal is about a week old, pull on the extra teat and cut it off with a sharp knife (or scissors). Put a wound dressing on the cut (p. 324).



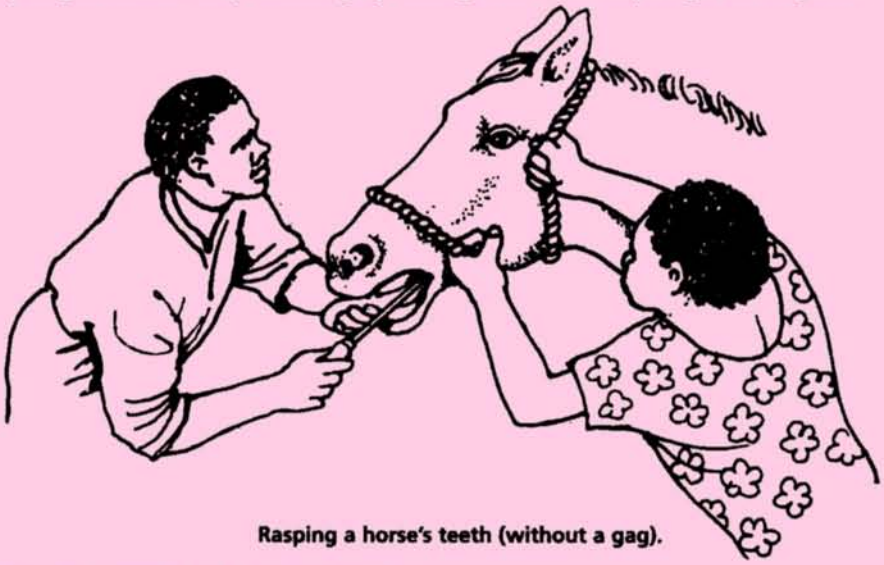
Blocked teats

If an animal has milk but the milk will not come out through a teat, you can put a special small tube made of plastic or metal into the end of the teat. This will let the milk come out. Clean the end of the teat and the tube with antiseptic or alcohol. Push the tube into the teat. When the milk has drained out or the udder is recovering pull the tube out. Some people leave the tube in for a few days. Put antibiotics in through the tube if there is an infection in the udder.

Care of the teeth

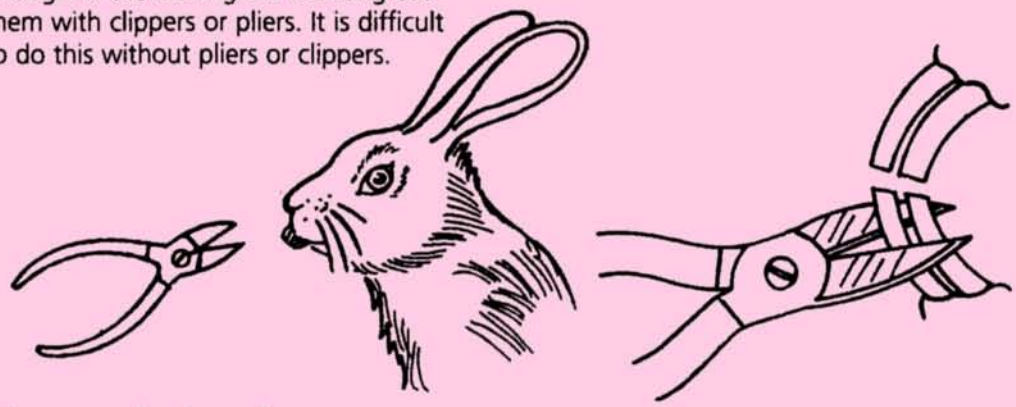
Horses, mules and donkeys When these animals eat they grind their teeth down. Sometimes the back teeth have sharp edges on them. These make it difficult for the animal to eat normally. You can grind these sharp edges down with a rasp. It is difficult to do this without a rasp.

- Open the mouth and have it held open, preferably with a gag (p. 24).
- Put your hand in to feel the sharp edges and guide a rasp over the teeth and file the sharp edges down. Keep checking by feeling until the sharp edges have gone.



Rasping a horse's teeth (without a gag).

Rabbits The rabbit has four front teeth on the upper jaw and two on the lower jaw. The teeth grow all the time. The rabbit usually wears them down as it eats. Sometimes the teeth do not wear down enough. If the teeth grow too long cut them with clippers or pliers. It is difficult to do this without pliers or clippers.

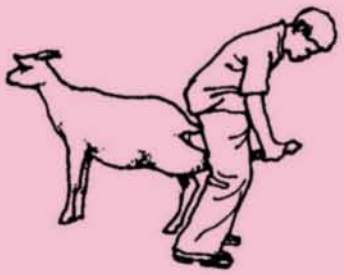


Care of the feet

Animals' hooves grow all the time but they are worn down by the ground. When the ground is soft, hooves do not wear down as fast as they grow so they become too long. To avoid this it helps to make animals walk on hard, dry ground sometimes. If the hooves become much too long the animal cannot walk properly and the foot easily gets infected.

How to trim feet

- Hold the animal so you can lift the foot up (p. 14).
- Use a sharp knife to cut off small pieces of hoof until the hoof is a normal shape.



- It is the edges of the hoof that need cutting most. Do not cut too deep, especially over the soft middle part of the foot.
- If the foot bleeds, stop cutting and put antiseptic (p. 324) on the foot.
- If the foot smells or is hot and painful, it is probably infected or has an *abscess* (p. 252).

Cattle and buffaloes
Hooves that have grown too long look like this (1). Cut them so they look like this (2).

Buffalo

Buffalo - trimmed

Sheep and goats
Hooves that have grown too long look like this (1). Cut them so they look like this (2).

Goat

Goat - trimmed

Camels A camel's foot is soft underneath and has a pad of fat inside. Keep the toes cut so they are level with the pad. Clean up wounds under the foot and put antiseptic on them (p. 324).

Horses, mules and donkeys *The middle of the foot should be above the ground* when the outside edges are flat on the ground.

When animals often walk on hard ground the hoof wears away faster than it grows so it helps to put a metal shoe on the foot to protect it. You need skilled help to make good shoes and to put them on. Take shoes off, cut the hoof down and put them back on every six weeks.

Cracked hoofs
If the hoof dries out and cracks, make a cut across the end of the crack to stop it becoming longer.

If the crack is deep, wash it with salt water and put antiseptic (p. 324) in it. Put oil or grease on the foot to keep it moist and stop it cracking. If an animal has shoes, make sure they fit and are changed often enough.

Rabbits and dogs Cut the nails with clippers or pliers to keep them short. Do not cut too close or they will bleed.

WARNING

Burning on the skin is NOT a good way to treat infectious diseases or *worms*. It will not help the animal to recover. It distresses animals. There are better treatments and more useful things to do to help recovery (p. 140).

Burning and branding

People burn marks onto animals with hot irons for many different reasons.

- Burning is a useful way to stop a wound bleeding (p. 68).
- It is a good way to stop young animals' horns from growing (p. 83).

How to kill animals to eat

People often have religious rules about how they kill animals for food. In many places only specially trained people are allowed to kill animals. **Respect the traditions of others.**

- When you kill an animal for meat, cut across the neck so that you cut through the large blood vessels and the blood drains out. Hang the animal up to make it easier for the blood to drain out.
- Keep the place where you kill animals for meat separate from where you keep animals. Put a fence around it to keep people, dogs and other animals away.
- Keep flies off the meat.
- Wash your hands before and after you cut animals up for meat.

Where to cut at the neck to kill an animal

Section 5 How to prevent and control disease

11 Infection

Animals have infection when they have *microbes* or *parasites* that cause disease inside their body or on their skin.

Microbes and parasites

Many diseases are caused by very small *microbes*, for example, *bacteria* or *viruses* that are too small to see. Some microbes are very strong and often cause disease even when there are few of them, for example, *rabies* (p. 260). Weaker microbes only cause disease when there are many of them, as when animals are kept in a dirty place where microbes can breed.

Some *parasites* are tiny but many are large enough to see. Some live inside an animal's body, for example, *worms* (p. 218) and some live on the skin, for example, *ticks* (p. 156).

Parasites take their food from animals and cause harm.

Strong, healthy, well fed animals can fight off many microbes or parasites.

How does infection spread?

These are the ways that infection usually spreads from sick animals to healthy ones:

By touching other animals

On contaminated things

Some diseases, especially skin diseases, e.g., *ringworm* (p. 180), spread when animals touch things such as bedding, feed bowls, or ropes *contaminated* by infected animals.

Infected animals contaminate things by touching them or leaving faeces, urine or *discharges* on them.

By people
People spread infection on their clothes or their hands and feet, and on dirty injection needles.

Through the air
Animals get infected when they breathe in air with microbes in it. Some microbes, for example, *foot and mouth disease viruses* (p. 279), can be carried hundreds of kilometres in the air.

From the mother before an animal is born
Baby animals can get some diseases before they are born if their mothers are infected. They get the infection through the *uterus* or from the *vagina* while they are being born.

In food and water
Discharges, urine or faeces from infected animals often contaminate food or water that other animals eat or drink.

On pasture
Pasture gets infected with *worm* eggs and *larvae* by the faeces of animals with worms. Animals get infected when they eat worm larvae or eggs with the plants they graze.

By insects
Flies (p. 158), *ticks* (p. 156) and other insects carry infection from infected animals to healthy animals.

Wounds
Animals get some diseases from infection that gets into a wound, for example, *black-quarter* (p. 144), *rabies* (p. 260).

At mating
Some diseases only spread when animals mate, for example, *dourine* (p. 297).

Carrier animals

Some animals that look healthy are infected with microbes or parasites. These animals are called carrier animals because they carry infection in their body and can spread it to other animals. They can stay infected for a very long time. They are often animals that have had a disease and recovered.

Immunity

Immunity is an animal's ability to fight off infection. When animals are infected with microbes they produce special chemicals in the blood called *antibodies* that kill these microbes. (Antibodies are made by the *white blood cells*.) Animals that have become immune to a disease are ready to fight off infection with that disease if it happens again.

Animals become immune to a disease when:

- They are infected with microbes and suffer disease. Or when they are infected with microbes but fight them off and do not suffer disease.

- They are *vaccinated* for a disease (p. 353).

This kind of immunity is called *active* immunity because the animals produce their own antibodies. It lasts a long time, sometimes even for the animal's life.

Animals also become immune to a disease when:

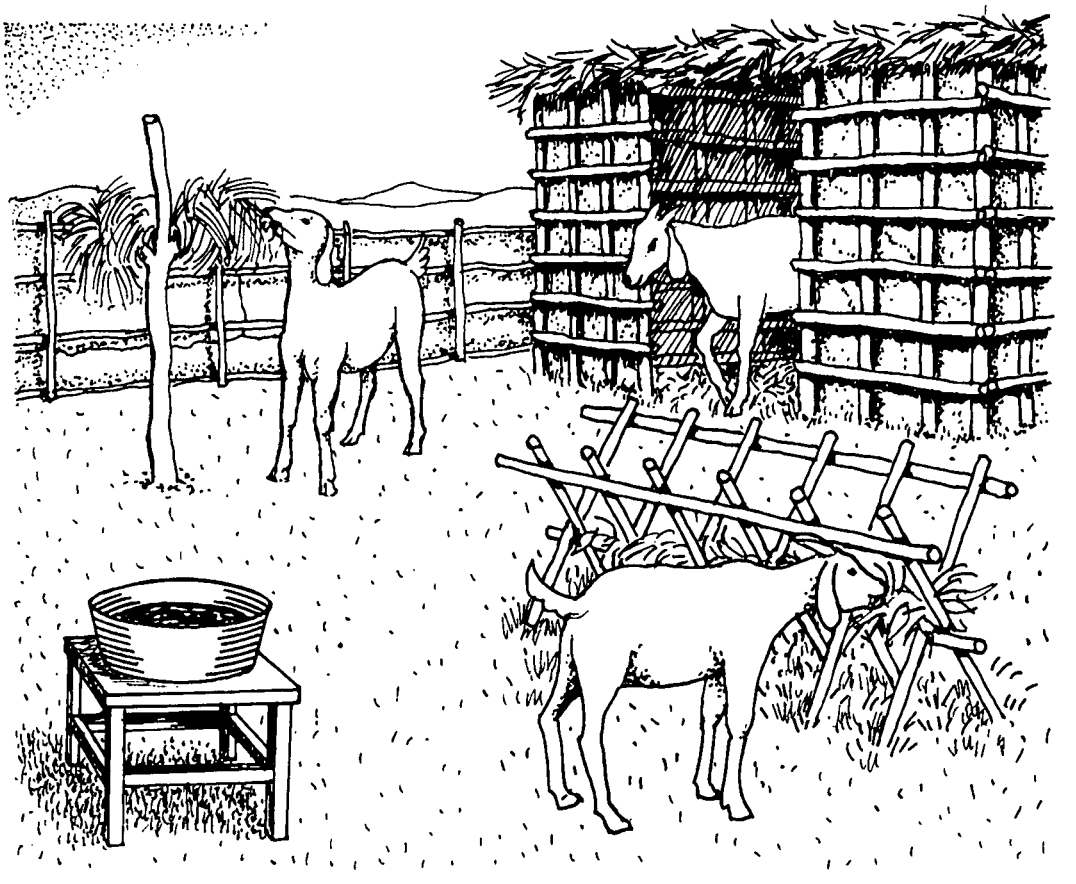
- They get some immunity from their mother through the *uterus* before they are born.
- They drink the first milk (*colostrum*) that comes from their mother (p. 62). Colostrum has antibodies from the mother in it.

This kind of immunity is called *passive* immunity because the animals do not produce their own antibodies. It does not last long – no more than six months and often only a few weeks.

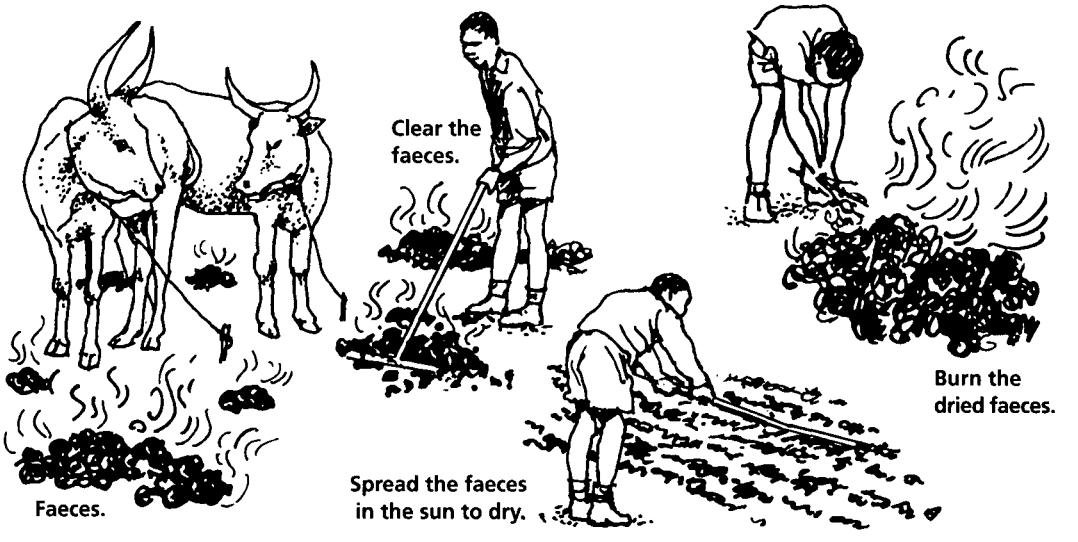
How to prevent infection

It is usually best to **prevent** disease so that animals do not become sick and unproductive. But some animals will always become sick and need treatment. If a disease is difficult or expensive to prevent it may be better to wait for the disease to happen and then treat it, especially if it does not happen often or is not very serious. **The most important way to prevent animals from getting disease is to feed them properly and give them plenty of water to drink.**

- Give animals clean food. Put food or water bowls high up so that the animals cannot drop faeces in them.



- Keep animals in clean dry places. Microbes and parasites like wet, dirty places. When many animals are kept close together in one place it is especially important to keep them clean. Clean out houses where animals live, frequently. Remove the dirty bedding. Wash the walls and floor well; use soap and water or disinfectant (p. 324) if possible. Put gates and equipment out in the hot sun. Make sure water can drain away from houses and enclosures.
- Remove faeces from animal enclosures often. These people in Sudan tie their animals up in the same place every night but they clean away the faeces every day. They spread the faeces out in the sun to dry and they burn them.



- Avoid keeping animals too crowded together. Too many animals in one group always leads to disease. Animals have social rules and behaviour like people do. If you take too many animals away from a group or add too many to it all at once the balance of a group of animals changes. Disease and other problems often follow soon after changes like this.
- Move enclosures and temporary houses often to avoid a build up of infection and parasites.
- Move animals away from pasture they have used for a long time and let the pasture rest for a few weeks. The hot sun soon kills worm eggs. Put young animals on clean ground where other animals have not been for a long time.
- Use medicines for infections and worm medicines properly (p. 311).
- Vaccinate animals for the important diseases in your area.
- Be careful with the bodies of dead animals because disease can come from them. Bury or burn the body of an animal that dies of a very infectious disease.
- Do not mix your animals with others that you know are not healthy (see page 109). But mixing your healthy animals with other healthy animals can be useful to help them to get immunity.
  Example: In Kenya, when there is little grazing near home, people often go to look for more distant pasture. They check the pasture and look to see if the animals in the places they visit have disease. If the animals there are sick they do not take their own animals to this pasture.
  Example: These people in Somalia (p. 92) are fetching water in pans from a well to stop their animals getting disease from other animals that drink at the well.
- Work together with others and with control programmes (p. 93) to prevent disease.

Women fetch the water in Somalia.

How to avoid stress

Stress reduces an animal's strength and its ability to fight off infection. Animals are stressed by things like:

- Having an injury.
- Having a disease.
- Giving birth.
- Being poorly fed or not having enough water to drink.
- Being kept crowded in unsuitable houses.
- Being caught and handled by people or moved a long distance.
- Being moved to a different place and mixed with a different group.
- Being vaccinated or given medicines.

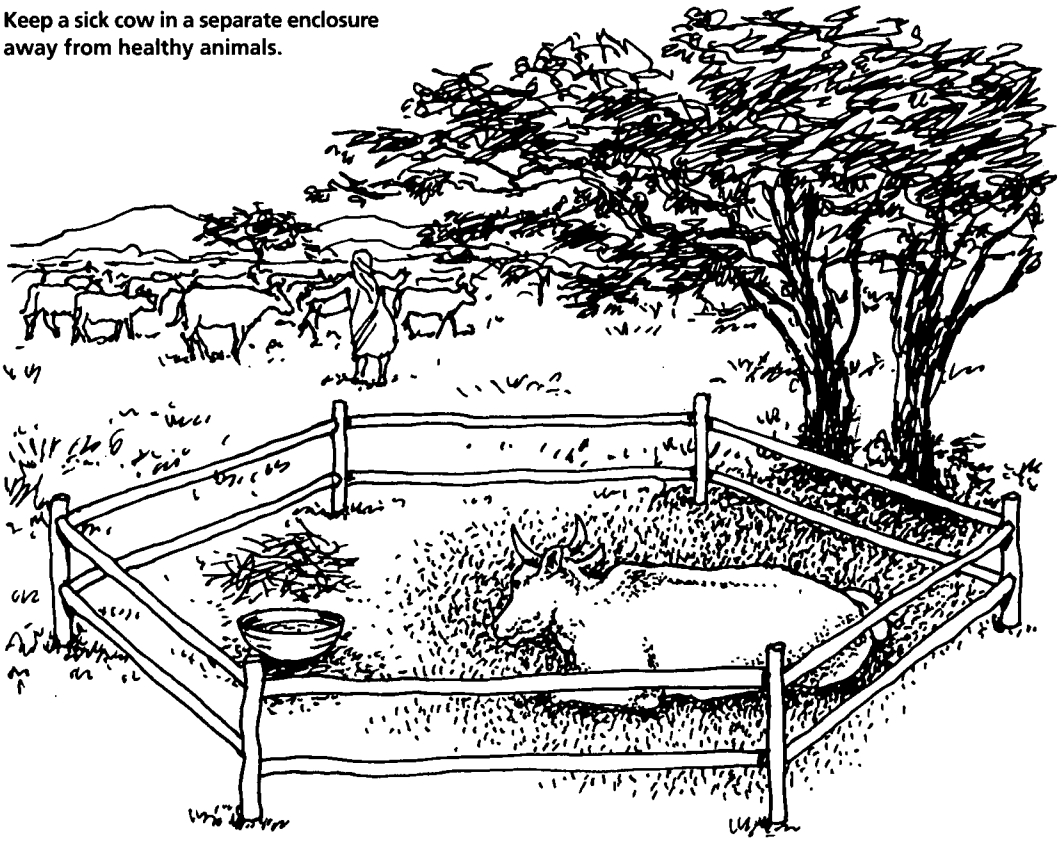
Animals get infection and suffer much more from diseases when they are stressed. **Avoid stressing animals, if possible, to keep them healthy**. Recognise when animals are stressed and reduce any stress they suffer if you can.

How to control infection when animals are sick

- Watch animals carefully and treat sick animals as soon as possible. If more than one or two animals become sick, treat other animals in the same group even if they look healthy. This way you can save the life of many animals and stop disease spreading to others.
- Separate sick animals from healthy ones quickly. Keep them on their own at least 50–100 metres away from healthy animals. Diseases are spread a long way by flies or through the air.

  It is best to move the healthy animals to a clean place away from sick animals. Moving sick animals away is not so good. They may leave infection behind them. The healthy animals will be in a place that is still infected and may get disease.
- Keep a sick animal outside an enclosure that has other animals in it at night, even if the animal grazes with the others in the day time. Animals that are grazing are not so close together as they are at night in an enclosure. So disease does not spread so easily between them when they are grazing.
- Avoid letting people who work with sick animals mix with healthy animals. They can bring infection with them.
- Control flies near sick animals if possible (p. 103) to stop them spreading disease.
- Do not bring in new healthy animals until a disease problem has stopped.

Keep a sick cow in a separate enclosure away from healthy animals.



- Do not move sick animals over long distances, they will infect healthy animals they pass on the way.

Disease control programmes

Some diseases threaten so many animals and people that governments have programmes to control them or to get rid of them. **Work together with others to help these programmes**. When animals in your area are not sick it is tempting not to help. But unless all the people in your area work together, the disease will not be controlled and your animals can get disease another time.

These are some ways that programmes try to control disease:

- They advise people to take precautions, such as isolating sick animals, destroying bodies of dead animals or boiling milk from sick animals before people drink it.
- They try to control the movement of animals to stop infected animals spreading disease and to stop healthy animals moving to a place where there is already disease.
- They *vaccinate* animals to protect them against the disease. So they do not become sick and spread it to other animals.
- They kill infected animals. Good governments, who ask animal keepers to kill animals as part of control programmes like this, give the animal keepers money to *compensate* them. Programmes that ask animal keepers to kill animals with no compensation do not often work.
- They do tests to find out if animals have been vaccinated properly or if they carry infection. They need to take samples – often blood samples – to do these tests. These tests are important to make sure that control programmes work.

12 How to control parasites inside the body

Roundworms and *flukes* often make animals sick but you do not see them in an animal's faeces. Only the eggs come out in the faeces and they are too small to see. *Tapeworms* (p. 101) do not often make animals sick even though you can see them in an animal's faeces. **It is the worms you cannot see that usually cause disease.**

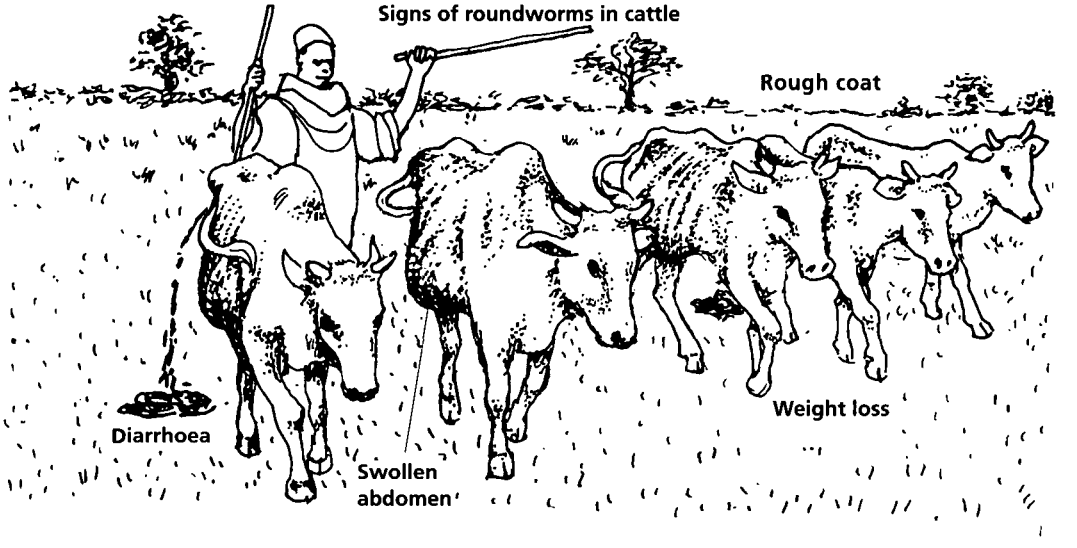
Skilled workers can check animals' faeces with a microscope for most worms. They do not need to check faeces of all the animals in an area. If they find worm eggs from a few sick animals, it is likely that other animals in the same area have the same worms. Get skilled help from someone who knows about the *parasites* in your area (at least occasionally) to help control worms or flukes and to plan the most effective time to use worm medicines. **Work with others to include all the animals in your area to make a programme to control worms or flukes.**

How to control roundworms

In most places worms (roundworms) make animals sick more often than anything else does.

Most worms make animals thin and stop them growing. They often cause *diarrhoea* (p. 211). Animals usually get worms from the pasture they graze. This is often because pasture is not looked after well and there are many worm eggs and *larvae* on it. For details about worms that cause problems like these see: *worms* (p. 218), *ascaris worms* (p. 220).

Some kinds of worms cause other problems, for example, *earworm* (p. 153), *eyeworm* (p. 150), *heartworm* (p. 199), *hookworm* (p. 221), *hump sore* (p. 174), *lungworm* (p. 200), *whipworm* (p. 221), *worm nodules* (p. 185).



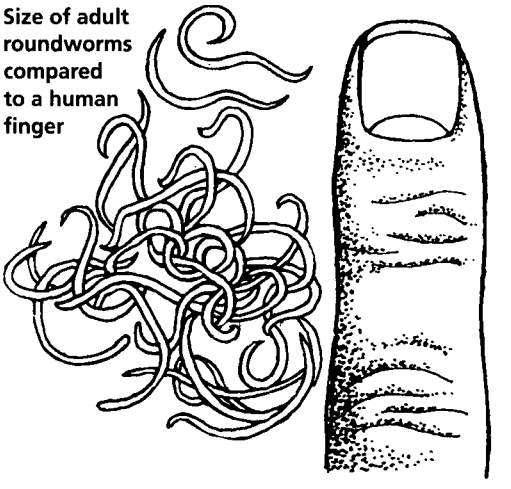
How do worms live?

Many types of roundworms cause disease but most of them live in a similar way. The worms that make animals sick most often are called *Haemonchus*. Learning how worms live helps you to understand how to control them.

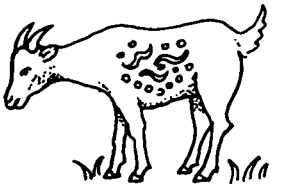
It is usually adult worms that make animals sick. Most adult worms are thin and white or red/brown. You can usually just see them in the stomach or intestine of a dead animal. They produce eggs that come out in an animal's faeces about three weeks after an animal was infected. (One worm can produce up to 15,000 eggs every day.)

Worm eggs develop into larvae in the faeces on the ground. The worm larvae move out of faeces onto the leaves of plants after about four weeks. The larvae move up to the top of plants when it is wet and down to the ground when it is dry.

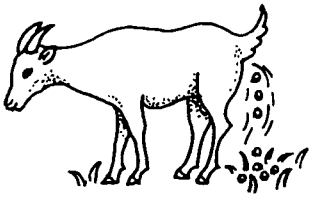
Animals get infected with worms from pastures with worm larvae on them. They get infected more easily when the pasture is wet. Worm larvae develop into adult worms in an animal's stomach or intestine. The larvae usually develop quickly into adults. Then animals become sick soon after they graze pasture with worm larvae on it. But in cold or dry times some worm larvae take a long time to develop. They do not become adults that make the animal sick until conditions are warmer or wetter. When this happens animals only become sick after the cold or dry time is over.



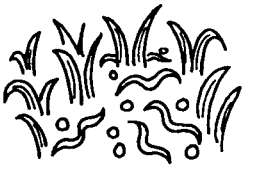
Size of adult roundworms compared to a human finger



Adult worms in the stomach or intestine produce eggs.

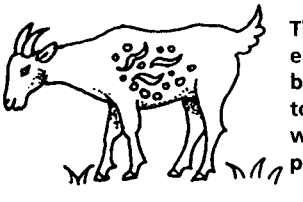


Eggs drop to the ground in faeces.



Eggs hatch in the grass and larvae come out, grow and change.

Animals eat the larvae with the grass.



The larvae enter the body, change to adult worms and produce eggs.

How to reduce problems caused by roundworms

1 Feed animals properly

Animals that are properly fed can fight off many worms.

2 Manage pasture to reduce the number of worm larvae on it

- Do not keep too many animals on a small area for a long time. Pasture quickly gets large numbers of worm larvae on it when animals with worms graze on it. Then the pasture becomes dangerous and other animals easily get worms from it.

- If you keep many animals in a small area, keep young animals separate from older animals. Put forage into troughs to stop animals grazing the pasture that has probably got many worm eggs on it.
- Cut long grass. Then sunlight will kill many worm eggs in faeces on the ground. Use the grass you cut as forage. Worm eggs and larvae are near the ground so the forage will not have many worm eggs or larvae in it.
- Put young animals onto pasture before adults. Adult animals with worms may not look sick but their faeces may have many worm eggs in them. They quickly make a pasture dangerous for other animals, especially in wet seasons.

Safe pasture

To reduce the number of worm eggs and larvae on a pasture so that it is safe for animals to graze:

- Do not put animals on the pasture for 10 weeks when it is dry. Most worms on the pasture will die and it will be safe to graze again.
- Pastures that have had forage or other crops cut from them have few worm larvae on them. They are safe to graze.

How to use safe pasture

- Separate young animals from adults at the beginning of a wet season.
- Treat the young animals with worm medicine and put them on the safe pasture. Treat all the animals that will use the same pasture. Otherwise animals you do not treat will leave worm eggs on the pasture. They will soon infect the animals you have treated.

Grazing different animals together

When you graze different kinds of animals together they do not get worms from each other. Sheep and goats get the same types of worms. But the worms that cattle or horses get are usually different. Worms from one kind of animal usually cannot live in another kind. When one kind of animal grazes a pasture it eats worm eggs and larvae from other kinds of animals without becoming sick. This cleans the pasture of many worm eggs and larvae that would make the other kinds of animals sick.

It is a good idea to graze a pasture with one kind of animal for about two months, then graze it with another kind. For example, a pasture that has been grazed by sheep and goats is safe for cattle or horses to graze. The pasture may have many sheep and goat worm eggs on it. But the sheep and goats will have eaten many cattle worms or horse worms and cleaned the pasture for these animals.

3 Use worm medicines to control worms

Always treat the whole of a group of animals that graze in the same place at the same time. **Do not just treat one or two animals in a group**. But you do not need to treat all the groups of animals that graze in different places. It is cheaper to treat only the groups of animals that most need treatment.

The most important groups of animals to treat are:

- Young, growing animals.
- Animals which are being specially fattened for meat.
- Pregnant sheep and goats. This will stop them giving worms to their young.

If you are starting a programme to control worms you will need to treat all the young grazing animals.

When to give worm medicine

- Give worm medicine to young animals at the beginning of a wet season. Treat sheep and goats under two years old and cattle under three years old (adult cattle do not usually need treating with worm medicine). This will stop them from getting sick. It will stop worm eggs coming out in their faeces onto the pasture.
- Treat them again at the end of a wet season. This will reduce the number of worm larvae inside the animal in the dry season that follows. In a dry season animals may have little to eat. They can suffer badly from worms if they are infected with many worm larvae.
- In places where it is wet for much of the year and there are many worms, you may need to treat animals several times.
- Treat any new animals that come to join a group as soon as they arrive.
- Some people give their animals salt (p. 231) to eat or take their animals to salty pastures at least once a year to help reduce the number of worms. This is not as effective as using modern worm medicines properly.

Resistance to worm medicines

In cool, wet places where people have used many worm medicines for a long time, worms have become *resistant* to some medicines. These medicines do not work any more in these places. In most dry places this is not a problem. You need skilled help to decide if worms in your area have become resistant. Skilled workers can test to see if worms have become resistant but the tests are complicated.

Avoid making worms become resistant to medicines even if it is not a problem in your area yet:

- Use worm medicine as few times as possible. Try to use worm medicine less than three times a year.
- Give the correct dose of worm medicines (pp. 313, 336). Check that dosing guns give the right amount.
- Do not bring animals from an area with resistant worms. They will bring resistant worms with them.
- Change the type of worm medicine you use each year.

When a worm medicine does not seem to work it is rarely because worms are resistant to it. It is more likely that:

- The animals have been given too low a dose.
- The pasture has many young worms on it and animals get infected again soon after they have been treated.
- The problem is caused by a parasite, e.g. *liver flukes*, or by something else, such as infection with *microbes*, that the worm medicine does not treat.

When worm medicines do not seem to work any longer, get a skilled worker to check the faeces again.

Different animals and worms

Goats Goats normally eat bushes and plants above ground level where there are no worm larvae. But, especially in wet places, they eat grass and plants near the ground and get infected with worms. They get severe disease. Goats get the same kind of worms as sheep do. Treat them with the same medicines.

Camels Camels usually do not suffer much from worms because they live in dry places where there are not many worm larvae on the pasture.

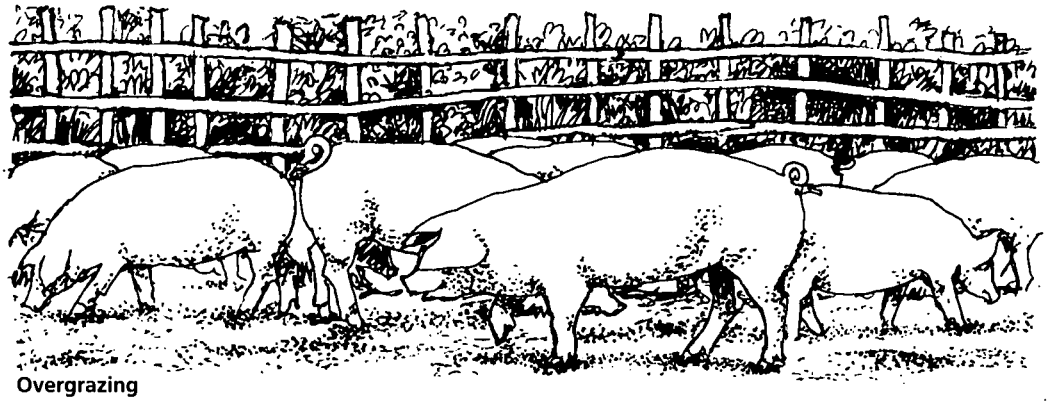
Horses, mules and donkeys To treat these animals take the steps shown below:

- If animals live on the same pasture all the time or live in buildings, remove the faeces every day and make a pile of them (p. 44).
- Let other animals graze pasture after horses. Cattle, sheep and goats do not get the same worms as horses. They clean the pasture of horse worms without becoming sick.
- Give worm medicine regularly every three months (p. 336).

WARNING

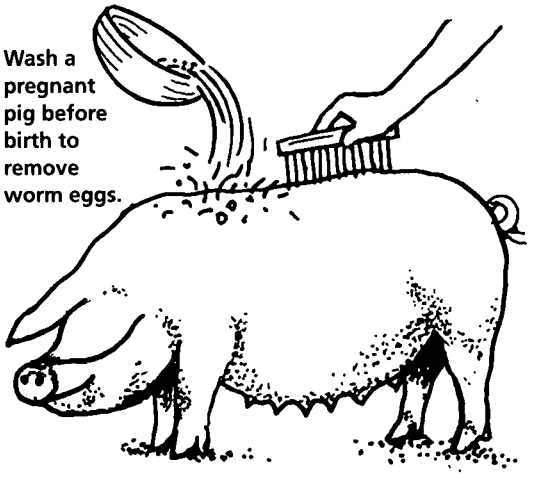
Some medicines that are good for horses are not good for mules or donkeys. Follow the medicine maker's directions carefully.

Pigs Pigs usually suffer from worms because they live on the same small area, such as a roadside, for a long time. The ground soon has many worm larvae on it.



Overgrazing

- Move pigs to a clean piece of ground every two weeks in a wet season. They can safely stay longer at dry times. Cultivate the ground where the pigs have lived. Grow a crop on it or use it for different kinds of animals before putting pigs back on to it.
- In a wet season wait about three months before you put pigs back on ground they have already used. In a dry season wait two months – worm larvae die much sooner when it is dry.
- Treat pregnant females a week before they give birth. Use a worm medicine that kills all kinds of worms (p. 336). Wash the female just before she gives birth to remove any worm eggs on her skin to stop new-born pigs getting worms.
- Clean faeces from a pen where a female gives birth, every day. Keep baby pigs and their mothers separate from other pigs.
- Give worm medicine to treat all pigs regularly for worms (p. 336)



Wash a pregnant pig before birth to remove worm eggs.

Dogs Dogs get several different kinds of worms, such as *ascaris worms* (p. 220), *hookworms* (p. 221) and *heartworms* (p. 199).

To control most of the worms that dogs get:

- Give worm medicine to pregnant dogs before they give birth.
- Give worm medicine to young dogs when they are three weeks old. Give them worm medicine again when they are six weeks, nine weeks, 12 weeks and six months old. Then give them worm medicine once every year.
- Clean away faeces from the places where dogs live all the time.

Birds Birds that are free to wander about often get worms. They get worms (like animals do) from pasture *contaminated* with worm eggs and larvae from the faeces of birds with worms. Birds also get some worms that live inside snails or insects that they eat.

- Move birds to clean ground often.
- When large numbers of birds live in the same place keep adult and young birds separate.
- Give birds clean food and water.
- Clean out their houses. When one group of birds is moved from a house clean out the faeces and *disinfect* the house before you put new birds in.

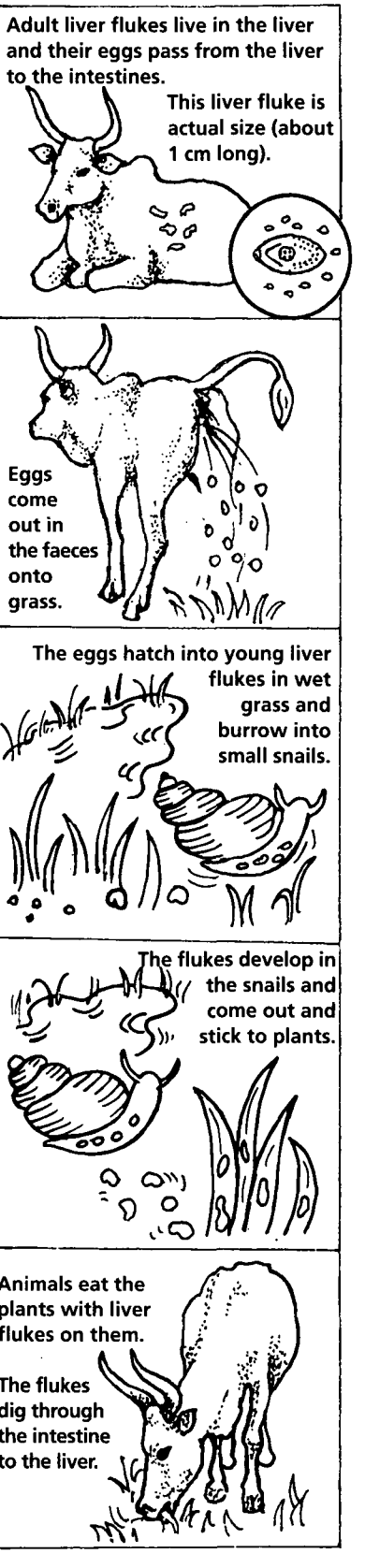
How to control liver flukes

How do liver flukes live?

Adult *liver flukes* (1–10 mm) live in an animal's liver. They each produce up to 20,000 eggs every day that go from the liver into the *intestines*. The eggs come out in an animal's faeces about two months after the animal was infected. The eggs hatch in wet places to produce young forms of liver flukes. These young liver flukes are too small to see. They burrow into small snails that live in slow moving water such as irrigation ditches. Young liver flukes develop inside the snail for about six weeks. Then they come out of the snail and stick to plants around the edge of water.

Animals get infected with young liver flukes when they graze near water and eat plants with young liver flukes on them. (Some young liver flukes can live in hay if it is not well dried.)

Young liver flukes grow in an animal's intestines. They dig through the intestine and go to the liver to develop into new adults.

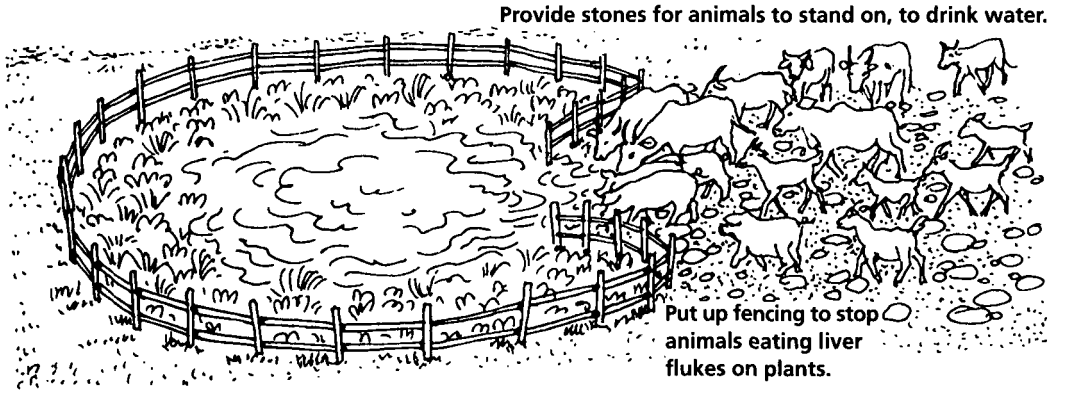


How to reduce problems caused by liver flukes

Get skilled help from someone who knows the parasite problems in your area, if you can, to plan a programme to control liver flukes. Encourage other animal keepers in your area to work together to reduce the danger from liver flukes.

1 Stop animals getting infected with young liver flukes

- Keep animals away from wet places where snails carry liver flukes. Put a fence round these places to keep animals away. Draining the wet places where snails live works but it is usually expensive.



- Clear plants away from the place where animals drink. And put stones or concrete for animals to stand on when they drink.
- Use pipes rather than open channels for irrigation water.
- Avoid grazing in places that have been flooded. Wait at least two months after they become dry before grazing these places if you can. Or wait until the grass is dry and make hay from it. If you have to graze wet places, where there are snails, put older cattle to graze there first and sheep and goats last. (Older cattle suffer less severe disease than sheep and goats.) Be ready to treat animals that become sick with worm medicines.
- Use water from bore-holes or wells or take it from fast-moving rivers rather than ponds or irrigation ditches. Put animals' drinking water in a trough or bowl.
- Use forage from trees because it does not have young liver flukes on it.
- It is difficult to kill snails that carry liver flukes with chemicals. You have to do it at least every year. It is expensive. Some people use plants, such as *Phytolacca dodecandra* to help kill snails. People plant *Eucalyptus* trees so that leaves fall into the water to kill the snails. Scientists have found many kinds of *Eucalyptus* leaves that kill snails. **Beware planting *Eucalyptus* trees in places where there is little water**, they take a lot of water out of the ground.
- People are trying to use kinds of snails they can eat but that do not carry liver flukes, to compete with snails that carry liver flukes and reduce the number of them.
- Some people keep ducks, especially in rice fields. Ducks eat what is left after the harvest and they eat snails.

2 Use worm medicine to control liver flukes

- Use worm medicine (p. 336) to kill adult liver flukes and stop pasture becoming contaminated with liver fluke eggs.
- Give worm medicine at the end of a dry season. This stops liver flukes developing and contaminating pasture when it becomes wet.

- Give worm medicine 1–2 months after you think animals have been infected with young liver flukes. Animals are most likely to get infected in wet seasons when they graze wet pasture near water.
- Places that are wet for a long time often have many liver flukes. In some wet places you have to treat animals three times a year.
- Medicines that kill young liver flukes are expensive. Plan a programme to control liver flukes using cheaper medicines, e.g. oxyclozanide, that kill adult flukes (p. 338).

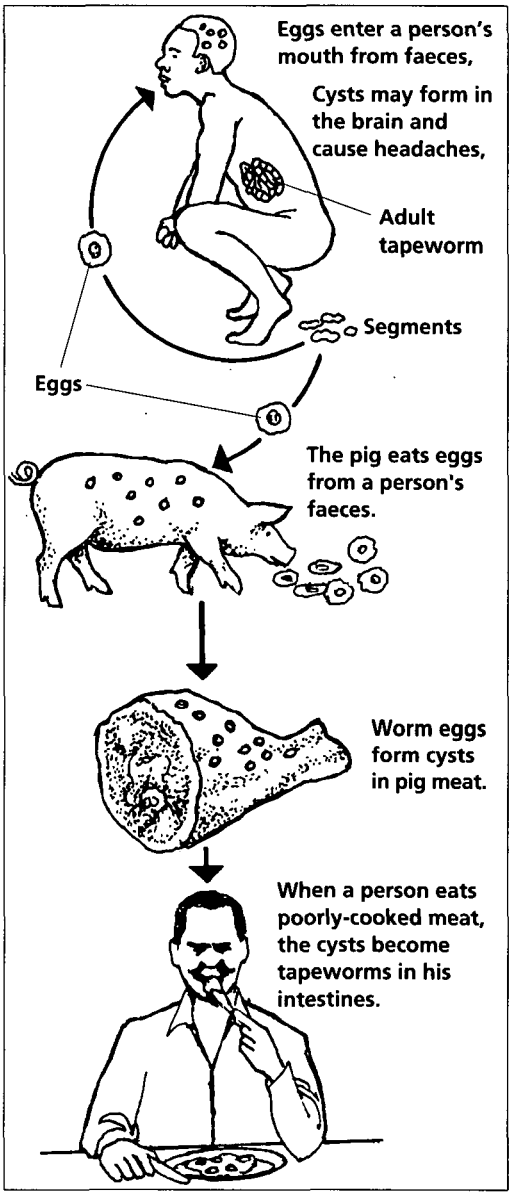
How to control tapeworms

Most adult *tapeworms* do not make animals sick even when it is easy to see them in an animal's faeces. But *tapeworm cysts* can make people sick (p. 7).

How do tapeworms live?

All tapeworms have two *hosts* (animals that they live in). Adult tapeworms are made of segments and are often long (over 5 m). They live in the *intestines* of animals and people. These animals or people with adult tapeworms inside them are called *final hosts*. Segments of the tapeworm fill up with eggs. When a segment is full of eggs it breaks off and comes out in the faeces. You can see segments of some types of tapeworm in the faeces. They look like big white/brown grains of rice. The segment breaks up on the ground and eggs come out.

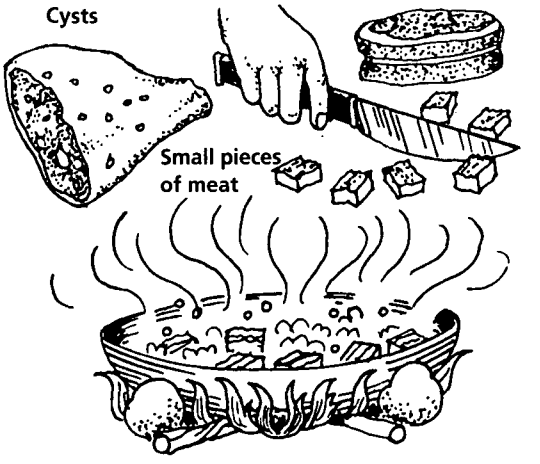
Another animal or an insect eats the tapeworm eggs. The eggs hatch in the intestines and develop into larvae that dig through the inside of the body. They stop somewhere in the body and develop into a *cyst* full of fluid with tapeworm larvae in it. This animal or insect with a tapeworm cyst in it is called an *intermediate host*. Animals or people (*final hosts*) get infected with tapeworms when they eat meat or insects with cysts in them.



Ways to control most tapeworms

- Keep dogs, pigs and other animals away from the bodies of dead animals (and dead people). Especially keep meat with tapeworm cysts in it away from dogs.
- Avoid eating meat with tapeworm cysts in it.
- Look carefully for tapeworm cysts when you kill animals for meat. Do not burst the *cysts*. This would release baby tapeworms. Bury or burn any cysts you find.

- Cook meat so that it all gets hot enough to kill tapeworm cysts. Meat that has been cooked enough to kill tapeworms is brown all the way through and no longer red/pink and bloody. Cook meat from pigs especially well. The meat needs to be very hot for several minutes to kill tapeworm cysts. It is easier to make meat hot if you cut it into small pieces.
- Cook waste food that is fed to pigs.
- Treat people with worm medicine when they have tapeworms (p. 8).
- Treat dogs for tapeworms in places with *hydatid disease* (pp. 7–8).
- Dig proper deep pit *latrines* for people to use. Encourage people, including children, to use latrines and not to leave their faeces on the ground where pigs and other animals can eat them.
- Wash your hands after handling dogs. Make especially sure children wash their hands after handling dogs and before they eat.
- Wash vegetables before you eat them.



Ways to control hydatid disease (p. 7)

In some places there are control programmes for *hydatid disease*. **Work with these programmes to save peoples lives, especially the lives of children**. As part of a control programme skilled workers check dogs' faeces with a microscope for tapeworm eggs.

- Warn people that they can get infected with tapeworm eggs by touching dogs that have tapeworms.
- Give worm medicine to dogs regularly to kill tapeworms. Some old worm medicines kill tapeworms but do not kill the eggs that come out in a dog's faeces. Use a medicine, such as praziquantel (p. 338), that kills the tapeworms and stops eggs coming out in the faeces. Mebendazole (p. 337) also works but not as well. Treat all dogs every two months in an area where this disease is a problem.

13 How to control parasites outside the body

How to control flies

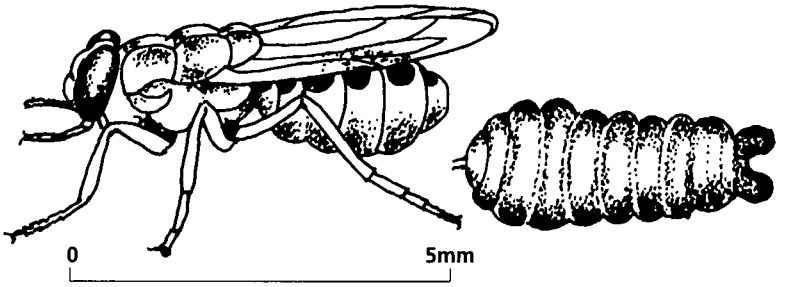
- Make sure that houses for animals are clean and dry. Clean away faeces, rotten bedding and old food.
- Treat wounds quickly.
- Be aware of when and where there are many flies. There are usually more flies in wet seasons. Flies are usually most active early in the morning and in the evening. They are less active when it is very hot in the middle of the day or very cold at night.
- Graze animals at night when there are fewer flies around. In daytime avoid shaded places where many flies live.
- Try to avoid wet, muddy places where many flies breed.
- Use ***insecticides*** to repel or kill flies (p. 339).

Many insecticides kill flies. It is more difficult to *repel* flies. It is difficult to keep enough chemical on an animal to repel flies for more than a short time. Some insecticides, especially pyrethroid insecticides (p. 344), repel flies effectively. These chemicals stay on the animal for some time and kill insects that land on the animal. Some modern insecticides come mixed into plastic collars or ear tags that slowly release insecticide and go on repelling and killing flies for some time.

How to control tsetse flies

Tsetse flies [*Glossina*] are usually dark yellow/brown, about 5–15 mm long. The wings cross over each other when the fly is not moving. Tsetse flies only live in Africa south of the Sahara, where one kind lives on open rangeland, one by rivers and another in forests.

Tsetse flies bite all kinds of animals and people and spread *trypanosomosis* (p. 295). Animals are irritated by the painful bites of tsetse flies. Each fly feeds on an animal for about a minute every 2–3 days. Male and female flies bite but usually not at night. Female tsetse flies do not lay eggs. Eggs become larvae inside female flies which lay live larvae on dry, sheltered ground. The larvae cannot live in sunlight and dig into the ground. They



Tsetse fly Larva of tsetse fly

become new adult flies after about 25 days. Female flies live for about three months and each produce 5–10 larvae.

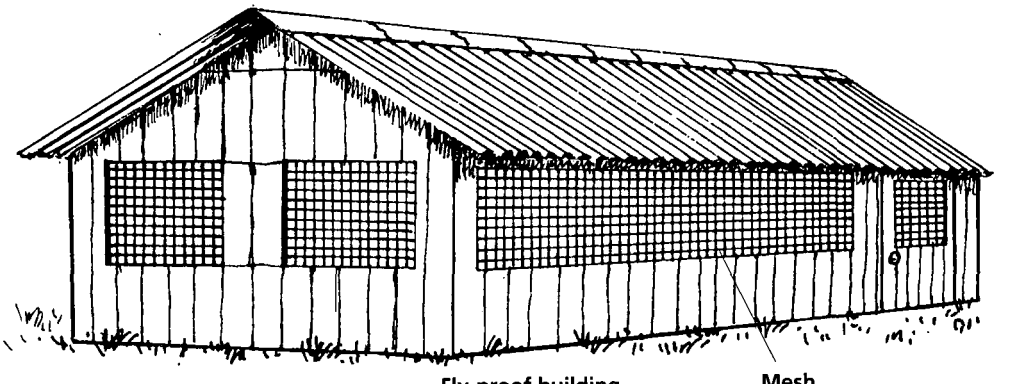
Most people now agree there are three good ways to control tsetse flies:

1 Use **traps** that attract and catch tsetse flies but **do not use insecticides**.
2 Use **traps** that attract flies and kill them **with insecticide (targets)**. These are more expensive to use because of the cost of insecticide.

   To use traps effectively, work together with skilled workers and others in your area to organise a programme. You need to use enough traps or targets – at least four every square kilometre – over a wide area to make it safe from flies. Using traps to control tsetse flies is cheaper than giving medicine to prevent *trypanosomosis* (p. 334). It is easy for people who distribute medicines to distribute these traps.
3 Use **'pour-on' insecticide** on animals. The animals attract tsetse flies and the insecticide kills them. Deltamethrin is the best insecticide for this (p. 342).

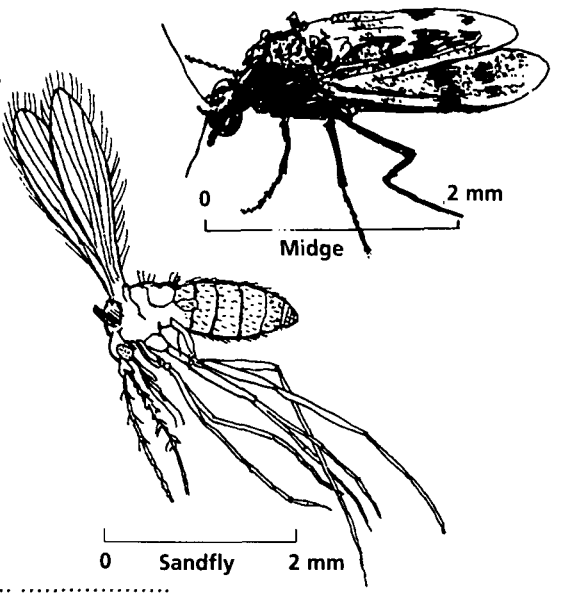
Other ways to control tsetse flies cost more or are less effective:

- **Smoke**. Some herders burn special plants to produce smoke to keep tsetse flies off their cattle. It does not always work.
- **Clearing bush.** It is almost impossible to clear enough bush to be effective.
- **Repellents.** People rub animals with different things to repel flies. They usually do not work. Tsetse flies are difficult to repel.
- **Killing wild animals.** This doesn't work because tsetse flies that were living on the wild animals all move onto the cattle. This makes the fly problem worse for an animal keeper.
- **Spraying the ground** with insecticide is costly. It needs to be done over a wide area. It may only work for a short time.
- **Releasing** *sterile* male tsetse flies (these are flies that have been treated so they are not able to breed) is too costly because it needs so many sterile flies.
- **Using natural enemies** of the tsetse fly. The 'Robber Fly' attacks tsetse flies but it does not kill many of them.
- **Fly-proof buildings** with mesh over the windows and doors, protect animals from tsetse flies. They cost a lot to build. They do not work if animals go out to graze so you always have to bring forage to the animals, who have to stay in the buildings.



There are always as many tsetse fly larvae living underground as there are adult tsetse flies. Even if you kill all the flies in an area, underground larvae survive. They soon become adult flies that come out of the ground. **You need to go on killing tsetse flies for a long time to make an area safe**.

How to control other flying insects

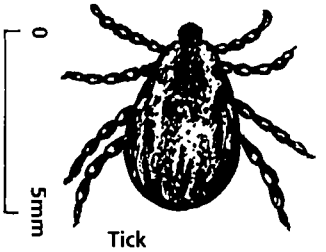


Midges [*Culicoides*] are very difficult to control. They breed in very large numbers from larvae that live in soil or plants anywhere wet and warm. Move animals to a high windy place to avoid midges.

You can repel **mosquitoes** (p. 344) with pyrethroid insecticide like you repel flies. **Sandflies** [*Phlebotomus*] live near the ground, especially near termite mounds and the holes made by small animals. Control them by spraying insecticide in these places.

How to control ticks

Adult *ticks* have eight legs. They are small and dark until they fill up with the blood they suck from an animal. After they feed they swell with blood and are easy to see – up to 1 cm across. Each tick can take about 2 ml of blood during its life and animals can have many ticks on them. One horse in Kenya had 16 kg of ticks on it.



Tick

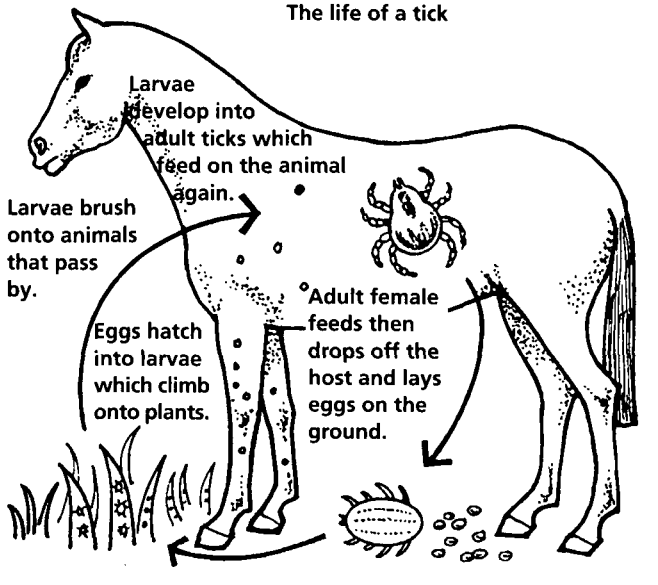
Tick full of blood

How do ticks live?

One-host ticks

Example: **Blue Cattle Tick [*Boophilus*]**

Adult ticks bite through an animal's skin and feed on its blood for several days. They mate while they live on an animal. Male ticks stay on the animal for some months after they have mated, then they die. Female ticks drop off and each lays thousands of eggs on the ground. Several weeks later the eggs become small larvae with six legs – you can just see them, they look like grains of sand. The larvae climb up plants



and are brushed on to animals that pass by. On an animal the larvae develop into *nymphs*, then into adults that feed on the animal again. Some ticks live on more than one animal:

Two-host ticks

Example: **Red-legged Tick [*Rhipicephalus*]** ....
Adult ticks feed on an animal. The female ticks drop off and lay eggs that become larvae which attach to an animal. The larvae feed on one animal and become nymphs that fall to the ground. The nymphs become adults and attach to another animal, then the females drop off and lay eggs again.

Three-host ticks

Examples: **Bont Tick [*Amblyomma*]** .... **Yellow Dog Tick [*Haemophysalis*]** .... **Bont Legged Tick [*Hyalomma*]** .... (These can also be one or two-host ticks.)
Adult ticks feed on an animal then drop off and the females lay eggs that become larvae which attach to an animal. The larvae feed on one animal and drop off to become nymphs on the ground. The nymphs attach to another animal, feed and drop off to become adults on the ground. The adults attach to a third animal and feed, then the females drop off and lay eggs.

Soft ticks

Soft ticks only feed for a short time and do not stay on an animal for long. They need to feed often and usually live close to where the animals sleep. Soft ticks do not have a hard shell on their backs like hard ticks.

Control of ticks

It is difficult to make a good programme to control ticks and needs the help of a skilled worker who knows which ticks live in your area and which diseases they carry.

How to control tick problems without killing ticks

Do not remove all the ticks from animals, especially from young animals. It is usually a good thing for animals to have some ticks on them to ensure that animals develop *immunity* to the diseases they carry. The best way to control ticks and the diseases they spread is probably **not** to kill the ticks. Try to get a balance between ticks, the diseases they carry and *resistance* that animals have to these diseases. (This balance is called *enzootic stability.*) It is a cheap and effective way of avoiding the problems caused by many diseases that ticks spread.

Animals become immune to diseases in areas where young animals get bitten by infected ticks. Although animals in these areas are infected with *microbes* that cause disease, they have developed enough resistance not to become sick. Some governments encourage people not to kill ticks to let enzootic stability build up over a wide area. But this needs many people to work together over a very large area for a long time. It is difficult for people who have been used to controlling ticks for many years to learn to stop controlling them and understand how to live with them.

If enzootic stability happens naturally there is no need to dip or spray animals to kill ticks. But this does not always happen. Ticks may cause severe problems that you need to control. There are sometimes good reasons to control ticks:

- Animals might move to an area where ticks spread an infection the animals have never had. They will have no immunity to this infection and could get severe disease from infected ticks.
- Some diseases, such as *East Coast fever* (p. 276) are severe and so easily spread that even one tick can spread them. In areas where diseases like this happen it is especially important to get skilled help because it is very dangerous to allow ticks to infect your animals.

Try to avoid importing animals from far away. Local cattle are more likely to resist ticks and the diseases they carry than imported breeds.

To reduce the number of ticks on pasture:

- Move animals away from pasture which has many ticks on it.
- Avoid pasture with many ticks on it for as long as you can.
- Cut the bushes and cultivate the land with ticks on it. Burn dry grassland.
- Keep chickens or other birds in places where there are many ticks, such as around watering places. The birds eat the ticks.
- Remove plants from around animal houses.
- Clean animal houses regularly.
- Keep clean animals away from animals with many ticks on them.
- Some people grow Neem trees [*Azadirachta indica*] near to animal houses to help to repel ticks but it does not always repel them.

Ways to kill ticks

You can control ticks almost completely with insecticides (p. 339) but that is expensive. It is also risky because if control stops for any reason the animals have no *resistance* to diseases that ticks might suddenly infect them with.

Dipping and spraying

Dipping animals in insecticide or spraying them to kill ticks works but is expensive. Dips and sprays contain large amounts of dangerous chemicals. Carefully follow the instructions for using them (p. 340).

Oily dressing

Some people use a mixture of engine oil and nicotine on ticks to kill them (p. 341).

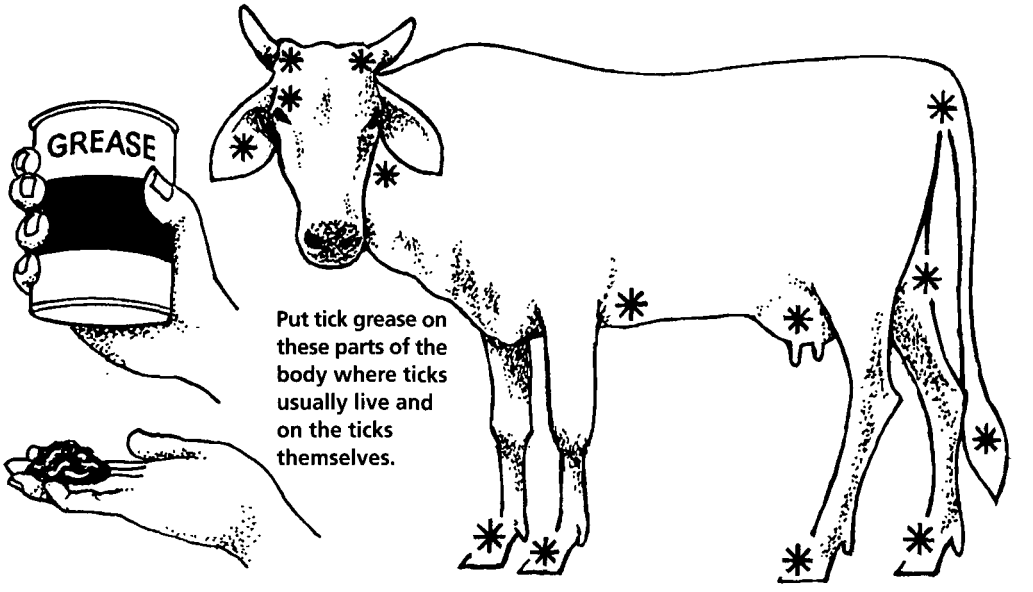
Salt

Some people who do not have chemicals for killing ticks use salt. They wash the whole animal with salt water, using a handful (50 g) of salt in each litre of water. Or they take the animals into the sea or a lake with salty water.

Tick grease

Tick grease is easy to put on by hand and works when there are not too many ticks on an animal. Put it on the parts of the body where ticks usually live and put it onto the tick itself.

In Kenya some people keep wild antelope. They get rid of ticks without handling the animals. They smear tick grease on to branches that the animals rub against. This way the animals get some tick grease on to themselves.



Remove ticks by hand

In many places people take ticks off by hand. This is a good way to reduce the number of ticks. It is easy to remove a few ticks. It is a cheap way of dealing with ticks that does not need any imported chemicals. But it is more difficult to remove many ticks that are close together. When you pull the tick off **do not leave its head and mouth-parts buried in the skin**, they may cause infection and an *abscess* (p. 186). This is important when you take ticks off the teats. An abscess can destroy the whole teat. Avoid leaving the mouth parts behind by killing ticks with insecticide before you remove them.

- When there are many ticks kill them by wiping with a cloth covered in insecticide (p. 341). When they die they will fall off. A cloth soaked in kerosene also helps make the ticks fall off.
- Look at the udder of a milking animal carefully every day and remove any ticks on the teats.
- When using chemical on the teats avoid letting baby animals suck straight away because the chemicals can poison them.

Resistance to insecticides

Insects, including ticks, can become resistant to insecticides if the same chemical is used too often or for too long. When insects have become resistant to an insecticide, that insecticide will no longer control them. In places where people have gone on using the same insecticide chemicals each year, ticks have become resistant and the chemicals do not work any more. The main ways to avoid insects becoming resistant to insecticide chemicals are:

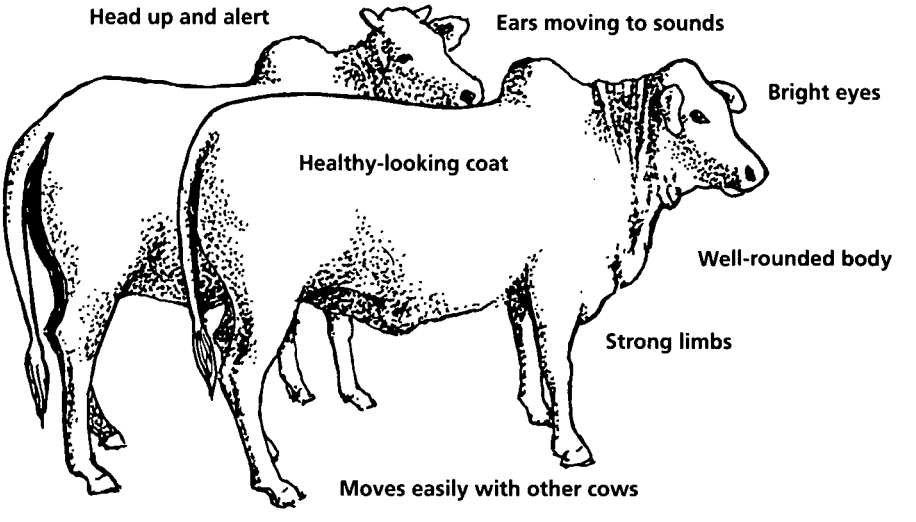
- Use insecticides as little as possible.
- Change the type of insecticide you use every other year. In one area where people have been using three types of insecticide dips and changing from one to another every two years they have avoided problems of resistance. The chemicals still work, even now after they have been used for more than twenty years.
- Use insecticides that go on acting for a long time, (persistent) chemicals, especially carefully. Get skilled advice about which insecticides are best to use and how to use them to avoid causing resistance.

Section 6 Signs of disease

14 What does a sick animal look like?

It is important to understand what a normal healthy animal looks like before you can decide what is different about a sick animal.

- Healthy animals are alert and hold their heads up. They have bright eyes and look around actively. They move their ears when they hear a sound.
- They have well-rounded bodies and strong limbs and move easily with others in a group.
- They move their ears and tail to frighten flies away.
- They have a healthy-looking coat. Healthy cattle and buffaloes lick their coats and you can often see the lick marks.

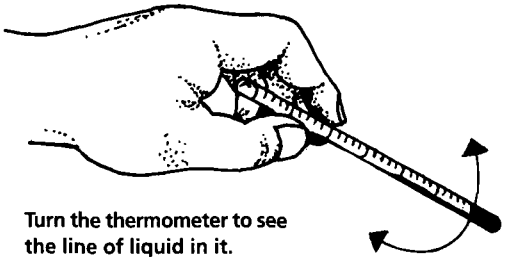


Body temperature

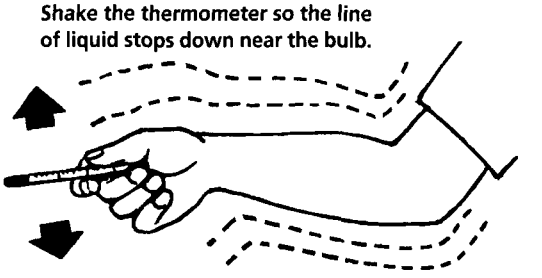
When an animal is sick it may have a body temperature higher or lower than normal (p. 110).

How to measure the body temperature of an animal

- Turn the thermometer until you can see the silver or coloured line, the place where the line stops marks the temperature.
- Hold the thermometer firmly and shake it so that the line stops down near the bulb of the thermometer.

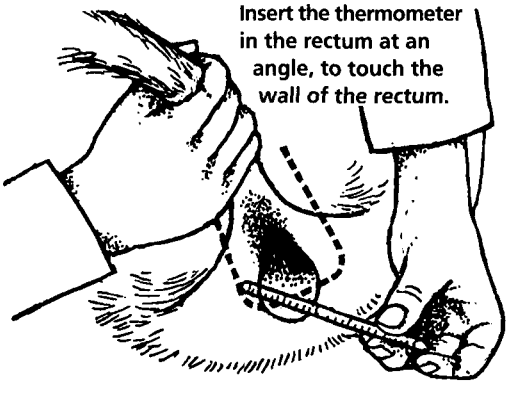


Turn the thermometer to see the line of liquid in it.



Shake the thermometer so the line of liquid stops down near the bulb.

- Get someone to hold the animal, or tie it up. Lift the animal's tail and push the thermometer into the *rectum*. It slides in more easily if a little vegetable oil is put onto the thermometer. Push it in as far as you can but do not let go of it. Keep the thermometer touching the side of the rectum for at least a minute. Do not hold it in the middle of some faeces. They are cooler than the body.
- Take the thermometer out, wipe it clean and turn it so you can see where the line stops and read the temperature.



Insert the thermometer in the rectum at an angle, to touch the wall of the rectum.

Keep the thermometer clean. **Do not leave it in the hot sun or put it in hot water or it will break**.

If you do not have a thermometer you can estimate the temperature of an animal quite well by feeling an animal's back with your hand or, especially a pig, by feeling its ear. Do the same to a few other animals that seem healthy to see if this animal feels warmer. This does not work when all the animals are hot because of the sun.

Normal body temperature

Healthy animal	Minimum		Maximum	
	°C	°F	°C	°F
Camels*	35.0	95.0	41.0	105.8
Cattle, buffaloes	37.5	99.5	39.5	103.1
Horses, mules, donkeys	37.5	99.5	39.0	102.2
Sheep	38.5	101.3	40.0	104.0
Goats	38.5	101.3	40.5	104.9
Pigs	38.0	100.4	40.5	104.9
Rabbits	38.5	101.3	39.5	103.1
Dogs	38.5	101.3	39.5	103.1
Birds	40.5	104.9	43.0	109.4

Very young animals usually have a temperature about 1°C higher than adults.

* A camel's temperature is much higher in the afternoon and evening. A camel has a fever if the temperature is over 37°C at sunrise or over 39°C at sunset. In the middle of the day healthy camels can have a temperature over 41°C.

Many thermometers have both °F (Fahrenheit) and °C (Centigrade or Celsius) scales on them (p. 10). In this book temperatures are all measured in °C (Centigrade or Celsius).

To convert Centigrade to Fahrenheit:
Multiply the temperature in Centigrade by 9 then divide by 5 and add 32.
Example: 38°C × 9/5 + 32 = 100.4°F

To convert Fahrenheit to Centigrade:
Take 32 from the temperature in Fahrenheit then multiply by 5 and divide by 9.
Example: 98°F – 32 × 5/9 = 36.6°C

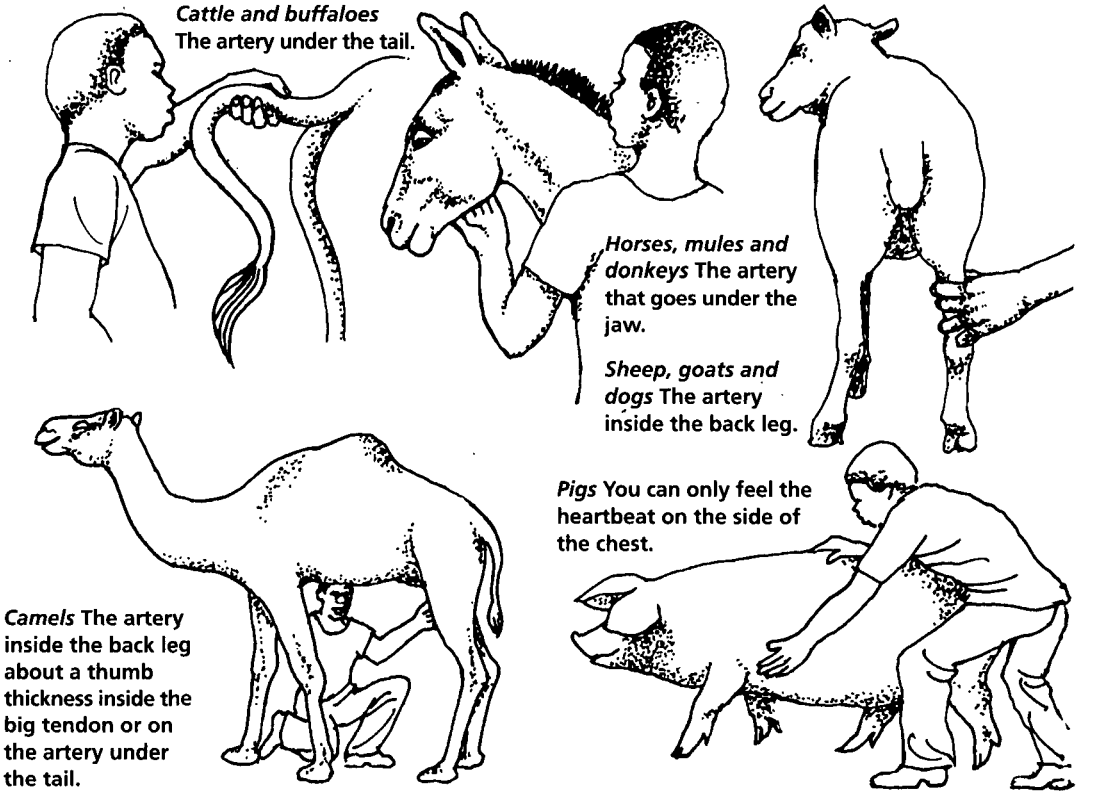
Breathing and heart rate

Animals normally breathe in three separate movements: breathing in, breathing out and a short pause. Count the number of times the chest moves in **or** out in a minute and compare the answer with the table below.

Very young, very old, very fat or pregnant animals breathe faster than this. Animals resting in the shade breathe much slower than those standing in the hot sun. Sick animals often breathe faster or slower than normal (p. 112).

Measure the heart rate after an animal has rested for at least five minutes and compare the answer with the table. You can tell how fast the heart beats by putting your hand on the chest directly over the heart and feeling it. Feel the left side of the chest just behind the leg. Make the animal stand with the left leg a little in front of the right.

Each time the heart pumps it pushes blood though the *arteries*. You can feel this as a pulse by putting your fingers over arteries just under the skin at different places on the body:



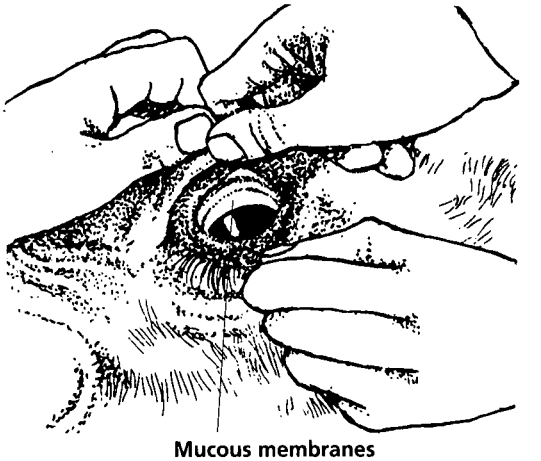
Remember that young animals have a faster heartbeat. Exercise or pregnancy make the heart beat faster. Sick animals often have a faster or slower heart rate than normal.

Approximate normal heart rates and breathing for different animals

Healthy adult animal	Heartbeats per minute	Breaths per minute
Cattle, buffaloes	55	12
Sheep, goats	75	12
Horses	35	12
Mules, donkeys	55	12
Camels	40	10
Pigs	85	15
Dogs	110	20
Rabbits	200	50
Birds	280	25

Mucous membranes

The thin skin that lines the inner surfaces of the body is called a *mucous membrane*. Mucous membranes are thinner than normal skin and are always wet with mucus. They give a guide to what is happening inside the body because they are so thin that you can see blood vessels through them. Some mucous membranes are easy to see, for example, inside the mouth, at the *vulva/vagina* and inside the eyelid. The easiest place to look at mucous membranes is inside the eyelid because in other places they are often coloured brown/black like the skin is.



Mucous membranes

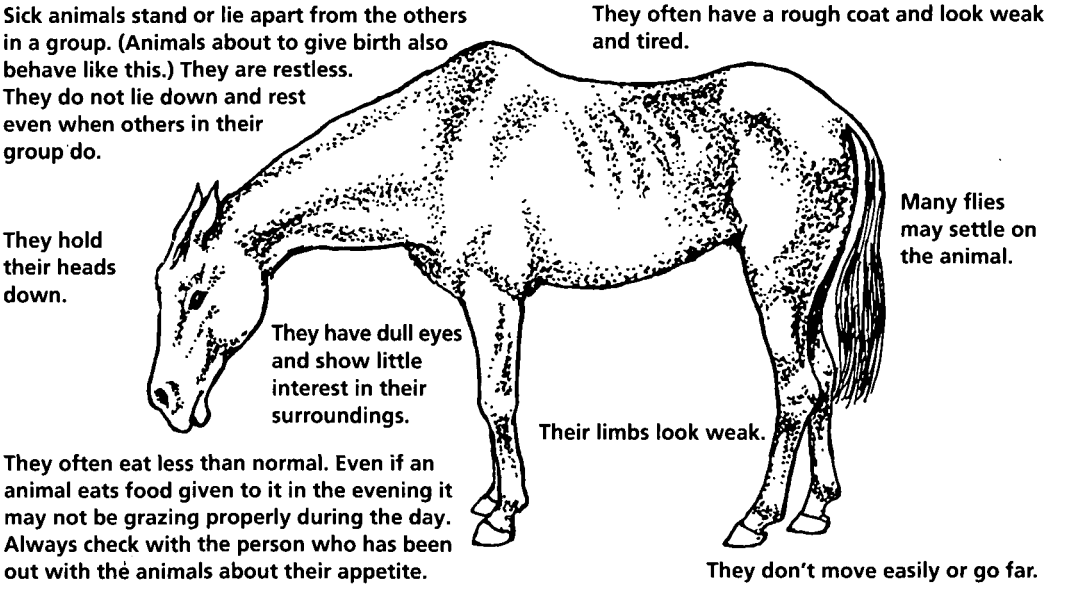
Normal healthy animals have pink/red mucous membranes – look at some healthy animals to learn what they look like.

When an animal is sick the mucous membranes may become pale/white, yellow, very dark red or red/blue or brilliant red. These are common signs of disease. Pale mucous membranes are a sign of *anaemia* (p. 268) and of many diseases. Animals have yellow mucous membranes when the liver is damaged, for example, by *liver flukes* or when *blood cells* are damaged by diseases such as *anaplasmosis* (p. 271). Dark red or red/blue mucous membranes are sometimes a sign of a particular disease but they may look like this for many reasons. Brilliant red mucous membranes are a sign of *cyanide poisoning* (p. 304).

15 How to look for signs of disease

People usually notice that an animal is sick because it starts to behave differently. It is important to **keep checking your animals** so you can notice any change in behaviour early on.

The drawing below shows many of the signs that an animal is sick.



Ask about sick animals

Find out about the animal before you do anything else. Listen to what people say they have seen wrong with it. If it is your own animal ask yourself the same questions. It is helpful to organise in your mind – or even on a piece of paper – a list of questions you want answered. **Make a note of the answers**, then if you need to get skilled help it will be easy to tell others about the problem.

Ask questions that do not suggest answers

If you ask 'What were the faeces like?' people will tell you what they saw and you will get good information.
If you ask 'Did the animals have diarrhoea?' people will probably say 'Yes' even if they do not know. This does not help you.
If you ask 'Have your goats been eating grass?' people will answer 'Yes' or 'No'. But *if you ask* 'What have your goats been eating?' you will get more information.

Ask questions like these about the animal itself:

- Why do you think the animal is sick? ... Which part of the animal has the problem? When did people first notice these signs? Have you seen signs like these before? ... When? ... What disease do you think the animal has?
- Is there anything else about the animal that is not normal?
- What does the animal eat and drink? ... Has it been eating and drinking normally?
- How old is the animal? ... What sex is it? ... Is it pregnant? ... When did it last give birth? ... Was it castrated?
- What kind of place does the animal come from?
- Has the animal been in contact with other animals? ... Which animals?/wild animals? ... Where?
- What treatment has been tried already? ... What vaccinations have been given?
- Is the animal part of a group?

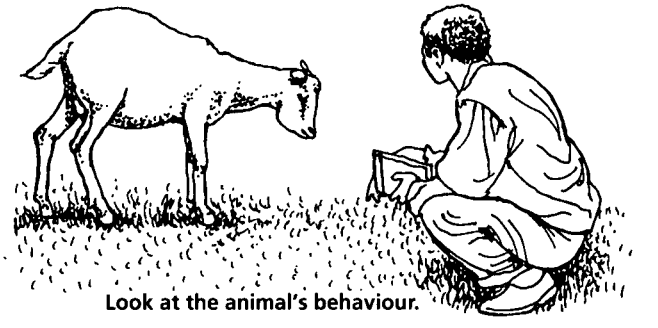
Ask about other animals in the group:

- Do other animals in the group have the same problem? ... How many others are sick? ... How many have died? ... How old are they?
- Have other kinds of animal got the same problem?
- Have any new animals come in to this group?

If you have asked the right questions and listened to the answers you will get strong suspicions about what is wrong before you even look at the animal!

Look at sick animals from a short distance away

Before you disturb the animal, look at how it behaves.



Look at the animal's behaviour.

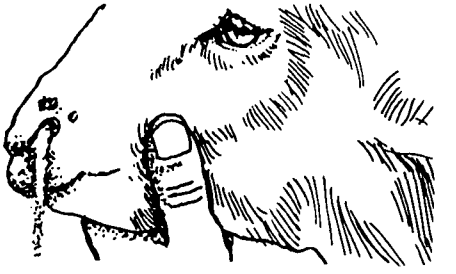
- Is the animal excited, aggressive, or calm?
- Does the animal look distressed or in pain? ... Is it kicking at itself?
- Is it breathing easily and normally – or does its breathing look distressed? ...How fast is the animal breathing? ... Is it breathing deep slow breaths or shallow short breaths? ... Does its abdomen move as well as its chest when it breathes out? ... Does it show pain by grunting, especially when it breathes out?
- Is it biting, rubbing or scratching itself?
- Is it shaking its head or grinding its teeth?
- Does it move normally and respond normally to other animals and things?
- Is it with its group or alone?

Examine animals from nose to tail

(Some people prefer to start from the tail, after they have taken the temperature.)
First take the animal's temperature (p. 110). An animal with a high temperature above the normal maximum (p. 110) has a fever. This is usually a sign of *infection* (p. 88). An animal with a low body temperature below the normal minimum (p. 110) could:
a) be starved of food,
b) be bleeding a lot, especially inside where you cannot see it (p. 67),
c) have lost a lot of fluid and be *dehydrated* (p. 267),
d) be very close to dying.

Nose

- Is there a *discharge* coming from the nose?
- Are there any blisters or sores on the nose?
- Does the breath smell bad?



Mouth

- Is there much *saliva* coming from the mouth?

WARNING

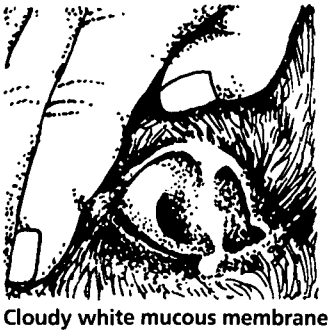
Animals that have much saliva coming from the mouth might have rabies (p. 260). Avoid handling the mouth of an animal you think might have rabies.

(Healthy male camels in the mating season and any healthy camels after they have eaten salt have much saliva coming from the mouth.)

- Are there any blisters, sores, wounds or objects in the mouth?
- Does the animal grind its teeth? This is often a sign of pain.

Eyes

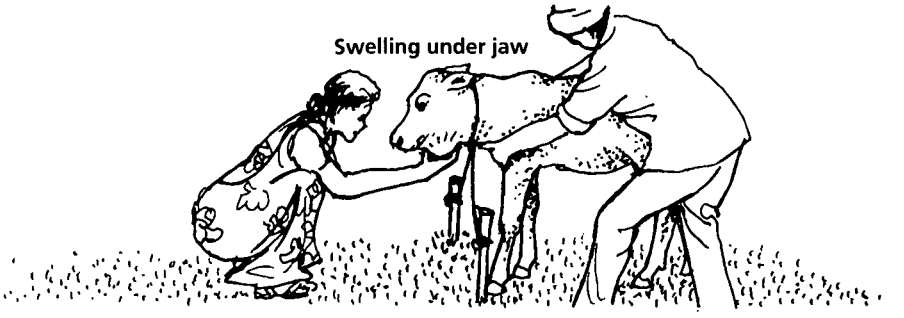
- Is there a discharge coming from the eyes?
- Is the centre of the eye cloudy white/blue?
- What colour is the *mucous membrane* inside the eyelid (p. 112)?



Cloudy white mucous membrane

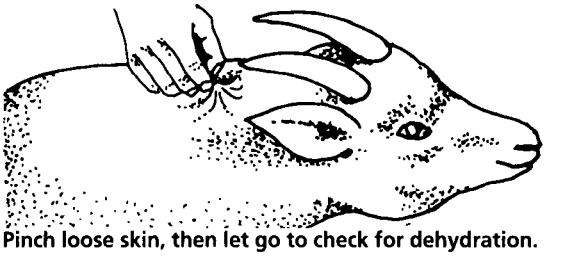
Head and neck

- Is there any swelling under the jaw?
- Are there any other swellings? These may be *lymph nodes* (p. 41)

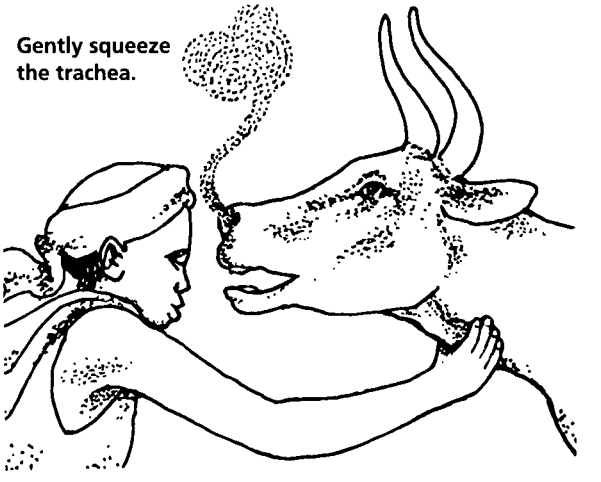


Body

- Feel the animal's heartbeat (p. 111).
- Pinch a fold of loose skin and let it go. Does the skin go back to normal immediately? If the fold of skin only goes back to normal slowly it is a sign of *dehydration* (p. 267).
- Is the animal coughing? ... Gently squeeze the *trachea* (Do not squeeze harder than would be comfortable if it was done to you). Healthy animals do not usually cough when you do this, but animals with infection in the lungs or trachea do cough.
- Put your ear to the side of the chest to listen to the lungs. If you can hear bubbling or rasping or liquid noises it is a sign of lung disease, for example, *pneumonia* (p. 195).

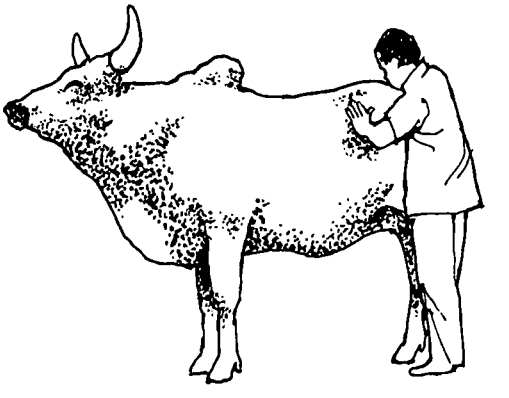


Pinch loose skin, then let go to check for dehydration.



Cattle, buffaloes, sheep and goats

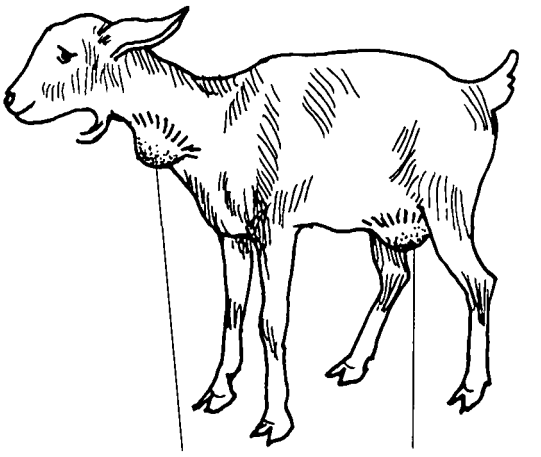
Push with your hand just behind the last rib to check that the *rumen* is contracting normally. You should feel the rumen contract about once every minute (p. 35).



Check the rumen is contracting normally.

Skin

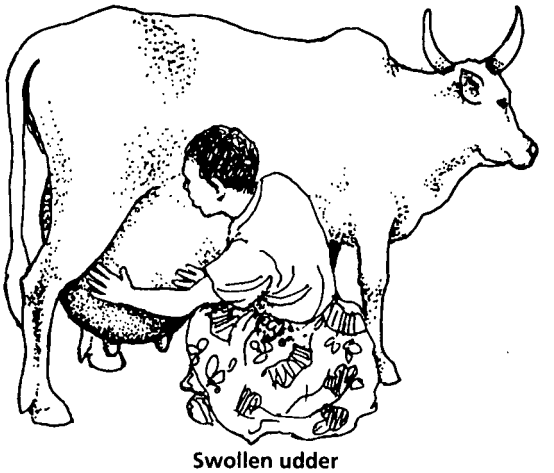
- Are there any sores or blisters on the skin? (p. 191)
- Are there any swellings under the skin? These may be *lymph nodes* (p. 41).
- Is the coat normal and healthy? Are there any places where the wool, hair or feathers are missing? When animals, especially camels, are sick for a long time they often lose hair.



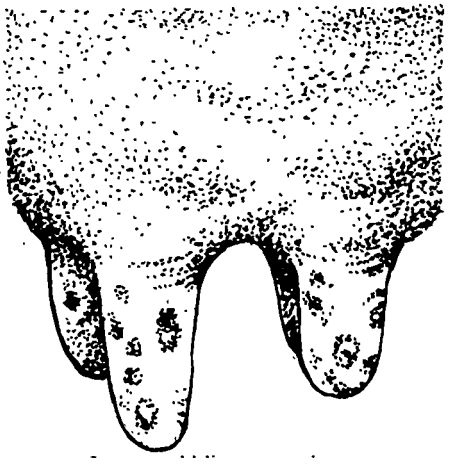
Swellings under the skin

Udder and genitals

- Is the udder swollen or hotter than normal?
- Does the animal resent the udder being touched?
- Are there injuries on the teats?
- Is the animal producing less milk than usual?



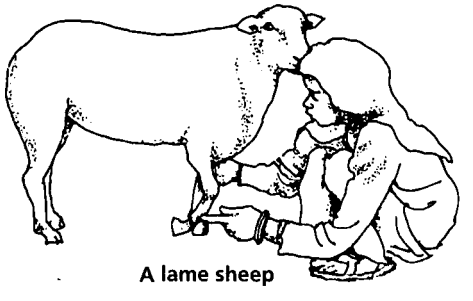
Swollen udder



- Is the milk normal? ... Is it red or thin and watery? ... Are there lumps in the milk?
- Is there a *discharge* from the *vulva*? ... from the *penis*?

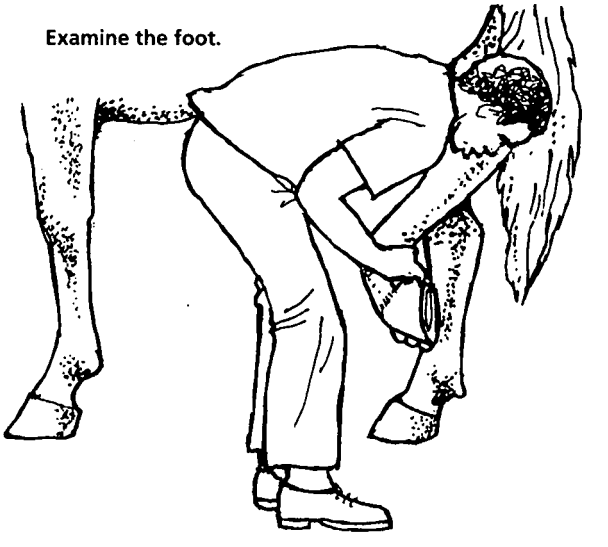
Legs and feet

- Is the animal lame? ... Which leg(s)?
- Examine the foot and the rest of the leg for wounds, heat, swelling or pain.



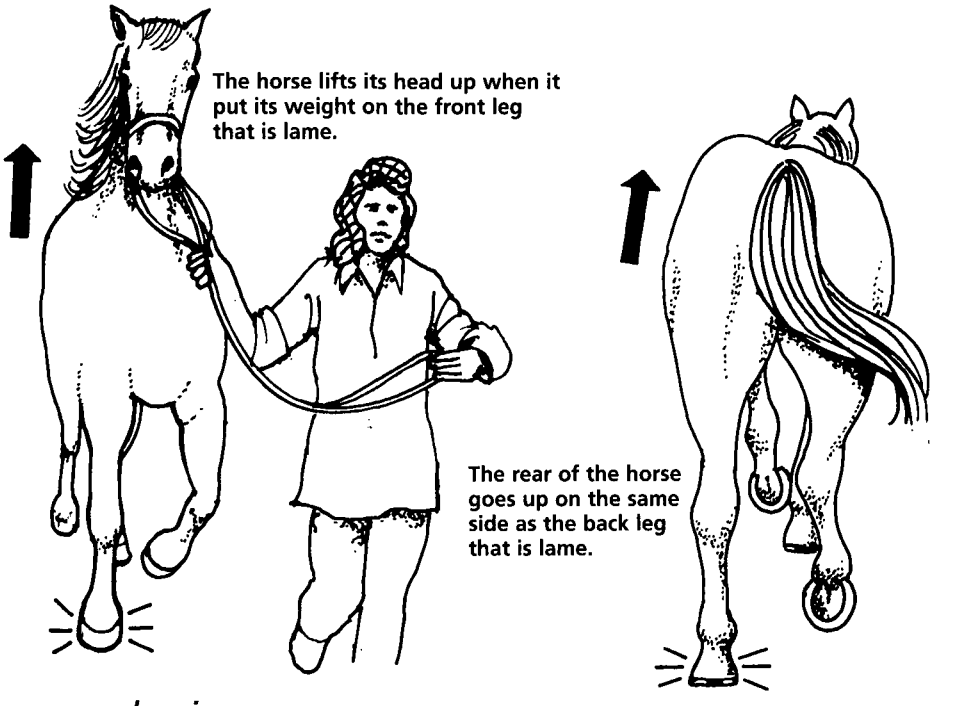
A lame sheep

Examine the foot.



Horses, mules and donkeys
How to tell which leg is lame.

- Get somebody to lead the animal, making it trot towards you.
  If the animal is lame on a front leg it will raise its head when that leg hits the ground.
- Get the person to lead the horse, making it trot away from you.
  If the horse is lame on a back leg you will see the back of the horse go up on that side as the lame leg hits the ground.



Faeces and urine

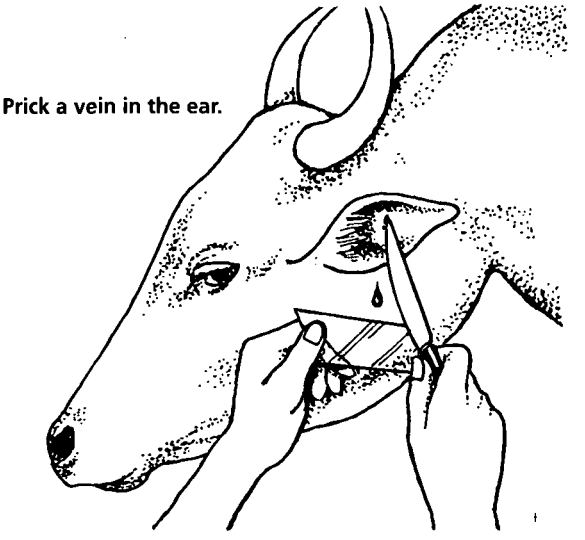
- Does the animal pass urine and faeces normally?
- Does the animal look distressed when it passes faeces or urine?
- Are the faeces normal? ... Are they dry and smaller than normal? See *constipation* (p. 212) ... Are they watery and passed more often than normal? ... Is there blood or mucus in the faeces? See *diarrhoea* (p. 211).
- Is the urine normal? ... Is the urine very dark? See *dehydration* (p. 267) ... Is the urine red? ... Is the animal passing little or no urine?

The urine of healthy horses and rabbits is often cloudy.

How to make blood smears

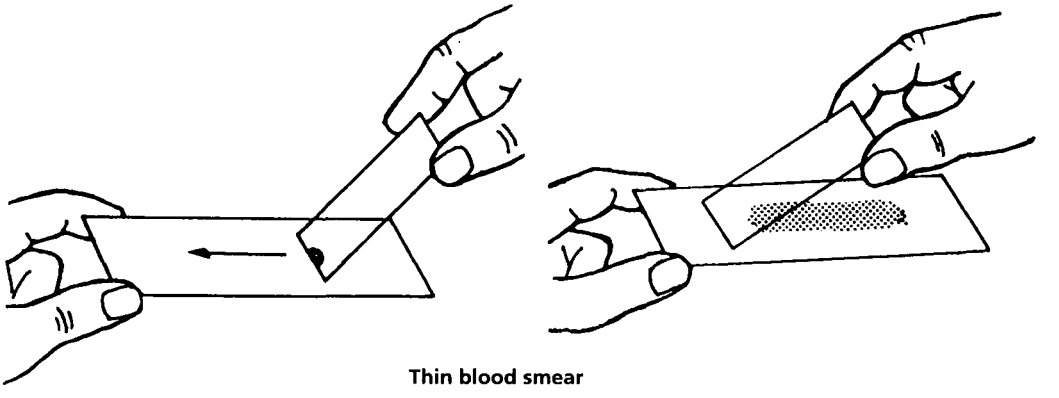
Skilled workers often need to examine blood from a sick animal with a *microscope*. They need a smear of blood on a glass microscope slide. (Skilled workers with microscopes can often provide the microscope slides for you and show you how to do this.) They either need a thin *blood smear* or a thick *blood smear* on the slide.

To make a blood smear for them to examine use a clean needle or blade to prick a *vein* and get a few drops of blood. You can take the blood from any vein. The vein in the ear is easiest. You only need a drop or two. You can also take blood from a dead animal. You will need to make the blood smear quickly before the blood clots. Make two smears in case one is broken or lost or the smear is too thin or too thick.



Thin blood smear (e.g. for babesiosis [p. 248])

- Put one drop of blood at the end of the microscope slide.
- Touch the drop with another microscope slide like this.
- Push the drop of blood along the bottom microscope slide using the top one like this. It will spread a thin smear of blood over the bottom one.



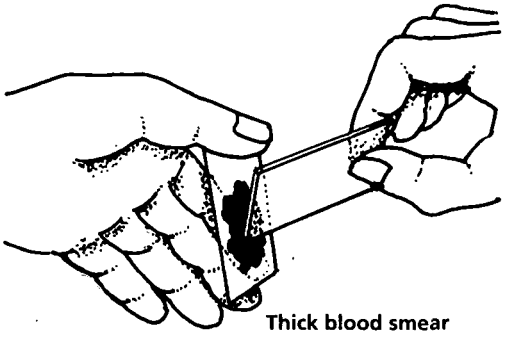
Thin blood smear

- Wave the bottom microscope slide in the air to make it dry. Hold the microscope slides by the edges and do not touch the blood smear.

Thick blood smear (e.g. for trypanosomosis [p. 295])

- Put a drop of blood on the middle of a microscope slide.
- Spread the drop out with the corner of another microscope slide or with a clean blade or even a clean matchstick.
- Hold it in the air to dry it.

Put the two smears back to back with the blood on the outside and wrap them carefully in clean paper. Do not forget to



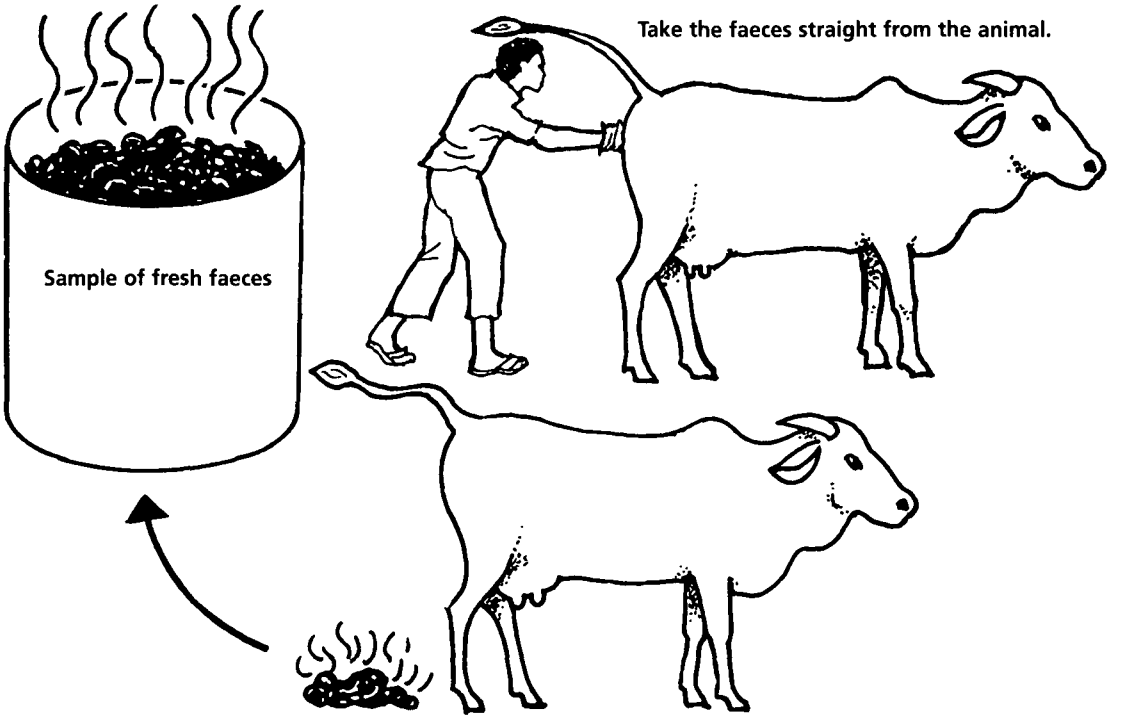
Thick blood smear

send details about the animal the blood smears came from with the samples.

(Skilled workers sometimes need to take other samples, such as samples of blood they take from a vein and put in a container, to examine.)

How to take a sample of faeces

Take a **small** sample of fresh faeces (10–20 g). Put the sample into a small container so that it is nearly full. Take the sample from the middle of some faeces. Try not to get soil or dirt mixed with the sample. You can take the sample straight from inside the animal. Cover or seal the container before it goes to a laboratory for testing.



Examining a dead animal

WARNING

Do not open the body of an animal you think has died of anthrax (p. 141).

Examining the body of a dead animal may help you to find out why it died. This can help you to treat other animals that are still alive and stop them dying too.

It is difficult to examine the body of a dead animal and you will usually need skilled help. Do not open the body yourself if you can get a skilled worker to examine it. You may destroy useful signs that the skilled worker will look for.

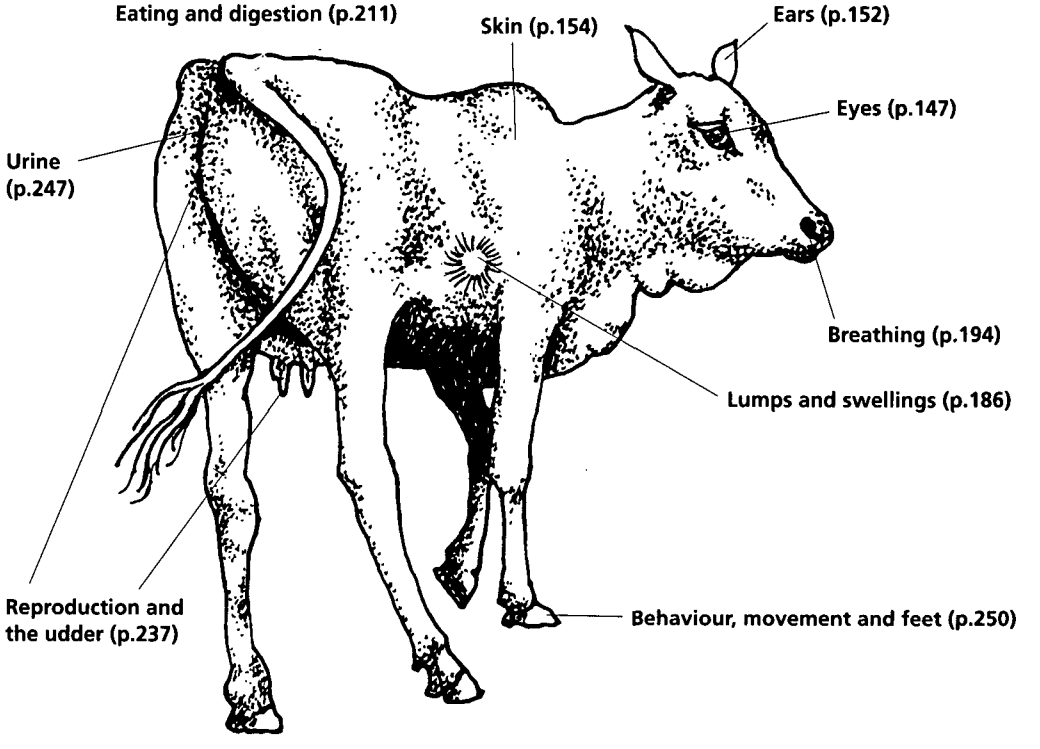
Remember that the body of a dead animal may carry a disease that people can get. Wash your hands, preferably with hot water and soap or disinfectant, after handling the body of a dead animal.

16 A quick guide to signs of disease and what they mean

The drawing below shows you which page to go to for more details about different signs of disease. (This is a cow but the chapters in this section also describe signs that other animals have.)

The signs described here are grouped together depending on which part of the body they are to do with. This guide suggests just some important diseases that may cause the signs you see when an animal is sick. Look carefully at what you see wrong with an animal (p. 113) and compare what you see with the signs described here. Turn to the pages indicated to look up more details and try to decide which disease or problem is causing the signs.

Many diseases look the same and animals do not always have the same signs, even when they have the same disease. The signs do not usually all happen at once or in the same order and some signs might not happen at all. Remember that a sign to do with one part of an animal can mean there is something wrong with another part. For example, animals often stop eating normally when they are sick but there may be nothing wrong with the stomach. Perhaps the animal does not eat because it has a bad foot and will not walk to its food.



Do not expect to find out exactly what is wrong with every sick animal. This book helps you recognise some important diseases but it is often not possible – even for skilled workers – to work out exactly which disease an animal has. If you can decide which disease an animal has you can treat it better, but if you cannot decide you can often treat it by looking carefully at the signs and treating them, such as *fever* (p. 266).

Animals that die suddenly

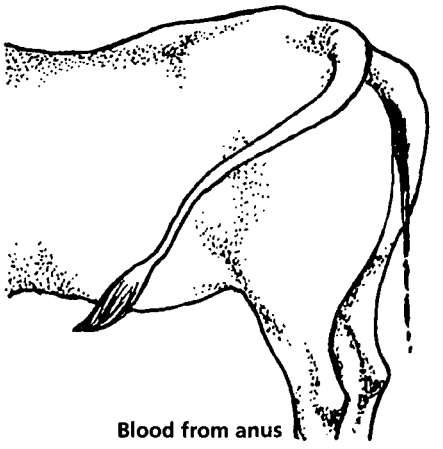
Diseases and problems mostly to do with these signs begin on page 141. Some animals die so quickly that you do not see any signs of disease and cannot treat them. But if you find out why an animal died you can often stop others dying from the same cause. Animals die suddenly for many reasons, these are just some of the important common ones to look out for. If you see any of these signs in a dead body look up the diseases or problems shown.

Always look out for anthrax when you find an animal that died with no signs of disease.

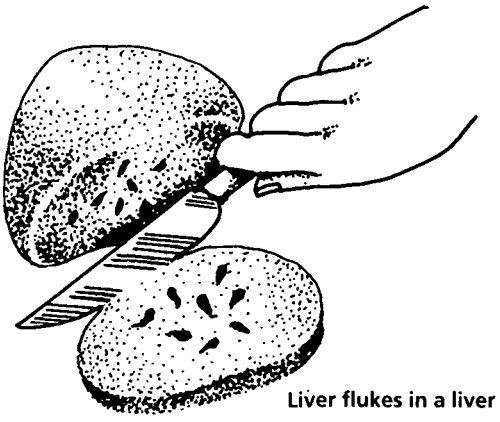
Signs for animals that die suddenly

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
One or two animals have died. Dark blood comes from the mouth, nose or *anus*. There is no sign of diarrhoea.	✓													*Anthrax* (p. 141)
Gassy swellings under the skin which crackles when touched.		✓		✓	✓	✓								*Blackquarter* (p. 144)
Diarrhoea and signs of bleeding from the *anus*. Have thrashed about on the ground.		✓												*Heartwater* (p. 257)
Diarrhoea but no bleeding from the *anus*. Swollen neck, head or tongue. *Discharge* from the nose.		✓												*Haemorrhagic septicaemia* (p. 266)
Had changed to better food. Under one year old. No other signs.					✓	✓								***Enterotox-aemia*** (p. 146)
Have many young ***liver flukes*** in the liver.					✓	✓								***Liver fluke*** (p. 285)
Other goats in the group have distressed breathing.						✓								*CCPP* (p. 197)

Also see:
Any animal *Lightning* (p. 146); *Poisoning: cyanide* (p. 304); *Rift Valley fever* (p. 289); *salmonellosis* (p. 235); *pneumonia* (very young animal) (p. 195).
Very young animals:
Cattle, sheep, goats, pigs *Foot and mouth disease* (p. 279).
Sheep *Sheep and goat pox* (p. 177).
Horses, mules, donkeys *Very severe worms* (p. 219).
Pigs *Trypanosomosis* (p. 296); *African swine fever* (p. 293).



Blood from anus



Liver flukes in a liver

Signs to do with eyes

Diseases and problems mostly to do with these signs begin on page 147.

Signs to do with eyes

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Cannot see and walks into things. It may have other signs of disease around the eye.	✓													*Blindness* (p. 147)
Blinking and avoiding bright sunlight. Cloudy or white eyes. Clear, white/grey or yellow *discharge* comes from the eye – discharge that is not washed away becomes a dry crust around the eye. Or one or both eyes are closed and the eyelids are red and swollen. The eye is red and inflamed.	✓													*Eye injury* (p. 147); *conjunctivitis* (p. 149); *kerato-conjunctivitis* (p. 150); *eyelids turned in* (p. 148); *bites: insects, snakes* (pp. 304, 307)
Clear *discharge* from the eye but no other signs.	✓													*Thelazia (Eyeworms)* (p. 150)
Discharge from the eyes and nose. *Fever*. Small lumps under the skin, sometimes over the whole body.		✓	✓											*Lumpy skin disease* (p. 176)
The skin is wet and has *ticks* on it. *Discharges* from nose and mouth. *Fever.*		✓	✓											*Sweating sickness* (p. 184)
Discharge from the eyes and a high *fever*. Females abort. Diarrhoea, often with blood in it. Collapse and die.					✓	✓								*Nairobi sheep disease* (p. 288)
Discharge from the eyes and pale *mucous membranes*. Have slowly become thin.				✓			✓	✓						*Trypanosomosis* (p. 295)

Also see:
Cattle, buffaloes *Malignant catarrhal fever* (p. 287); *rinderpest* (p. 290).
Sheep, goats *Bluetongue* (p. 273); *contagious agalactia* (p. 245); *goat plague* or *rinderpest* (p. 290).
Horses, mules, donkeys *Besnoitiosis* (p. 166).

Signs to do with ears

Diseases and problems mostly to do with these signs begin on page 152.

Signs to do with ears

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Shaking its head. Ears sensitive to being touched. The animal rubs its ears on things or scratches them and may lose hair around the ears where it has rubbed. Much dark wax in the ear. One or both ears hang down.	✓													*Ear mites* (p. 152)
Pus or *discharge* coming from the ear.	✓													*Ear infection* (p. 152)
Pus comes from the ear. The animal has recently been dipped in insecticide. In East/Central Africa.		✓												*Earworm* (p. 153)

Signs to do with skin

Diseases and problems mostly to do with these signs begin on page 154. For larger lumps and swellings under the skin see also page 126 and page 186.

Signs to do with skin

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Losing hair or wool, often around head and neck or legs. Scabs on the skin. Skin may be thickened. Animals scratch or rub. (Some kinds of *mange* do not make the animal scratch or rub.)	✓													*Mange* (p. 154)
Rubs or scratches. Black dots on skin. Often weak or sick animals that live close together.	✓													*Lice* (p. 157)

Signs to do with skin (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Rubs or scratches. Tufts of raised hairs anywhere on the body. Swellings under the skin, especially round head and neck or under the abdomen. Horses have small wet sores on mane and tail.	✓													*Allergy* (p. 162)
Grey, scaly scabs in round patches – around the head first. Usually animals in houses.	✓													*Ringworm* (p. 180)
Wound filled with fly *larvae*.					✓								✓	*Flystrike* (p. 161)
Scabs on much of the skin. Small tufts of raised hair that are easy to pull out. Wet sores under the raised hair soon become scabs on head and lower legs, sometimes over the body. Animal thin and not growing. Goats especially have scabs on nose, mouth and genitals.		✓			✓	✓	✓						✓	*Dermatophilosis* (p. 170)
Scabs and cracks on pale/white areas. Skin falling off. Sometimes yellow membranes.		✓			✓								✓	*Photo-sensitisation* (p. 163)
Skin over swellings on the legs and back is dry and crackles. No *discharge* from the nose. Very lame.		✓			✓								✓	*Blackquarter* (p. 144)
Few or many small lumps on the skin, especially near the *testicles* or eyes. Sometimes the thickened skin has wet patches on it.		✓	✓			✓	✓	✓						*Besnoitiosis* (p. 166)
Blisters around the hooves and the mouth. Much *saliva* coming from the mouth.		✓	✓		✓	✓			✓					*Foot and mouth disease* (p. 279)
Small lumps. *Discharge* or blood from the lumps. Skin thickened.		✓	✓											*Hump sore* (p. 174)
Small lumps sometimes over whole body. *Fever. Discharge* from eyes/nose.		✓												*Lumpy skin disease* (p. 176)
Skin is wet. Have *ticks* attached. *Fever. Discharges* from eyes, nose and mouth.		✓										✓		*Sweating sickness* (p. 184)
Thick scabs around mouth and nose. Lose a lot of wool. Dark blue/red membranes. Swollen tongue. *Discharges* from nose and mouth.					✓	✓								*Bluetongue* (p. 273)
Thick scabs that become bleeding sores. Young animals: on mouth and head. Old animals: on feet and udder.					✓	✓								*Contagious pustular dermatitis* (p. 167)

Signs to do with skin (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Sores and scabs on the skin, especially on the back.							✓	✓						*Rain sores* (p. 164)
Swelling of genitals. Sometimes swelling under abdomen also. Pale *mucous membranes*. Becomes thin.							✓	✓						*Dourine* (p. 297)
Lumps in rows (along *lymph* vessels in the neck). Green/yellow *discharge* comes from some lumps.							✓	✓						*Epizootic lymphangitis* (p. 190)
Lumps on legs and feet, sometimes on neck. Some lumps burst, *pus* comes out. Some become open sores.							✓	✓						*Ulcerative lymphangitis* (p. 193)
Lumps under the jaw or around the neck. The lumps burst, *pus* comes from them. Thick white/yellow *discharge* from the nose. Usually young animals.							✓	✓						*Strangles* (p. 204)
Red areas on skin. Especially legs and ears. *Fever*. Not walking normally.									✓					*African swine fever* (p. 293)

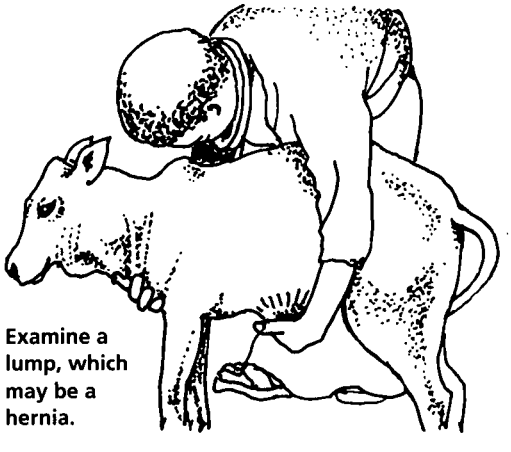
Also see:
Any animals *Saddle sores* (p. 165); *pox diseases* (p. 177).
Cattle, buffaloes *Farcy* (p. 192).
Sheep, goats *Scrapie* (p. 182).
Horses, mules, donkeys *Anhydrosis* (p. 166); *glanders* (p. 197); *summer sores* (p. 173); *worm nodules* (p. 185).
Pigs *Erysipelas* (p. 171).

Signs to do with lumps and swellings

Diseases and problems mostly to do with these signs begin on page 186. For smaller lumps see also page 124 or page 154.

Feel the lump or swelling, as well as looking at it, to work out what kind of lump or swelling it is so you can choose the right treatment for it. Find out:

- Is it hard and solid or soft and full of fluid?
- How large is it?
- Is there only one lump or swelling or are there many?



Examine a lump, which may be a hernia.

Signs to do with lumps and swellings

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Hard, hot and painful swelling that becomes softer. Sometimes it bursts and *pus* comes out. Sometimes with other signs of disease.	✓													*Abscess* (p. 186)
Soft, sometimes large, but not painful swelling. It feels full of fluid and becomes smaller and hard after a few weeks. No other signs of disease.	✓													*Haematoma* (p. 187)
Soft swelling that becomes smaller if squeezed gently. Often around the *navel*, sometimes inside the *scrotum*. No other signs of disease.	✓													*Hernia* (p. 188)
Soft swelling over a large area, often on the lower parts of the body; under the abdomen, chest or jaw. Other signs of disease.	✓													*Oedema* (p. 190)
Swelling on the legs and back. Skin over the swelling crackles. Do not have a *discharge* from the nose. Very lame.		✓			✓								✓	*Blackquarter* (p. 144)
Swellings around the joints or the *navel*.												✓		*Joint ill* (p. 251)
Swelling under the jaw or neck.		✓	✓		✓	✓							✓	*Liver fluke* (p. 285)
Lumps under the skin below the ears, at the bottom of the neck or in front of the shoulders. High *fever*. Pale *mucous membranes*. Cloudy eyes. Die with bloody froth from nose and mouth.		✓												*East Coast fever* (p. 276)
Swelling around head and neck. *Saliva* comes from the mouth. No *discharge* from nose.							✓	✓						*Anthrax* (p. 141)
Swellings around eyes, head or neck. *Saliva* comes from the mouth. Dark red/blue *mucous membranes*.							✓	✓						*African horse sickness* (p. 270)
Swellings around head and neck. *Discharge* from nose becomes thick white/grey/yellow. Cough. *Abscesses* under jaw that burst and *pus* comes out.							✓	✓						*Strangles* (p. 204)
Swelling under abdomen and around legs. *Fever* that comes and goes.							✓	✓						*Dourine* (p. 297)
Swelling under jaw and neck. Has been near the bodies of dead animals.										✓				*Anthrax* (p. 141)

- Is it hot to touch?
- If you squeeze the lump gently can you make it smaller?
- Is the animal sick or healthy otherwise?

Also see:
Horses, mules, donkeys *Epizootic lymphangitis* (p. 190); *ulcerative lymphangitis* (p. 193).

Signs to do with breathing

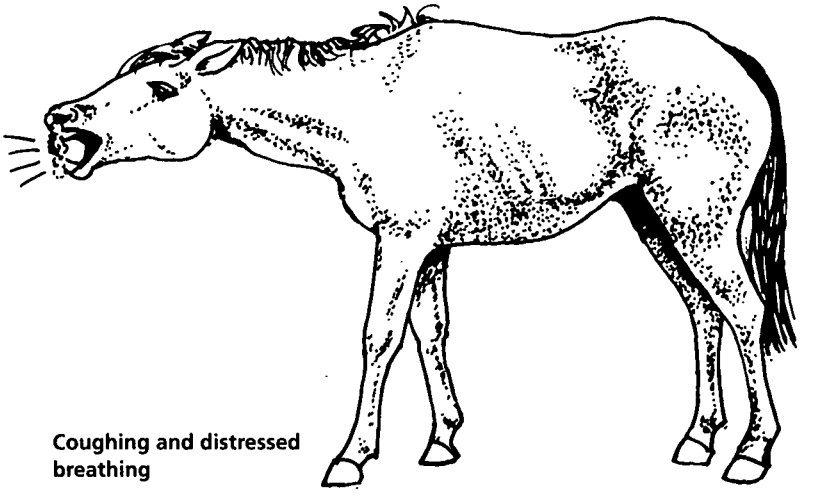
Diseases and problems mostly to do with these signs begin on page 194.

Coughing

Even healthy animals cough occasionally but animals that cough often usually have a disease (p. 194).

Double breathing

Sometimes after a **horse, mule** or **donkey** has finished breathing out, it contracts its abdomen to push out more air. This is called 'broken winded' or 'double breathing'. The animal often also coughs and has a *discharge* from its nose. This is a sign that the animal is very sick with, for example, *pneumonia* (p. 195).



Coughing and distressed breathing

Signs to do with breathing

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Distressed breathing. Cough. *Fever.*	✓													*Pneumonia* (p. 195)
Distressed breathing. Cough. No *fever.* Only in cooler wetter places. Usually young animals.	✓													*Lungworm* (p. 200)
Noisy distressed breathing that usually soon recovers.	✓													*Allergy* (p. 162)
Coughing for a long time. Thin older animals.	✓													*Tuberculosis* (p. 205)

Signs to do with breathing (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Very distressed breathing. Brilliant red *mucous membranes*. Have eaten young sorghum plants.	✓													*Poisoning: cyanide* (p. 304)
Usually cattle that have been crowded together, transported or *stressed*. Usually young sheep or goats. Distressed breathing. Cough. High *fever*. *Discharge* from nose. Many animals die.		✓	✓	✓	✓	✓								*Pasteurellosis* (p. 202)
Distressed breathing. Very swollen abdomen on the left side.		✓	✓		✓	✓								*Bloat* (p. 215)
Distressed breathing. Cough a little. *Fever*. Watery clear/yellow *discharge* from nose. Swollen tongue. Swelling around the head. Dark red/blue *mucous membranes*. Diarrhoea with blood in it. No sores in the mouth.		✓	✓	✓										*Haemorrhagic septicaemia* (p. 283)
Distressed breathing. Cough. *Fever*. Small clear *discharge* from nose that becomes thick yellow/white.		✓	✓											*CBPP* (p. 195)
Distressed breathing. No cough. Red sores in the mouth that become grey/white/yellow. Clear *discharge* becomes white/grey from nose and eyes. Severe diarrhoea with blood and pieces of *intestine* that look like cloth in the faeces.		✓	✓											*Rinderpest* (p. 290)
Distressed breathing. No cough. Thick *discharge* from nose and eyes. High *fever*. Sores in mouth later. Some have diarrhoea.		✓	✓											*Malignant catarrhal fever* (p. 287)
Distressed breathing and *discharge* from nose. Thick scabs around nose and mouth. Red ring around top of feet. Swollen mouth. Some have blue tongue.					✓	✓								*Bluetongue* (p. 273)
Distressed breathing. Cough. High *fever*. *Discharge* from nose. Goats especially.					✓	✓								*CCPP* (p. 197)
Distressed breathing and *discharge* from nose. High *fever*. Abortions. Diarrhoea, often with blood in it. Collapse and die.														*Nairobi sheep disease* (p. 288)
Very distressed breathing. Some have severe cough. Swelling over eyes, around head and neck. White/yellow frothy *discharge* from nose. Die in a few days.														*African horse sickness* (p. 270)
White/grey *discharge* from nose. Large swellings under jaw and around neck. Swellings burst releasing *pus*. Cough. Very noisy breathing.														*Strangles* (p. 204)

Signs to do with breathing (continued)

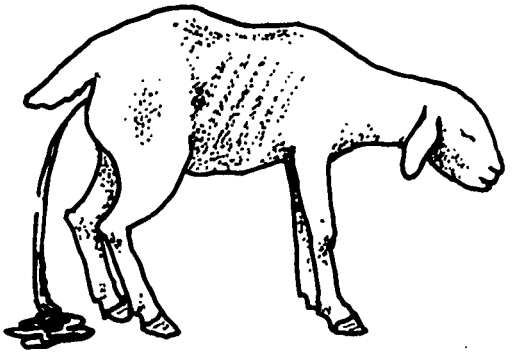
Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Clear *discharge* from nose and eyes. Some cough. Behave nervously. Some vomit. Rarely, the pads of the feet are thickened.										✓				*Distemper* (p. 275)
White/yellow *discharge* from nose. *Fever* that comes and goes. Do not eat. Vomit. Bleeding points on *mucous membranes* and skin. Some have blood coming from nose. Imported dogs.										✓				*Canine ehrlichiosis* (p. 274)
Distressed breathing. Green diarrhoea. Go round in circles and have convulsions. Many die.											✓			*Newcastle disease* (p. 208)

Also see:
Cattle, buffaloes *Anaplasmosis* (p. 271); *besnoitiosis* (p. 166); *East Coast fever* (p. 276); *heartwater* (p. 257); *lumpy skin disease* (p. 176); *mucosal disease* (p. 234); *Rift Valley fever* (p. 289); *sweating sickness* (p. 184).
Sheep, goats *Besnoitiosis* (p. 166); *goat plague* (p. 282); *rinderpest* (p. 290); *heartwater* (p. 252); *nasal bots* (and **other animals**) (p. 202); *Rift Valley fever* (p. 289); *schistosomosis* (p. 222); *sheep and goat pox* (p. 177).
Horses, mules, donkeys *Anthrax* (p. 141); *besnoitiosis* (p. 166); *epizootic lymphangitis* (p. 190); *glanders* (p. 197); *schistosomosis* (p. 222); *tuberculosis* (p. 205).
Birds *Avian coryza* (p. 207).

Signs to do with eating and digestion

Diseases and problems mostly to do with these signs begin on page 211.

Signs to do with eating and *digestion* often include *diarrhoea* (p. 211). Animals have diarrhoea so often and for so many reasons that on its own this is not a useful guide to which disease an animal has. The more watery, unusually coloured or foul smelling the diarrhoea is, the more likely it is to be a sign of a serious disease.



Signs to do with eating and digestion

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Eating much less than normal and becoming thin.	✓													*Loss of appetite* (p. 214)
Passing few hard dry faeces or none at all.	✓													*Constipation* (p. 212)
Behaving unusually because of severe pain in the abdomen. Especially horses, mules or donkeys.	✓													*Colic* (p. 217)
Much *saliva* coming from the mouth, but no other signs of disease.	✓													*Something stuck in the mouth* (p. 228) or the *oesophagus* (p. 228), *broken teeth* (p. 226), *abscess* inside the mouth (p. 186)
Much *saliva* from the mouth. No diarrhoea. Behave unusually, may become aggressive, stagger about and shake. Eat unusual things or much more than usual. Become *paralysed* – back legs first.	✓													*Rabies* (p. 260)
Much *saliva* from the mouth. Lame on all feet. Blisters in mouth and around feet.		✓	✓											*Foot and mouth disease* (p. 279)
Much *saliva* from the mouth. Swollen legs. Large sores with *pus* on the skin.		✓	✓											*Lumpy skin disease* (p. 176)
Much *saliva* from the mouth. Difficulty breathing. Swelling around the eyes and head. High *fever*							✓	✓						*African horse sickness* (p. 270)
Much *saliva* from the mouth. Behave nervously. Easily frightened by noise or light. Third eyelid comes across the eye. Closed jaws with very tense muscles. Cannot eat.							✓	✓						*Tetanus* (p. 263)
Much *saliva* from the mouth. Dark red/blue *mucous membranes*. Thick scabs around nose and mouth. May have red rings around the top of the feet. Swollen mouth and may have a blue tongue.					✓	✓								*Bluetongue* (p. 273)
Diarrhoea. Animals thin and not growing normally. Eating less than normal but may have a swollen abdomen. Do **not** usually have a *fever*. Pale *mucous membranes*. Animals on pasture that has had many animals on it before.	✓													*Worms* (p. 218)
Very watery diarrhoea. Blood in faeces. Faeces smell bad. Usually young animals living crowded together.	✓													*Coccidiosis* (p. 224)

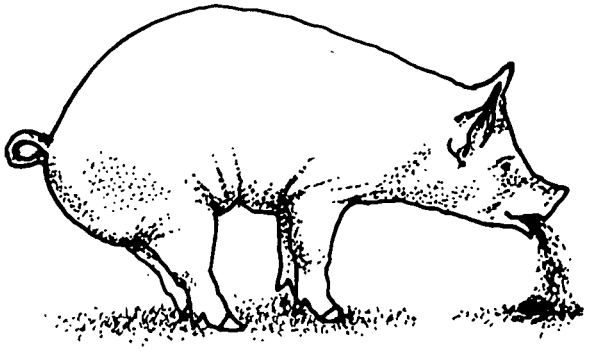
Signs to do with eating and digestion (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Diarrhoea is mild and has gone on for a long time. Animals have been near water with snails in it, are thin and not growing. May have swelling under jaw. Some may die.		✓	✓		✓	✓								*Liver fluke* (p. 285)
Diarrhoea. Blood in faeces. *Saliva* comes from the mouth. Clear/yellow watery *discharge* from nose. Swollen tongue. Swelling around head. *Fever*. Dark red/blue *mucous membranes*. Do not cough much. No ulcers in the mouth.		✓	✓											*Haemorrhagic septicaemia* (p. 283)
Diarrhoea is sudden and severe. Blood in faeces.		✓	✓											*Heartwater* (p. 257)
Diarrhoea is sudden and severe. Blood in faeces. Usually young animals.		✓	✓											*Mucosal disease* (p. 234)
Diarrohea is sudden and severe. Blood and pieces of *intestine* like cloth in faeces. *Discharge* from nose, mouth and eyes.		✓	✓											*Rinderpeest* (p. 290)
Diarrhoea. Much *saliva* from the mouth. Stagger about. Red urine.		✓	✓											*Babesiosis* (p. 248)
Diarrhoea has gone on for a long time. Thin. Yellow *mucous membranes*. Have eaten plants with yellow flowers.							✓	✓						*Poisoning: Senecio* (p. 307)
Yellow faeces with blood in them. Die quickly. Under 2 weeks old.					✓	✓								*Lamb dysentery* (p. 233)
Green watery diarrhoea. Blood in faeces. *Fever* comes and goes. Females abort. Happens quickly, many animals collapse and die.					✓	✓								*Nairobi sheep disease* (p. 288)
Very watery faeces. Faeces smell bad, have blood and mucus in them. *Discharges* from eyes, nose and mouth. Happens quickly and many die.					✓	✓								*Goat plague* (p. 282), *rinderpest* (p. 290)
Diarrhoea, may be very watery, white or green or have blood in it. May be *worms* in the faeces.											✓			*Coccidiosis* (p. 224), *worms* (p. 218), *salmonellosis* (p. 235)
Watery green diarrhoea. Faeces smell bad. Distressed breathing. Birds behave unusually or collapse. Happens quickly, often to many birds.											✓			*Newcastle disease* (p. 208)

Signs to do with eating and digestion (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Vomiting and diarrhoea happen quickly. Yellow *mucous membranes*. Drinking much water. Pale faeces may become black and watery.										✓				*Leptospirosis* (p. 284)
Diarrhoea. Vomiting. Not eating normally. Drinking a lot of water. Weak and tired. Clear/grey/white *discharge* from eyes and nose. *Fever.* Skin of nose and under feet sometimes thick and hard.										✓				*Distemper* (p. 275)
Severe diarrhoea and vomiting. *Uncoordinated* and walk in circles. Shake and become *paralysed.* High *fever.* Many die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)

Sometimes these signs include *vomiting*. Usually only dogs, pigs and other animals with simple stomachs vomit like people do. But other animals sometimes have food coming back up the oesophagus and out of the mouth or nose or may even vomit if they have some very severe diseases, such as *Rift Valley fever* (p. 289). If this happens it is a sign the animal is very sick. If it happens to a horse it will probably die.



Also see:
Any animal *Overeating grain* (p. 227); *salmonellosis* (p. 235); *poisoning e.g., castor-oil plant* (p. 303); *lack of minerals* (p. 229).
Cattle, buffaloes *Johne's disease* (p. 232); *malignant catarrhal fever* (p. 287); *Rift Valley fever* (p. 289); *rinderpest* (p. 290); *schistosomosis* (p. 222); *sweating sickness* (p. 184).
Sheep, goats *Schistosomosis* (p. 222); *goat plague* (p. 282); *rinderpest* (p. 290); *Rift Valley fever* (p. 289).
Dogs *Tick paralysis* (p. 265); *canine ehrlichiosis* (p. 274).

Signs to do with reproduction and the udder

Diseases and problems mostly to do with these signs begin on page 237. **See also page 76 for emergency treatment of a prolapsed uterus.**

Signs to do with reproduction and the udder

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Large red swelling comes out of the *vulva*.	✓													*Prolapsed vagina* (p. 242), *prolapsed uterus* (pp. 76, 243)
Discharge from the *vulva*. Discharge is white, white/yellow, dark brown. It smells bad. Have given birth recently. (A clear or red/brown discharge that does not smell bad often comes from the *vagina* after a healthy animal has given birth.)	✓													*Metritis* (p. 241)
The *placenta* does not come out soon after birth. May smell bad.	✓													*Retained placenta* (p. 241)
Females abort (cattle 5–6 months after mating). Some males have swollen *testicles*. May have swollen joints. New-born animals are weak and may die.	✓													*Brucellosis* (p. 239)
Females abort. Stagger about. Have a high *fever*.		✓	✓											*Rift Valley fever* (p. 289)
Females abort. Baby animals cannot see, behave unusually.		✓	✓											*Mucosal disease* (p. 234)
Females abort. Infertility. Yellow *mucous membranes*. Red urine sometimes. Constipation. Pain in the abdomen.		✓	✓											*Leptospirosis* (p. 284)
Females abort. Infertility. Have weak babies that die. Have swellings on the udder or *scrotum*. Especially goats.					✓	✓								*Besnoitiosis* (p. 166)
Females abort. *Fever*. Diarrhoea with blood in the faeces. *Discharge* from eyes or nose. Some die.					✓	✓								*Nairobi sheep disease* (p. 288)
Females abort. *Fever*.					✓	✓								*Rift Valley fever* (p. 289)
Females abort. *Fever*. Weak new-born animals shake and die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)
Red or swollen teats. Teats have cracked skin or sores. Hot or swollen udder. Unusual milk. Animal resents being milked.	✓													*Mastitis* (p. 244), *sore teats* (p. 243)
Swollen genitals. *Discharge* from *penis* or *vagina*. *Fever*. Have slowly become thin.							✓	✓						*Dourine* (p. 297)

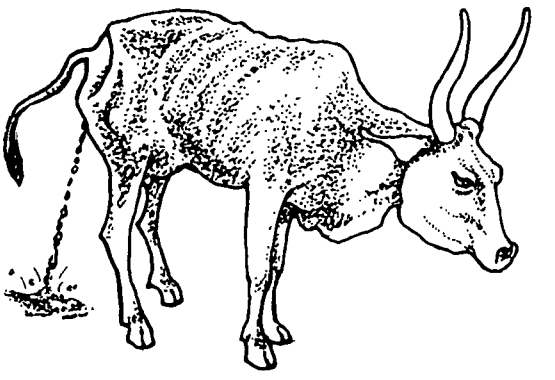
Also see:
Any animal *Breeding problems* (p. 237)

Signs to do with urine

Diseases and problems mostly to do with these signs begin on page 247.

The colour and amount of urine varies a lot, even when animals are healthy. Normal urine can be clear, dark yellow or cloudy, for example, healthy rabbits or horses often have cloudy urine. In dry times healthy camels pass little urine – often less than one litre a day.

If an animal does not pass urine for a day or is in pain when it passes urine it is a sign of disease. Urine is red/brown when there is blood in it and this is also a sign of disease.



Red/brown urine

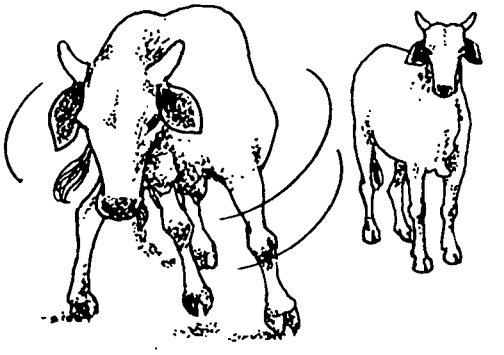
Signs to do with urine

Signs													
Not passing urine or passing very little dark coloured urine.	✓												*Dehydration* (p. 267)
An animal strains to pass urine but passes very little or none. The animal will not lie down and rest. It may have a high *fever*. After a few days the animal's breath smells bad.	✓												*Blocked urethra* (p. 247)
Red/brown urine. (Animals other than cattle do not always have red urine.) Pale/yellow *mucous membranes*. *Fever*.		✓										✓	*Babesiosis* (p. 248)
The urine smells unusual. (Some herders say it smells sweeter than normal.) Animals are weak and tired and slowly become thin.				✓									*Trypanosomosis* (p. 298)

Signs to do with behaviour and movement

Diseases and problems mostly to do with these signs begin on page 250.

Animals that cannot walk normally because of pain or injury are called *lame*. Animals that cannot control their movements properly to walk normally are called *uncoordinated* – they often walk in circles and fall down. An animal that cannot move parts of its body is called *paralysed* (p. 260). Many diseases and problems make animals lame, uncoordinated or paralysed, some common ones are shown here.



A bullock with uncoordinated movement

Signs to do with behaviour and movement

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Lame or slower than others in its group. Holds one leg off the ground or only puts a little weight on one leg. Part of a leg or a foot is hot, swollen or painful. A joint makes a grinding noise when the animal moves. Animal may have obvious signs of injury, e.g. bleeding.	✓													*Lameness* (p. 250), *broken bones* (p. 73), *dislocated joints* (p. 75), *arthritis* (p. 250)
Lame on one leg. If you press under the foot the animal feels pain. The foot may smell bad. May have swelling above the hoof. May have white/yellow/brown/grey *pus* coming from a wound in the foot.	✓													*Foot abscess* (p. 252)
Uncoordinated and easily excited. Much *saliva* comes from the mouth. Animal aggressive but may become weak and tired. Has an unusual appetite. Becomes *paralysed* from the back legs forwards and dies in a few days.	✓													*Rabies* (p. 260)
Easily frightened by noise or light. Jaws tightly shut with tense muscles, cannot eat or drink. Much *saliva* comes from the mouth. May have *third eyelid* (p. 42) coming across the eyes. Animal becomes rigid with muscle spasms and convulsions. Usually dies. (*Ruminants* may have *bloat*.)	✓													*Tetanus* (p. 263)
Moving stiffly. Becomes *paralysed* – starting with the back legs. Bends the head back to one side. (Cattle especially have probably been chewing bones.)	✓													*Botulism* (p. 256)
Uncoordinated and shaking. Suddenly becomes easily excited or weak and tired. Much *saliva* comes from the mouth. May be constipated. Collapses and becomes *paralysed*. May have convulsions and die. (Dogs and pigs may vomit.)	✓													*Poisoning: insecticides (and others)* (p. 305)
New-born animal is very lame. Many joints are hot and swollen. Animal is weak and tired. Eyes may be cloudy. Navel may be swollen with *pus*.												✓		*Navel ill* (p. 251)
Lame, especially back legs. Swelling over the back legs. Dry skin that crackles with gas bubbles under it. Weak and tired.		✓	✓	✓	✓	✓							✓	*Blackquarter* (p. 144)
Uncoordinated, may go round in circles. Grind their teeth. May have diarrhoea. Convulsions. *Fever*. Die.		✓	✓	✓	✓	✓								*Heartwater* (p. 257)
Lame on four legs. Blisters around mouth and tongue. Blisters between and above hooves.		✓	✓		✓	✓			✓					*Foot and mouth disease* (p. 279)

Signs to do with behaviour and movement (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Lame. Clear *discharge* from eyes and nose. *Saliva* comes from the mouth. Distressed breathing. Weak and tired and have *fever*. Produce little milk. Recover in a few days.		✓	✓											*Ephemeral fever* (p. 278)
Stagger about. Do not have much *saliva* coming from the mouth. Have a high *fever*. Have diarrhoea. Some have abortions.		✓	✓											*Rift Valley fever* (p. 289)
Walk stiffly and stagger about. Have red urine. Have distressed breathing. Pale *mucous membranes*. Do not have much *saliva* coming from the mouth.		✓	✓											*Babesiosis* (p. 248)
Very young cattle (under 6 months old). Become *paralysed*. Have *ticks* attached to them.		✓	✓											*Tick paralysis* (p. 265)
Lame. Thick scabs around nose and mouth. Dark red/blue *mucous membranes*. Red ring around top of the foot. Swollen tongue. Lose hair or wool.					✓	✓								*Bluetongue* (p. 273)
An animal will not walk and keeps moving its weight from one foot to another. It lies down and sweats. Feet are painful and hot.							✓	✓						*Laminitis* (p. 259)
Throw themselves about. Bite or kick at their side. Lie on their back and kick into the air. Sweat a lot.							✓	✓						*Colic* (p. 217)
Cannot move their legs. The legs are stiff. The back legs slowly become thin. Have swelling under the abdomen and around the genitals.							✓	✓						*Dourine* (p. 297)
Stagger about. Sometimes sit down like a dog or collapse. Back legs suddenly become weak or *paralysed*.							✓	✓						*Azoturia* (p. 255)
Stagger about. Have a swollen head and neck. Become sick suddenly. Have convulsions and soon die.							✓	✓						*Anthrax* (p. 141)
Behave nervously. *Discharge* from the eyes and nose is clear then becomes white/grey.										✓				*Distemper* (p. 275)
Uncoordinated and walk in circles. Shake and become *paralysed*. Severe diarrhoea and vomiting. High *fever*. Many die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)

Also see:
Cattle, buffaloes (sometimes other animals) *Footrot* (p. 254); *lack of phosphorus* (p. 229); *malignant catarrhal fever* (p. 287).
Sheep, goats *Enterotoxaemia* (p. 146); *nasal bots* (p. 202); *tapeworm – cysts* in the brain (p. 101); *scrapie* (p. 182).
Horses, mules, donkeys *Trypanosomosis* (p. 297).

Signs to do with many different parts of the body

Diseases and problems mostly to do with these signs begin on page 266.

Nearly all diseases have signs to do with more than one part of the body. Try to decide which parts of the body the signs are mostly to do with and look them up on pages 121–39. Sometimes an animal looks 'sick' (see page 109) but it is difficult to work out which parts of the body are causing the problem, especially when a disease happens slowly and goes on for a long time. Diseases and problems like these, that are difficult to work out, can be serious. They include those set out in the table below.

Signs to do with many different parts of the body

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Weak and tired. Has a higher body temperature than normal (p. 00).	✓													*Fever* (p. 266), *heatstroke* (p. 268)
Weak and tired. Pale *mucous membranes*. Have lost a lot of blood – perhaps inside where you cannot see it. May have given birth with difficulty.	✓													*Bleeding* (p. 66) *Anaemia* (p. 268)
Weak and tired. Thin and not growing – even when animal has enough food. Stand alone and do not move much. Rough, dull coat with hair that stands up. Body looks small compared with the head. Produce little milk. May have pale *mucous membranes*. May have diarrhoea. Usually do **not** have a *fever*. The skin feels dry – if you pinch a fold of skin and let go it does not fall back as quickly as normal. The eyes are sunken. Animal has a rough coat and does not move much.	✓													*Dehydration* (p. 267), *worms* (p. 218), *poor feeding* (p. 45), *lack of minerals* (p. 229), *skin problems* (pp. 124, 154)
Pale *mucous membranes* may become yellow. Live near water with snails in it. May have diarrhoea. Some have swelling under the jaw. Usually do **not** have a *fever*. Become thin and some die.	✓													*Liver flukes* (p. 285), *Schistosomosis* (p. 222)
Fever comes and goes. Pale *mucous membranes*. Become thin. Abortions and infertility.	✓													*Trypanosomosis* (p. 295)

Signs to do with many different parts of the body

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Brilliant red *mucous membranes* are unusual and are signs of an EMERGENCY. (Animals also usually have distressed breathing.)	✓													*Poisoning: cyanide* (p. 304)

Also see these diseases – most of them cause a high fever:
Any animal *Anthrax* (p. 141); *babesiosis* (especially cattle or dogs) (p. 247); *leptospirosis* (p. 284); *poisoning* (p. 301); *tuberculosis* (p. 205).
Cattle, buffaloes, camels, sheep, goats *Anaplasmosis* (p. 271); *Rift Valley fever* (p. 289).
Cattle, buffaloes, sheep, goats *Theileriosis* (p. 294).
Cattle, buffaloes, camels *Haemorrhagic septicaemia* (p. 283).
Cattle, buffaloes *Ephemeral fever* (p. 278).
Cattle *East Coast fever* (p. 276).
Sheep, goats *Bluetongue* (p. 273); *Nairobi sheep disease* (p. 288).
Horses, mules, donkeys *African horse sickness* (p. 270).
Dogs *Canine ehrlichiosis* (p. 274); *distemper* (p. 275).

Section 7 Diseases and problems, what to do about them

This section of the book describes common problems and diseases that have signs mostly to do with different parts of the body. It tells you what to do about them. If possible diseases for a particular part of the body that cause similar signs are grouped together. The section begins with general rules on how to care for a sick animal.

How to care for a sick animal

It is often more important to look after sick animals properly than to give them medicines.

- Keep a sick animal quiet. Handle it firmly but gently.
- Shelter it from the hot sun, cold wind or rain but make sure it has plenty of fresh air.
- Give the animal plenty of water to drink.
- Give it good food that is easy to eat. Feed sick animals little and often.
- Try to find out what is wrong with the animal and treat any disease as soon as possible.
- Make sure the animal has a clean dry place to lie down.
- Keep the animal sitting up comfortably, so that it can eat and breathe normally. Sick animals cannot move to where they are most comfortable.
- Keep the animal clean. Animals covered in wet faeces attract flies that bring infections. Healthy animals keep themselves clean but sick ones are usually weak and cannot.
- Separate sick animals from healthy ones (p. 92).
- Visit healthy animals to feed and water them before you visit sick ones, to avoid spreading disease.
- Wash yourself and any equipment you used after dealing with a sick animal. When an animal has recovered clean up the place where it has been. Use disinfectants (p. 324) if needed.

The treatment an animal needs depends on what the animal is used for. For example, if you treat an animal with a bad leg and it survives but is *lame* it will not be much use for pulling things, but it might be good for meat. Animals are usually kept for more than one purpose. Most animals provide food or raw materials for people but they are also used for transport and power. They are a store of wealth and often important in peoples' lives and rituals.

17 Diseases and problems mostly to do with animals dying suddenly

The problems shown below are the most common when animals die suddenly, but there are others, such as *poisoning: cyanide* (p. 304), severe *worms* (p. 218), accidents and injuries (p. 65), *navel ill* (p. 251), which you can find on the page numbers noted.
ALWAYS SUSPECT ANTHRAX WHEN ANIMALS DIE SUDDENLY.

Anthrax

Cattle, **sheep** and **goats** get *anthrax* most often. **Buffaloes, camels, dogs, horses, mules** and **donkeys** get anthrax sometimes. **Pigs** also get it but not so severely. **People** can get anthrax.

Signs

Animals become sick with anthrax 12–24 hours after they get infected.

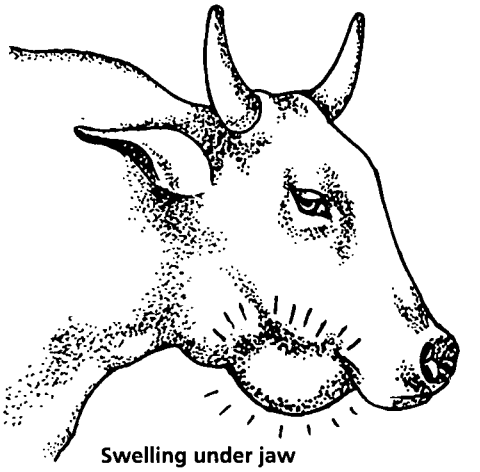
- Animals, especially *ruminants*, often die before people see any signs of disease, it happens so fast.
- Sometimes you see animals alive with anthrax. They have a very high *fever* and may have blood in the urine, faeces or milk.
- They often have difficulty breathing and usually collapse and die after 1–3 days.

Different animals and anthrax

- Most animals other than cattle have a high fever. They often have swelling under the jaw and sometimes under the neck, chest and abdomen. Some have sores and swellings on the skin.
- Some animals recover.

Skilled workers can look at a *blood smear* with a microscope to check for anthrax.

In a dead animal dark blood often comes from the nose, mouth and anus. This blood stays liquid and the body does not go stiff after death. (Animals' bodies normally go stiff 1–12 hours after death.)



Swelling under jaw

Other diseases that look like this:

Blackquarter (p. 144), *enterotoxaemia* (p. 146), *lightning* (p. 146), *pasteurellosis* (p. 202), *poisoning: plants* (p. 306).

What to do with the dead body of an animal with anthrax

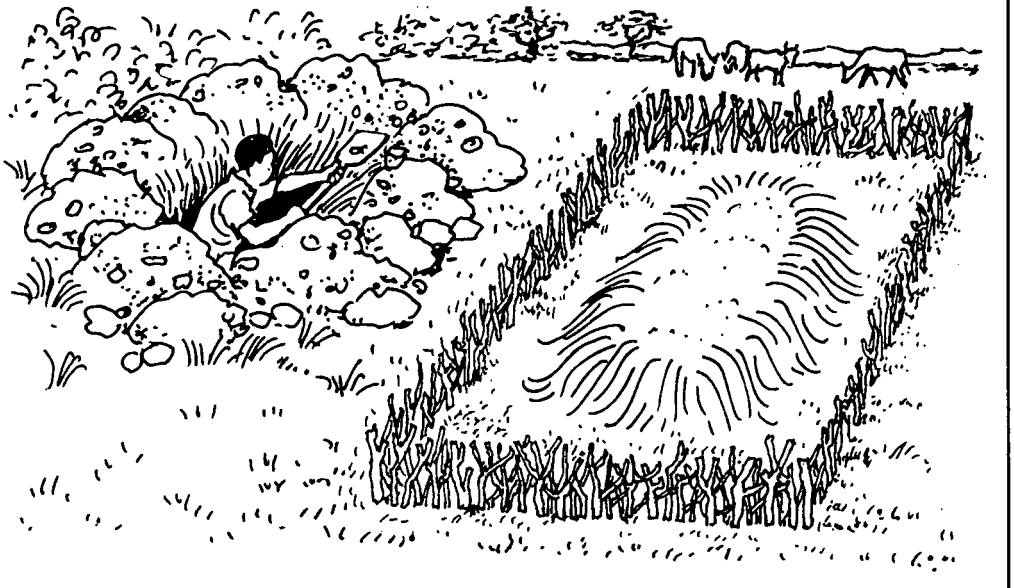
WARNING

DO NOT OPEN A BODY THAT YOU THINK HAS ANTHRAX

The bodies of animals that die of anthrax are dangerous to people and animals. Blood from the body is very infectious. When anthrax microbes in the blood are exposed to air they develop a thick protective wall around themselves. These thick-walled microbes are called *spores*. These spores can live for many years on the ground. They are dangerous. They easily infect animals and people with anthrax. Do not cut into the body. It is safest to bury the body if you can.

Bury a body

- Bury the body in a hole as deep as a tall man. Dig the hole a long way from water that people and animals drink.
- Bury anything, including soil, that has touched blood from the dead body.
- Put some thorns or a fence to keep animals off the place where you have buried the body.



Burn a body

Sometimes it is difficult to bury a body. It is as good to burn the body but you need a large fire and much fuel. Make a fire that is hot under and over the body.

- Dig a hole (about one metre long and nearly half a metre deep for a large animal) and put dry grass, wood, or some old tyres in it.
- Put the body on top and put more fuel on top of the body and pour diesel or kerosene on to start the fire.

When it is not possible to bury or burn a dead body:

- Cover the body with thorns or with stones to keep away animals or birds that might attack it and open it.

The bodies of animals with anthrax are always dangerous. After three days in the hot sun many microbes inside the body die but the skin has spores on it where blood has come out and they can easily infect animals or people with the disease.
IT IS VERY DANGEROUS TO EAT AN ANIMAL WITH ANTHRAX. ALWAYS BURY OR BURN THE BODY IF YOU CAN.

How animals get anthrax

Animals get anthrax from soil they eat while grazing. They only get it from the soil in places where animals have had the disease before. Anthrax microbes come from the blood of infected animals and live for a long time in the soil. Often the disease happens when animals go back to infected places in wet seasons. Some animals, especially camels, get infected on the skin when they are bitten by flies that carry anthrax.

Anthrax is caused by *bacteria* [*Bacillus Anthracis*].

Treatment

People do not usually see cattle, sheep, goats or camels with anthrax soon enough to treat them. Sometimes when the disease is less severe and happens more slowly there is time to treat animals, especially pigs.

- Give an antibiotic; it works well if you give large doses soon enough (p. 328).
- When some animals in a group die of anthrax, watch the others carefully for 1–2 weeks. Take their temperatures (p. 110) and immediately treat any animals that have a *fever*.

Prevention and control

- Bury or burn the bodies of animals with anthrax to stop the disease spreading to other animals or people. Avoid taking animals to places where you know there is anthrax infection in the soil.

- *Vaccine* for anthrax is effective and lasts for nearly a year. Many governments organise vaccination every year where the disease is a problem.
- Vaccinate animals one month before they go to an area where the infection is common or one month before a time when you expect the disease to happen.

Blackquarter, Blackleg

Cattle and **sheep** get *blackquarter* most often, **other animals** get it occasionally. Healthy, well-fed, young animals get the disease most often.

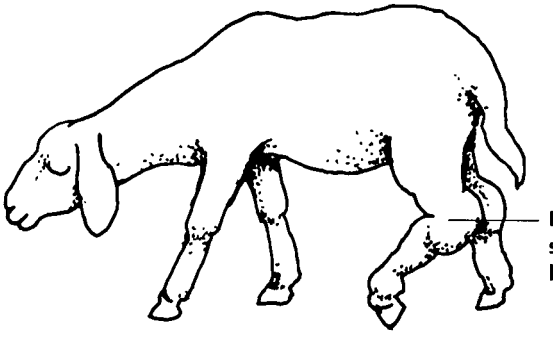
Signs

Animals become sick 1–7 days after they get infected with blackquarter.

- The wounds where the infection gets in are usually too small to see.
- This disease usually happens very quickly. Animals often die before they have signs of disease.

Sometimes the disease happens more slowly.

- The animals are tired and weak. They are very lame. Usually the back legs are lame and they become swollen and hot. You can feel bubbles under the skin over the back legs. The skin is dry and crackles when you touch it.
- The animals have a high *fever* and most die in 1–2 days.



Other diseases that look like this

Anthrax (p. 141).

How animals get blackquarter

Animals get blackquarter through very small wounds, such as thorn pricks. Infection comes from the soil. *Microbes* get into the soil from the bodies of animals that die from blackquarter and can live in the soil for a long time.

Blackquarter is caused by *bacteria* [*Clostridium chauveoi*].

Treatment

Treatment only works if it starts very soon.

- Give antibiotics (p. 328). Even large doses are not always effective.
- Some people treat blackquarter by cutting into the muscle to let air into the deep muscle where the microbes are. Blackquarter microbes cannot live in air so they are killed. But this does not always work and it can let other infections get in.

Prevention and control

Vaccination for blackquarter is effective and lasts for a year. It is possible to stop this disease from happening. Vaccinate animals every year where this disease is a problem.

When an animal dies of blackquarter, **burn or bury the body** and anything that comes from it or had touched it, as you would for *anthrax* (p. 142). If you cannot do this, put thorns around the body to keep other animals away.

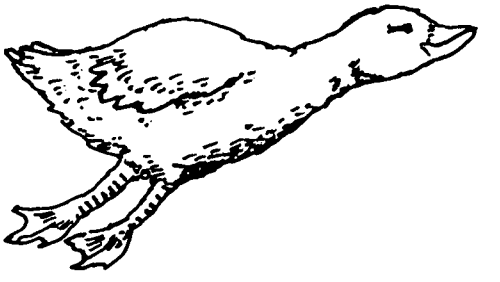
Duck viral hepatitis

Ducks, about one week old, and some other water birds get *duck viral hepatitis*.

Signs

Birds become sick 1–2 days after they get infected with duck viral hepatitis.

- Almost all the ducks of about one week old that get this disease die. Ducks over two months old do not get the disease.
- Their eyes are closed.
- The ducks stop eating, they are weak and tired. They fall over and soon they collapse completely. They stretch out their necks and legs.
- They die very quickly.



How birds get duck viral hepatitis

They get it from close contact with infected birds. Duck viral hepatitis is caused by *viruses*. [*Picornavirus*]

Treatment

There is no effective treatment for duck viral hepatitis.

Prevention and control

- Isolate infected birds. Move any healthy young ducks away from the place where the infection is.
- There is an effective *vaccine*. Vaccinate ducks when they are 10 days old and adult ducks used for breeding.

Enterotoxaemia, Pulpy kidney

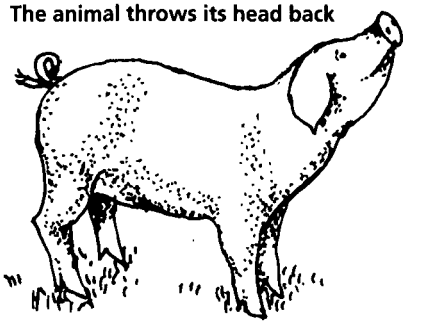
Sheep and **goats** get enterotoxaemia.

Signs

Sheep get the disease most severely.

- Many animals die before they have signs of disease.
- Some animals become restless. They are suddenly weak and tired.
- They throw their heads backwards and stretch their legs out.
- They soon have convulsions and often die in 1–2 hours.

The animal throws its head back



In a dead animal the *intestines* are dark red. The kidneys are soft. The sac around the heart has blood-stained fluid in it. The abdomen also has blood-stained fluid in it.

How animals get enterotoxaemia

Animals get it when they suddenly eat much better food – when they go to new pasture at the start of a wet season or they start eating grain. Usually animals 1–12 months old get it after they are weaned. Infection comes from the soil. The *microbes* grow quickly in the *intestines* and produce strong poisons that make the animal sick very fast.

Enterotoxaemia is caused by *bacteria*. [*Clostridium perfringens. Type D*].

Treatment

- There is no effective treatment for an animal that already has severe disease.
- Move the group to poorer food immediately. Then slowly give them better food. It may help to give antibiotics (p. 328) to other animals in the group before they become sick.

Prevention and control

- Avoid suddenly moving sheep or goats to a much better pasture.
- Vaccination for enterotoxaemia is effective. If the disease happens often vaccinate pregnant animals 1–2 months before they give birth to protect the new-born animals. Vaccinate young animals when they are two months old. Give two doses three weeks apart. Vaccinate again every six months.

Lightning

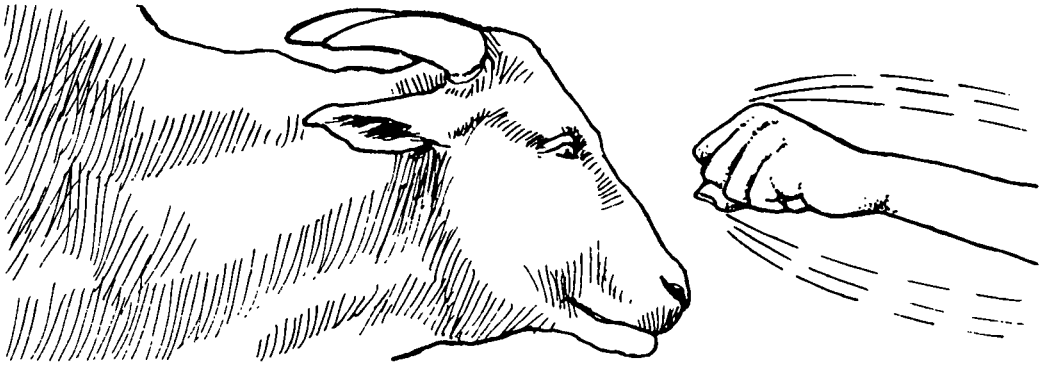
Animals hit by lightning sometimes have burns on the skin. The burns are not always easy to see. Look carefully under the hair to find them.

18 Diseases and problems mostly to do with eyes

Blindness

How to tell if an animal can see:

- Animals that cannot see at all walk into things.
- Make a quick movement with your hand towards the animal's eye. If the animal can see it will blink.



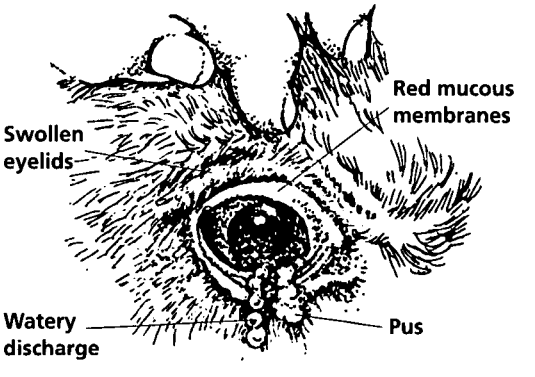
If an animal cannot see with one eye it is usually because of an object in the eye or an injury. If an animal cannot see with either eye and the animal has a *fever* it usually has an infection. Give an antibiotic (p. 328).

Animals that cannot see are sometimes healthy otherwise. But they have difficulty finding food and they walk into things. It is often best to kill them for meat.

Injury or something in the eye

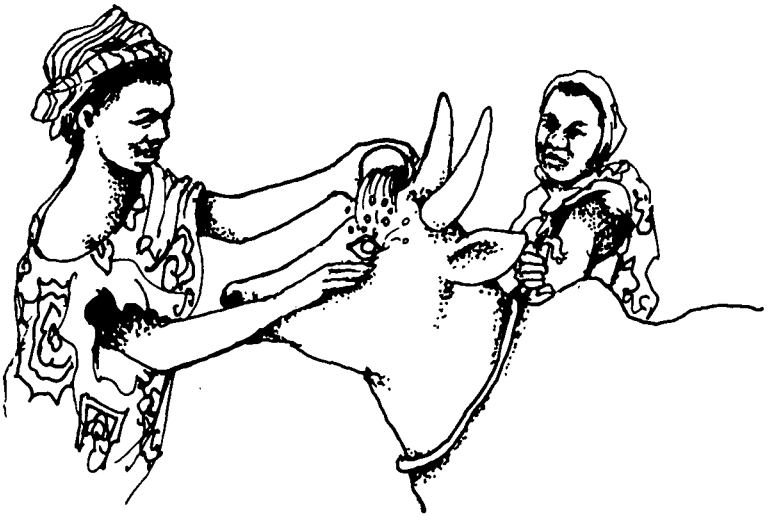
Signs

- The eye is red and the eyelids are swollen and the animal blinks a lot.
- A watery *discharge* comes from the eye. If there is infection *pus* may come from the eye.



Treatment

- Get someone to help hold an animal securely and wash your hands before treating eyes.
- Clean around the eye with clean salt water.
- Open the eyelids and check for injury or objects in the eye. If you can see something in the eye take it out. It helps to use a clean wet cloth to take out objects.



Use plenty of clean water or other eyewash (p. 349) to wash grit, small objects or *discharge* from the eye. In West Africa people use a few drops of vegetable oil to help move small objects out of the eye.

- If there is infection put an antibiotic (p. 349) in the eye. Often, cleaning the eye and keeping it clean will let it recover without antibiotic.

Eyelids turned in

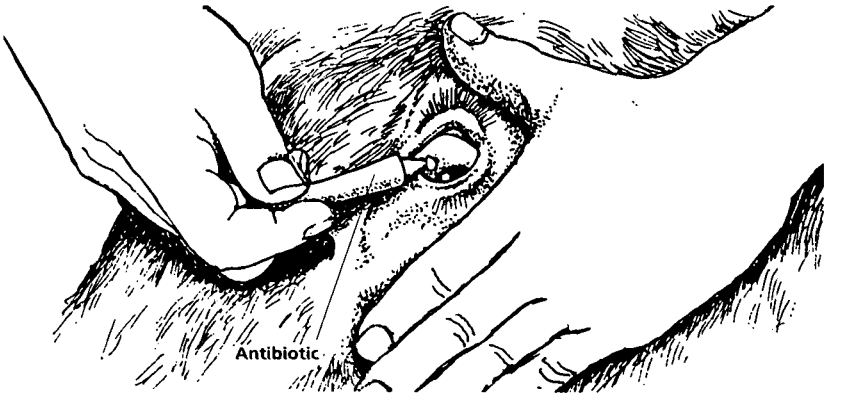
Very young animals especially have this problem; some are born with eyelids that turn in. The eyelashes rub on the front of the eye and damage it.

Signs

- A watery *discharge* comes from one or both eyes that may be closed with swollen eyelids.
- The eye is red and inflamed. The centre of the eye becomes cloudy/white and the eye may become so damaged that the animal cannot see.

Treatment

- Lift the eyelid out with your finger and put antibiotic in the eye.
- Turning the eyelid out regularly for a few days sometimes treats this.



● Skilled workers can do a simple operation to treat this.

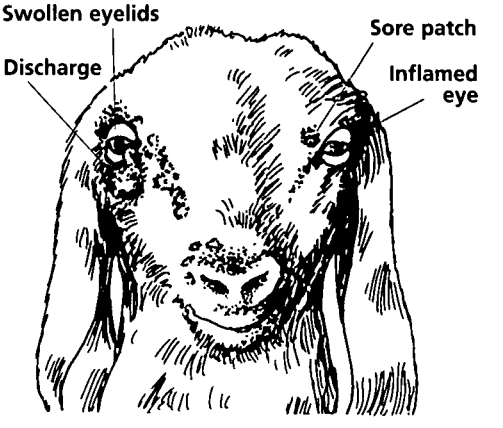
Do not use these animals for breeding.

Conjunctivitis, Eye infection

All animals and **people** can get *conjunctivitis*. Some kinds of animals get a severe kind of conjunctivitis called *kerato-conjunctivitis* (p. 150).

Signs

- ◆ The skin under the eyelids – *conjunctiva* (p. 42) – is red. Sometimes the whole eye is inflamed. The eyelids are swollen.
- ◆ A clear/white/yellow *discharge* often comes from the eye.
- ◆ The animal blinks often and avoids bright sunlight.
- ◆ Sometimes the infection attacks the skin around the eye and causes a sore that can even go down the nose.



Eye infections spread by direct contact and are spread by flies and other insects. They spread more easily, go on for longer and are often more severe when there are many flies or much dust.

Treatment

- ● Wash the eye with clean water or salt and water.
- ● Put antibiotic drops, ointment or powder into the eye (p. 349). Skilled workers inject antibiotic under the eyelid. This works well.
- ● Separate an animal with an infection from healthy animals.
- ● Wash your hands after treating the animal.

Kerato-conjunctivitis, Pink-eye

Cattle, camels, sheep and **goats** can get *kerato-conjunctivitis*.

Signs

Animals become sick 1–20 days after they get infected.

- The disease attacks one or both eyes.
- A clear *discharge* comes from the eye.
- The *mucous membranes* under the eyelid – the *conjunctiva* – become red.
- The animals avoid strong sunlight. They blink a lot.
- The discharge from the eye often becomes grey/white.
- Most cattle have a small white/grey/yellow spot in the middle of the eye. The spot grows and covers much of the eye.
- The animal cannot see with the bad eye for a time.

Sheep and goats usually recover after 7–10 days with no treatment.
Cattle usually recover after 3–4 weeks with no treatment.

- Sometimes the spot becomes red and swells. The eye bulges out and sometimes gets injured.
- Without treatment sometimes the eye bursts.

How animals get kerato-conjunctivitis

They get it from other infected animals when they touch them. Flies and dust also carry the infection between animals. Cattle do not get the disease from sheep or goats. Sheep and goats do not get the disease from cattle. The disease happens most at dry times in places where there are many flies or much dust.

Kerato-conjunctivitis is caused by a mixture of *bacteria* [*Moraxella, Mycoplasma, Listeria, Chlamydia*].

Treatment

- Many antibiotics are effective. Use ointment or powder to put antibiotic directly into the eye (p. 247).
- Skilled workers inject antibiotic under the *conjunctiva*. This needs to be done skilfully but works well.

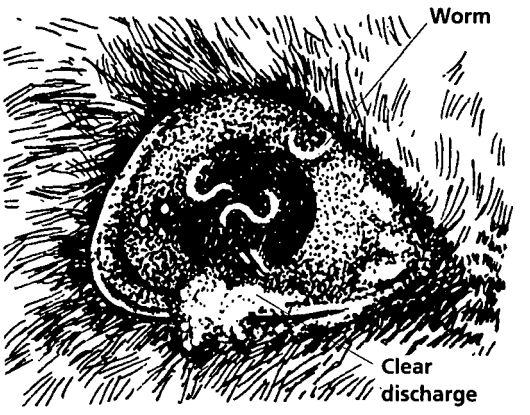
Eyeworms, Thelaziosis

Most animals can get *eyeworms*.

Signs

- A clear *discharge* may come from one or both eyes. Occasionally the discharge becomes white/grey/yellow and the animal tries to avoid bright light.

◆ You can see a thin white *worm* about 2 cm long on the surface of the eye, there are usually no other signs of disease.



How animals get eyeworms

Flies carry the *parasite* from the eyes of infected animals. Eyeworms are a type of *roundworm* (p. 94) [*Thelazia*].

Treatment

- To remove eyeworms from the eyes it helps to use a local anaesthetic eyewash (p. 348). Put 5–10 ml into the eye, wait a minute or two and wash the worms out with clean water (see p. 349).
- Levamisole (p. 337) kills eyeworms. Put 1 per cent solution directly into the eye, or use ivermectin (p. 337).
- Put an antibiotic (p. 349) onto the eye if the *discharge* is cloudy white/yellow.

19 Diseases and problems mostly to do with ears

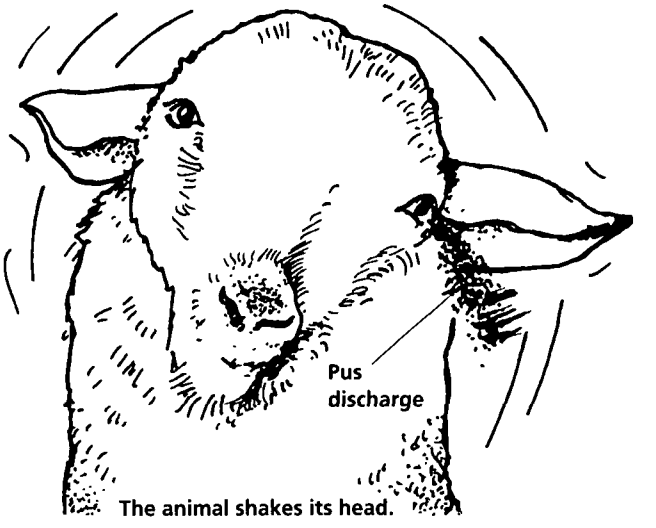
These are the most common problems but there are others, such as *haematoma* (p. 187).

Ear infection

All kinds of animals get ear infections.

Signs

- Sometimes the animal shakes its head or holds it on one side and has a white/yellow *discharge* of *pus* from the ear.



The animal shakes its head.

Treatment

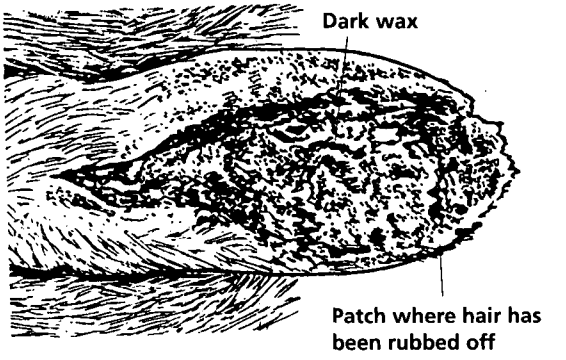
- Clean the ear out with clean water, salt water or antiseptic (p. 324).
- Then put an antibiotic (p. 328) into the ear.

Ear mites

Many animals get *ear mites*, especially **horses**, **pigs** and **dogs**.

Signs

- The animals' ears are sensitive to being touched.
- The animal rubs its ears on things or scratches them. Sometimes the animal rubs hair off its head around the ears when it rubs.
- It shakes its head.
- It has much dark wax in the ear.
- One or both ears hang down.



Animals get ear mites from direct contact with infected animals.

Treatment

Use mild insecticide to kill the mites (p. 349) An insecticide mixed with oil is useful because it softens the wax inside the ear. Ivermectin (p. 337) works.

Earworm, Rhabditis bovis

Earworm only happens in Central and East Africa and Madagascar. Only **cattle** get earworm.

Signs

- Animals have a white/grey/yellow *discharge* from (usually) one ear.
- They may become thin and not produce much milk.

How animals get earworm

They get it from insecticide dips infected with earworms.

Earworm is a type of *roundworm* (p. 94) [*Rhabditis bovis*].

Treatment and control

Ivermectin (p. 337) works but it is expensive. Some people use tobacco (p. 345).

20 Diseases and problems mostly to do with skin

These are the most common skin problems but there are others. See also, lumps and swellings (p. 186), *glanders* (p. 197).

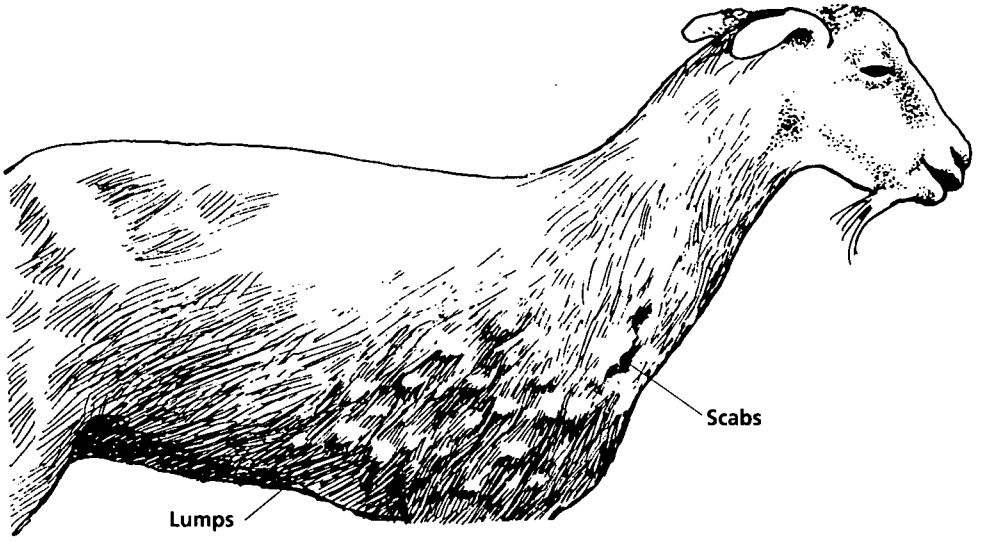
Mange (mites)

All animals and **birds** get *mange*. Young animals can get severe mange badly. **People** sometimes get mange (p. 6) but they do not always get it directly from animals.

Signs

Animals become sick 2–3 weeks after they are attacked by mites.

- Animals scratch and rub against things because mites bite into the skin and cause a lot of irritation. (Some kinds of mites [*Demodex*] do not make animals scratch and rub). Some animals shake their heads and rub their ears against things because they have mites in the ears.
- Mange often starts around the ears and the neck. The skin becomes red and some animals lose hair or wool. Skin damaged by mites often gets infected and becomes crusty with scabs. When mange goes on for a long time the skin gets thick and scaly and animals do not produce much milk or meat.
- When the animal is killed the skin is usually damaged and worth little.



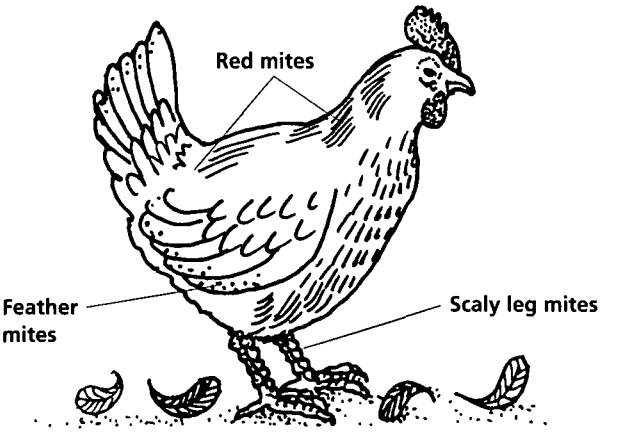
Camels often get severe mange. It starts on the head and neck and under the abdomen but soon spreads over the whole body.

Birds

Red mites. Birds with many of these mites are very irritated. They do not grow, and become thin. Some birds even die. Red mites spread *fowl pox* (p. 179) and other diseases.

Scaly leg mites dig into the skin on birds' legs. The birds have thick scaly legs and often cannot walk properly.

Feather mites live at the base of feathers and cause irritation so birds pull the feathers out.



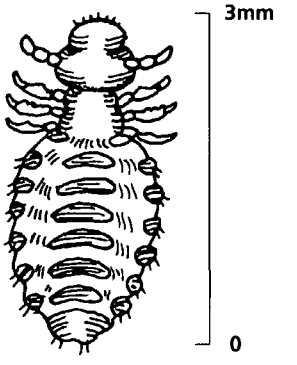
Other diseases that look like this:

Pox (p. 177); *contagious pustular dermatitis* (p. 167).

How animals get mange

Animals get mange by direct contact with animals infected with *mites*. Mites nearly always live on animals' skin so they spread directly from animal to animal, usually when animals are kept close together in houses. Rarely, animals get mange from mites in the bedding or on the ground.

Mange is caused by small *parasites* called *mites* .... They are so small you can only just see them. Some mites feed on the surface of an animal's skin, others dig deep into the skin.



Mange mite

Birds Red mites live on the skin of birds. In daytime the mites live in cracks in buildings where birds live. At night they feed on the birds. Females lay eggs in cracks near where the birds sleep.

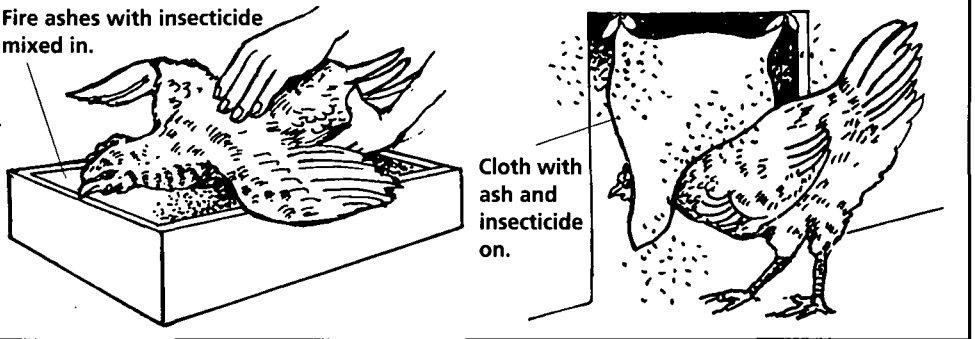
Treatment and control

Most insecticides kill mites but sometimes it is difficult to kill mites because they are deep in the skin (p. 342).

- Treat animals quickly and treat all the animals in a group with mange at the same time. Otherwise mites from animals you do not treat will soon spread back to the animals you have treated.
- Treat animals again after two weeks. (Mites lay eggs on the skin of animals and insecticides do not kill the eggs. But the eggs develop into young mites in about a week, and then the second treatment kills them.)
- Clean up the house where the animals live. Some mites and eggs fall onto the ground and can spread back to the animals you have treated. If it is difficult to clean the house and mange keeps coming back, spray insecticide on the ground around where the animals live.

- For mange in the ears, giving ivermectin by injection works well (pp. 337, 344) but it is expensive. You can use any insecticide spray to kill mites in the ear or mix insecticide with vegetable oil and put a few drops into the ear. The oil helps the insecticide get through the ear wax and attack the mites (p. 349).
- Some types of mange are severe and spread very easily so governments have control programmes for them. Sheep get a type of mange [*Psoroptes ovis*] that is controlled like this by dipping every year to control the mites.
- **Birds** You can treat *red mites* and *feather mites* easily with an insecticide dusting powder (p. 342).

  It is difficult to treat *scaly leg mites*. Scrubbing the legs with insecticide sometimes works. But often the scabs are so thick the insecticide cannot reach the mites. It is often best to kill the bird for meat.

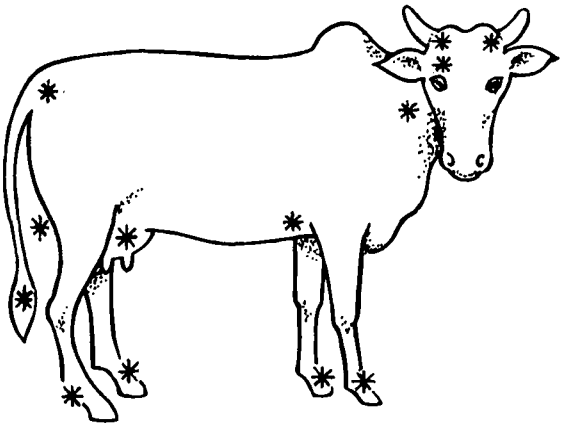


Ticks

Ticks cause skin problems and they spread many important diseases.

Signs

This picture shows the parts of the body where ticks most often live.



- ◆ When animals are bitten by many ticks they can be very irritated and become thin and weak. They may have pale *mucous membranes*.
- ◆ Tick bites often get infected by *bacteria* and turn into *abscesses* (p. 186). The bites damage an animal's skin and make the hide less valuable for leather.
- ◆ Female animals suffer when ticks bite the teats, especially when there are many ticks close together. The teats can get infected where the ticks have been. Some animals get *mastitis* (p. 244) from this.
- ◆ Some animals get sore and infected ears because of tick bites.

Treatment and control

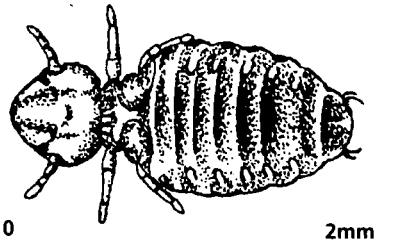
For how to control ticks see pages 106–8.

- Treat infected tick *bites* with antibiotic powder or spray (p. 325).

Lice

Lice are insects with no wings, about 1–5 mm long that live on the skin of animals, birds and people. They look like small black dots on the skin and you can see their grey eggs attached to hairs or feathers.

Some lice (*Biting lice*) feed on hair and on the surface of the skin, others (*Sucking lice*) bite through the skin to feed off body fluids.



A biting louse

Animals kept on rangeland rarely have problems with lice but they can be a problem for poorly fed, weak young animals kept in overcrowded places. A few lice do little harm but many lice can be a problem for an animal.

Signs

- Animals scratch and rub against things, some are so irritated that they never rest and do not eat properly.
- Some animals or birds lose hair, wool or feathers.
- A few animals with many lice have pale *mucous membranes*.

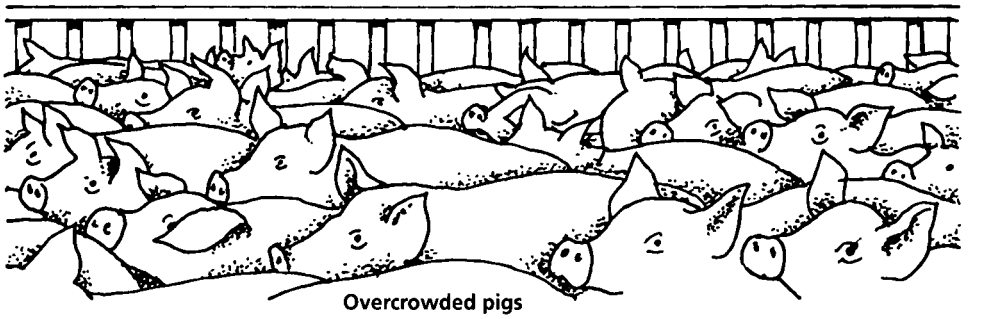
Horses, mules and donkeys usually get lice around the tail or on the mane. **Pigs** usually have lice around the head and neck and between the legs.

How animals get lice

Lice always live on animals and lay their eggs on animals. So an animal can only get lice from another animal when the animals are close together. But different kinds of lice live on different animals and they do not move from one kind of animal to another.

Treatment and control

- Make sure that animals are properly fed and that animals in houses are not too crowded together. Keep animals outside in the sunlight as much as possible.
- Separate animals with lice from healthy ones and examine new animals carefully for lice. If they have any lice on them, treat them before the lice spread to other animals.
- Most insecticides (p. 339) kill adult lice but some do not kill lice eggs so treat the animals again after two weeks when all the eggs have hatched and before new ones are laid.

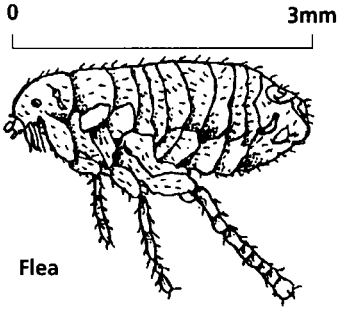


Overcrowded pigs

- Always treat all the animals in one place for lice at the same time. Otherwise lice will survive on any animals you do not treat and will soon go back on to animals you have treated.

Birds Use insecticide powder or paint the perches with liquid insecticide (p. 344). Before you put a bird in her nest box, treat her and the bedding in the box with insecticide powder to stop her spreading lice and other *parasites* to her young.

Fleas



Flea

Fleas have no wings and move around by jumping. They are not often a problem for farm or rangeland animals but can be for **dogs**, **rabbits** and **birds** and sometimes get on to other animals and people. They bite through an animal's skin to suck blood.

Dog fleas carry the *larvae* of *tapeworms* (p. 101).

Adult fleas lay eggs on the ground. They become larvae on the ground and develop into adults on the ground near where animals live. Adult fleas jump onto animals to feed off their blood.

Signs

- ◆ Animals with fleas itch and are restless, they sometimes damage their coats by scratching.
- ◆ Sometimes fleas look like black spots on the face of birds; they do not move much.

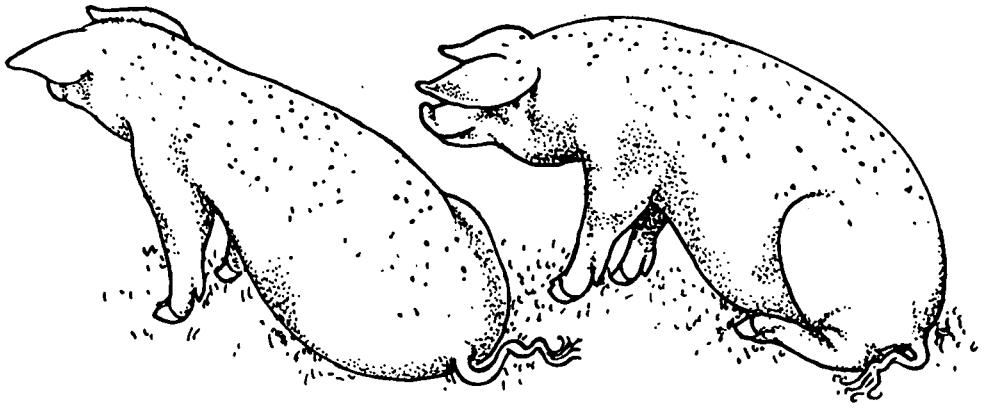
Treatment and control

It is easy to kill fleas with insecticide but it is more difficult to kill flea larvae.

- Use insecticide spray or powder (p. 339) and clean the place where the larvae are.

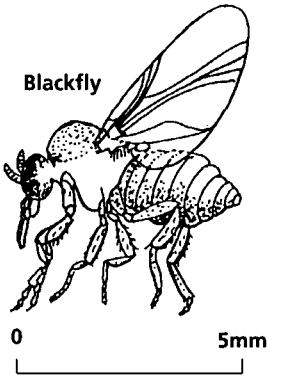
Flies

Many different flies cause problems on the skin and spread disease when they bite animals. To find out how to control flies see page 103.



Flies on pigs

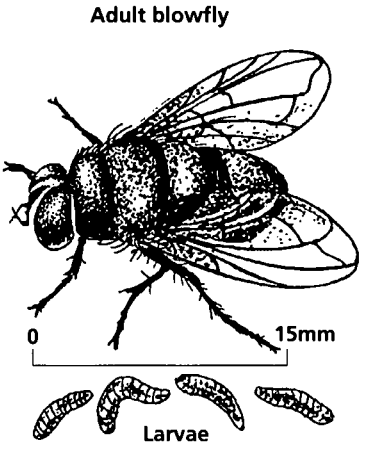
Blackflies [*Simuliidae*] .... are small flies 1–5 mm long. Often many flies bite an animal at the same time to feed on blood. They are worst at dawn and at dusk. They spread *worms* that cause skin nodules (p. 185). These flies lay eggs in moving water.



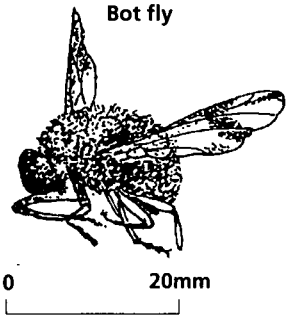
Blowflies [*Calliphoridae*] .... are usually shiny and bright blue/green or yellow/red or orange/gold, about 5–15 mm long.

They cause *flystrike* (p. 161).

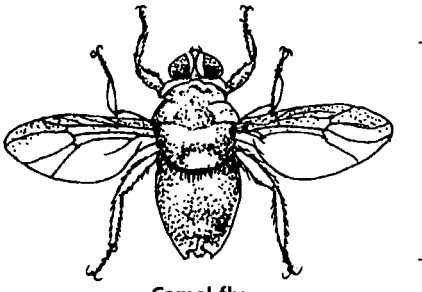
Adult blowflies lay hundreds of eggs on animals' skin when it is damaged. The eggs are about 1 mm long. They hatch into *larvae* (called maggots) after 1–3 days. The larvae feed on the animal's flesh for two weeks and grow to 1–2 cm long, then fall to the ground and dig into the soil. They come out of the ground as new adult flies after 1–3 weeks.



Bot flies [*Gastrophilus*] Stomach bots .... lay eggs around the head and neck of horses. The eggs develop into larvae that the horse swallows. The larvae – '*Bots*' – stick to the inside of the *stomach*. Sometimes you see many of them in a dead animal but they do not usually cause disease. *Bots* come out in the faeces and develop in the ground into new adult flies.

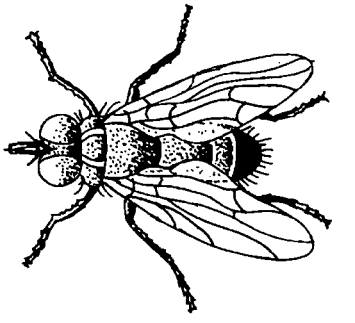


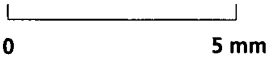
Camel flies [*Hippobosca*] Ked flies .... have small wings and do not fly well. They have claws and cling firmly to a camel's skin. They only attack camels but a similar kind of fly attacks sheep. Camel flies do not cause serious problems, though they suck blood and can cause *anaemia* (p. 268). Camel herders say these flies especially attack animals that are already sick. Sick animals sometimes look black because they have so many camel flies and fly faeces on them.



Camel fly

Horn flies [*Haematobia*] .... are green/brown, yellow/brown or grey/black. They are about 5 mm long. They live on cattle and cause much irritation. Often many of them attack an animal at once but each fly bites many times a day to feed on blood. They spread *hump sore* (p. 174).

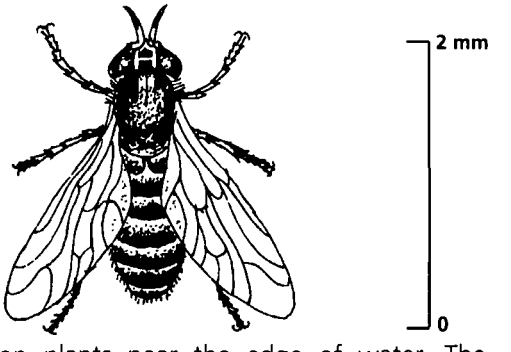

Horn fly



Adult horn flies live all the time on animals – usually at the base of the horns or on the back. Females lay eggs in cattle faeces. The eggs become *larvae* in the faeces and become new adult flies in about 2–4 weeks. (Buffalo flies are like horn flies but are silver/grey with some spots. They attack buffaloes, cattle and even horses.)

Horse flies [*Tabanidae*] .... are usually large (about 2 cm long) and dark brown but some are smaller and grey/yellow or yellow/brown. They are larger than tsetse flies. They bite horses, cattle and people. They cause pain and bleeding when they bite and they spread diseases. They mostly bite animals under the abdomen when it is hot and there is no wind. Other kinds of flies are attracted to the places that bleed.

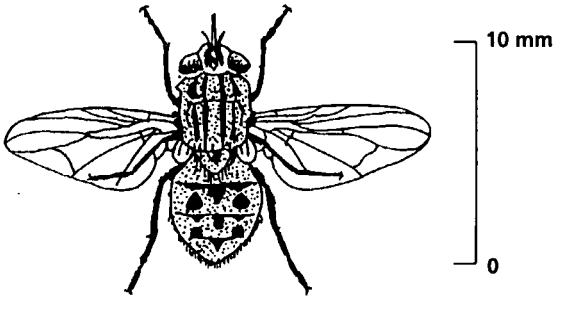
Horse fly



Female horse flies bite animals and suck blood but male flies live on plants. The female lays hundreds of light brown eggs on plants near the edge of water. The eggs become *larvae* after a week and fall to the ground to become new adult flies.

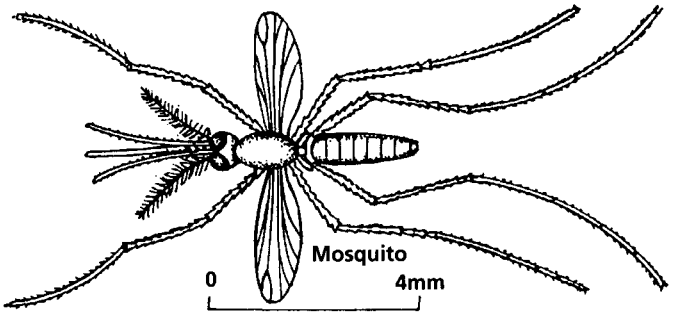
Stable flies [*Stomoxys*] .... are about 5–10 mm long. They are grey/black with spots and have wings that stick out when they are not moving. They attack cattle, horses and most other animals and birds. Animals can be so annoyed by these flies that they do not eat much and produce little. They spread many diseases. They lay eggs in rotten bedding and old food around animal houses. The eggs become *larvae* that become new adult flies after 2–3 weeks.

Stable fly



Midges (p. 105) .... spread *African horse sickness* (p. 270), *bluetongue* (p. 273) and *ephemeral fever* (p. 278).

Mosquitoes .... spread *ephemeral fever* (p. 278), *heartworm* and *Rift Valley fever* (p. 289).



Sand flies (p. 105) .... spread *leishmaniosis* (p. 175).

Treatment and control

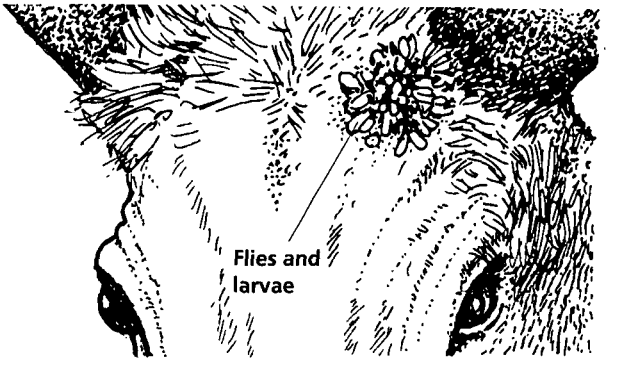
See pages 103–5 for how to control flies.

Flystrike, Myiasis .....

All animals get *flystrike* but **sheep** get it worst and most often. **People** sometimes get flystrike.

Signs

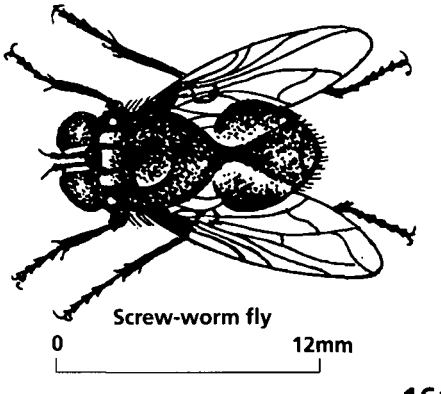
- Animals are irritated and scratch and rub at a wound with fly *larvae* in it. The larvae can destroy a lot of flesh. The wound often gets infected by *bacteria*.



How animals get flystrike

Animals get flystrike from eggs that blowflies lay in a wound. They lay eggs in very small wounds, such as *tick* bites and on larger wounds, such as castration wounds.

The eggs become *larvae* that eat the animal's flesh. (Some people call these larvae *maggots*.) One severe kind of flystrike is caused by *screw-worm fly* larvae.



Treatment and control

- Treat wounds as soon as possible (p. 69). Use a wound dressing that kills fly eggs or larvae (p. 326). Or use a pour-on insecticide that gets into the blood of an animal and kills fly larvae when they eat the animal's flesh.
- Give an antibiotic to stop infection (p. 328).
- Cut wet, dirty wool from around the back legs of sheep.
- Avoid doing castration or other operations when there are many flies.
- Control flies if you can (p. 103).

Insecticides (p. 339) for flystrike include: Cyromazine, Diazinon, Fenthion and Trichlorphon.

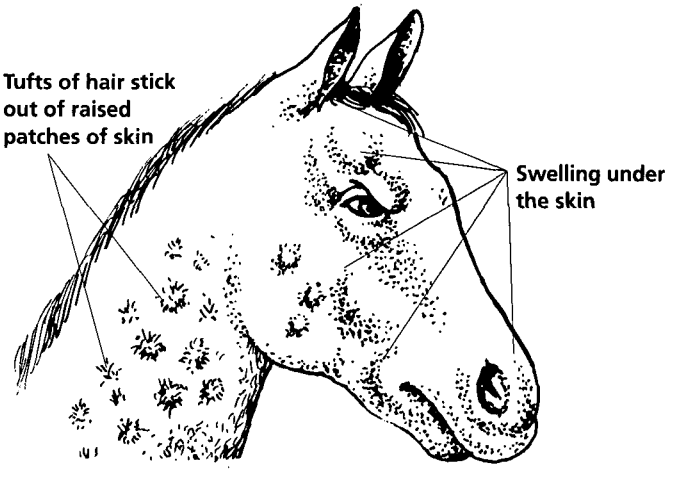
Allergy

All animals can have an *allergy*.

Signs

An allergy can be mild or severe, the signs vary a lot but often include:

- Animals suddenly have swelling under the skin and may have raised patches on the skin with tufts of hairs that stick out.
- They breathe fast and the breathing is distressed. Sometimes the reaction in the lungs is so bad the animal cannot breathe.



How animals get an allergy

Animals have an allergy when they are in contact with something they are sensitive to. The body reacts with a lot of *inflammation*. The things that animals and people are sensitive to include insect stings, certain plants and some medicines, such as penicillin.

Horses get an allergy, with raised tufts of hair on the skin, called *sweet itch*, when they are bitten by midges [*Culicoides*].

Treatment

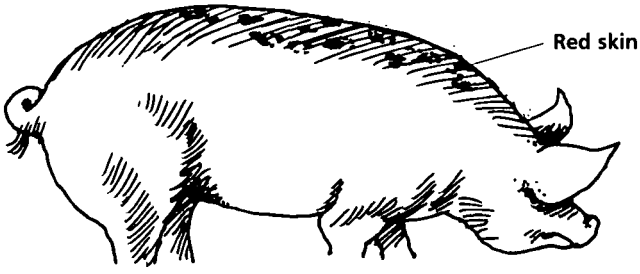
Most animals recover with no treatment quite quickly. They recover sooner when they are no longer in contact with the thing they are sensitive to. If an allergy is severe skilled workers give *antihistamine*. If it is very severe and the breathing is very distressed they also use other special medicines.

Sunburn

Animals, especially **pigs** or **horses** imported from cooler places, get burned by the sun. This happens especially on parts of the body where there is little hair. It happens on the backs of pigs with white skin and around the nose of pale horses.

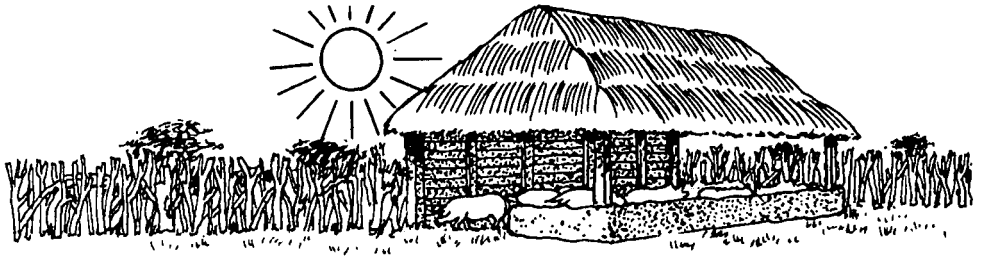
Signs

- The skin becomes red. It is wet and sometimes has blisters on it. Pieces of skin fall off leaving sores that bleed.



Treatment

- Use wound dressing or antibiotic powder to prevent infection (p. 324).
- Provide good shade for the animals.



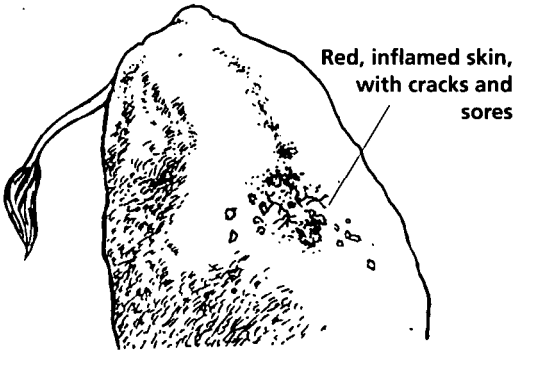
Animals in shade

Photosensitisation

Some poisons, especially plant poisons make the skin of animals, especially **cattle** and **sheep**, very sensitive to sunlight – they cause *photosensitisation*.

Signs

- The pale coloured parts of the skin become red and inflamed and the skin cracks open. This often happens on the back and around the nose but can happen anywhere on the body. Sometimes the skin dries up and large pieces of skin fall off leaving a sore red patch underneath.
- The *mucous membranes* sometimes become yellow.



- Most animals do not become sick but a few of them become very sick.
- **Sheep** get cracked skin on the face and sometimes the skin falls off in large scabs. This happens when they are poisoned by a small fungus [*Pithomyces chartarum*] that lives on dead plants on the ground.

How animals get photosensitisation

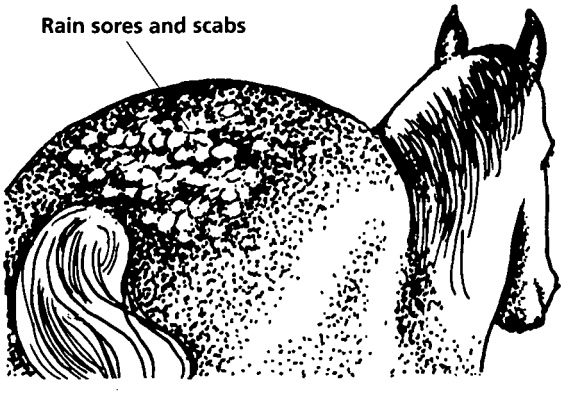
They get it when they eat poisons that the liver cannot destroy and which make the skin very sensitive to sunlight. The poisons usually come from plants, or fungi that live on plants.

Treatment

- Put the animals into the shade and keep them away from bright sunlight for a few days.
- Put a wound dressing (p. 324) on the cracks and sore places.
- Give an antibiotic by injection to treat infection if the skin is very damaged.
- Move the animals to a different pasture away from the plants you suspect poisoned them. Some plants are only poisonous at certain times and the pasture may be safe to return to later in the year.

Rain sores

Horses, mules, donkeys Horses get sores on the skin when the skin is wet for a long time. They get scabs on the back and shoulders when they are left out in the rain for a long time with no shelter. They also get cracks and scabs in the skin around the feet. Sometimes *pus* comes from these cracks.



Treatment and prevention

- Wash and rub gently with antiseptic to remove the scabs (p. 324).
- Dry the sore area carefully.
- Keep the animal in the dry.
- Use antibiotic powder or a wound dressing that dries the sores (p. 324).

Prevent this problem by not letting horses stay wet for too long. Give them shelter and brush them dry after they have been in the rain for a long time.

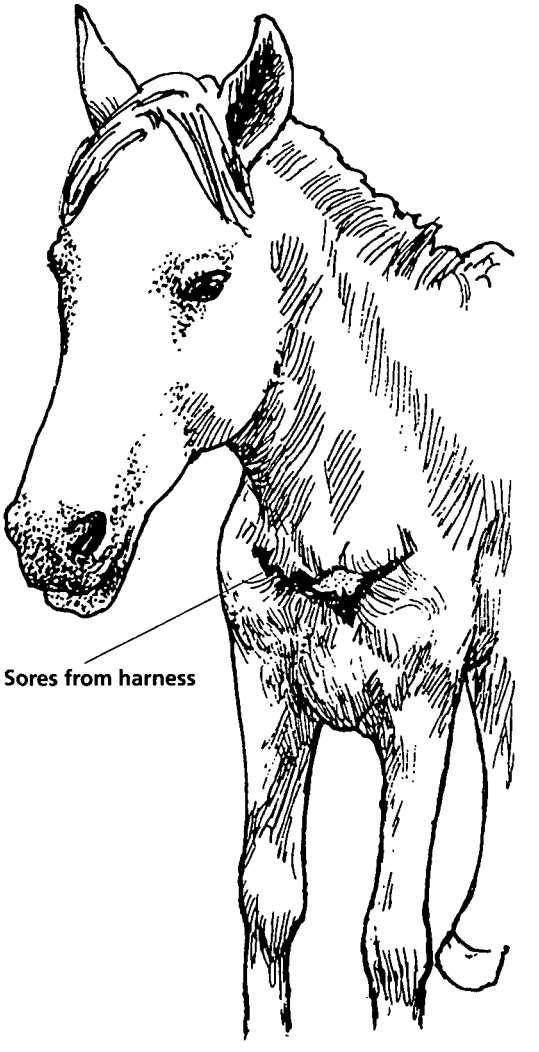
Saddle sores

Any animal can get *saddle sores*.

Signs

Animals have sores on the skin where ropes or harness has rubbed them. Some animals have more sensitive skin than others and often get sores from harness or ropes. Dried sweat mixed with sand or dust between the harness and the skin often helps cause sores. Some animals get sores when it rains and water gets between the harness and the skin.

- Some animals have round dry sores with curled up edges and normal skin in the centre (sometimes called a set-fast). This type of sore takes a long time to recover on its own.



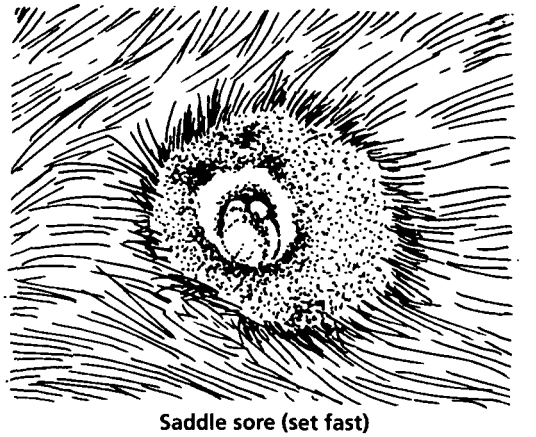
Treatment

- Stop the harness rubbing. Change the way it fits or use padding to keep it away from the sore spot and give the place where the sore is a rest.
- Clean the sore with antiseptic and put on a dressing that dries it (p. 324).

The sore will usually recover in a few days.

People in West and Central Africa put the powdered bark of *Adenium obesum* trees onto sores to repel flies and birds and help the animal to recover. But the juice from this tree is poisonous and can cause diarrhoea. **Keep it away from the eyes because it damages them.**

To treat a set-fast, skilled workers usually use a local anaesthetic (p. 348) then cut the piece of skin off and put antiseptic on the wound.



Saddle sore (set fast)

Anhydrosis, Dry coat

Horses get *anhydrosis*. Riding horses imported to hot wet areas get it most. Imported dairy cattle get it rarely.

Signs

Animals with anhydrosis cannot sweat even when they are hot.

- Horses have fast distressed breathing after they have worked.
- They have a high temperature.
- At first they sweat much more than normal. Soon they only sweat from a few parts of the body: the neck, middle of the back or between the front legs. After a few weeks they only sweat on the top of the neck.
- The coat looks rough and dry.
- Some horses lose hair around the head.
- A few horses die suddenly while they are working.

How animals get anhydrosis

This is not an infectious disease. It does not spread to other animals. It happens because some animals cannot adjust to living in hot places.

Treatment and control

- Move animals to a cooler place and they will recover. Or keep the animals as cool as possible and do not make them work in hot sun.
- Make sure they have enough water to drink and enough salt (p. 231).
- Give them plenty of fresh green food.
- Skilled workers can give special medicines but they do not always work.

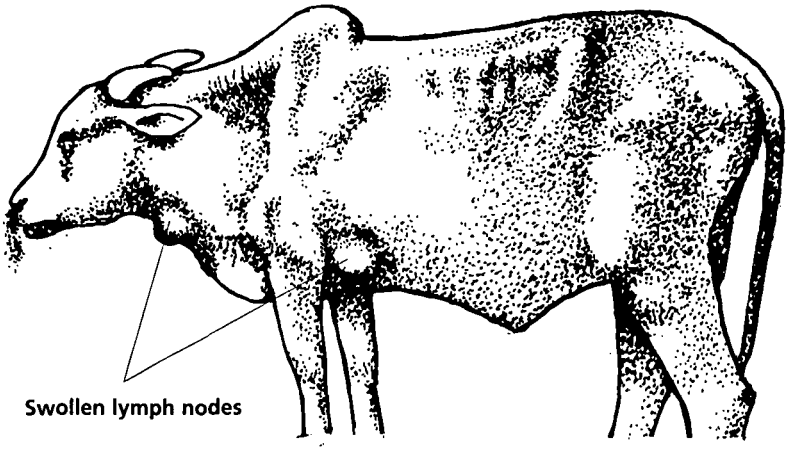
Besnoitiosis, Globidiosis

Cattle get besnoitiosis. **Horses, mules, donkeys** and **goats** occasionally get it.

Signs

Cattle become sick 7–10 days after they are infected.

- They have swollen *lymph nodes* under the skin (p. 41).



- Some animals have a clear *discharge* from the nose and eyes. They try to avoid bright sunlight. Sometimes there are white patches on the eye.
- The animals have *diarrhoea* and a high *fever*.
- Some animals die after about 10 days. Animals that recover have lumps under the skin. Their skin becomes thickened and they lose some hair.
- **Goats** have lumps in their ears and around the genitals. They have white patches on their eyes. Pregnant goats abort and many become infertile. New-born goats are weak and some die.
- **Horses, mules** and **donkeys** have the same signs as cattle but do not have such severe disease.

Other diseases that look like this:

Dermatophilosis (p. 170); *lumpy skin disease* (p. 176); *malignant catarrhal fever* (p. 287).

How animals get besnoitiosis

Infection is probably spread by biting flies but infection may come from cats.

Besnoitiosis is caused by *protozoa* [*Besnoitia*].

Treatment

There is no good treatment but skilled workers can give medicines to help animals recover.

Prevention and control

- Separate sick animals from healthy ones (p. 92).
- In Southern Africa people use a *vaccine* that is effective.

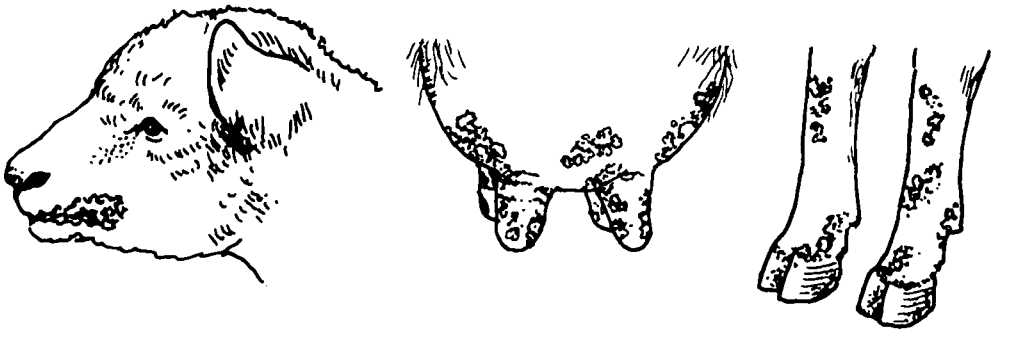
Contagious pustular dermatitis, Contagious ecthyma, Orf

Sheep and **goats** get *contagious pustular dermatitis* most often. **Dogs** or other animals get it rarely. **People** can also get contagious pustular dermatitis (p. 6).

Signs

Many animals in a group usually get the disease at the same time.

- Animals have small raised red sores on the skin.
- Baby sheep that are sucking their mothers have sores around the lips and eyes. They often stop sucking because their mouths are sore. The mothers have sores on the teats and udder.
- Older animals usually have sores on the legs and feet. But sores happen anywhere the skin is injured and infection can get in.
- Several small sores often join together and have thick scabs over them. Some scabs break off and there is much bleeding under them.



Red, raised sores and scabs

- Sometimes flies lay eggs on the sore places and cause *flystrike* (p. 161).
- Most animals recover with no treatment in 1–2 months. If animals get the disease again it is usually mild and they recover in 1–2 weeks with no treatment.

Other diseases that look like this:

Bluetongue (p. 273); *foot and mouth disease* (p. 279); *sheep pox* (p. 177).

How animals get contagious pustular dermatitis

Animals get it from direct contact with sick animals or from contact with infected scabs. The *microbes* can live for months in dry scabs from infected animals. Infection gets in through small injuries in the skin.

Dogs can get this disease from the meat of infected animals. Baby **sheep** and **goats** get the disease from their mothers. Adult females can carry infection for a long time but not have signs of disease. When they give birth the disease comes back and infects the young.

Contagious pustular dermatitis is caused by *viruses* [*Parapox*].

Treatment

There is no effective treatment for contagious pustular dermatitis.

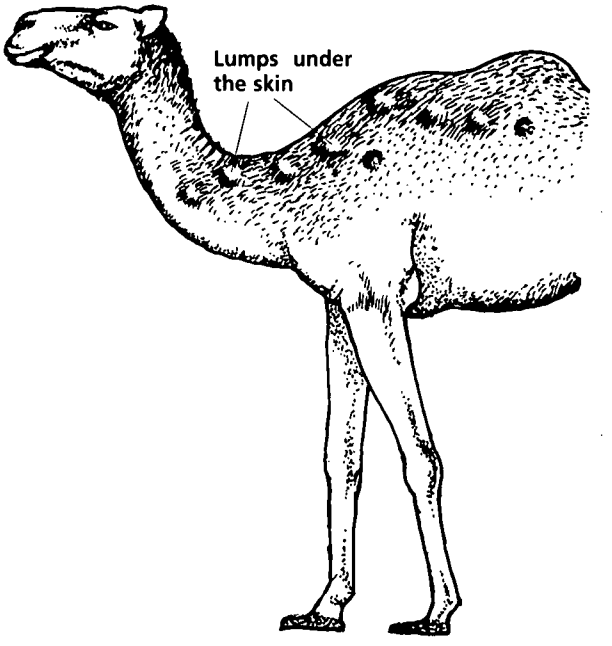
- Help the animal to recover by cleaning sores with antiseptic and use antibiotic powder or spray (p. 324) to treat infection and dry the wounds.
- Small doses of the *worm* medicine levamisole (p. 337) sometimes help healing.

Prevention and control

- Do not mix infected animals with healthy ones. Isolate infected animals to stop the disease spreading (p. 92).
- *Vaccine* for contagious pustular dermatitis is effective. But animals usually recover without treatment so it is rarely worth vaccinating them. It may be worth vaccinating animals when you know they have been near infected animals or vaccinating healthy animals before you mix them with a group that has infection.
- People in East Africa make their own vaccine by crushing a scab from an infected sheep with glycerine. They scratch the vaccine onto the leg of a healthy animal to vaccinate it, but this can cause disease.

Contagious skin necrosis

Only **camels** get contagious skin necrosis.



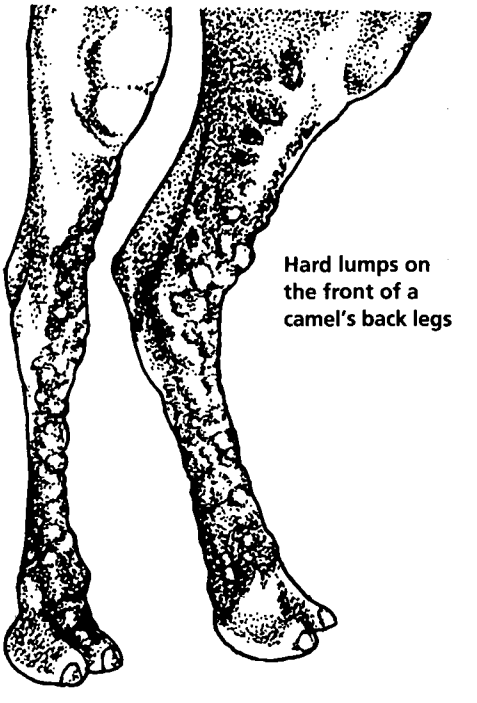
Signs

Usually several camels have contagious skin necrosis at the same time.

- The camels have lumps under the skin, usually on the back, the hump and around the base of the neck.
- The lumps have *pus* in them and break open to become open sores. Some of them become deep ulcers that grow if they are not treated.

Other diseases that look like this

Camels sometimes get hard lumps on the front of their back legs that look like contagious skin necrosis, especially in wet seasons. The hard lumps often break open leaving a sore that bleeds. These lumps are difficult to treat but do not cause the animal much of a problem. If the lumps break open and become sores put antibiotic powder or wound dressing on them to dry them and prevent infection (p. 324).



How animals get contagious skin necrosis

They get it from touching infected camels. Infection gets in through small injuries in the skin.

Contagious skin necrosis is caused by several *bacteria* together. [*Streptothrix* with *Actinomyces/Corynebacteria/Staphylococci/Streptococci*]. It is not caused by a lack of salt, as many people used to think.

Treatment

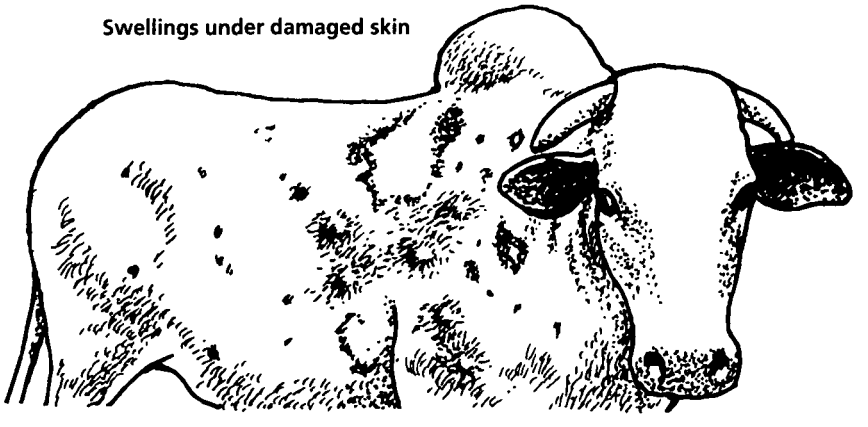
- Remove any *pus*.
- Wash the sores with water or antiseptic and put antibiotic powder or spray on them (p. 324).
- Some camel herders cut open the *abscess* and clean out pus and dead flesh. They burn around the abscess with a hot iron to stop infection spreading and put juice from a euphorbia tree [*Euphorbia* species] inside the wound to cauterise it.
- People in Kenya put a mixture of iodine and Vaseline (p. 326) on the sores after they have drained any pus. Other people make a paste from the boiled bark of *Commiphora africana* trees. When the paste is cool they mix it with urine and put it on the open sore to help it to heal.

Dermatophilosis, Streptothricosis, Lumpy wool

Dermatophilosis happens in Africa and Asia. It is usually a mild disease except in West and Central Africa, Zambia and Madagascar where it is often severe. **Cattle** get dermatophilosis most often. **Goats**, **sheep** (lumpy wool disease) and **horses** get it occasionally.

Signs

- The animals have swellings in places where the skin has been damaged. The swellings become open sores that develop scabs. The scabs become large and the skin becomes thickened. If the scabs get rubbed off these sores bleed.



- Animals that get severe disease do not graze properly. They become thin and weak. Some animals die because they do not eat.
- The disease usually goes on for about a month. When it is hot and wet for a long time the disease goes on longer.
- **Sheep** that get the disease on woolly parts of the body have large, hard, thickly matted lumps of wool.

Skilled workers can look at a scab or piece of damaged skin to check for this disease with a microscope.

Other diseases that look like this:

Besnoitiosis (p. 166); *lumpy skin disease* (p. 176); mange (p. 154); ringworm (p. 180); **Camels** *Contagious skin necrosis* (p. 169).

How animals get dermatophilosis

Animals usually get dermatophilosis when there are long wet times then periods of hot sun. Damaged skin encourages the disease, especially when damaged by *tick* [*Amblyomma*] bites or damaged by flies, birds or thorns. Insects or birds carry the disease from an infected animal. Some animals get infected by direct contact with infected animals. Occasionally infection spreads through the air.

Dermatophilosis is caused by *microbes* like large *bacteria* [*Dermatophilus congolensis*]. These microbes only live on the skin of animals. Many animals have these microbes on their skin but most of the time the microbes do not cause disease.

Treatment

- Animals often recover with no treatment especially when it is hot and dry. But the microbes can stay alive on an animal's skin and cause disease again when it is wet.
- Putting medicine on the scabs does not usually work.
- Giving an antibiotic by injection (p. 328) may help to treat the disease itself. It also helps to stop the damaged skin getting infected by bacteria.

Prevention and control

- Try to avoid the skin damage that lets this disease happen.
- Control *ticks* that cause skin damage (p. 105).
- Control flies if possible (p. 103).
- If the disease is a serious problem, make a shelter to protect the animals from rain but make sure they have plenty of fresh air.
- In a settled place try to remove sharp thorn scrub from fields where animals are kept.
- Kill animals that have very severe disease to stop it spreading to other animals.

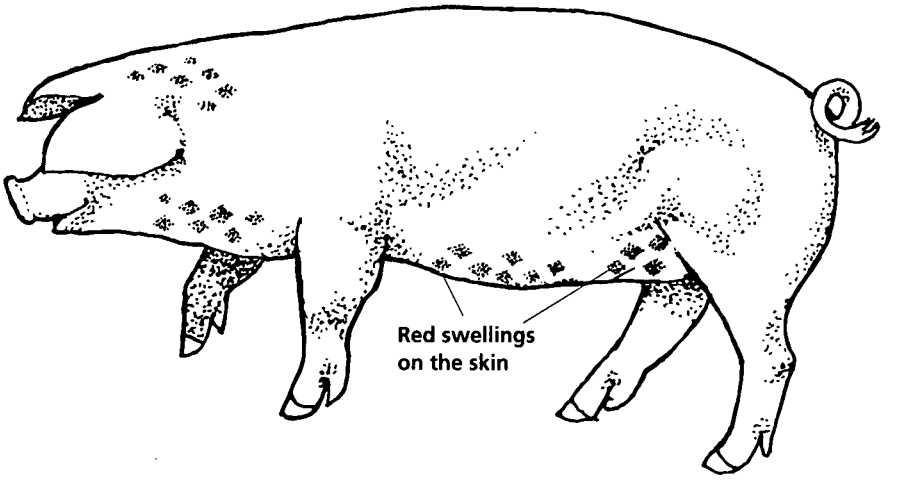
Erysipelas

Pigs get *erysipelas* very often in many parts of the world. Young **sheep** also get it. **People** occasionally get erysipelas (p. 6).

Signs

Pigs become sick 1–14 days after they get infected with erysipelas.
Sometimes the disease is **mild**:

- The pigs have red swellings about 5 cm across on the skin, especially on the head and neck, under the abdomen and between the legs.



- They are weak and tired and have a low *fever* but most recover after about two weeks.

Sometimes the disease is **severe** and happens very fast:

- The pigs have red swellings on the skin and have a *discharge* from the eyes.
- They are weak and tired and do not eat. They have a high *fever*.
- Many animals collapse and die after 3–4 days. A few animals die suddenly, especially if they are made to run about. Others recover slowly.

Sometimes the disease is **less severe** but it goes on for a long time:

- The animals are lame and have hot, swollen joints for a few weeks. Then the swelling gets smaller but the legs often become stiff.

Sheep, especially young sheep become sick two weeks after they get infected:

- They become lame and have hot, swollen joints for a few weeks. Then the swelling gets smaller and the legs often become stiff.

How animals get erysipelas

Pigs get infection from direct contact with infected animals or from *contaminated* things. Infection comes from the faeces of infected animals.
Sheep get infection when they are born or from operations, such as castration.
Erysipelas is caused by *bacteria* [*Erysipelothrix*].

Treatment

- Treatment works if you start it soon enough.
- Give an antibiotic as soon as possible. Penicillin works well (p. 332).

Prevention and control

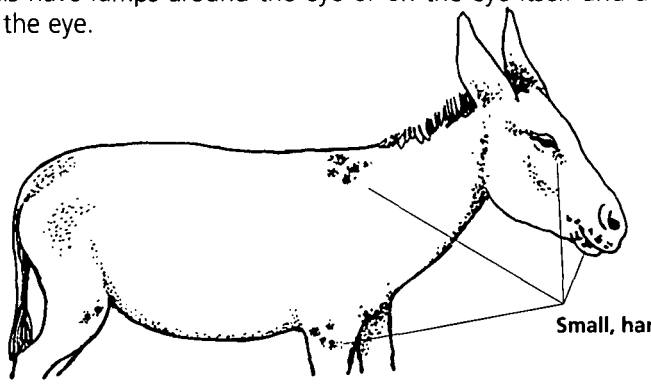
- Keep animals clean to avoid infection (p. 91).
- *Vaccines* for erysipelas only protect the animal for a short time and are not often worth using.

Habronemosis, Summer sores

Horses, **mules** and **donkeys** get *habronemosis*.

Signs

- Animals have small hard lumps on the skin around the nose and lips or around the legs and shoulders. They rub these lumps, which break open and become sores. The sores become larger and scabs grow over them.
- Some animals have lumps around the eye or on the eye itself and a watery *discharge* comes from the eye.



How animals get habronemosis

House flies or stable flies spread the disease when they leave tiny *worms* on small folds or wounds on an animal's skin. The worms come from the faeces of infected animals. (The animals eat some worms from around the lips and the worms develop in an animal's stomach before they are passed in the faeces.) Flies' larvae living in animals' faeces get infected with the worms. The disease happens most in hot wet seasons.

Habronemosis is caused by small (2 cm) *roundworms* [*Habronema*].

Treatment, prevention and control

- Ivermectin (p. 337) works but it is expensive.
- People put caustic chemicals on the sores to slowly burn them away. Never use caustic chemicals near the eyes, it will damage them very severely.
- To avoid this problem remove faeces from around the places where horses live.
- Treat small wounds quickly and protect them from flies.

Horn cancer

Cattle and **buffaloes** get *horn cancer*. Usually only Hariana cattle get it.

Signs

- The horn becomes loose and comes away from the skin.
- You can see a grey/yellow lump at the base of the horn. It is covered with blood and mucus, it smells bad and is often infected.

- ◆ Sometimes a white/yellow *discharge* comes from the nose.
- ◆ The cancer spreads inside the animal to other parts of the body.

How animals get horn cancer

Animals usually get it when the horn has been injured. It is not an infection. Castrated males get it most often.

Treatment

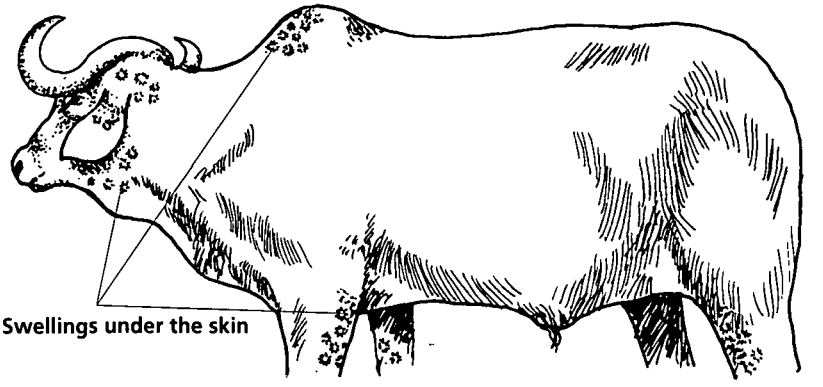
- ● Skilled workers can cut out the cancer. This often works if they do it before the cancer spreads to other parts of the body.
- ● Sometimes they use special medicines to control the cancer but they do not always work.

Hump sore, Stephanofilariosis

Hump sore only happens in Asia. **Cattle** and **buffaloes** get hump sore.

Signs

- ◆ Animals have small swellings under the skin that join together and become sores. The swellings are often on the hump but they may be around the head and neck or on the ears or legs.
- ◆ After a time the swellings bleed and the skin becomes thick and scaly.



How animals get hump sore

They get infected by flies that carry tiny *worms* from animals with hump sore. Hump sore is caused by small *roundworms* (2–10 mm) [*Stephanofilaria*].

Treatment

- ● Put insecticide (p. 339) onto the swelling to kill the *worms*.
- ● Some worm medicines are effective, especially ivermectin injections (p. 337).

Leeches

All animals, especially, **cattle**, **buffaloes** and **camels** can get leeches on the skin when they stand in water, or inside the mouth and nose when they drink. **People** can also get leeches.

Signs

- Blood comes from the legs, nose or mouth at places where leeches bite. Leeches attach to the skin and cut through it to get blood. They produce chemicals that stop blood from clotting.

Treatment

- To make leeches let go of the skin, people put salt on them or use insecticide or tobacco mixed with water (p. 345).
- Remove leeches from the skin or inside the mouth with a cloth. Put salt on the cloth to help make the leeches let go and to help grip them.
- To remove them from the nose hold the animal firmly and push insecticide mixes with water (about the strength of a dip) up the nose with a syringe with no needle. Hold the nose level so the liquid does not come out or go down the *trachea*. Use about 10 ml for a small animal and 50 ml for a large animal. When the leech lets go it comes out onto the ground or the animal swallows it.

Leishmaniosis, Leishmaniasis

Leishmaniosis happens in North Africa and Asia. **Dogs** get leishmaniosis. Rarely, other animals get it or become infected with no signs of disease. **People** can get it (p. 6).

Signs

- Usually animals have sores on the skin, especially around the nose, mouth, eyes and tips of the ears. Some of the hair around these sores falls out. Dogs often recover from this with no treatment.
- Rarely the disease also spreads inside the body and goes on for a long time. Then the dog also has diarrhoea. With no treatment it becomes thin and dies.

How animals get leishmaniosis

They get it when they are bitten by infected *sand flies* (p. 105). Sand flies get infected when they bite infected wild animals that live in holes in the ground. One type of *parasite* [*Leishmania tropica*] causes disease mostly on the skin, another [*Leishmania infantum*] mostly inside the body.

Treatment

It is difficult to treat leishmaniosis effectively. Skilled workers sometimes treat dogs with special medicines.

Prevention and control

- Killing an infected dog helps stop the disease spreading to people.

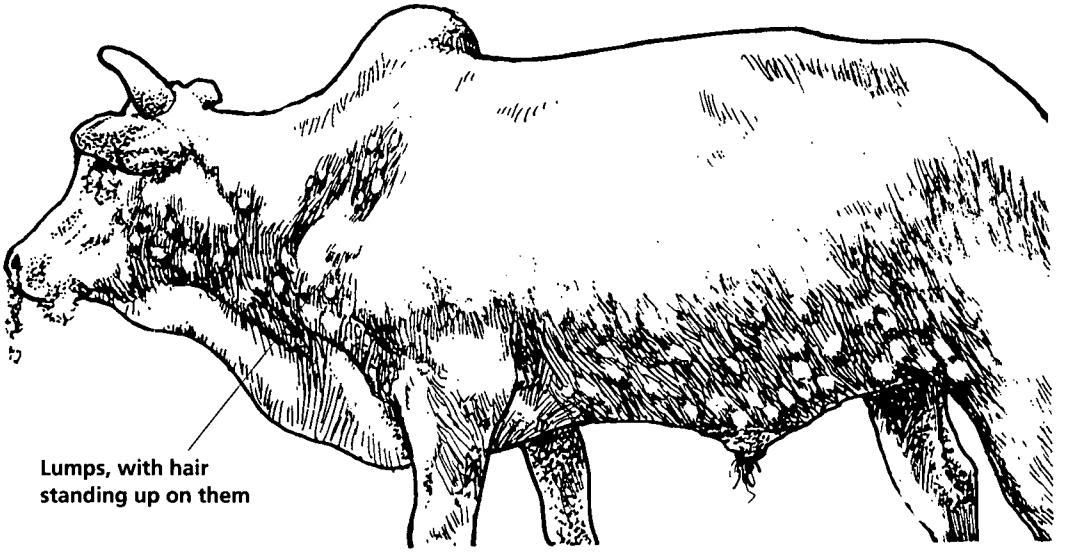
Lumpy skin disease

Lumpy skin disease does not usually happen in Asia. Only **cattle** get lumpy skin disease.

Signs

Cattle become sick 10–20 days after they get infected.

- The animals have much *saliva* coming from the mouth. A clear *discharge* comes from the eyes and nose. Later the *discharge* from the nose becomes grey/white.
- The cattle are weak and tired and stop eating. They have a *fever* that sometimes goes down after 1–2 days but it goes up again. Animals produce little milk and pregnant cattle often abort.



- Lumps appear on the body, usually around the head and neck, under the abdomen, on the legs, or around the genitals and the udder.
- The lumps are hard and usually all about the same size. The hair on the lumps stands up. Softer, yellow/grey lumps may appear on the mouth. They rub off easily leaving sore red patches.
- Many of the lumps on the skin turn into *sores* that get infected and become deep wounds. Most of these dry up and heal after a few weeks but they leave scars that damage the hide. Some lumps become hard and do not go away.
- Cattle do not usually die but they take months to recover and a few of them become very thin.
- Occasionally the disease is very mild, animals only have a low *fever* and lumps on the skin that heal in about six weeks.

Other diseases that look like this:

Besnoitiosis (p. 166); *dermatophilosis* (p. 170); *ringworm* (p. 180).

How animals get lumpy skin disease

They get it when they are bitten by insects that suck blood, such as mosquitoes. The disease happens most when there are many insects at the start of a wet season. Imported breeds of cattle get the disease more easily than local cattle.

Lumpy skin disease is caused by *viruses* [*Capripox*].

Treatment

There is no treatment for lumpy skin disease. Give an antibiotic injection (p. 326) to stop the damaged skin getting infected by *bacteria*.

Prevention and control

- *Vaccination* for lumpy skin disease is effective. Vaccinate healthy animals in contact with the disease.

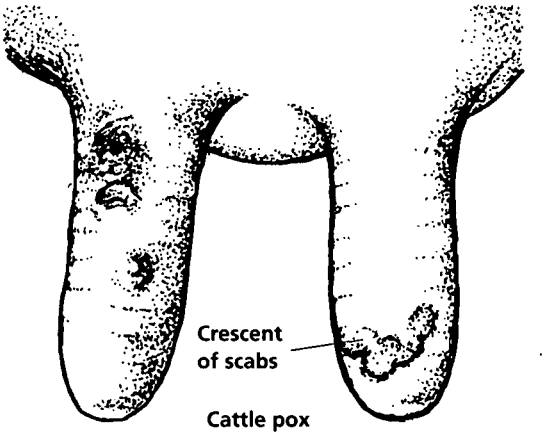
Pox

Most pox diseases happen in Africa and Asia but horse pox does not. *Sheep* and *goat pox* happens in Africa north of the equator and in Asia. **Most animals** can get *pox* diseases but each animal gets a different type of pox disease.

Signs

Cattle become sick 5–10 days after they get infected.

- They have small red sores on the teats at places where there are small injuries. The sores soon have scabs over them. When the scabs fall off they leave a crescent of smaller scabs.
- Sometimes the disease goes on for a long time. The teats become rough with many grey/yellow scabs.
- Animals usually recover in 2–8 weeks.



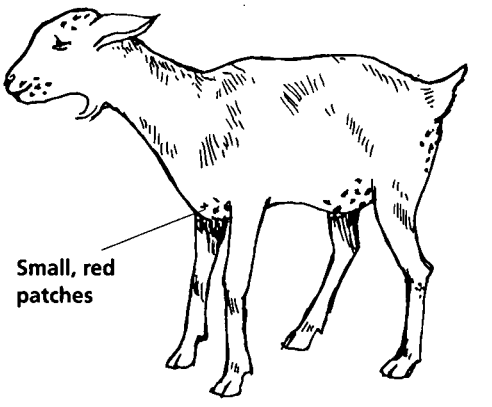
Cattle pox

Buffaloes only have mild disease. They have blisters on the udder and under the tail. Baby animals have blisters around the mouth.

Sheep or **goats** become sick 1–7 days after they get infected. Very young sheep get the most severe disease. Some very young sheep die before they have signs of disease.

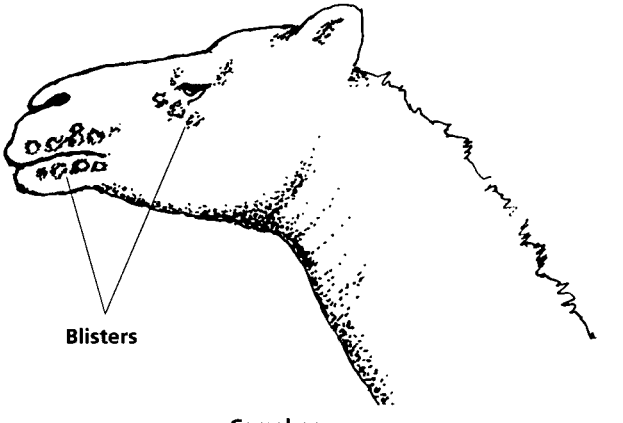
- Most animals are weak and tired and stop eating. They have a high *fever* for a short time. A watery *discharge* comes from the nose and eyes. Much *saliva* comes from the mouth.
- They have small red patches on the skin (p. 178) – usually around the mouth, on the head, under the tail and between the legs. The patches become swellings under the skin. Then they become blisters that break and become open sores. The sores soon have scabs over them.

- Animals often have distressed breathing – they have blisters inside the lungs too.
- Pregnant sheep and goats often abort.



Camels become sick 5–15 days after they get infected. They usually only get mild disease around the mouth.

- They have a low *fever*.
- They have swelling around the lips and blisters that fill with *pus* in the mouth and around the lips. It is painful for the animal to eat. They may also have blisters around the genitals.
- Camels usually recover in 2–3 weeks but often have scars where the blisters were.



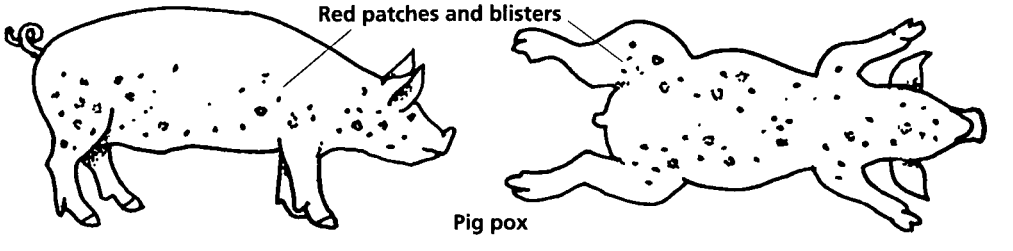
Camel pox

Young camels 6–24 months old can get severe disease that involves the whole head:

- They stop eating and have a high *fever*. They have diarrhoea and become *dehydrated*.
- They have blisters around the lips and eyes that spread over the head and may spread over the whole body. Some blisters break open and become sores that bleed.
- A watery *discharge* comes from the eyes. Some animals cannot see properly.
- A few animals die after 1–2 weeks because the head swells so much they cannot breathe. Most animals recover.

Pigs become sick 4–14 days after they get infected. *Pig pox* is a mild disease.

- The pigs have a low *fever*.
- They have red patches on the skin. These become blisters that break and become open sores with brown/black scabs over them. The blisters are on the abdomen and between the legs when pigs are bitten by *lice*, or along the back when they are bitten by *stable flies* (p. 160). Adult female pigs get blisters on the teats when they suckle infected baby pigs.

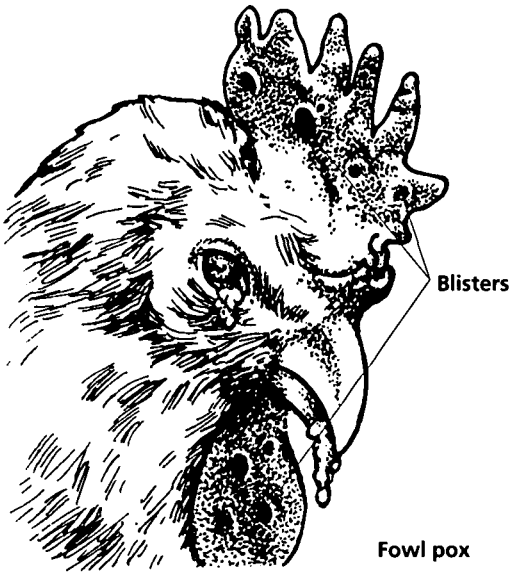


Pig pox

◆ Most pigs recover in 2–8 weeks.

Birds get *fowl pox* most often when they are older.

◆ They have blisters around the head and inside the beak and eyelids. They also have blisters under the wings and on the feet. The blisters soon break and become scabs.



Fowl pox

◆ The birds have a clear *discharge* from the beak and eyes. They have *pus* around the eye and pus may come from the nostrils. Some birds have a thickened membrane inside the mouth.
◆ Most birds recover but fowl pox reduces their *resistance* to other diseases.
◆ A few birds get more severe disease and quickly become thin and may die.

Other diseases that look like this:

Bluetongue (p. 273); *foot and mouth disease* (p. 279); *mange* (p. 154); *contagious pustular dermatitis* (p. 167).

How animals get pox diseases

Pox diseases spread by direct contact between animals and on *contaminated* things. Many animals get infection from people who have touched infected animals. Animals, especially buffaloes, get it when they are milked by people who have touched infected animals.

Infection comes from the blisters and scabs of infected animals. Infection can live for a long time in dry scabs that fall off.

Cattle, buffaloes Baby animals get pox from infected mothers. They are infected for life and may become sick when they are adults.

Camels Pox spreads quickly through a group of camels, especially in or just after wet seasons.

Pigs usually only get *pig pox* when they are 3–6 weeks old. They get it from touching infected pigs or when they are bitten by *lice* (p. 157) or *stable flies* (p. 160) that carry infection.

Birds get *fowl pox* from direct contact with sick birds or from insect bites.

Animals and birds that have had pox are usually *immune* and rarely get the disease again.

All pox diseases are caused by *viruses*: *Sheep* and *goat pox* [*Capripox* – some types attack sheep, others attack goats]. pig pox [*Suipox*]. buffalo pox [*Orthopox*]. camel pox [*Orthopox*]. cattle [*Parapox*]. (Cowpox is a different disease. It only happens to cattle, cats and people in Western Europe. It is like smallpox, a disease of people, that no longer exists anywhere.)

Treatment

There is no treatment for pox diseases but you can help animals to recover:

- If the sores are bad or deep put antibiotic or antiseptic on them. Be careful not to spread the disease further. Use wound dressings that dry up the sores. If the skin becomes infected by *bacteria* give antibiotic by injection (p. 328).
- **Camels** Skilled workers can give special medicines to reduce swelling of the head but this can be dangerous because the medicines stop animals from fighting off infection.
- **Birds** It is best not to put medicine on the scabs, you are more likely to spread the disease than treat it.

Prevention and control

- *Isolate* infected animals by moving healthy animals away from them. Avoid moving infected animals to areas without the disease.
- *Vaccinate* healthy animals that have been near infected animals.
- Avoid using, or disinfect (p. 324), things that have touched infected animals.
- Make sure that new-born animals drink enough *colostrum*, this gives them some *immunity* to pox diseases from their mothers.
- Those people who milk infected animals should not milk healthy ones. It is best not to drink the milk from infected buffaloes.
- **Sheep, goats** Vaccination is effective.
- **Camels** New vaccines for *camel pox* are effective but difficult to get. Some people make their own vaccine for camel pox. They mix scabs from infected camels with milk and prick the lips of healthy new-born camels to protect them. **This may work but is dangerous because it can cause severe disease**.
- **Pigs** Vaccination is effective. Control the *lice* (p. 157) or *flies* (p. 103) that spread the disease.
- **Birds** Vaccination is effective. Vaccinate birds every year. You can do this at the same time as you vaccinate for *Newcastle disease* (p. 208).

Ringworm

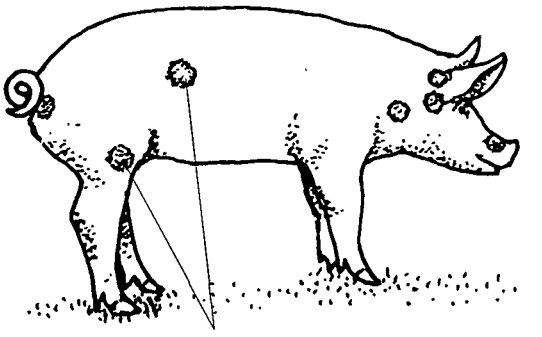
All animals can get *ringworm*, but usually only animals kept in houses get it. **People** can get ringworm (p. 6).

Signs

Animals become sick with ringworm 7–28 days after they get infected.

- Animals have a circular scab on the skin about 3 cm across. Scabs usually happen first around the nose, above the eyes, on the ears or under the tail. The skin under the dry scab is wet. Scabs soon join together and become thicker.

- After several days the scabs fall off. The skin underneath becomes dry and grey/white.
- Animals do not scratch much when they have ringworm. But they sometimes scratch a lot if the scabs become infected by *bacteria*.
- The scabs fall off after a few weeks and leave patches with no hair.
- Animals slowly recover even without treatment. The hair grows back in about three months.



Circular scabs

- **Horses, mules and donkeys** have white/grey scabs that are hard to see. They have patches with no hair on the head, over the back and over the back legs that soon spread over the body. They recover without treatment in 4–6 weeks.
- **Pigs** usually have small red patches that become dark coloured crusty scabs.
- **Camels** up to three years old get ringworm most and the scabs are usually on the head or neck.
- **Dogs** usually have small scabs around the head and ears.

How animals get ringworm

They get it when they touch infected animals and from *contaminated* buildings, ropes and other things. Sometimes birds spread the disease. Animals get ringworm more often when it is hot and wet.

Ringworm is caused by *fungi* [*Microsporum and Trichophyton*]. It is **not** caused by a worm.

Treatment

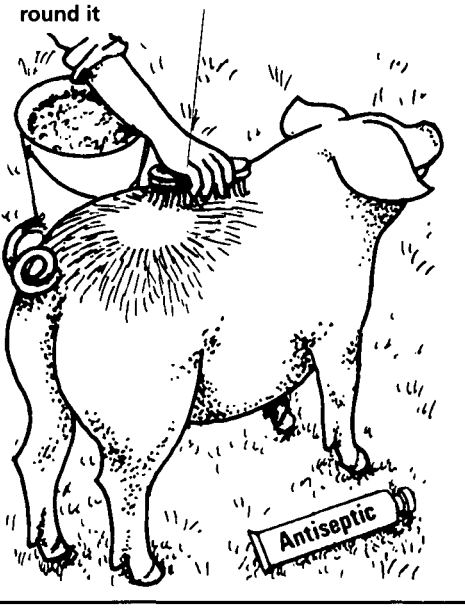
Animals usually recover from ringworm with no treatment but it may take 2–3 months. They recover sooner when it is dry and sunny.

To help recovery:

- Shave the hair around the place with ringworm. Burn the hair you have shaved off because it is infected.
- Scrape the scabs off gently. Use soapy water and a brush.
- Put antiseptic on the sore area (p. 324).

  Animals treated like this can recover in 2–3 weeks.
- Give griseofulvin (p. 331) by mouth or put it directly on the sore area. This medicine is expensive but animals treated with it start to recover in about ten days. Other medicines that you put on the skin are also effective (p. 328).

Patch of ringworm with hair shaved off round it



Prevention and control

- Isolate and treat animals with ringworm.
- Use disinfectant (p. 324) to clean *contaminated* places and things before using them for healthy animals. Direct sunlight kills ringworm *microbes*.
- *Vaccinating* for ringworm is expensive. It is rarely worth using a vaccine. Animals that recover from ringworm do not usually get the disease again.

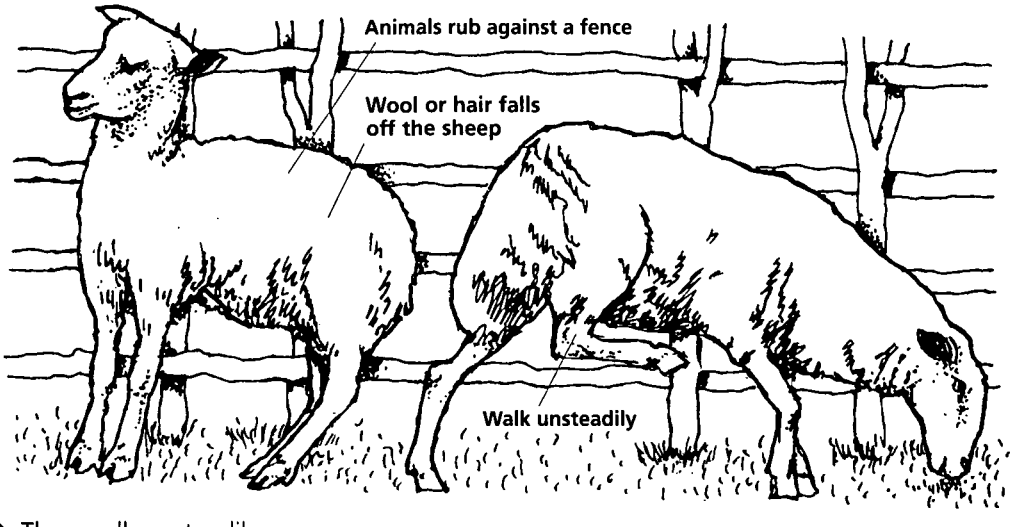
Scrapie

Scrapie happens in Africa and Asia when animals have been imported from Europe. **Sheep** and occasionally **goats** get scrapie.

Signs

Animals become sick 2–4 years after they get infected with scrapie.

- They behave unusually. They rub against things and bite themselves because the disease makes them irritated. If you pinch them on the back they make biting movements with their lips.



- They walk unsteadily.
- They do **not** have a *fever*.
- Animals do not recover. They are sick for 1–6 months. Then they become thin and weak and they die.

Other diseases that look like this:

Mange (p. 154); *lice* (p. 157).

How animals get scrapie

They get it from their mothers soon after they are born. Infection usually comes from milk or the placenta and membranes that come out after birth. Some animals get infection from pastures where infected animals have been.

Scrapie is caused by pieces of protein like small *viruses*.

Treatment and control

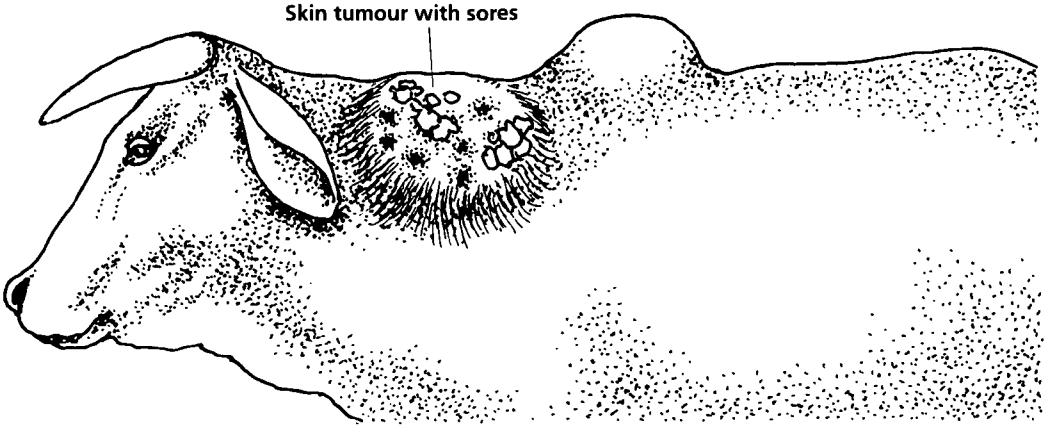
There is no treatment for scrapie. **Avoid importing animals with scrapie.**

Skin tumours

All animals can get *tumours* on the skin. **People** do not usually get *skin tumours* from animals.

Signs

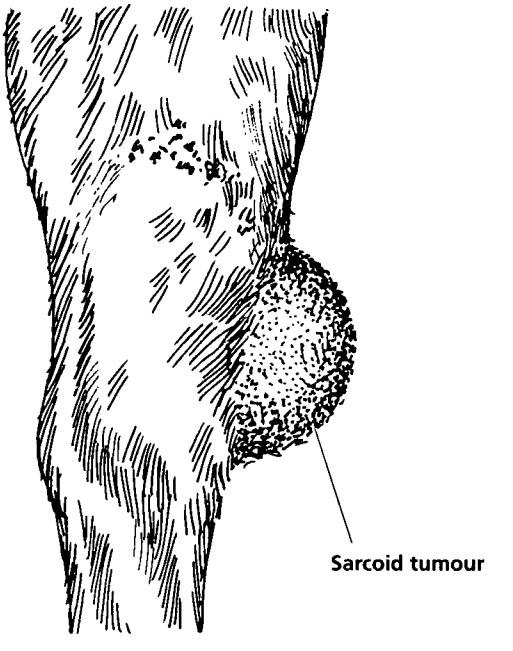
- Hard lumps on the skin that are not hot are often tumours. These lumps usually grow slowly. Sometimes the skin over a tumour is injured and the lump has open sores on it. There are many different kinds of skin tumours but the most common ones are hard and dry and look like this.



- These skin tumours often appear 3–12 weeks after animals get infected.
- They often grow on the genitals and on the teats. These tumours do no harm but they sometimes interfere with milking. Sometimes they make mating difficult.
- **Horses, mules and donkeys** sometimes get skin tumours that look like these, they are called *sarcoids*. They grow at the base of the ear and low on the legs of horses. They do not spread through the body but they sometimes grow back after they are cut off.

  Horses often get small tumours around the nose and mouth. These usually disappear after 1–6 months with no treatment.

  Old grey horses sometimes get skin tumours around the base of the tail. They are called *melanoma* and they spread inside the body.



◆ **Camels** about a year old get small skin tumours around the lips and nose. Older camels get tumours, especially on the teats. The tumours go away after a few months with no treatment.

Skilled workers need complicated laboratory tests to decide what kind of tumour an animal has.

How animals get skin tumours

Only some types of skin tumours spread to other animals. The types that spread are more often on younger animals. Usually there are more than one or two of this type of tumour on an animal.

Animals get the types of skin tumour that can spread from direct contact with animals that have skin tumours. They often get skin tumours after they mate with an infected animal. Infection with these types of tumour usually gets in to the body through small wounds. Some families of animals seem to get skin tumours more often than others.

Skin tumours are sometimes caused by *viruses* [*Papavovirus*].

Treatment and control

You cannot treat most tumours.

Some tumours do not spread to other parts of the body (these are called *benign* tumours). Skilled workers sometimes remove these tumours.

Some tumours spread to other parts of the body (these are called *malign* tumours). It is not worth operating to remove these because they come back in other parts of the body.

- Skilled workers can make *vaccines* for some skin tumours from the tumours themselves. They usually inject the vaccine into or under the skin and give another injection two weeks later. These vaccines often work. Other medicines are not very effective.
- Some people cut or pull skin tumours off or tie a thread around the base of the tumour. These treatments do not work well. They can cause more tumours to grow.
- If a tumour has open sores on it, treat it with an antibiotic to stop infection. Use antibiotic powder or wound dressing (p. 324).

Many tumours fall off after 3–18 months with no treatment. This is why some people claim they can make tumours go away and even ask for money to do this.

Sweating sickness

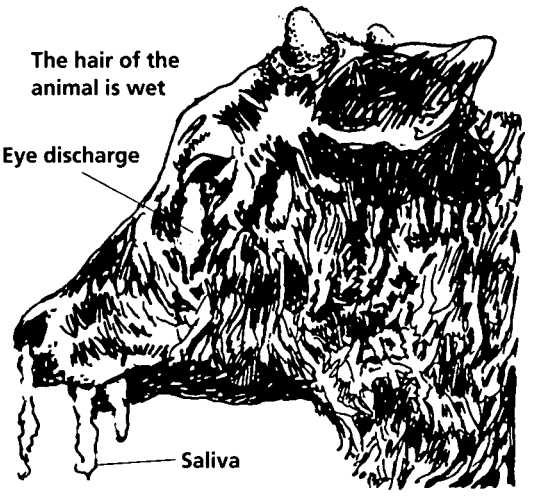
This disease does not usually happen in Asia. It happens in Africa south of the equator. Only **very young cattle** get *sweating sickness*.

Signs

Animals become sick 5–10 days after they are bitten by *ticks*.

◆ The head and the rest of the body becomes wet.

- Much *saliva* comes from the mouth and a clear *discharge* comes from the eyes and nose. The *mucous membranes* are red.
- The animals look weak and tired and have a high *fever*. Some die after 1–7 days with no treatment.



How animals get sweating sickness

They get it when they are bitten by *ticks* [*Hyalomma*]. This disease is not an infection, it happens because sometimes the *saliva* of ticks is poisonous.

Treatment and control

- Remove the *ticks* (p. 108) as quickly as possible.
- Give an antibiotic (p. 328) to treat *bacterial* infection.
- Control the disease by controlling *ticks* (p. 105).

Worm nodules, Onchocercosis

Cattle, buffaloes, horses, mules, donkeys and **camels** can get *worm nodules*.

Signs

- Animals have small lumps (called nodules) just under the skin. The lumps are full of *worms* and *worm larvae*.
- **Cattle** usually have lumps on the legs, around the genitals, on the neck and between the front legs.
- **Horses** usually have lumps near the feet and on the neck.

Skilled workers can check a piece from one of the lumps for these worms with a microscope.

How animals get worm nodules

Midges and flies get infected when they feed on these lumps. They spread the worms to healthy animals they bite.

These worms are thin white *roundworms* (about 20 cm) [*Onchocerca*].

Treatment and control

- Ivermectin works well, other medicines are less effective (p. 337).
- Try to control flies (p. 103) that spread the worms.

21 Diseases and problems mostly to do with lumps and swellings

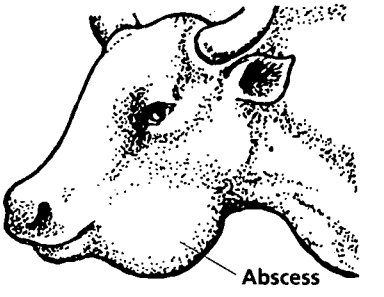
This chapter looks at some common reasons for lumps and swellings but there are others. See the last chapter on diseases and problems mostly to do with skin such as *allergy* (p. 162), *lumpy skin disease* (p. 176), *worm nodules* (p. 185), and *skin tumours* (p. 183).

Abscesses

All animals can get *abscesses*. They usually happen on the skin where there has been a wound but some diseases cause abscesses under the skin or deep inside the body.

Signs

- Abscesses often start as hard, hot swellings then become softer. The lumps are full of *pus*. You cannot make them smaller by gently squeezing them (unless they burst).
- Some abscesses feel hard, the skin over them is tight because they have so much *pus* in them. They often become soft and burst, releasing pus. An abscess often has a dark patch with no hair on it where the skin becomes thinner at the place where it will burst.



Other diseases that look like this:

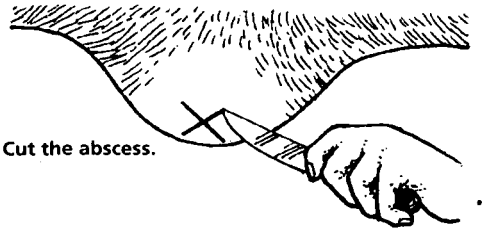
Haematoma (p. 187); *hernia* (p. 188); *skin tumour* (p. 183).

Treatment

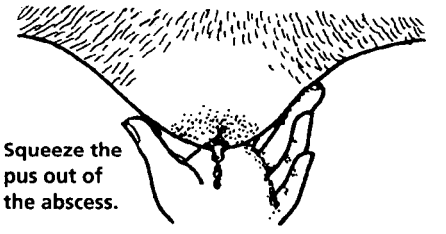
Abscesses often burst and heal with no treatment. There is no need to give antibiotic injections to animals with abscesses unless they have a *fever* or are sick. Antibiotics can stop abscesses becoming soft and bursting. They can make an abscess grow a thick wall around itself and stay for a long time.

- If an abscess is not soft and ready to burst, hold a cloth soaked in hot water over it for a few minutes several times a day until it becomes softer and ready to burst. Or put a *poultice* (p. 327) onto an abscess to make it burst. Or wait till it is soft and cut into it to drain *pus* out of it.
- Make an X-shaped cut into the abscess at the lowest point so that pus can drain out easily. Squeeze it till pus stops coming out. Sometimes clean blood comes out after the pus. This is a good sign that you have drained all the pus.
- When you have squeezed out all the pus, wash out the abscess. Use an old syringe, without a needle, filled with clean water or antiseptic (p. 324) to wash out any pus that is left. Washing the abscess out two or three times is usually enough.

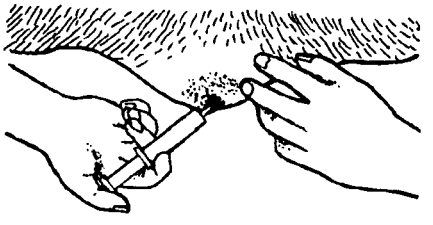
- Some abscesses need to drain for a few days before all the pus comes out. To stop the hole you have made from closing, soak a long strip of cloth in antiseptic and push it through the hole. Leave a short piece hanging out. Pull a short length out every day until the abscess has drained.
- Wash your hands after treating abscesses and clean any equipment you have used.



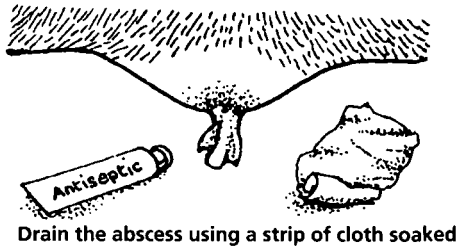
Cut the abscess.



Squeeze the pus out of the abscess.



With a syringe with no needle, wash the abscess out.



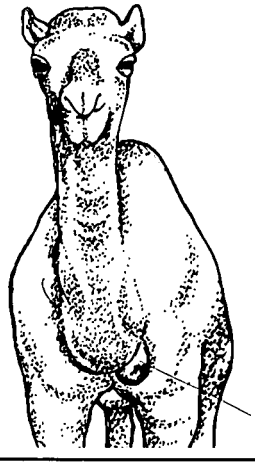
Drain the abscess using a strip of cloth soaked in antiseptic.

Camels

Camels often get abscesses in the *lymph nodes* at the base of the neck. They also get them on the hump, the shoulders or on the back legs. Some of these abscesses are large and much pus comes from them.

Abscesses inside the body:

Camel herders in East Africa say their camels also get abscesses deep inside the body that make the camels sick. They call this disease 'Mala' .... It is difficult to treat. Antibiotics do not always work and can make the problem worse or go on for longer.



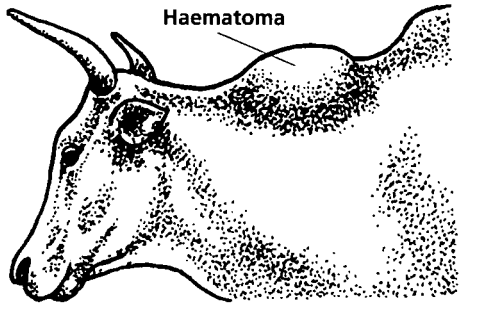
Abscess in a lymph node

Haematoma

All animals can have *haematomas*.

Signs

- Animals have a lump under the skin after they are injured, e.g. by a kick.
- The swelling is soft and grows for a few hours – possibly a few days after the injury; it may become very large. You cannot make the swelling smaller by squeezing it gently.
- The animal shows no pain if you handle the swelling.



How animals get haematomas

The lump is full of blood. The injury has made the animal bleed under the skin.

Treatment

- Pour cold water over the swelling soon after it happens to help stop the bleeding inside. Otherwise leave these swellings alone. They become smaller and harder and usually disappear after 2–4 weeks. Sometimes the animal has a small hard lump for life but it is harmless.

Pour cold water on to a haematoma.

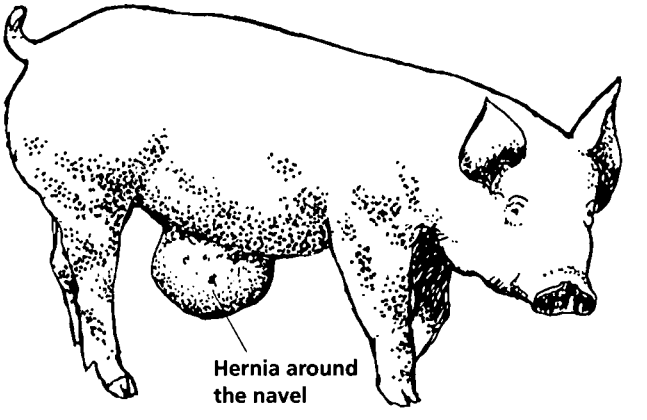
- If the swelling is large and on a part of the body that annoys the animal, skilled workers can drain the swelling. They wait a few days for bleeding inside the animal to stop, then cut into the lowest part of the swelling. But infection can get into the cut and the animal sometimes needs an antibiotic (p. 328).

Hernia

Any animal can have a *hernia*.

Signs

Hernia around the navel:

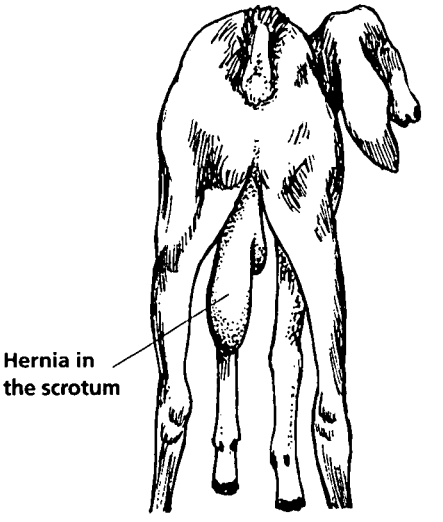


Hernia around the navel

- Hernias often appear as a swelling around the *navel* of a very young animal. The swelling is full of parts of the *intestines* that have come through the hole where the *umbilical cord* comes out.
- You can usually push the contents of the swelling back through the hole by squeezing it gently but the swelling soon comes back again.
- Sometimes another animal licks a swelling like this and makes it worse. The skin sometimes breaks and intestines come out.

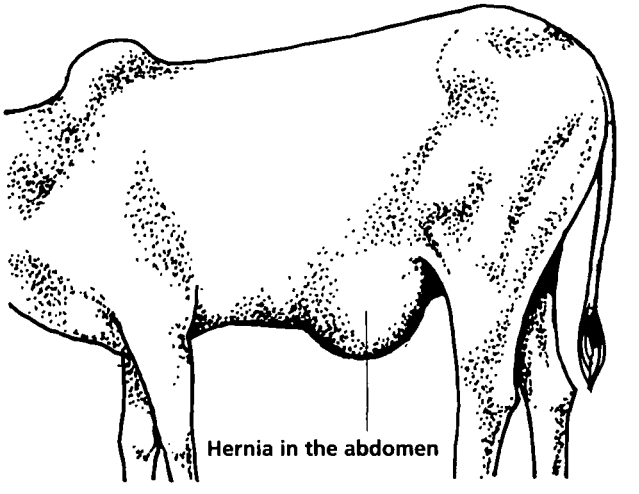
Hernia in the scrotum:

- One side of the *scrotum* becomes swollen, sometimes it is very large. Young pigs or goats often have hernias like this.



Hernia in other parts of the body:

- Hernias sometimes happen around the abdomen, especially after an injury, for example, by another animal's horn. The swelling can be very large.



Other problems that look like this:

Abscesses around the *navel* are full of *pus*. You cannot make them smaller by squeezing them gently.

How animals get hernias

A hernia happens when a layer of muscle breaks and some of the body contents, such as part of the *intestine*, come out through the hole and form a lump under the skin or in the *scrotum*.

Treatment

- Small hernias at the *navel* usually disappear as an animal grows.
- Skilled workers can operate to treat a hernia by pushing its contents back into the abdomen and stitching the broken muscles back together. But this is difficult and expensive. If the swelling is very large or the *intestines* have come out through the skin, kill the animal for meat.

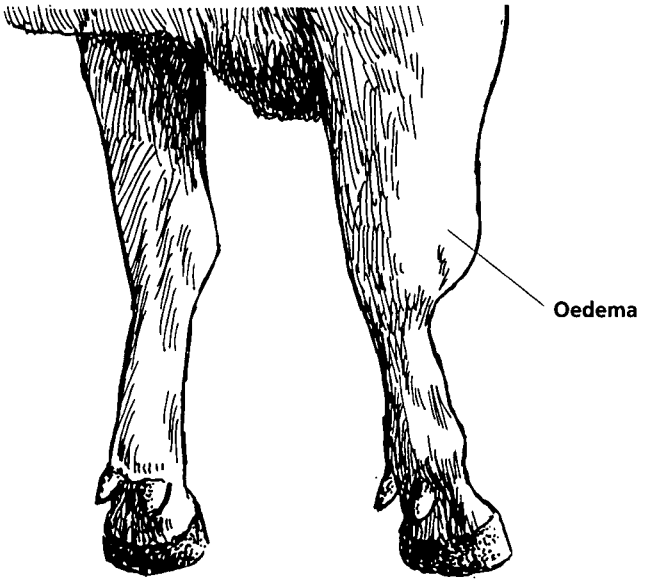
Always check before you castrate an animal that the *scrotum* is not swollen. If it is swollen **do not castrate the animal**. **It is dangerous.** The intestines inside the hernia will fall out and the animal will die. Skilled workers rarely repair these hernias; it is difficult.

Oedema, large areas of swelling

Any animal can have *oedema* – a large area of swelling under the skin.

Signs

- Animals have swelling on the lower parts of the body, often under the jaw, under the abdomen or in the legs.
- Oedema under the jaw is often a sign that an animal has *worms* (p. 218) or *liver fluke disease* (p. 285).



How animals get oedema

It is often part of the body's reaction to infection. The body produces a lot of fluid that gathers under the skin and becomes a swelling that may spread over a large area of the body, especially the lower parts of the body.

Treatment

The only way to treat this kind of swelling is to treat the disease that causes it.

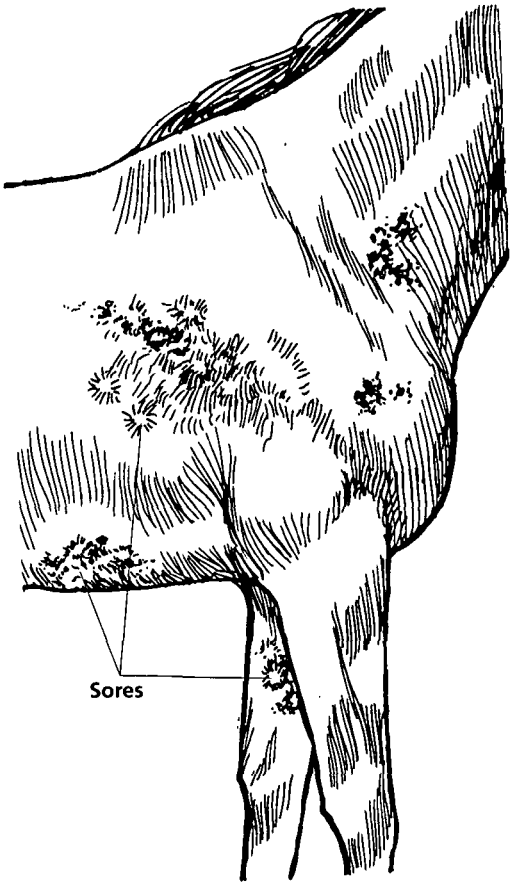
Epizootic lymphangitis

This disease happens in Africa north of the equator and in Asia. Only **horses**, **mules** and **donkeys** get *epizootic lymphangitis*. **Donkeys** do not get it often. Some people say **camels** get it occasionally.

Signs

Animals become sick with epizootic lymphangitis 4–12 weeks after they get infected.

- The animals have small wet sores at places on the skin where the infection gets in. The sores are usually inside the front legs, under the abdomen, around the shoulders and on the neck. Sometimes they are also around the mouth and nose.
- Lumps appear under the skin near where the sores are. The lumps are swollen *lymph nodes* and vessels that become larger and softer. They burst and much yellow *pus* comes from them. They become deep sores and sometimes several of them join together to become one large sore.
- Pus comes from these sores for 1–2 weeks then they dry up and have a scab over them. The scab falls off and pus comes from the sore again. The scabs over the sores fall off a few times. And each time the sores get smaller. After 2–3 months the sores heal.
- Well fed animals that live in hot dry places with much sunshine often recover with no treatment. But sometimes the sores go on for many months and the animals become thin and weak.



In a dead animal lymph nodes under the skin and the lymph vessels between them are large and full of pus.

Other diseases that look like this:

Glanders (p. 197); *ulcerative lymphangitis* (p. 193).
Skilled workers can check the pus from wounds with a microscope to identify this disease.

How animals get epizootic lymphangitis

Animals get infected by direct contact with infected animals or *contaminated* things. They usually get it when many of them live together in one place. They also get it when they are bitten by flies that have fed on an infected animal. Infection gets in to the body through small wounds in the skin that often come from harness that does not fit.

Epizootic lymphangitis is caused by *fungi* [*Histoplasma farciminosum*].

Treatment

- Isolate and treat infected animals as soon as possible.
- You can cut sores out with a knife and dress the wound with antiseptic (p. 324) but treatment often does not work, even when skilled workers do it.

Sometimes the disease seems to go away but it comes back about a year later.

Prevention and control

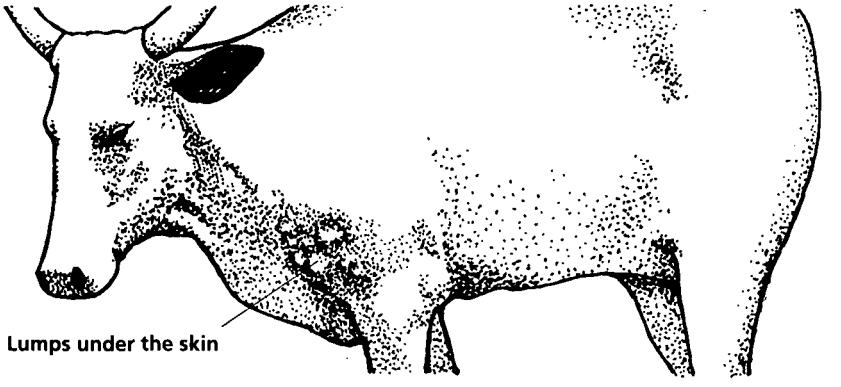
- Clean anything contaminated by infected animals with strong disinfectant. This disease easily spreads from one animal to another on things.
- Burn any bedding used by infected animals.
- Cover the wounds so that flies cannot get to them and spread infection.
- There is a *vaccine* for this disease but it does not work well.
- Animals that have had the disease become *immune* and do not get it again.

Farcy

Only **cattle** and **buffaloes** get *farcy*.

Signs

◆ The animals have lumps full of *pus* under the skin on the neck and between the front legs.



◆ The animals do not rub or scratch the lumps.

Other diseases that look like this:

Tuberculosis (p. 205).

How animals get farcy

They get it from close contact with infected animals or from *contaminated* things. Infection gets into the body through small cuts and wounds in the skin.

Farcy is caused by *bacteria* [*Mycobacteria* and *Nocardia*]. Infection with these microbes can confuse tests for *tuberculosis* (p. 205).

Treatment

Medicines do not work. If you cut the lumps open and drain them they usually come back. But treatment may not be needed because the disease does not usually make an animal very sick even when the lumps look bad.

Prevention and control

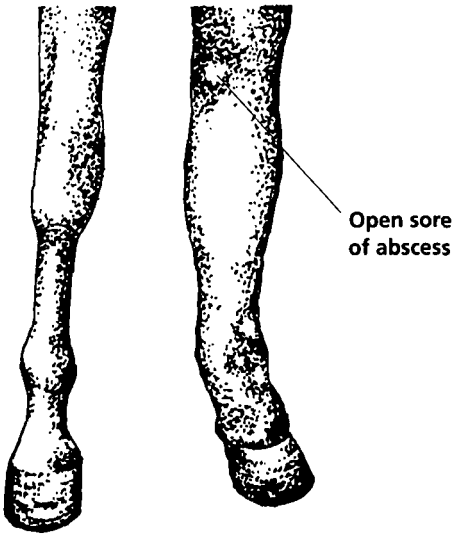
- Separate animals with farcy from healthy animals if there are only one or two of them. But in some places many animals have farcy and it may not be worth separating them.
- Disinfect things that infected animals have touched.

Ulcerative lymphangitis

Horses get *ulcerative lymphangitis* but it is not common. **Mules** and **donkeys** do not get it so often. **Cattle, pigs** and **camels** get it rarely.

Signs

- Small lumps appear under the skin on the legs, especially near the foot. The animal's legs swell up and feel hot.
- The lumps become larger and burst and white/yellow/green *pus* comes out. The pus may have blood in it. Hard swellings may appear further up the leg.
- When the *abscesses* have burst they leave an open sore that heals in 2–3 weeks.



Other diseases that look like this:

Epizootic lymphangitis (p. 190); *glanders* (p. 197).

How animals get ulcerative lymphangitis

Animals get infection through small wounds in the skin. They get it more often when they live in crowded, wet dirty places. Infection can live in the soil for a long time.

Ulcerative lymphangitis is caused by *bacteria* [*Corynebacterium pseudotuberculosis*].

Treatment

- Cut into the *abscess* with a knife to drain the *pus*.
- Scrape out the inside of the hole and wash it out with antiseptic (p. 324). This usually works.
- People in East Africa put the juice from euphorbia trees [*Euphorbia* species] onto the sores to cauterise and disinfect them. But this may distress the animal.
- If the animal does not recover give antibiotic by injection (p. 328).

22 Diseases and problems mostly to do with breathing

Coughing and distressed (noisy) breathing

Even healthy animals cough occasionally, especially if they eat dry dusty food. But **if animals cough often it is a sign of disease**. Animals usually cough (or sneeze) or have noisy breathing because they have infection with *microbes* or *parasites* in the lungs (see *pneumonia* (p. 195)) Sometimes they have *abscesses* (p. 186) in the lungs. They also cough and sneeze when they have *fly larvae* or something, such as a thorn, in the nose (p. 202).

Birds get many diseases with signs of distressed breathing, especially at cold, wet times. Some of these diseases, such as *infectious bronchitis* and *chronic respiratory disease*, are not in this book because it is almost impossible, even for skilled workers, to tell them apart without complicated tests. You will need skilled help to deal with these diseases. But easily **the most likely cause of severe disease with distressed breathing in birds is *Newcastle disease* (p. 208).** You cannot treat *Newcastle disease* but you can treat some of the other breathing problems that birds have with antibiotics (p. 328).

Treating distressed breathing

- If an animal with distressed breathing has *fever* and a *discharge* from the nose or eyes, give antibiotics (p. 328).
- If an animal coughs but has no *fever* and no *discharge* from the nose, treat for *lungworms* (p. 200).
- People in Asia put crushed garlic [*Allium* species] in animals' or birds' food to help them recover from breathing problems.

Preventing breathing problems

- Vaccinate animals and birds against important diseases in your area, for example, vaccinate birds for *Newcastle disease*.
- Do not keep too many animals or birds crowded together in one house.
- Do not feed very dusty food, especially to horses; put some water with it.
- Protect very young animals from cold wind and rain.
- Control *lungworms* (p. 201).
- Be careful when giving medicine by mouth that it does not go down the *trachea* into the lungs.

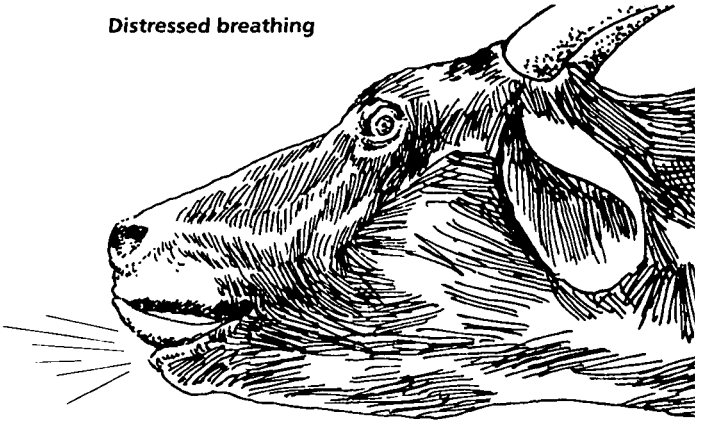
Pneumonia

All animals can get *pneumonia*. Any infection in the lungs is called pneumonia. (Infection in the *bronchi* is called *bronchitis*.). Animals get it most when they are weak, poorly fed or kept in small houses with little fresh air on dirty wet bedding. Pneumonia is a sign of many severe diseases. Animals also get pneumonia when they have been given liquid medicine by mouth that went into the *trachea* by mistake.

Signs

- Animals cough, have fast distressed breathing and often have a *discharge* from the nose. They usually have a *fever*.
- Animals with severe pneumonia often breathe through the mouth as well as the nose. They make a grunting sound with each breath because they feel pain in the chest.
- They seem to fight to get air and may stretch their necks out, trying to get air.

Distressed breathing



In a dead body the lungs are dark coloured. There is often fluid in them and they are heavy. Cut off a piece and drop it into some water – normal lung floats, lung from animals with pneumonia usually sinks.

Treatment

- **Make sure that animals have plenty of fresh air**.
- Antibiotics (p. 328) often work well. They stop infection by *bacteria* even when pneumonia is caused by *viruses* or *parasites* that antibiotics do not kill.
- In cool, wet areas, animals that cough a lot and have much watery *discharge* from the nose and mouth may have *lungworms* (p. 200). Give them *worm* medicine (p. 336).

Contagious bovine pleuropneumonia, CBPP

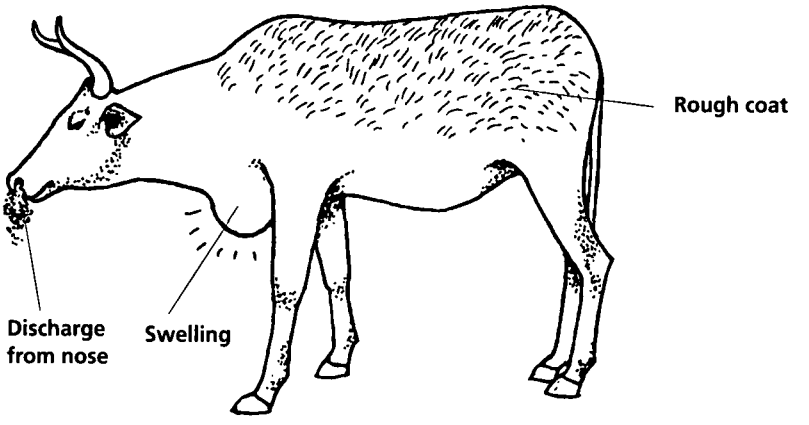
Cattle and **buffaloes** get *CBPP*.

Signs

Animals become sick about a month after they get infected with *CBPP*.

- With **severe disease** that happens fast animals have a high *fever*. They are tired and weak. They soon stop eating and their coats become rough.

- They have fast and distressed breathing. They cough. Often they grunt with pain as they breathe out. Cattle very sick with CBPP stand facing the wind. They have their front legs wide apart and stretch their head forwards. They are trying hard to get more air into their lungs.
- Sometimes when the disease is very severe a thick yellow *discharge* comes from the nose. And there is swelling under the chest.
- Some animals with very severe disease die.



- With **mild disease** that often goes on for a long time, animals have few signs. But if you disturb the animals when they are resting, they often begin coughing.

Carrier animals:
Many animals recover from CBPP. Animals that recover seem healthy but they are dangerous *carriers* of CBPP. Often they still have infection deep in their lungs. They can become sick again many months later. Some people call these animals 'lungers'; they can breathe infection out into the air and infect others.

How animals get CBPP

They get infected through the air from the breath of other animals. Animals usually get the disease when many of them are kept close together at night. They easily catch CBPP from each other. Large groups of cattle that are *stressed* are most likely to suffer.

CBPP is caused by microbes like small *bacteria* [*Mycoplasma mycoides mycoides*].

Treatment

It is best not to treat cattle for CBPP. When you treat animals for CBPP with antibiotic they recover but still carry infection. These carrier animals ('lungers') make it difficult to get rid of the disease completely.

Prevention and control

Many countries where CBPP is common have control programmes (p. 93) for it. Work with these programmes to help get rid of the disease. *Vaccines* against CBPP are used in control programmes. Control programmes usually start with vaccinating twice in one year, then once every year. Some strong vaccines cause bad reactions but weaker vaccines do not protect animals for long. In areas where CBPP does not usually happen programmes often aim to control the disease, if it happens, by killing infected animals and those in contact with them.

Contagious caprine pleuropneumonia, CCPP

CCPP happens in Africa north of the equator and in parts of Asia. **Goats** and occasionally **sheep** get CCPP.

Signs

Usually many animals are sick at the same time. They become sick 20–30 days after they get infected with CCPP.

- Some animals die before they have signs of disease.
- **With severe disease** that happens quickly; animals cough and have a *discharge* from the nose. They have distressed breathing. They are weak and tired and have a high *fever*.
- Many goats die after 4–5 days.
- **With mild disease** that goes on for a long time animals cough and have a *discharge* from the nose.
- Some animals have diarrhoea. They become thin and look very sick. Most animals recover slowly but some become very sick and die.

In a dead animal the lungs are very dark. They have some yellow *pus* on them. Often they stick to the side of the chest and the chest has much yellow fluid in it.

How animals get CCPP

They get it from close contact with infected animals. Infection comes from discharges from the noses of infected animals. Animals often carry infection but have no signs of disease.

CCPP is caused by *mycoplasmas* [*Mycoplasma* species] – they are like small *bacteria*.

Treatment

In an area where people are trying to eradicate CCPP it is best not to treat it because treatment makes some animals into carriers. In these areas it is better to isolate or kill sick animals. But if you are not trying to eradicate the disease you can treat CCPP.

If you think an animal has CCPP start treating all the animals in its group as soon as possible. Antibiotics often work when treatment starts soon enough. They can stop healthy animals in contact with sick ones from getting disease. Tylosin (p. 333) works well but you can also use tetracycline (p. 333).

Prevention and control

- *Vaccines* for CCPP are effective in some areas but not in others.

Glanders

The disease happens mostly in Asia, especially in Mongolia. It happens occasionally in West and Central Africa. **Horses, mules** and **donkeys** get *glanders* most often. Other animals get it occasionally. **People** rarely get glanders (p. 6).

Signs

Animals become sick with glanders 2–25 weeks after they get infected.
When the disease happens quickly, usually when **mules** and **donkeys** get it, the signs are:

- The animals have distressed breathing. They cough and have a *discharge* from the nose. They sneeze out the discharge from time to time.
- They have swollen *lymph nodes* under the jaw. They have a *fever*.
- Some animals die after two weeks.

When the disease goes on for a long time, usually when **horses** get it (this is more common), the signs are:

- The animals cough and a clear *discharge* comes from the nose. The discharge becomes thick and grey/yellow. Sometimes it is red/brown with blood in it.
- Animals may have lumps inside the nose and on the skin around the neck. Thick grey/yellow *pus* comes from these lumps when they break.
- The animals look weak and tired and become thin. They have a *fever* that comes and goes.
- Most animals die eventually.

In a dead animal there are small lumps (about 1 cm) in the lungs and sometimes in the liver.

Other diseases that look like this:

Epizootic lymphangitis (p. 190); *strangles* (p. 204).

How animals get glanders

They get glanders from water or food *contaminated* by animals with glanders. They also get it from contaminated saddles and harnesses. Dogs get it by eating meat from dead animals with glanders.

Glanders is caused by *bacteria* [*Pseudomonas mallei*].

Treatment

No treatment is effective.

Prevention and control

- Immediately isolate animals you suspect have glanders.
- Do not let them drink from the same water bowls as healthy animals.
- Be careful not to spread glanders from sick animals to healthy ones on food, ropes or other things.
- Kill animals with glanders as soon as possible. They are unlikely to recover. The disease spreads easily and there is no treatment so this is the only way to control it.
- Some governments try to eradicate glanders. It is possible to eradicate glanders.
- Skilled workers test animals for infection with a small injection into the skin under the eye. They kill animals that carry glanders.
- Wash yourself carefully after handling animals with glanders.
- It is best not to eat meat from animals with glanders.

Heartworm, Dirofilariosis

Dogs get *heartworm*. **People** get heartworm rarely (p. 6).

Signs

- The dog has distressed breathing and coughs.
- It is weak and easily becomes tired.
- It stops eating and may vomit.
- It cannot walk normally.
- Sometimes a dog has pale *mucous membranes*.
- Later the dog has a swollen abdomen and swelling under the skin.
- Skilled workers can look for heartworms in a fresh *blood smear*.

How animals get heartworm

Mosquitoes get heartworms from infected animals and spread them to animals they bite. The disease happens most in hot, wet places. Heartworms are thin white *roundworms* (30 cm) [*Dirofilaria immitis*]. They live inside the heart and in large *veins* and *arteries* near the heart.

Treatment and control

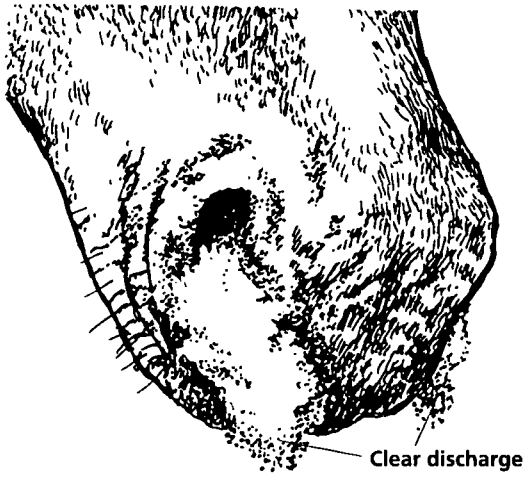
Treatment for heartworm is effective but needs skilled help. The medicines used, such as levamisole or tetracyclines, kill *worms* that live in the blood. Sometimes dead worms go into the heart and stop it working so the animal dies. It is difficult to protect dogs against heartworm. Give diethylcarbamazine (5.5 mg/kg by mouth) every day for a week every six weeks while there are many mosquitoes and for another two months. Or give ivermectin once every month when there are many mosquitoes.

WARNING

Some dogs are poisoned by ivermectin (p. 337).

Influenza

Horses, birds and rarely **pigs** get *influenza*.



Signs

Animals become sick 1–4 days after they get infected with influenza.

- They have a high *fever*.
- **Horses** have a clear *discharge* coming from the nose. The discharge soon becomes white/grey/yellow. They have a loud cough.

- **Pigs** have distressed breathing. They sneeze and cough. A clear *discharge* comes from the eyes. Most recover in 1–2 weeks with no treatment.
- **Birds** with influenza have the same signs as birds with many other diseases that have signs to do with breathing (p. 128).

Other diseases that look like this:

Many diseases that have signs to do with breathing look the same (p. 128).

How animals get influenza

They get infection through the air when they are close to infected animals.
Influenza is caused by *viruses* [*Influenza Type A*].

Treatment, prevention and control

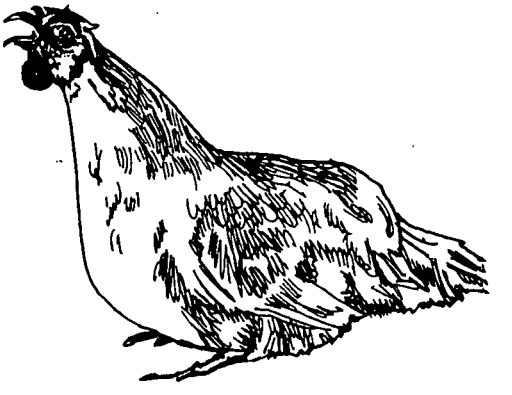
Vaccination is not usually worthwhile except for **horses**. Vaccination of horses is effective. Vaccinate animals twice, three months apart. Then vaccinate them every six months.

Lungworms, Parasitic bronchitis

Only animals that live in cool, wet places get *lungworms*. **Cattle**, **sheep**, **goats** and occasionally **horses**, **mules**, **donkeys** and **pigs** get lungworm disease, especially when they are young.

Signs

- Animals have distressed breathing and cough.
- They do not grow normally.
- They do not have a *fever*.
- **Sheep** and **goats** are usually sick for a long time. They cough and have fast distressed breathing with a clear/white *discharge* from the nose. They do not have a *fever*.
- **Horses** often get lungworm disease but **donkeys** do not usually suffer much. (Horses can get lungworms from donkeys.)
- **Birds** have distressed breathing and cough and gasp to get air. Some birds die because they cannot breathe.



◆ Skilled workers look at faeces with a microscope to check for lungworm.

In a dead animal the *trachea* and *bronchi* have *worms*, *mucus* and some blood in them. **Birds** have bright red (2 cm) worms in the trachea.

Other diseases that look like this:

Pneumonia (p. 195).

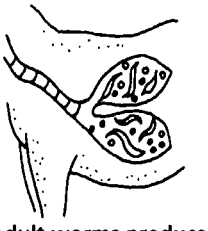
How animals get lungworm disease

They get it from *lungworm larvae* on pasture. Lungworm larvae come from the faeces of animals with lungworms. An animal eats the larvae when it grazes and they go into the *intestines*. The larvae dig through the intestine and go through the body into the lungs to become adults about a month after the animal ate them. The adult lungworms (5–10 cm) live in lungs or *trachea* and produce eggs that develop into larvae which the animal coughs out onto the ground. The animal also swallows some larvae, these come out in the faeces. One animal can *contaminate* the pasture with many millions of larvae that develop on the ground and can infect other animals after about a week.

Lungworm disease is caused by types of *roundworms* [*Dictyocaulus* and others].

Animals eat the larvae with grass. The larvae go into the intestines.

The larvae go in the blood from the intestines to the lungs.



Adult worms produce eggs in the lungs.

The eggs are coughed up onto the ground or swallowed. They hatch on the ground or in the intestines.

Some larvae pass out of the eggs on to the grass in the faeces.

The larvae are eaten with grass.

Treatment

- Treatment is not effective after the disease has become severe. But many *worm* medicines (p. 336) work if you give them soon enough.
- When you treat animals for lungworm disease, move them away from pasture contaminated with lungworm larvae. Preferably move them to dry pastures.

Prevention and control

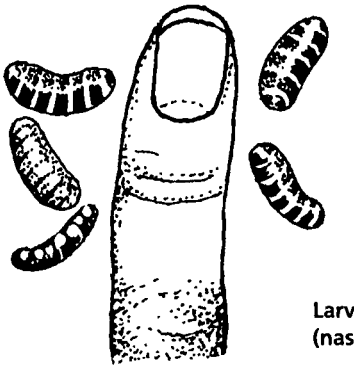
- To control lungworms give worm medicine, e.g. levamisole (p. 337) three times, three weeks apart. Give the first medicine as soon as animals go to pasture that might have lungworm larvae on it.
- **Cattle, sheep** and **horses** get different kinds of lungworms so it is safe to move one of these kinds of animal on to pastures grazed by another kind.
- Keep young animals separate from adults that have or have just had lungworms.
- Some people breed animals, especially sheep, that are *resistant* to some worms.
- Prevent lungworms as you do *roundworms* (p. 94).

Nasal bots

Horses, camels, sheep and **goats** get *nasal bots.*

Signs

- Animals sneeze and some have a grey/white/yellow *discharge* from the nose.
- They sneeze *larvae* (*bots*) out onto the ground.



Larvae (nasal bots)

How animals get nasal bots

Nasal bot flies lay eggs in and around an animal's nose. The eggs become *larvae* (1 cm) inside the nose. They fall to the ground when an animal sneezes, and develop in the soil into new adult flies. The flies that cause this are:

Horse [*Rhinoestrus*], **Sheep/goat** [*Oestrus ovis*], **Camel** [*Cephalopina titillator*].

Treatment and control

- Many insecticides kill nasal bots (p. 339). Give them by injection or use an insecticide spray up the nose.
- People in Kenya push insecticide mixed with water up the nose with a tube attached to a syringe.
- **Horses** Scrape off any bot fly eggs around the nose.

An insecticide is given using a syringe with a tube

Pasteurellosis

Cattle, sheep, goats and **pigs** get *pasteurellosis*. **Cattle** and **buffaloes** also get a very severe type of pasteurellosis called *haemorrhagic septicaemia* (p. 283).

Signs

Animals usually become sick 7–10 days after they get infected. Many animals in a group usually get this disease at the same time. The disease spreads fast. Animals out at pasture do not get this disease so often.

- ◆ Some animals stop eating and look tired and weak; they have a high *fever*.
- ◆ They often cough a lot and have distressed breathing that becomes worse.
- ◆ Some animals collapse and die in a few hours.
- ◆ Other animals are sick for several days.
- ◆ They lose weight and become thin and weak. Sometimes they have a swollen abdomen.
- ◆ They grind their teeth.
- ◆ Their breathing is often rapid but weak.
- ◆ They usually have diarrhoea.
- ◆ They die after 5–6 days if they are not treated.

In a dead animal both lungs have dense red/grey patches in them. The airways have mucus in them. Animals that were sick for several days have yellow fluid in the chest and in the sac around the heart.

Other diseases that look like this:

CBPP (p. 195), *pneumonia* (p. 195).

How animals get pasteurellosis

Animals get pasteurellosis from close contact with other animals. They get it by breathing in infection from other animals. They usually get it when they are kept close together, especially when they are kept in hot, damp buildings without much air. This often happens when animals are transported. (Some people call this disease *shipping fever*.) Animals also get pasteurellosis when they suffer *stress* for other reasons.

Pasteurellosis is caused by *bacteria* [*Pasteurella multocida/haemolytica*].

Treatment

- ● Many antibiotics are effective (p. 328).

Prevention and control

- ● Avoid keeping animals in hot, damp, overcrowded conditions. Be sure that animals in ships and vehicles have plenty of air.
- ● There are dead *vaccines* for pasteurellosis. You need to vaccinate every year and vaccines are not always effective. Good vaccines should be made from the type of *bacteria* that cause disease in your area.
- ● Animals that have had pasteurellosis are *immune*, but only for a few months.

Snoring disease

Snoring disease only happens in the Indian sub-continent. **Cattle**, **buffaloes** and **horses** get snoring disease.

Signs

- ◆ The animals have noisy, distressed breathing and a white/yellow/grey *discharge* comes from the nose.

How animals get snoring disease

Animals get infected with *blood flukes* from water snails. They get infected through the skin or from drinking the water where infected snails live. Animals can get the disease from snails that people have infected. The disease usually happens in places where there is water all year round.

Snoring disease is caused by *blood flukes* [*Schistosoma*] (p. 222).

Treatment

- Metrifonate, Trichlorphon, Praziquantel – an expensive medicine used for people with bilharzia – and other medicines are effective (p. 338). **Some of these medicines are dangerous for the animal.**

Prevention and control

- Control *blood flukes* in the same way as you control *liver flukes* (p. 99) by avoiding wet places where there are many snails that carry the *parasites*.

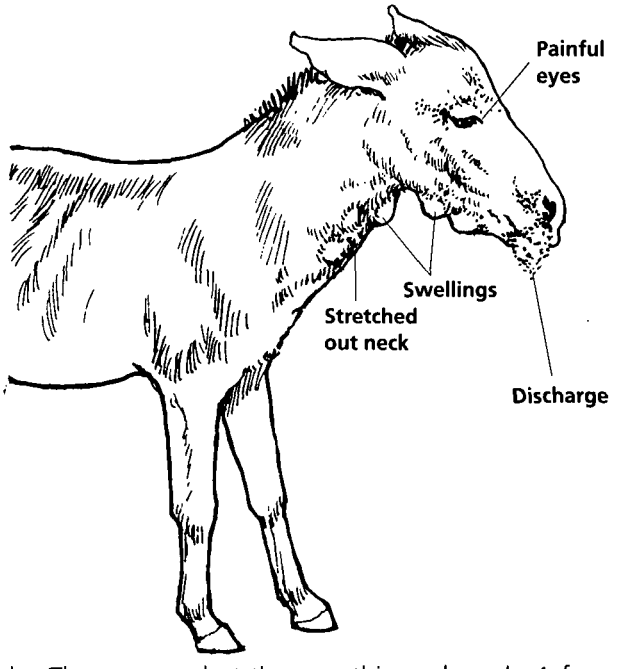
Strangles

Horses, **mules** and **donkeys** get *strangles*. Young animals get it most often, especially when many of them are crowded together.

Signs

Animals become sick 4–8 days after they get infected with strangles.

- The animals stop eating.
- They have a *fever*.
- They have a watery *discharge* coming from the nose. The discharge soon becomes thick, white/yellow.
- Some animals have painful eyes and try to avoid bright light.
- They cough and sneeze and stretch their heads out.
- Their breathing is very noisy.
- Food and water sometimes come back through the nose.
- There are swellings under the jaw and around the neck. These swellings are *lymph nodes* that have *abscesses* in them. The swellings burst after 1–2 weeks. Thick white/ yellow *pus* comes from them.



- Most animals are sick for 3–4 weeks. They recover but they are thin and weak. A few animals die if they are not treated. Some animals seem to recover. But they become sick again months later if the animal suffers *stress*.

How animals get strangles

They get it from close contact with infected animals. They also get it from pasture and things that infected animals have *contaminated*. Infection comes from *abscesses* and *discharges* from the nose of infected animals.

Strangles is caused by *bacteria* [*Streptococcus equi*].

Treatment

- Isolate and treat animals as soon as possible.
- Give an antibiotic (p. 328).
- People in Senegal use aromatic leaves of the *Boscia senegalensis* tree. They chop the leaves and put two handfuls in a bag for the animal to breathe (p. 350). The smell of these leaves make the animal produce more mucus from the nose and this helps the animals to recover. **But the leaves are poisonous and they do not let the animal breathe from the bag for more than 5 minutes.**
- Skilled workers can cut open the *abscesses* to let the *pus* out (p. 186). You can do this but be careful. **It is dangerous to the animal because the abscesses are often close to important *veins*, *arteries* and *nerves*.**

Prevention and control

- Clean and disinfect places where infected animals have been.
- Vaccination for strangles is effective.

Tuberculosis

Cattle, buffaloes and **camels** get *tuberculosis*. Cattle kept out at pasture all the time do not often get tuberculosis. **Sheep**, **goats** and **horses** rarely get tuberculosis. **Birds**, **pigs** and other animals sometimes get different types of tuberculosis. **People** can get tuberculosis (p. 6).

Signs

Animals become sick with tuberculosis several years after they get infected. So animals with signs of tuberculosis are usually old.

- Older animals start to cough occasionally, then they cough most of the time. They have a dry cough at first then they cough up white/yellow mucus. This mucus is very infectious.
- They lose weight and become thin.
- Some of the *lymph nodes* under the skin swell up. You can see and feel these, especially on the neck and the front legs.
- Animals sometimes have enlarged udders that feel hard and lumpy and the milk may become yellow, with *pus* in it.
- Animals become thin and weak then they die after a long time.
- **Birds** get tuberculosis but they are often not very sick. Some older birds become thin. They sometimes have pale or yellow combs. A few birds become lame. A few birds die suddenly with no sign of disease.

In a dead animal there are usually hard swellings with pus inside them – *abscesses* – inside the body. Sometimes there are only one or two. Sometimes there are many small abscesses in the chest and abdomen.

Other diseases that look like this:

Farcy (p. 192).

How animals get tuberculosis

They get it from close contact with infected animals. They usually get it when they are close together in a building. Baby animals get it from drinking infected milk. Animals that live out on pasture all the time rarely get tuberculosis.

Camels rarely get tuberculosis except when they live close to infected cattle. Tuberculosis is caused by *bacteria* [*Mycobacterium*].

Treatment

There is no treatment for tuberculosis.

Prevention and control

- There is no vaccine for cattle with tuberculosis.
- When animals are kept in houses, make sure:

  They are not too crowded.

  There is enough fresh air.

  The house is cleaned out often.

  The animals are properly fed.

  Clean and disinfect houses where infected animals have been.
- It is best not to eat the meat from an animal with tuberculosis. But sometimes people are very hungry. If there are only a few *abscesses* and you can see them clearly, carefully cut them out without opening them and dispose of them before cooking the meat properly and eating it. If there are many abscesses spread though the body, dispose of the whole body. **DO NOT EAT IT, it is dangerous**.

Testing for tuberculosis

In some countries there are control programmes for tuberculosis. Work with these programmes to help control the disease. The only way to control tuberculosis in cattle is to test them for infection and to dispose of infected animals. Skilled veterinary workers can test for infection by giving small protein injections into the skin on the neck or near the base of the tail. After three days they look at the place where these injections were put to see if they are swollen. If the skin has reacted by swelling the animal has probably got tuberculosis or has been in contact with it.

Avian coryza

Chickens and other **birds** get this disease.

Signs

Birds become sick 1–10 days after they get infected with avian coryza.

- The birds have distressed and noisy breathing (see p. 128). They sneeze and have a *discharge* from the nostrils. The discharge is clear then it is white/yellow and smells bad.
- The birds shake their heads and stretch their necks out. They have a discharge from the eyes and have swelling around the head.
- They stop laying eggs.
- Birds with mild disease have a clear discharge from the beak and cough and sneeze occasionally.

Other diseases that look like this:

Newcastle disease (p. 208).

How birds get avian coryza

They get it from *contaminated* water and food. They also get it from birds with the disease and from birds that carry infection but are not sick.

Avian coryza is caused by bacteria [*Haemophilus* and others].

Treatment and control

- If there is much swelling around the head give an antibiotic (p. 328).
- Keep birds in clean conditions and make sure they are well fed. Give them plenty of clean water.

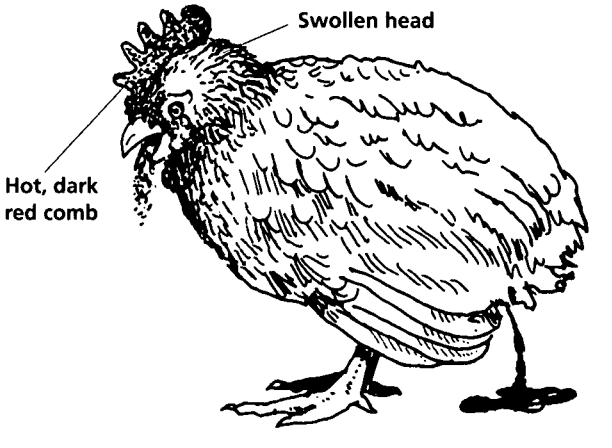
Fowl cholera, Pasteurellosis

Chickens, ducks and many other **birds** get *fowl cholera*.

Signs

Birds become sick 2–10 days after they get infected with fowl cholera.

- **With severe disease** that happens fast; some birds die suddenly before they look sick.
- Many birds are tired and weak. They do not eat much. The feathers look rough. Sometimes the head is swollen. The comb and wattle are hot and dark red.



- ◆ They have fast, distressed breathing. They cough and sneeze. A clear/yellow *discharge* comes from the eyes and beak. This makes breathing difficult.
- ◆ Many birds have severe watery green/grey/yellow diarrhoea. The feathers around the tail become dirty with faeces.
- ◆ Many birds die after 2–3 days.
- ◆ **With mild disease** that goes on longer (usually male birds), the comb and wattle often become pale. A clear discharge comes from the beak. There is swelling around the eyes.

Other diseases that look like this:

Newcastle disease (below); *salmonellosis* (p. 235); *avian coryza* (p. 207).

How birds get fowl cholera

They get it from contact with sick birds or from water and things *contaminated* by infected birds. Sometimes wild birds bring the infection.

Fowl cholera is caused by *bacteria* [*Pasteurella multocida*].

Treatment

- ● It is usually not effective to treat birds that have already got signs of the disease.
- ● Move healthy birds away to a clean place and treat them. Or remove the sick birds and treat the others.
- ● Give an antibiotic in the food or water for a few days (p. 315).
- ● You can try to treat valuable birds by injecting antibiotic into the muscle (p. 328), but it does not often work.

Prevention and control

- ● If the birds live in houses make sure the houses are kept clean.
- ● Make sure birds have clean water to drink. Avoid giving them water that has been *contaminated* by other birds.
- ● Empty any house where sick birds have been. Clean it and disinfect it.
- ● *Vaccination* for fowl cholera is effective. But you need skilled help to decide if this disease is causing the problem, then you need to vaccinate the birds every year.

Newcastle disease, Fowl pest

Chickens and other tame and wild **birds** get *Newcastle disease*. **It is the most important disease that village poultry get.**

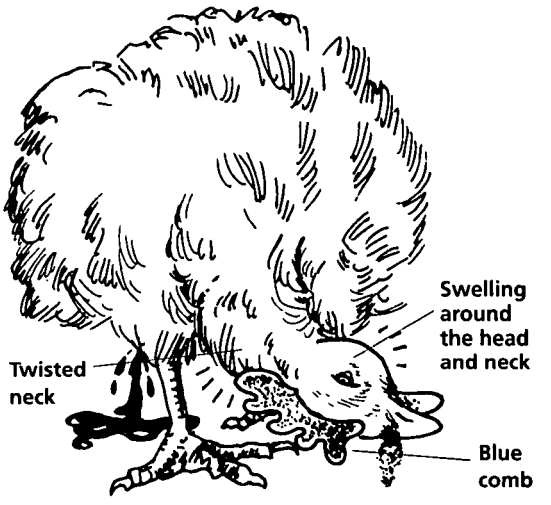
Signs

Usually many birds in one place get Newcastle disease at the same time. Sometimes it is **very severe**, especially for young birds:

- ◆ Many birds die suddenly before they have signs of disease. Often nearly all the young birds in one place die but only a few adults die.

Sometimes the disease is a little **less severe**:

- The birds stop eating and become weak and tired.
- They stop laying eggs.
- They have watery green diarrhoea and become *dehydrated*.
- They cough and sneeze and a *discharge* comes from the nostrils.
- They often have swelling around the head and neck. The comb turns blue.
- Some birds have a paralysed wing or leg, or have a twisted neck. Sometimes the birds shake.
- Many birds collapse and soon die.



Sometimes the disease is **mild**:

- The birds have distressed breathing.
- They do not eat much and lay fewer eggs than normal

In a dead bird with severe Newcastle disease there are bloody patches in the *intestine*. Some birds have thick yellow air sacs. Most birds have some mucus in the *trachea*.

Other diseases that look like this:

Avian coryza (p. 207); *fowl cholera* (p. 207).

How birds get Newcastle disease

They get it through the air and from eggs, faeces and the dead bodies of infected birds. They often get it from drinking water *contaminated* by faeces from sick birds. Wild birds help spread the disease. Wild animals and dogs spread the disease when they carry away dead infected birds.

Newcastle disease happens most often at the start of a wet season. Wild birds often bring the disease at the same time each year.

Newcastle disease is caused by *viruses* [*Paramyxovirus*].

Treatment

There is no treatment for Newcastle disease. If Newcastle disease happens:

- Kill the sick birds and bury them a long way from healthy birds.
- Keep any birds that have been properly vaccinated but watch them closely for signs of disease. Sell all the birds that have not been properly vaccinated; people can eat them. Do not keep these birds to eat them one by one. They will soon spread disease and die. As soon as they look sick nobody will want to buy them or eat them.
- Clean enclosures and houses where the birds live by clearing away faeces and using disinfectant (p. 324).
- Wait at least four weeks before bringing in new birds and vaccinate them as soon as they arrive.

Prevention and control

- Keep birds away from water *contaminated* by faeces from infected birds.
- Give birds clean water to drink from clean bowls. Refill the bowls often.
- If birds live in houses keep them on slats so that the faeces fall through.
- Don't keep chickens, guinea fowl, pigeons and ducks close together. Some birds, especially pigeons and ducks, carry Newcastle disease even if they do not become sick.
- Some people avoid Newcastle disease by selling or eating their birds at the start of a wet season.

Vaccination for Newcastle disease

Live and dead vaccines are very effective. Some governments give out free vaccine. Use the live vaccine. Dead vaccine is only useful for large groups of laying or breeding birds. (Some people are trying new vaccines that you give in drinking water.)

Most vaccine is freeze dried and needs diluting. Dilute dry vaccine with distilled water. Do not use water from a tap. Put one drop in the bird's eye and one in the nostril. Vaccinate adult birds by injection under the skin under the wing.

Vaccine only lasts for a few hours after you have mixed it with water. There is often enough in one bottle to vaccinate many birds. It is a good idea to get people from villages nearby to come and get vaccine when you dilute it. Then they can take it back to their village while it still effective.

Vaccinate birds when they are 7–10 days old and again two months later. Do this before the start of a wet season. Newcastle disease vaccine protects birds for about six months. People often vaccinate birds every three months because new chicks are always hatching and they are not sure which birds have been vaccinated.

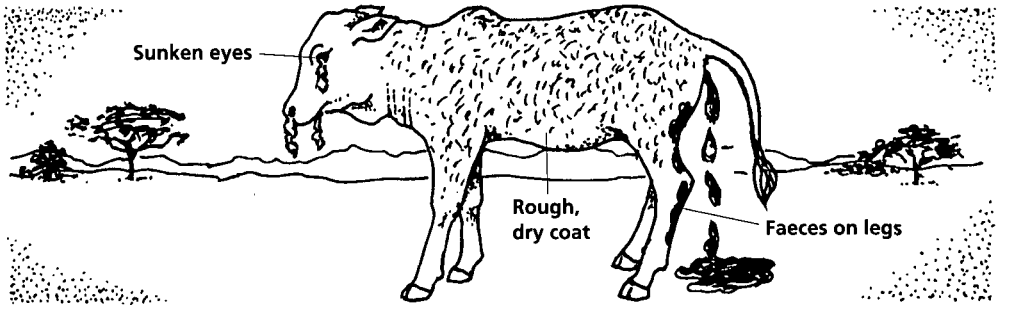
Some people use traditional methods of vaccination but modern vaccines are cheap, effective and easy to use (p. 353).

23 Diseases and problems mostly to do with eating and digestion

The diseases and problems looked at in this chapter are the most common ones but other problems also have signs to do with eating and *digestion*. See also *poor feeding* (p. 45), *liver flukes* (p. 285), *plant poisoning* (p. 306).

Diarrhoea

Animals with *diarrhoea* have watery faeces and pass them often. Sometimes the faeces are an unusual colour and smell foul. There is sometimes blood in the faeces. The back legs are dirty with faeces. Diarrhoea is a common sign of many diseases, especially *worms* (p. 218) or *flukes* (p. 285). See page 130 for a guide to more of these diseases.



Problems to do with diarrhoea

- Animals become *dehydrated* (p. 267) if diarrhoea goes on for long. They become weak and do not *ruminate*. They have dry skin and a rough coat and their eyes sink into the head.
- Diarrhoea is dangerous for young animals. They quickly lose a lot of water in their faeces and become dehydrated.
- Animals often get diarrhoea when they have worms. It is also a sign of many diseases (pp. 130–3).

Animals often have diarrhoea when:

- Their food suddenly changes, especially when they are weaned from milk.
- They have too much milk or wet, green food or too much of one kind of food, e.g. grain.
- They are infected by *microbes* that they fight off.
- When they suffer *stress*, especially **horses**.
- A new-born horse is about a week old and its mother is in heat.
- Male **camels** sometimes have diarrhoea in the mating season.

These animals usually recover quickly with no treatment but when diarrhoea does not stop in a day or two or is very severe or the animal has a *fever* it needs treatment.

Treatment for diarrhoea

- Stop the animal from drinking milk for two days.
- Give plenty of water to drink. Giving water is helpful, but it is better to give water with some sugar and salt in it, see *rehydration fluid* (p. 346). **It is very important to give fluids to replace what an animal loses, especially for very young animals. Give some fluid every few hours.**
- Many people give animals some liquid they make, by boiling the bark from trees in water and letting it cool, to help them recover.
- Antibiotics sometimes help stop diarrhoea but usually they don't. Antibiotics only treat diarrhoea caused by *bacteria* that they can kill.

Preventing diarrhoea

- Make sure that new-born animals get colostrum to drink as soon as possible (p. 62).
- Control *worms* (p. 94).
- Give the animal proper food and clean water.
- Do not suddenly graze animals on wet pasture. Wait till later in the day when pastures become drier. Avoid suddenly giving a lot of wet, green food and then a lot of water to drink.
- Vaccinate animals for the most severe diseases that cause diarrhoea in your area. Some vaccines that you give to the mother protect her offspring.
- Remove faeces often from houses where animals live.
- Avoid keeping too many animals in one place.

Constipation

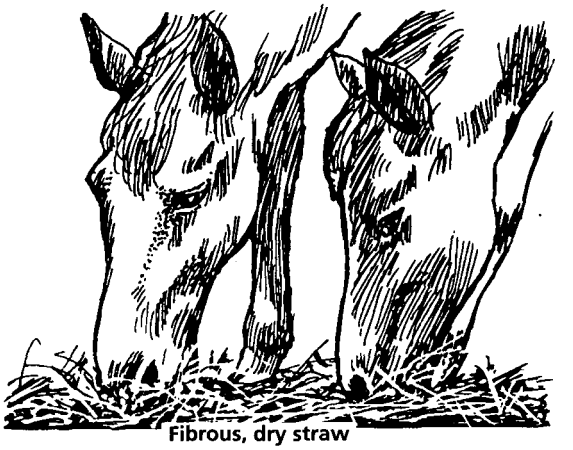
Animals with constipation do not pass faeces often. They often strain to pass faeces.

Signs

- If the animal passes faeces they are dry and hard.
- There is no sign of faeces that the animal has passed in the night.

Some reasons why animals get constipation

- They sometimes get it when they suddenly get different food.
- When an animal has a severe disease it often has constipation at first that changes to diarrhoea later.
- Animals get constipation when they eat dry food with much fibre in it and when they have much too little water to drink.
- Animals kept in houses are more likely to be constipated if they do not move around.



Fibrous, dry straw

- It can happen when an animal has a blockage in the *intestine* or when it has severe injuries of the back legs.
- It is also a sign of several diseases (p. 130).
- **Pigs** often have constipation soon before they give birth (p. 53).
- **Horses, mules** and **donkeys** sometimes do not pass faeces soon after they are born, which they should do. If this happens the new-born animal will not lie still, it gets up and lies down and kicks its legs about. It strains to pass faeces. If it behaves like this and has not passed faeces 12 hours after it is born, help it to pass faeces by putting some liquid into the *rectum*. Use a rubber tube like this. Lubricate the tube with some vegetable oil or some soapy water. Push the tube gently through the *anus* and pour in about half a litre of warm water with some soap in it. Or use about half a cup (100 ml) of liquid paraffin or a cup (200 ml) of vegetable oil.

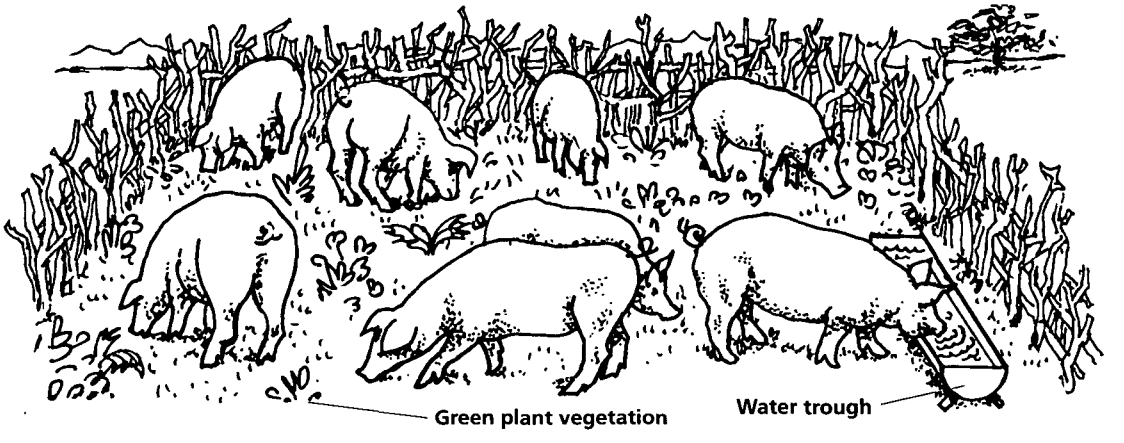

Use a syringe with a rubber tube on the end instead of a needle.

Treatment for constipation

- Make sure the animal has plenty of water to drink.
- Give a laxative medicine (p. 346).

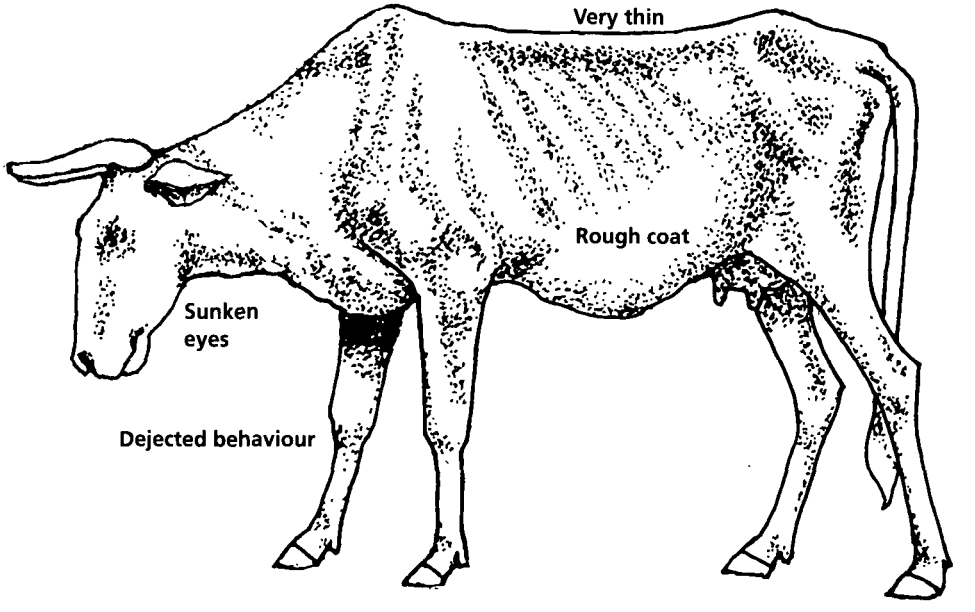
Preventing constipation

- Make sure that animals have plenty of water to drink and there is room for them to move around.
- Give some green food every day.
- Do not *stress* the animals.
- Keep the houses where animals live clean.



Loss of appetite, Eating less than normal

Animals that eat much less than normal look dull and become tired and weak; they soon become thin.



An animal or bird eats less than normal because:

- It has a problem in its mouth or with its teeth.
- It has a *fever* or other disease.
- It is suffering from pain.
- It is very hot in the sun.
- It has worked too hard.
- It is only given poor quality food. It is given food irregularly.
- It has many *worm parasites*.
- It has a problem in the *stomach* or *intestines*.
- It is suffering from *stress*.

Treating animals that eat less than normal

If there is nothing stuck in the *oesophagus* and you can find no other obvious reason why an animal is not eating:

- Check to see if the animal has a *fever* (p. 266).
- If the animal has no fever treat it for *worms* if you think they are a problem (p. 218).
- Try changing the animal's food slowly. Introduce a new food a little at a time.

Some people add something to food to stimulate animals to eat:

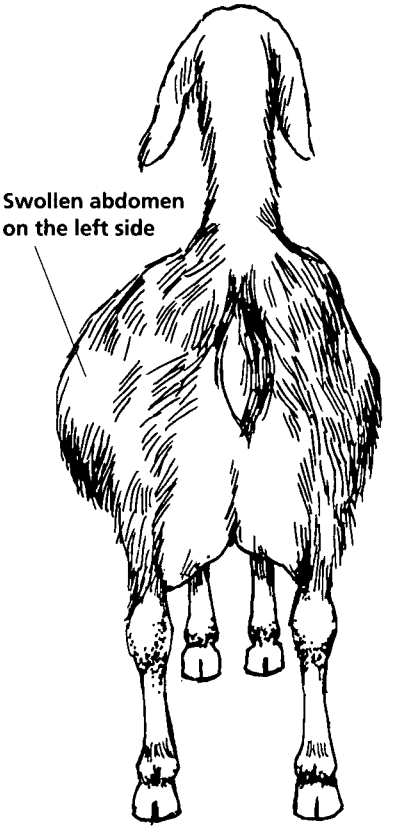
- They add half a cup (100 ml) of molasses to 1 kg of food for a few days.
- They add 1 small spoon of salt and two small spoons of sugar to 1 kg of food.
- They add pulp or juice from tamarind fruits [*Tamarindus indica*].

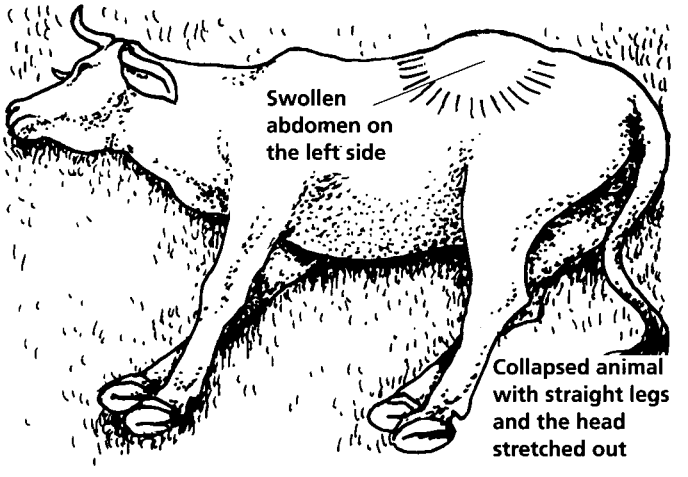
Bloat

Cattle, buffaloes, sheep and **goats** get **bloat**. Occasionally **camels** get it.

Signs

- The abdomen is very large on the left side; if the abdomen is very swollen the animal has distressed breathing.
- The animal stops eating.
- Sometimes green froth comes out of the nose and mouth.
- Some animals have a little diarrhoea.
- Sometimes the animal kicks its side or lies down and sticks its legs out and if the animal has bloat for a long time it collapses with its head stretched out.





How animals get bloat

Animals get *frothy bloat* – the *rumen* is full of froth – because their *digestion* is upset. Usually several animals get this at the same time. They get it when they eat a lot of wet, green pasture, especially with many legumes in it or when they have eaten ripe fruits or other food that ferments easily. Some plants and poisons cause sudden and severe bloat. Animals also get it when the food they eat is suddenly changed. Frothy bloat often happens at the start of a wet season and often happens again if animals continue to graze wet pasture. Move them to a less rich, drier pasture.

Animals get *gassy bloat* – the rumen is full of gas – when the *oesophagus* is blocked. Usually only one or two animals get this at the same time. They get it when they choke on something (p. 228) or when they have eaten plastic bags (p. 227) or when they have a disease, such as *tetanus* (p. 263), that paralyses them.

Bloat happens because gas or froth in the rumen (p. 35) cannot escape. Food being digested in the rumen always makes a lot of gas. Usually animals let this gas out of the rumen by belching every minute or two. But when animals eat things that make froth inside the rumen or have a blocked oesophagus they cannot belch the froth or gas out and the rumen swells with froth or gas.

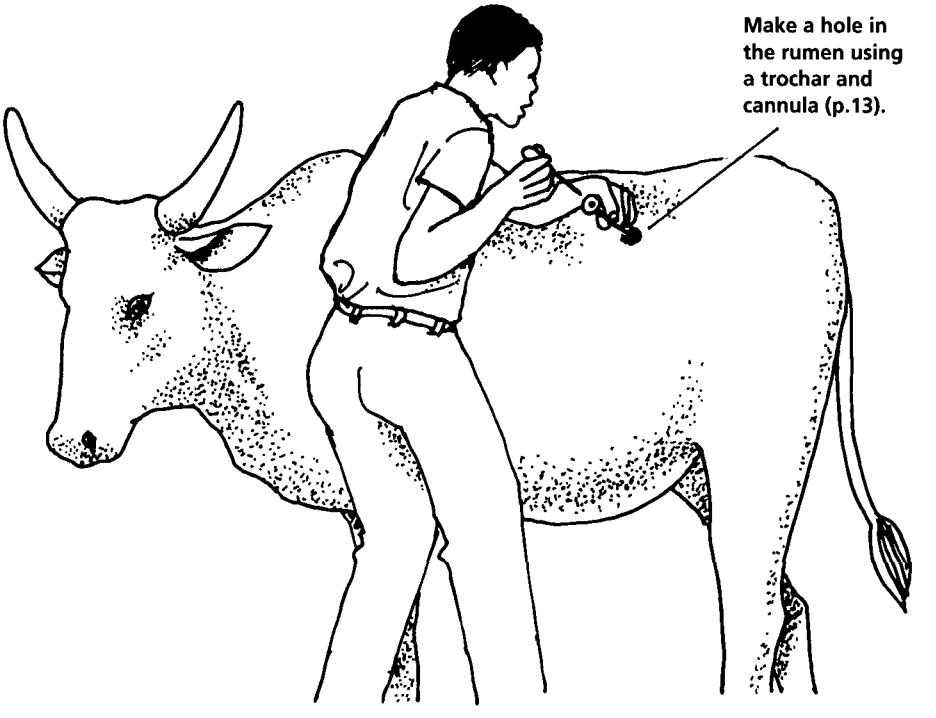
Treatment

- Do not feed the animal for a few hours. Make it move about.
- For animals with frothy bloat that is not severe, give a bloat medicine by mouth (p. 347). Rub the left side of the abdomen to help mix up the medicine.
- Give bloat medicine once a day for 2–3 days until the animal recovers. Be careful giving the medicine. The animal's rumen is already full of froth and the animal will not swallow easily. Give small amounts of the medicine at a time slowly.
- If the animal will not swallow, use one of these other methods to treat it.

1 In Asia people tie a rope across the animal's mouth and tie it around the head to make the animal chew at the rope to stimulate it to belch.

2 For gassy bloat or when frothy bloat is severe and the animal is distressed:

- Puncture the skin and the rumen to let the gas out. Use a knife or any sharp thing. The best thing to use is a *trochar* and *cannula* (p. 13).



- Make the hole a hand's width behind the last rib and a hand away from the edge of the back bone. Push hard, the skin is very tough. Gas and froth come out when you make the hole.
- It helps to put a tube (*cannula*) into the hole to keep the hole open. Pour some bloat medicine or vegetable oil through the tube into the rumen to help stop bloat happening again. When you remove the tube the hole seals itself, you do not need to stitch it.

3 Skilled workers sometimes put a *stomach tube* (p. 318) down the *oesophagus* to let gas and froth come out of the tube, then they pour medicine down the tube.

Prevention

- Feed animals with dry grass to fill them up before you put them onto new wet green pasture.
- Do not give water to animals just before you put them onto wet pasture.
- Do not put animals onto wet green pasture early in the morning but wait until the sun has made the pasture drier.
- Only put animals on a new wet green pasture for an hour or two each day and slowly increase the time they have on the new pasture. After a week they will be used to it and are much less likely to get bloat.
- When you change the food that you give to animals, do it slowly. If you start feeding grain to animals start with a small amount each day.

Colic

Horses, mules and **donkeys** get attacks of sudden and severe pain in the abdomen that make them behave unusually. This may be *colic*. Mules and donkeys have this problem less often than horses. **Other animals** occasionally get colic.

Signs

- The animal does not eat much and looks tired and weak.
- It becomes nervous. It gets up and down and may kick at its side or turn and bite at itself. Sometimes it sits down with its front legs stretched out. If the colic is severe the animal sometimes lies on the ground and kicks into the air (see page 76).
- Sometimes the abdomen looks swollen on the right side.
- Sometimes the animal will not urinate.
- It often does not pass faeces but it sometimes has diarrhoea later.
- It often sweats a lot and breathes very fast.
- The *mucous membranes* are often very bright red or dark red/blue.
- Sometimes the animal seems to recover then has colic again and sometimes the animal goes quiet and seems to recover but then it suddenly dies. This happens if the *stomach* breaks.

Other problems that look like this:

If a female has a large swollen abdomen and seems to be in pain but has fluid coming from the *vagina* she may be about to give birth.

How animals get colic

An animal usually gets colic because:

- It has eaten too much dry food (especially if they have not had enough water), too much grain, too much very green food or some rotten food. Forage easily rots if it is badly kept or very wet.
- The animal has eaten food that makes much gas in the *intestine*.
- The animal has been drinking a lot of cold water too soon after working.
- Animals have bad teeth and have not chewed their food properly.

- Colic often happens at the start of a wet season when there are green shoots for animals to graze but the ground is still dry and dusty and animals eat a lot of soil with the shoots.
- The animal has blocked or twisted *intestines*. **This is serious** and the animal often dies.
- Worms can block the intestines when there are many of them.

Horses get colic for many different reasons. It is difficult even for skilled veterinary workers to decide why a horse has colic. Sometimes you can find out why a horse had colic by looking inside the body after it is dead.

Treatment

When colic is caused by bad food or worms but the intestine is not blocked you can often treat the animal.

- Keep the horse moving. Do not let it lie down. Make it walk about several times every hour until it recovers.
- Give a laxative medicine such as vegetable oil or magnesium sulphate (p. 346). It is best to give this with a *stomach tube* (p. 318).
- If the animal has eaten much dry food this often cures the colic.
- Some people give medicines with ginger or pepper in them to help an animal to recover from colic.

If the horse does not recover after two or three hours, try to get skilled help. Skilled workers can give special medicines for colic. These medicines relax the stomach and intestines and can help the animal recover but are not always effective.

If the intestine is completely blocked or twisted the animal will probably not recover. Even skilled veterinary workers cannot always treat horses with colic successfully. Some horses with colic will die.

Prevention

- Check the animal's teeth often and file them if needed (p. 85).
- Treat the animal for *worms* (p. 336).
- Do not let animals drink immediately after working hard.
- Do not let the animal have too much grain at one time.
- Give animals water to drink **before** they eat.

Worms (roundworms), Parasitic gastro-enteritis

All animals and **birds** can get many different types of *roundworms* (p. 94). Young animals suffer most, especially in wet seasons. Animals do not often get worms in very dry places. Worms are only a problem near to water and when it rains but animals from dry places that have not had worms much before get very severe disease.

Poorly fed animals often have worms; they are thin because they are poorly fed **and** because they have worms. They need treatment for worms **and** better food.

Signs

Animals with worms usually do not have a fever

- Animals do not grow well, even with good food. They eat less than normal, become thin, weak and easily tired (see p. 214).
- They have a rough coat.
- They often have *diarrhoea* and may become *dehydrated*.
- Some animals have pale *mucous membranes*.
- Animals may have a swelling under the jaw and may also have swelling under the abdomen.
- **Goats** suffer very severe disease. Adult goats suffer as much as younger ones.
- **Horses, mules** and **donkeys** sometimes have severe pain in the abdomen – *colic* (p. 217) – because of worms. They sometimes have long white worms with thin tails in the faeces – *whipworms* (p. 221).
- **Pigs** often get large *roundworms* [*Ascaris suum*]. Adult pigs do not become sick. Young pigs under about four months old do not grow properly and become thin. They get other diseases more easily than normal. Occasionally they have difficulty breathing and some have diarrhoea.

Birds get worms most when many of them are kept together in a large group. They often get *roundworms* and *tapeworms* at the same time. Young birds suffer most from worms.

- The birds eat less than normal and do not grow normally. They become thin. The feathers look rough and some feathers fall out. They lay very few eggs.
- They have diarrhoea that comes and goes. The faeces sometimes have blood and mucus in them. Some birds have worms in the faeces.
- Some birds die.

Rarely, especially when worms infect animals they do not usually infect, they damage parts of the body, such as the brain, and cause unusual signs of disease, for example, *blindness* or *uncoordination*.

In a dead animal you can see some larger worms but others are too small to see easily. Some worms live in the *abomasum* – others live in the *intestines*. (*Tapeworms* (p. 101) are much larger and often live near the end of the intestine.)

Other diseases that look like this:

Liver flukes (p. 285). Find out if animals have worms or liver flukes because the treatment is different for liver flukes.

How animals get worms

Animals usually get worms from pasture contaminated with many worm eggs or larvae (p. 95). Worms often cause disease at the start of a wet season because many worm larvae all start to develop on the pasture at the same time. Worms usually make animals thin and stop them from growing properly because:

- Worms take some of an animal's food and stop the animal digesting its food properly.
- Sometimes there are so many worms that they block the *intestine*.
- Some worms damage parts of the body, e.g. the *liver* or *lungs*.
- Some feed on an animal's blood and make the animal bleed inside, then the animal has pale *mucous membranes* – *anaemia* (p. 268).
- Animals with many worms eat less than normal.

Treatment and control

- Give worm medicines (p. 336) to animals that become thin and have diarrhoea but no *fever*.
- If you think worms are causing a sudden and severe problem treat all cattle under three years old and sheep and goats under two years old immediately. Move the animals as soon as they have been treated to a safe pasture if possible (p. 96).
- **Control worms** to stop animals becoming sick and unproductive (p. 94).

Ascaris worms

Cattle, buffaloes, horses, mules, donkeys, pigs and **dogs** get *ascaris worms*. **Young animals** suffer most often, especially when many animals are kept on the piece of ground for a long time. Young buffaloes often get ascaris worms. **People** get some kinds of ascaris worms from animals, especially from dogs.

Signs

- **With severe disease** that happens quickly, animals cough and have distressed breathing.
- **With mild disease** that goes on for a long time, animals do not grow normally and become thin. They have a rough coat. They occasionally have diarrhoea and some animals vomit. They may have a swollen abdomen.

In a dead animal, pigs have white spots in the liver.

Other diseases that look like this:

Flukes (p. 285); *pneumonia* (p. 195); *worms* (p. 218).

How animals get ascaris worms

Animals get ascaris worms from ascaris eggs on pasture or on the soil in pens or enclosures. The eggs come from the faeces of animals with ascaris worms. Ascaris worm eggs develop into larvae in an animal's *intestines*. The larvae dig through the intestine and go into the *liver* and the *lungs*. They develop in the lungs and go up the *trachea* into the mouth. The animal swallows them. Then they develop into adult ascaris worms in the animal's intestines. They produce eggs that come out in the faeces about two months after the animal was infected. **Dogs** can get ascaris worms before they are born from their mothers. Newborn dogs can get them through the milk.

Ascaris worms are types of *roundworms*: **horses** [*Parascaris equorum*], **cattle**, **buffaloes** [*Toxocara vitulorum*], **pigs** [*Ascaris suum*], **dogs** [*Toxocara canis*].

Treatment and control

See page 94 for how to control *roundworms*.

- Many worm medicines, e.g. fenbendazole or piperazine, work well (p. 337).

- Keep very young children away from dogs. Make sure children have clean hands before they eat. Keep the places where dogs live clean and dry. These worms do not live for long in dry places.
- Give worm medicine e.g. fenbendazole (50 g/kg) every day to pregnant dogs for two weeks before they give birth and for two weeks afterwards. Give worm medicine to dogs when they are two weeks old. If the mother has not been having medicine, treat her at the same time. Treat the mother and baby dogs again after three weeks.

Hookworm

Cattle, buffaloes, sheep, goats and **dogs** get hookworms. They usually get hookworms when many animals are kept together in one place.

Signs

- Animals do not have a *fever*. They stop eating, do not grow normally and become thin (see p. 214).
- They have a rough coat.
- Some animals have pale *mucous membranes*.
- **Dogs** have sores on the skin where the *hookworm larvae* dig through. They often have diarrhoea and there is often blood in the faeces. They have pale mucous membranes. Very young dogs sometimes die in 1–4 days. Dogs usually also get different worms at the same time.

How animals get hookworms

Animals get infected by hookworm larvae that dig through the skin or by eating food contaminated with hookworm larvae. Infection usually comes from wet places contaminated with faeces of animals with hookworms. Different animals get different kinds of hookworms.

Hookworms are types of *roundworms* [*Ancylostoma, Bunostomum, Gaigeria, Agriostomum*]. Hookworms are usually 2–3 cm long, they live in the small *intestine* and suck blood.

Treatment, prevention and control

Treat animals for hookworms as for other *roundworms* (p. 220).

Whipworm, Pinworm

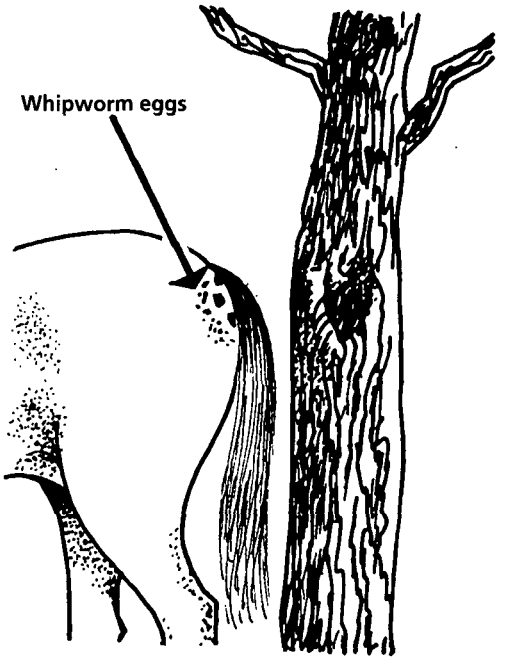
Signs

- **Horses** have long (15 cm) white whipworms with thin tails in the faeces.
- A horse rubs its tail against things. Whipworms lay eggs around the animal's *anus* and cause irritation around the tail.

How animals get whipworm

Adult whipworms live in a horse's *intestines* and come out to lay eggs around the *anus*. The eggs develop into larvae and fall onto the ground. Another horse gets infected when it eats larvae on pasture.

Whipworms are types of *roundworms* [*Oxyuris*].



Treatment and control

- Wash and brush horses often to remove whipworm eggs from around the tail.
- The worm medicine you give to control other *worms* (p. 00) will control whipworm as well.

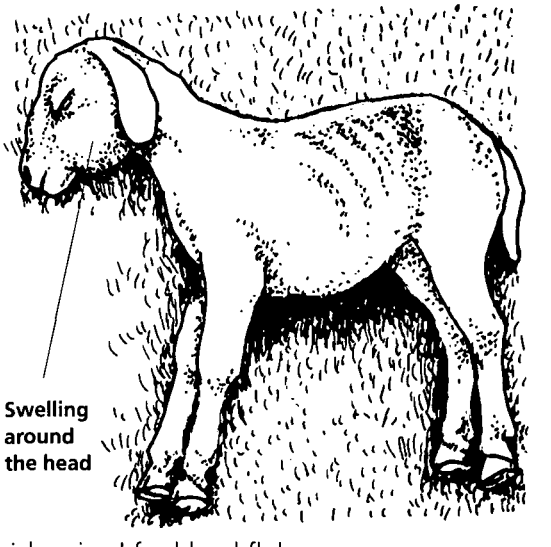
Blood flukes, Schistosomosis

All animals can get *blood flukes*. **People** get blood flukes (*Bilharzia*) (p. 6).

Signs

Animals become sick 7–9 weeks after they get infected with blood flukes.

- **With mild disease**, which happens most often, animals do not grow normally and become thin. They are weak and easily get other diseases.
- **With more severe disease**, which sheep and goats get occasionally, some animals have diarrhoea. There is often blood in the faeces. Animals stop eating and become *dehydrated*, they may have pale *mucous membranes*.
- Some animals are very sick. They have swelling around the head. Some collapse and die.



Skilled workers can check the faeces of a sick animal for blood fluke eggs.

Other diseases that look like this:

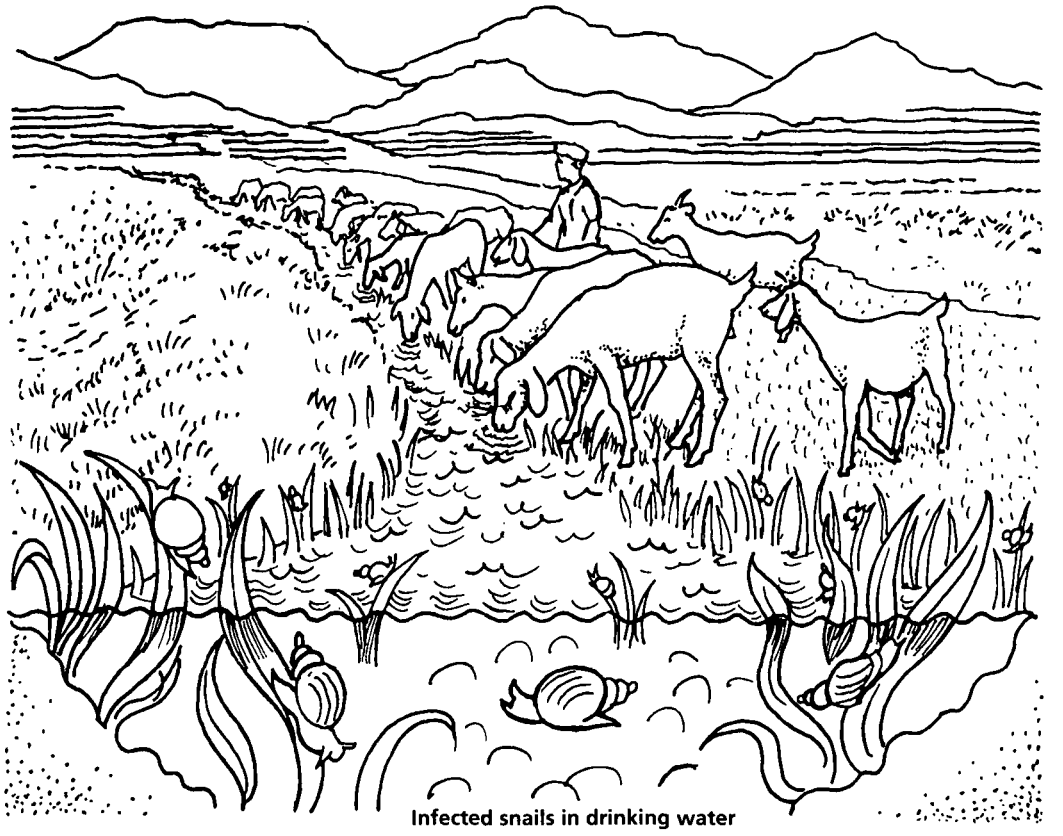
Liver flukes (p. 285); *worms* (p. 218).

How animals get blood flukes

Animals get infected through the skin or from drinking water where infected snails live. Animals can get the disease from snails that people have infected. The disease usually happens in places where there is water all year round.

Adult blood flukes live in blood vessels inside an animal's *abdomen*. They produce eggs that go into the *intestine* and come out in the animal's faeces. Young forms of blood flukes live in snails as *liver flukes* do.

Blood flukes are types of *flukes* [*Schistosoma*].



Infected snails in drinking water

Treatment

- Metrifonate, Trichlorphon, Praziquantel (an expensive medicine used for people with bilharzia) and other medicines are effective (p. 338). **Some are dangerous for the animal**.

Prevention and control

- Control blood flukes as you control *liver flukes* (p. 99).
- Keep animals away from wet places where there are many snails that carry the *parasites*.

Rumen flukes, Paramphistomosis

Young **cattle, sheep** and **goats** get *rumen flukes*.

Signs

- Rumen flukes rarely make animals sick but occasionally animals have diarrhoea that goes on for a long time and become thin and do not grow.
- The faeces smell foul and may have rumen flukes in them.

In a dead animal you can easily see rumen flukes, looking like red grains of rice (5–15 mm) stuck to the inside of the rumen.

How animals get rumen flukes

Animals get rumen flukes from infected snails.

Rumen flukes are types of *flukes* [*Paramphistoma*].

Treatment and control

- Treatment is not usually needed because rumen flukes rarely make animals sick.
- Treat and control rumen flukes as you do *liver flukes* (p. 99).

Coccidiosis

All kinds of animals, especially **very young animals**, get *coccidiosis*. **Birds** under two months old often get coccidiosis, some older birds get it.

Signs

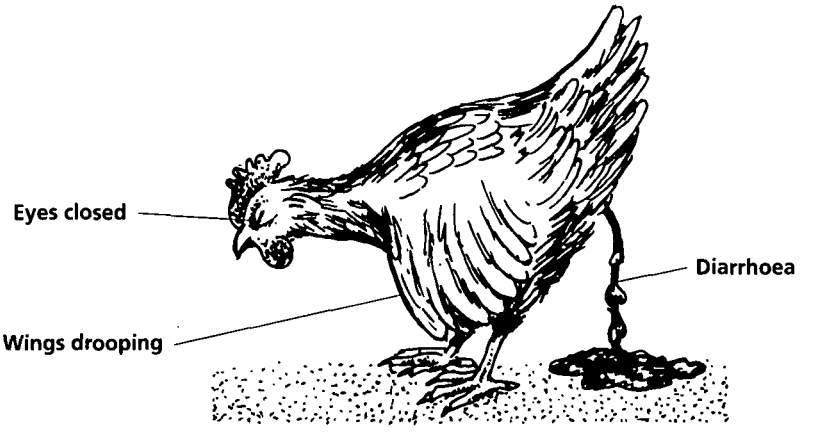
- Animals eat less than normal and become tired and weak (see p. 214).
- They have diarrhoea that may be severe, with blood and mucus in the faeces. Animals strain to pass faeces.
- Most animals recover with no treatment but with severe disease they may take a few weeks to recover and are thin. A few animals die.

Rabbits, especially under four months old, get coccidiosis.

- They have diarrhoea often, with blood in the faeces. They lose weight but often have swollen abdomens.
- Many rabbits die.

Birds become tired and weak.

- Young birds often have blood in the faeces after 4–5 days. Later there is much blood in the faeces.
- Sometimes many young birds die after 2–3 weeks.
- Older birds have diarrhoea and lose weight. They eat little and become weak and tired, their eyes are closed and their wings hang down.
- Many birds die.



Skilled workers can check the faeces of sick animals or birds for coccidiosis.

How animals get coccidiosis

They get it from food or water *contaminated* by faeces of infected animals. Animals only become sick with coccidiosis from large doses of infection, usually when they live in wet, dirty places very contaminated by faeces. Each kind of animal or bird gets a different type of coccidiosis and they do not infect each other.

Coccidiosis is caused by *protozoa* [*Eimeria or Isospora*].

Treatment

- Start treatment as soon as possible, several medicines are effective. (p. 331).
- You can give some medicines in food or drinking water.

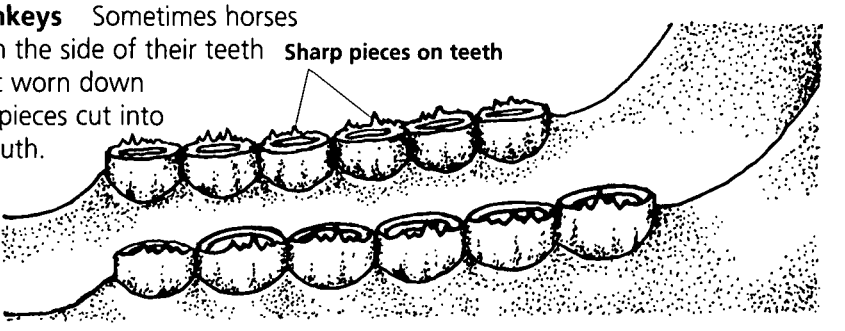
Prevention and control

- Separate sick animals from healthy ones and treat them as soon as possible.
- Keep animals on clean dry bedding.
- Clean faeces, away from places where the animals live. Coccidiosis *microbes* live in faeces, especially when they are wet.
- Put feeding and drinking bowls high up to stop faeces getting in them.

- Keep adult and young animals separate.
- Reduce the number of animals kept in one place.
- If coccidiosis becomes a problem in a building, take out all the birds or animals and clean the building with disinfectant (p. 324).
- In dry places where birds are not kept close together in large groups people often do not treat coccidiosis. They let the disease build up to a low level so that birds become *immune*.

Bad teeth

Horses, mules, donkeys Sometimes horses have sharp pieces on the side of their teeth where they have not worn down normally. The sharp pieces cut into the inside of the mouth.

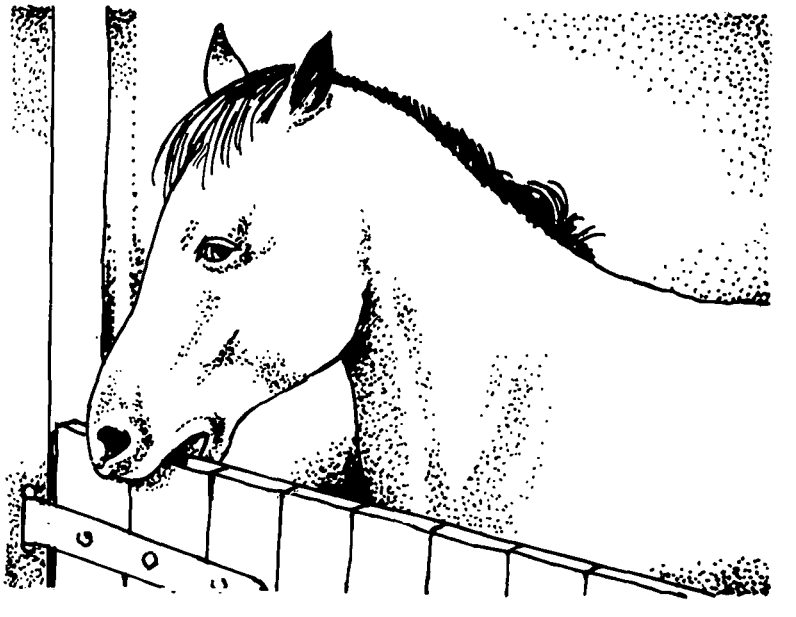


Treatment

- File the teeth with a rasp (p. 85).

Crib biting

Horses kept in buildings sometimes get bad habits. They chew or suck at the doors and other parts of the building. To stop them doing this put something bitter tasting on what they are eating. Aloes [*Aloe* species] are good for this. You can make a special collar that makes it difficult for them to get at the parts they have been biting. Horses learn these habits from other horses that already do them. Keep young, innocent horses away from those that already have bad habits.

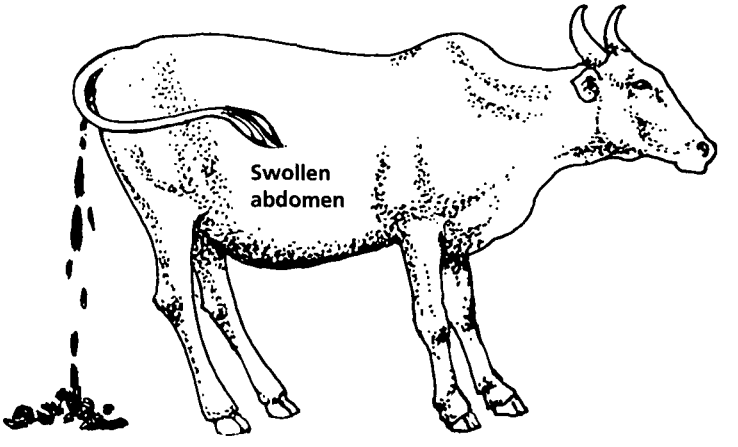


Overeating grain

Cattle, especially young cattle, sometimes eat too much grain or other concentrated food at one time. This usually happens when animals break into a food store and help themselves.

Signs

- The animals stagger about. They look 'drunk'.
- The left side of the abdomen is swollen and firm.
- Often the animals have diarrhoea.
- They become *dehydrated*.
- Some of them collapse and die within a few days.



Treatment

- Make sure the animals cannot get more grain to eat.
- Give them as much water to drink as they want.
- Give some alkaline medicine, e.g. magnesium hydroxide or aluminium hydroxide (p. 348) as soon as possible by mouth. (Grain turns to acid in the *rumen*. The alkali medicine works against the acid.)
- Skilled workers can give special fluids by injection into a *vein* for dehydration.

Eating plastic bags

Animals, especially **goats**, often eat plastic bags and they usually do not harm the animal but they can make animals become sick.

Signs

- A few days after an animal has eaten a plastic bag it suddenly stops eating.
- It has pain in the *abdomen* and *diarrhoea*, sometimes there is blood in the faeces.
- Some animals become very weak and die after a few days.

Treatment

- There is no easy treatment for this. If you think an animal is sick because it ate a plastic bag, kill it for meat before it becomes very sick.
- Try to stop animals eating plastic bags.

Something stuck in the mouth

This can happen to **any animal**, especially **dogs**.

Signs

- The animal often has much *saliva* coming from the mouth. The object is often stuck between the teeth, especially across the mouth between the top teeth.

A piece of wood stuck between the teeth

Treatment

- Open the mouth (p. 24) and remove the object.
- Clean any wound in the mouth with salt water or mild antiseptic (p. 324).

Something stuck in the oesophagus, Choke

This happens most to **horses**, **mules** and **donkeys** when they eat something large like a large piece of vegetable.

Signs

- The animal is often distressed.
- It coughs and behaves nervously.
- Much *saliva* comes from the mouth (see p. 263). Sometimes food and saliva come back out of the nose.
- Sometimes you can see and feel a lump on the left side of the neck where the object is.

Treatment

- Do not let the animal drink or try to eat until the blockage has gone.
- Try to gently massage the lump back up the neck so that the object comes back into the mouth and take it out.
- If this is difficult, put a small amount (25 ml) of vegetable oil in the mouth. This lubricates the *oesophagus*. It may make it easier to massage the lump back up the neck and it may let the animal swallow normally.
- Skilled workers can move objects like this by pushing them down the oesophagus with a tube. **This is dangerous to try yourself**; if the oesophagus breaks the animal will die.

Lack of minerals

All animals can suffer from a lack of minerals. Animals usually suffer from a lack of several different minerals at the same time. It is usually difficult even for skilled workers to decide which minerals an animal lacks. Remember that if animals are not growing well it may be through poor feeding, or worms, rather than a lack of minerals.

Signs

- Animals do not eat as much as normal and become thin even when they have enough food.
- They give less milk than normal.
- They have a dull coat and rough hair that stands up.
- They do not grow normally and do not become mature at a normal age.
- They start to lick bones or earth and sometimes dig the ground with a foot.
- Females do not show good signs of heat and do not easily become pregnant, some become infertile.

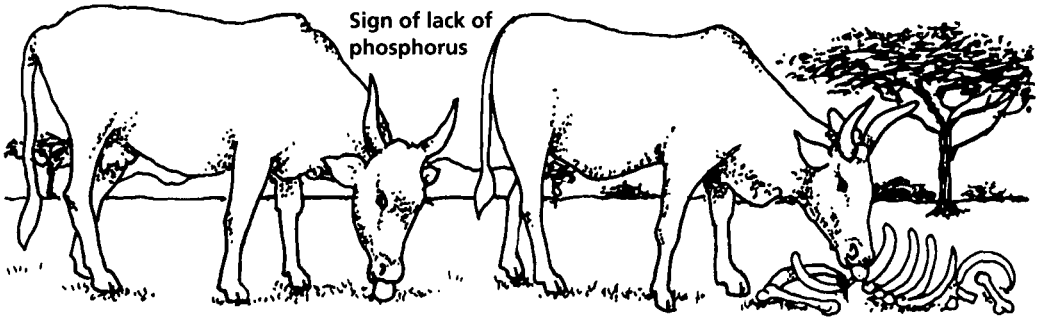
Lack of salt

- Animals lick soil and some drink other animals' urine.

Lack of phosphorus

Lack of phosphorus is common because the soil and the plants in many areas do not have much phosphorus in them.

- Females that give a lot of milk suffer most.
- When animals suffer severely from lack of phosphorus their appetite changes. They lick the ground and eat the bones of any dead bodies lying on the ground.



Lack of iron

Most animals get enough iron from their ordinary food but baby pigs that live in houses and only drink milk sometimes do not get enough iron because milk does not have much iron in it. The larger, stronger pigs suffer first.

- They become weak and shiver and do not eat. They get diseases easily.
- They have very pale *mucous membranes.*

Lack of iodine

- New-born and young animals may have no hair.
- When the lack of iodine is severe animals have a swelling in the neck. (This is the *thyroid gland*). In places where people get these swellings because of a lack of iodine, animals also often lack iodine.

Treatment and prevention

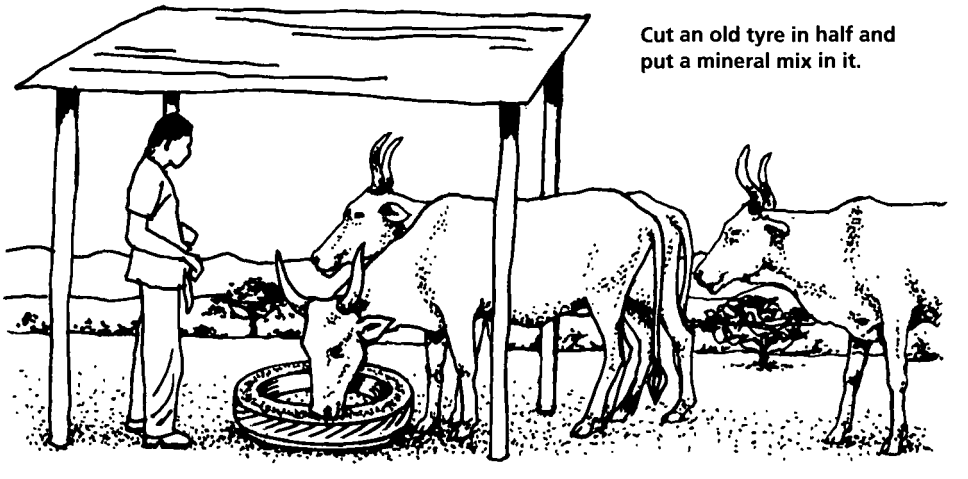
- These are some simple mixtures that help provide animals with enough minerals:

Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Mix a large pinch (about 1 g) of wood ash every day with the animals' food for every 10 kg of bodyweight.	2 parts: salt 2 parts: bone meal* or crushed bones	2 parts: salt 2 parts: bone meal 1 part: rock phosphate	2 parts: salt 2 parts: bone meal 1 part: lime	1 part: salt 4 parts: wood ash

(*'Bone meal' is sometimes available – it is a powder of bones that have been dried and finely ground.)

Let the animals eat as much of one of these mineral mixtures as they want. Put minerals in boxes to stop animals spreading them on the ground and wasting them.

- This person in Kenya is using an old tyre to give minerals to some cattle.



Cut an old tyre in half and put a mineral mix in it.

- Try to keep the rain off the minerals or they will wash away.
- Take animals to graze in places where there are more minerals in the soil and plants – at least for part of the year. In some places the grazing high on the hills has had the minerals washed out of it so people take their animals to graze in the valleys.

Lack of salt

Give animals about 500 g of salt in 100 kg of food. Camels need about 1 kg of salt every week – this is about eight times as much as cattle or sheep need. Birds only get about half the salt they need in their normal food so give them an extra two pinches (2 g) of salt in each kg of food.

Give small amounts of salt like this all the time. **Do not give a lot of salt all on one day to animals that do not usually get salt**. It can make them very sick and *stress* them so that other diseases appear.

- Take the animals to salty pastures.
- Put a block of salt for the animals to lick. This is a good way of giving salt to animals but it is expensive.

Lack of phosphorus

- Bone meal helps to prevent a lack of phosphorus, so do some foods, such as cottonseed cake, which have a lot of phosphorus in them.
- In areas where animals often lack phosphorus, put phosphorus *fertiliser* on the fields so that plants will have more phosphorus in them.

Lack of iron

- Give baby pigs in houses extra iron.
- Most soil especially red soil has iron in it, so put some soil into the pen for the baby pigs to eat.
- Or give injections of iron.

Lack of iodine

- Where lack of iodine is a severe problem it is most important to give extra iodine to pregnant animals.
- The easiest way to give iodine to animals is to use salt that has had iodine added to it.

Fowl typhoid

Birds get *fowl typhoid*.

Signs

Birds become sick 4–7 days after they get infected.
The disease is severe in places where it has not happened before:

- Some birds die before they have signs of disease.
- Some birds are tired and weak and have a high *fever*. They stand with their wings down. Their eyes are closed. The feathers are rough and the comb is dark red. They stop eating but they drink a lot of water. They have yellow/brown/green diarrhoea that smells bad (see pp. 130, 225).

◆ Many birds die in 2–7 days.

Sometimes **the disease is not so severe** and goes on for a long time. In places where the disease often happens, most birds have this kind of disease.

◆ A few birds die after 2–4 weeks.
◆ Some birds recover but still carry the infection.

How birds get fowl typhoid

They get it from direct contact with infected birds or from food, water or things *contaminated* by faeces from infected birds. Infection also comes from the dead bodies of infected birds. People spread infection on their clothes and feet. Eggs sometimes carry the infection.

Fowl typhoid is caused by *bacteria* [*Salmonella gallinarum*].

Treatment, prevention and control

- Give medicine in the drinking water as soon as the disease happens.
- Furazolidone and other medicines are effective (p. 329).
- It is difficult to control fowl typhoid and needs the help of skilled laboratory workers. If birds seem to be sick with fowl typhoid it is best to kill them. Cook them well before you eat them. Bury any parts of the bird you do not cook and eat, to stop the disease spreading.

Johne's disease, Paratuberculosis .....

.....

Johne's disease only happens in cooler, wetter places. **Cattle, buffaloes, camels, sheep** and **goats** get Johne's disease.

Signs

Animals get infected with Johne's disease when they are under six months old, and become sick after they are two years old.

◆ Animals produce less milk than expected and slowly become thin, but they still eat normally.
◆ They have diarrhoea that comes and goes. After 1–2 months they have constant watery diarrhoea. The faeces smell bad.
◆ Animals do not usually recover. After 2–6 months they become weak. They collapse and die.
◆ **Sheep** rarely get Johne's disease. They only become sick after they are three years old. They become very thin and have rough coats. Much later they have diarrhoea and then die after a few days.

In a dead animal parts of the *intestines* are thickened.

How animals get Johne's disease

They get it from infected food, water or milk. Infection comes from the faeces of infected animals. Animals often have infection but do not become sick.

Johne's disease is caused by *bacteria* [*Mycobacterium paratuberculosis*].

Treatment

There is no treatment for Johne's disease.

Prevention and control

- Isolate sick animals. Kill them for meat before they spread the disease to others. The new-born animals from infected mothers are usually infected. Kill them before they become sick. Avoid buying sick animals (p. 47).
- Prevent infected faeces getting into food and water. Place feed bowls high up.
- Clean up places where infected animals have been with strong disinfectant (p. 324). **Pasture will be free of infection after one year.**
- Skilled workers can use *vaccine* to help control the disease but it is not often worth using.

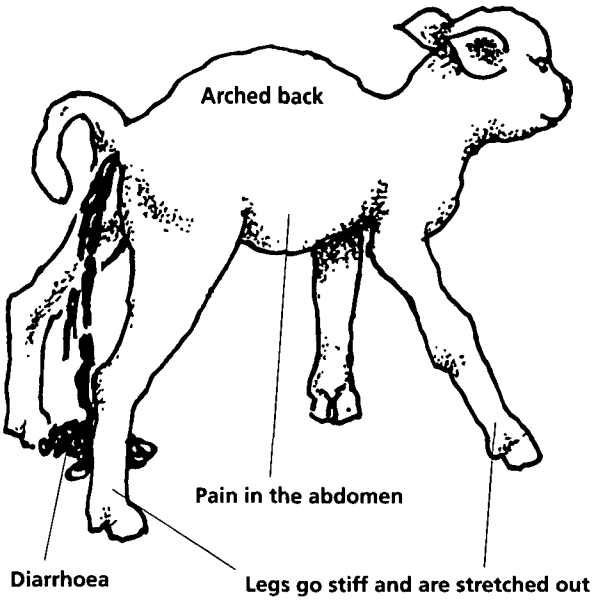
Lamb dysentery

Only **sheep** less than two weeks old get *lamb dysentery*.

Signs

- The animals have pain in the abdomen and arch their backs and stretch their legs out stiffly.
- They have diarrhoea. The faeces are yellow and sometimes have blood in them. Very soon the animals die.

In a dead animal the *intestines* are very dark red. Sometimes parts of the intestines are stuck together.



How animals get lamb dysentery

They get infection from the ground or from their mother's teats.

Lamb dysentery is caused by *bacteria* that live in the soil [*Clostridium perfringens. Type B*]. They produce poison that causes this disease.

Treatment

- Antibiotics (p. 328) may work if you give them soon enough, but they do not work after the diarrhoea has started and there is blood in it.

Prevention and control

- When some animals in a group become sick with lamb dysentery give an antibiotic e.g. tetracycline (p. 333) to others that are still healthy to stop them getting the disease.
- There is an effective *vaccine* for lamb dysentery. (Vaccine for lamb dysentery often comes mixed with vaccine for *enterotoxaemia* (p. 146)). For lamb dysentery give the vaccine to the pregnant mothers. Vaccinate a little more than one month before you think the lambs will be born; 3–4 months after the mothers were mated.
- New-born animals will get *immunity* to lamb dysentery from the colostrum they drink from their mothers.

Mucosal disease, Bovine virus diarrhoea

Only **cattle** get *mucosal disease*.

Signs

Mucosal disease (and the milder form of it called *bovine virus diarrhoea*) are complicated diseases that look like *rinderpest* (p. 290) except that usually only one or two animals get this disease at the same time. You will need skilled help to tell these diseases apart and to control them.

- ◆ Some animals with mucosal disease give birth to offspring that cannot see properly or have deformed limbs.

How animals get mucosal disease

Adult cattle get infected through the air. Infected pregnant cattle pass infection to the *foetus*.

Mucosal disease is caused by *viruses* [*Pestivirus*].

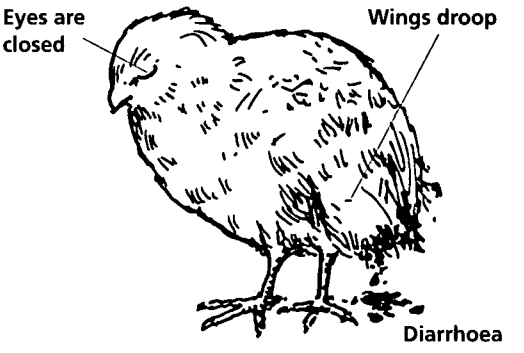
Treatment and control

There is no treatment for mucosal disease or bovine virus diarrhoea. *Vaccines* for mucosal disease are complicated to use and you will need skilled help. In places where this disease is a problem skilled workers usually vaccinate females 2–3 weeks before they mate. It is expensive to control this disease.

Pullorum disease, Bacillary white diarrhoea

Birds get *pullorum disease.*

Signs



- Birds under 20 days old suddenly become tired and weak. They stand with their wings down. Their eyes are closed. The feathers are rough. They cry out all the time.
- Many birds have white/grey diarrhoea. The feathers around the *anus* become covered in faeces.
- Many birds collapse and die when they are 10–20 days old.
- Some birds recover but still carry the infection.

How birds get pullorum disease

They get it from the egg when it hatches. Many birds that recover from the disease carry infection and can lay infected eggs. Birds also get the disease from direct contact with infected birds or *contaminated* things.

Pullorum disease is caused by *bacteria* [*Salmonella pullorum*].

Treatment and control

- It is complicated to control this disease. Skilled workers need to test blood samples to check for the infection.
- Kill the sick birds but cook them well before you eat them. Bury any parts of the bird you do not cook and eat, to stop the disease spreading.

Salmonellosis

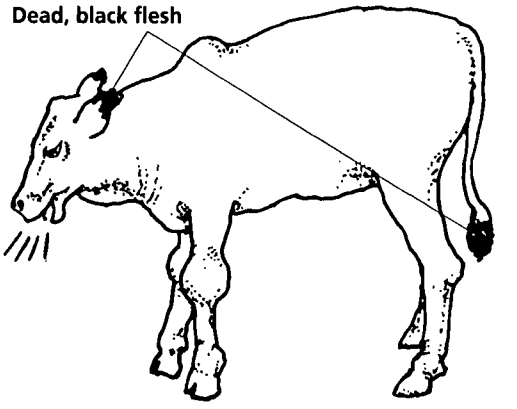
All animals and **birds** get *salmonellosis*. **People** often get *salmonellosis* (p. 6).

Many different types of salmonellosis microbes cause many different signs of disease. It is difficult to know if salmonellosis causes signs of disease without help from skilled workers and complicated laboratory tests. Salmonellosis makes many animals sick, especially in cooler, wetter places where animals are kept in houses or in large groups. Animals that always live out on pasture rarely get salmonellosis.

Signs

Animals usually become sick a few days after they get infected.

- **Adult animals** often have a high *fever*. They have severe watery diarrhoea that smells bad, with blood or mucus in the faeces. Pregnant animals often abort.



- **Animals about a month old** often have a high fever. They have severe watery diarrhoea that smells bad, with blood or mucus in the faeces. They become *dehydrated*. Some cough and breathe fast. Some have hot, swollen joints. Some have dead, black flesh at the ends of the ears and tail.
- **Animals 1–14 days old** often have a high fever. They have pale white/brown faeces that may have blood in them. They stagger about and collapse and die after 1–7 days with no treatment.
- **Animals of any age** sometimes get very severe forms of salmonellosis and die rapidly. All animals take a long time to recover if they are not treated.
- **Horses, mules, donkeys** and **camels** do not get the disease so often. But if camels get it they may have severe disease and often die.
- **Pigs** often have dark red patches on the skin under the abdomen.
- **Birds** get two main kinds of salmonellosis: *pullorum disease* (p. 235) and *fowl typhoid* (p. 231). Both diseases cause diarrhoea and death. Other types of salmonellosis also cause diarrhoea.

How animals get salmonellosis

They get it from food or water *contaminated* by faeces from infected animals or people. Adult animals become sick with salmonellosis more often when they are *stressed*.

Salmonellosis is caused by *bacteria* [*Salmonella* species]. People call many of the diseases caused by these bacteria 'paratyphoid'.

Treatment

- Treat animals as soon as possible.
- Many antibiotics are effective (p. 328).
- You can give medicines for salmonellosis by injection or by mouth or put medicine in the food or drinking water.
- Give rehydration fluid (p. 346) to young animals that suffer badly and are dehydrated.

Prevention and control

- Keep healthy animals away from sick ones. It is difficult to stop salmonellosis spreading because some infected animals have no signs of disease. These carrier animals can be infected for many months and spread salmonellosis to other animals.
- Avoid contamination of water and feed with faeces from animals that may be infected.

It is complicated to control salmonellosis properly. Skilled workers need to check faeces samples to identify the *microbes*. They sometimes use *vaccines* to control the disease but this is complicated and rarely the best way to prevent the disease.

24 Diseases and problems mostly to do with reproduction and the udder

These are common problems but there are others, e.g. *leptospirosis* (p. 284), *dourine* (p. 297).

Animals not in heat when expected

Usually if an animal does not have a heat period it is because she is pregnant. (p. 00). Females kept away from males are not stimulated to show heat. This sometimes makes it difficult to see if they are in heat. Some animals are only in heat for a short time at night when nobody sees them. Animals often do not show heat when they are thin and poorly fed or when they have a disease or many *worm parasites*.

Treatment

- Give better food or give *worm* medicines (p. 336). Thin animals often have worms and are poorly fed.
- Keep female animals close enough to a male to see and smell him. Or keep them with the male so that he can mate with them when they let him.
- Skilled workers can feel the *ovaries*. They sometimes use *hormones* to make animals have heat again. If these medicines are given to pregnant animals by mistake they will make them abort.
- **Pigs** Put a pig in heat with others you want to make come in heat. Put an adult male where the females can see him and smell him. Put urine from a male pig in the female's pen for a few days.

Animals mate but do not become pregnant

Sometimes a male animal is *sterile* – none of the females he mates with become pregnant.

- Check that the male does not have a *fever*, that he is well fed and not thin.
- Check that he does not have to mate with too many females.
- If a male animal is sick and has a fever, wait for about two weeks after the fever has gone before using him to mate again.
- If a male animal makes some females pregnant but not others it is more likely that the females cannot become pregnant.
- Often this is because they are mated at the wrong time of their heat, especially when they are mated too late after heat has started.

Animals in heat more often than normal

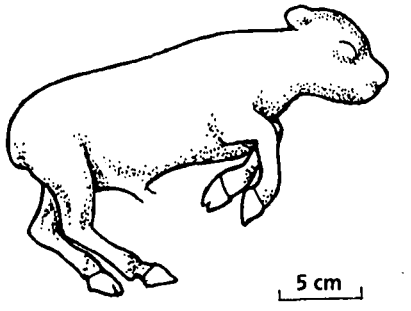
Sometimes a female animal is in heat much more often than normal and the heat is very obvious. This is usually caused by a disease in the *ovaries*. The ovary produces too much *sex-hormone* and this makes the animal behave strangely. Skilled workers can examine the ovaries and sometimes use hormones to treat this problem.

Abortions

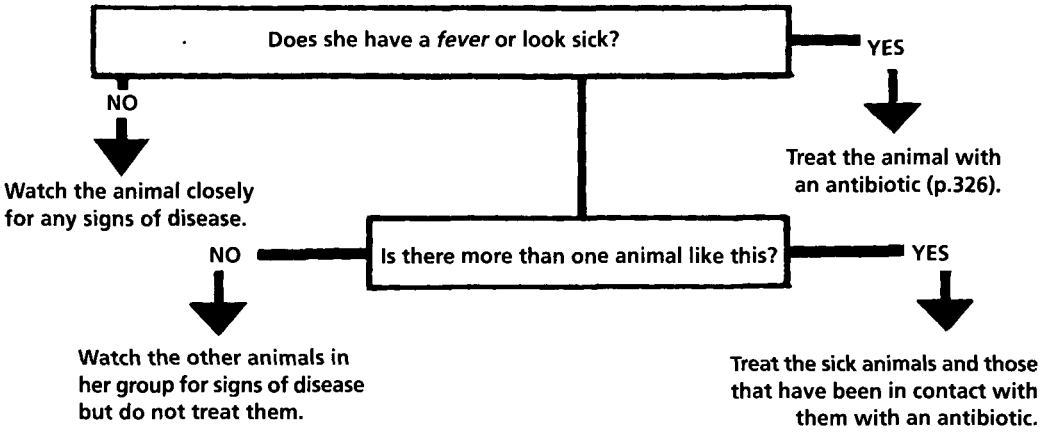
Some animals abort because of *infection*. The infection can be dangerous to other animals. It can make other pregnant females abort too. Sometimes many animals in a group abort at the same time.

What to do about abortions

- Isolate an animal that aborts from other animals. Especially keep her away from other pregnant animals.
- Move the healthy animals away to a clean place. There may be infection on the ground where the abortion was.
- Bury or burn a dead *foetus*, together with the *placenta*.
- Clean up the place where these have been and wash yourself.
- If only one animal aborts it is often not because of infection.
- If more than one animal aborts it is often because of infection.
- Check if the animal that aborts has *fever*.



Dead foetus



More about abortion

It is difficult, even for skilled veterinary workers, to find out what caused an abortion. For skilled workers to investigate abortions they will need the *placenta*, blood samples or the *foetus* itself.

Brucellosis

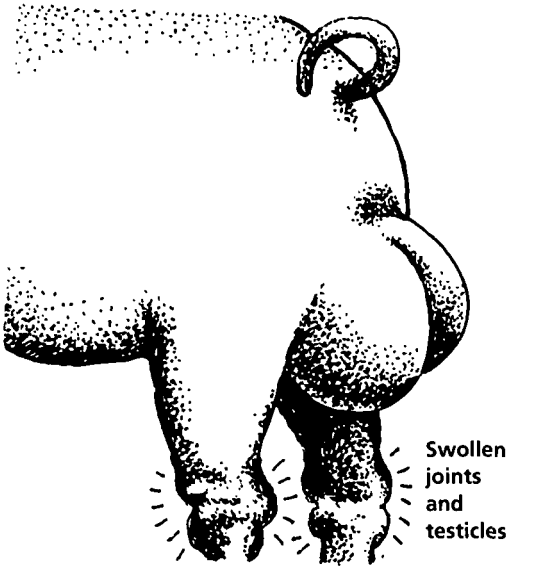
Cattle, sheep, goats and **pigs** get *brucellosis*. Goats get it more often than sheep do. **Camels** occasionally get it. **People** get *brucellosis* (p. 6).

Signs

Animals become sick many months after they get infected with brucellosis.

- They have abortions, usually about 5–6 months after they mated. After an abortion many cows do not let go of the *placenta* (p. 241).
- The *uterus* becomes infected (p. 241). Sometimes this infection is severe and even kills the animal but often it is milder, goes on a for a long time and may make the cow *sterile*.
- When several animals get brucellosis at the same time, a few of them have abortions. Some give birth to dead offspring. Some produce very weak offspring. Many animals get infection in the uterus and become infertile.
- When cattle that have not had the infection *before* move to a place where infection is common they get severe disease. Many animals have abortions at the same time.
- Male animals often have swollen joints, especially the knees. And they have very swollen *testicles*. The swelling lasts a long time. When it goes down the male is usually sterile.

Weak, new-born pig



How animals get brucellosis

Animals get brucellosis from direct contact with infected animals or from eating grass or other food *contaminated* by infected animals. Most infection comes from aborted *foetuses*, *placentas* and *discharges* that come from the *vagina* soon after an infected animal aborts or gives birth. Infected animals often have tails covered in discharge and this helps spread infection. Infection gets in to an animal's body through the skin or *mucous membranes*.

Brucellosis is a problem for settled farmers who keep many animals close together. It is not a problem for animals kept on rangeland, but these animals sometimes carry infection with no signs of disease.

Brucellosis is caused by *bacteria* [*Brucella abortus* and others].

Treatment

There is no effective treatment for brucellosis.

Prevention and control

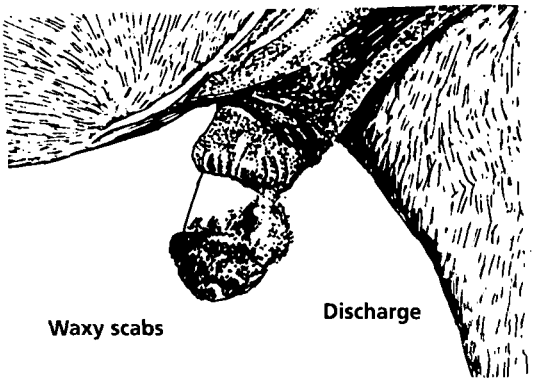
- Isolate cows that have abortions for three weeks.
- Dispose of anything *contaminated* with infection, preferably by burying it.
- Some people make a fire over the place where the abortion happened to clean the ground.
- *Vaccines* for brucellosis are effective. Vaccinate female animals when they are about six months old.
- Skilled workers can test blood to tell if an animal is infected. Get rid of animals that carry infection. **These animals are dangerous because people get sick from drinking their milk.**
- Some governments have programmes to control brucellosis.

Discharge from the penis .....

Any animal – usually **horses, mules and donkeys** – get this problem.

Signs

- A *discharge* comes from the *penis* or the sheath around it – prepuce. The *discharge* is often white/yellow.
- The animal rubs the penis or sheath on things because it is irritated. The penis extends out of the sheath.
- There are waxy scabs and *pus* in the folds of the penis.



Treatment

- Hold the sheath with one hand and gently pull the penis out with the other hand.
- Wash the penis clean with salt and water or soap and water then with clean water to remove the soap.
- Put a mild, oily wound dressing (p. 324) on the penis.
- Some horses have infection of the penis often. You may have to repeat this after a month. If the discharge does not stop, give antibiotic by injection (p. 328).

Metritis, Infected uterus

A clear or blood-stained red/brown *discharge* often comes from the *vagina* after a healthy animal has given birth. It does not smell foul. But a white/yellow discharge or a bad smell is a sign of infection in the *uterus*. This is called *metritis* and animals sometimes get it soon after they have given birth. Infection gets into the uterus through the *vulva* and vagina, especially when an animal gives birth in a dirty place. Animals often get metritis when the *placenta* does not come out.

Signs

With mild infection:

- Cloudy white *discharge* comes from the *vulva*. The discharge does not smell very bad.
- The animal does not have a *fever*. She is not sick.

With severe infection:

- Yellow or dark brown discharge comes from the vulva. It smells bad.
- The animal sometimes has a fever. She becomes very sick and stops eating, sometimes she lies down and will not get up. The microbes in the uterus produce powerful poisons.
- Some animals die after a few days. Some animals recover but they cannot have any more young; they are *sterile*. Other animals recover but they do not easily become pregnant again; they are *infertile*.

Treatment

- Treat the animal immediately if she has a fever or if she looks sick and has discharge.
- Give an antibiotic injection (p. 328). (Some people put antibiotic tablets into the uterus by hand but this is not the best way to treat metritis.) Even severe infection can be treated.

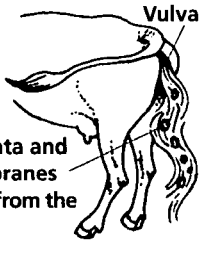
Prevention

- Make sure the place where an animal gives birth is clean and dry. Do not always use the same place without cleaning it up.
- Wash your hands and arms carefully with soap or disinfectant (p. 324) before putting them into an animal to help with a birth. You can cause infection if your hands and arms are not clean.

Animals often get metritis after a difficult birth because the vagina or *cervix* have been damaged.

Retained placenta

The *placenta* should come out soon after an animal has given birth. Sometimes it stays inside the animal and rots. Sometimes the placenta and membranes hang from the *vulva* for a long time.



Treatment

If the placenta does not come out:

Cattle, buffaloes

- Wash your hand and arm, with soap or disinfectant.
- People in East Africa make disinfectant from the plant *Cotyledon barbeyi.*
- Put your arm into the *vagina* and grip the placenta.
- Pull very gently. If the placenta comes out easily pull it out. If it is difficult to pull it out leave it there. If some placenta hangs out, cut it off.
- Put some antibiotic (p. 350) through the *cervix* into the *uterus.*
- If the animal has a *fever* or looks sick give an antibiotic by injection (p. 328).
- Encourage new-born animals to suck the mother as soon as possible after they are born. This helps make the uterus contract and squeeze the placenta out.
- People in Kenya give cattle a drink made from *Salvadora persica* to make the placenta come out.

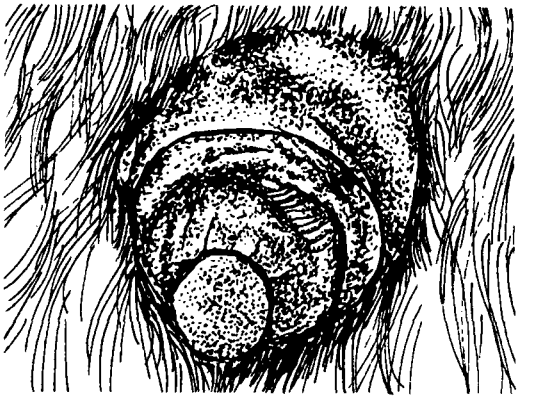
Horses and donkeys

The placenta usually comes out in less than three hours after birth. Sometimes a large part of it hangs from the vulva for another 4–5 hours before it all comes out.

- Tie the membranes in a knot to stop the animal treading on them. Never pull on the placenta and membranes, except very gently or you will damage the *uterus.*
- Skilled workers often give antibiotic injections and use special medicines to make the placenta come out because horses can become very sick if it has not come out after eight hours.

Prolapsed vagina

Sometimes the *vagina* is pushed out through the *vulva.* **Most female animals** can get a prolapsed vagina. It often happens to **buffaloes** and **camels**. Sometimes it happens again the next time they are pregnant. It usually happens when the animal has been pregnant for a long time, soon before it gives birth.



Signs

- A red swelling comes out of the vulva. This is the vagina that has been pushed out and turned inside out. It is not very dangerous for the animal unless infection gets in.
- Infection can cause abortion or make the animal very sick.

Treatment and prevention

- Wash the prolapse carefully.
- Treat any wounds with antibiotic powder or wound dressing (p. 324). Flies like to lay eggs on the prolapse so look for any fly damage and treat with a dressing that kills fly larvae (p. 326).
- Make the animal stand with its tail higher than its head. Push the prolapse back inside with both hands.

Wash the prolapsed vagina.

- Hold the vulva closed for a few minutes. Keep the animal standing up for as long as possible. She may push the prolapse out again when she lies down.
- Some people stitch the vulva closed to keep the prolapse in (see p. 78). This is not always needed and can cause infection around the stitches. Only do this if the prolapse keeps happening. Stitch with strong tape. **Remember to take the stitches out before the animal gives birth.**
- If the animal lives tied up in a house it helps to make the back of the place where it lies higher than the front.

Prolapsed uterus

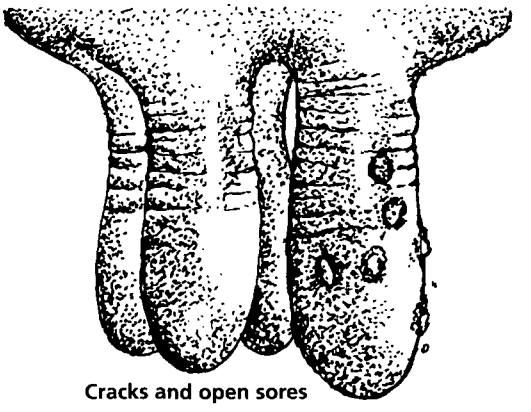
See EMERGENCIES (p. 76) for treatment.
THIS IS AN EMERGENCY. START TREATMENT IMMEDIATELY.

Sore teats

Cattle, buffaloes and other animals that are milked get sore teats most often when they start to be milked soon after they have given birth, especially when they have given birth the first time.

Signs

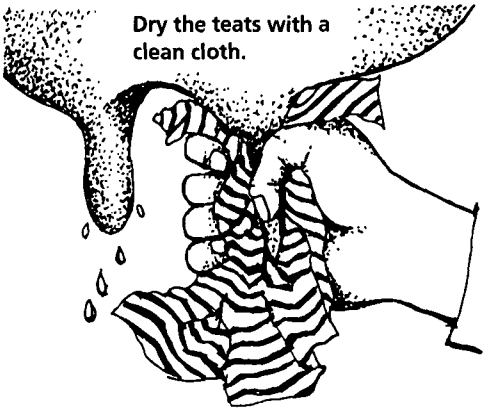
- The skin on the teats is cracked and there are painful open sores. Infection gets in to small cracks in the skin of the teats. Infection comes from faeces or from the ground. It spreads from one teat to another or to another animal on the milker's hands.
- The teat becomes swollen and red, the animal is restless when she is milked.



Cracks and open sores

Treatment

- It helps to handle and gently rub the teats of the animal before she gives birth and starts to be milked.
- Hold animals securely while they are milked. Do not hold the animal in place by its teats.
- If the udder is washed with water or made wet by the calf drinking, dry the teats with a clean cloth before milking.



- Keep the place where animals are milked clean.

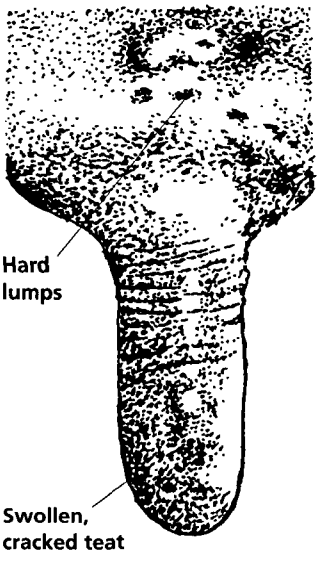
Mastitis

All animals that produce milk can get *mastitis*. Mastitis is an infection in the *udder*. Sometimes it is very mild and just slightly changes the milk. Sometimes it is severe, it happens very fast, the animal is very sick and may die.

Sheep and **goats** sometimes get very severe mastitis called *contagious agalactia* (p. 245).

Signs

- Mastitis infection is often in the udder for some time before signs appear. Sometimes animals give less milk.
- The milk looks different. It is watery, discoloured or has lumps in it. Sometimes it is stained with blood and looks pink.
- The teats are swollen and tender. Sometimes there are wounds or cracks on the teats.
- The animal resists being milked.
- The udder is hot. It looks reddened. It sometimes becomes swollen or hard.
- Often only one teat has signs of disease.
- The udder sometimes has hard lumps in it that are painful to the animal when you touch them.
- Some types of very severe mastitis make the udder become dark blue/black. It feels cool if you touch it. These are very bad signs and when they happen the animal stops eating and becomes very sick.



How animals get mastitis

They usually get infection through the end of the teat. Some infection comes from injuries around the teats or udder. Sometimes infection comes in the blood, especially when the animal has another disease. Animals get mastitis most often when they have just had babies and are giving most milk.

Pigs get mastitis, sometimes when their teats are bitten by the sharp teeth of baby pigs.

Treatment

- Treat the animal as soon as possible.
- If an animal has signs of mastitis milk her until the udder is empty. Do this as often as you can. Keep the udder as empty as possible. Infected milk can spread infection to another animal. Be careful not to spread mastitis to other animals.
- Put an antibiotic directly into the udder. Many antibiotics work well (pp. 328, 331). If the disease is severe, also give an antibiotic by injection.

Prevention

- Keep everything as clean as possible around the time of milking.
- Clean the udder before and after milking.
- Keep the place where the animal is milked clean.
- Milk animals with mastitis last to avoid spreading infection to others.
- After milking, keep the animal in a clean place at least for an hour. Feed animals after milking them. Then they stand up to eat and do not lie down where it is dirty. It is especially easy for infection to get in to the udder after milking. **The teat does not close completely until about one hour after milking**.

Contagious agalactia

Sheep and **goats** get *contagious agalactia*.

Signs

- The udder feels hot and causes the animal pain.
- The milk is thick and yellow/green with lumps in it. Sometimes it is watery with lumps in it. If the disease goes on for a long time the animal stops producing milk.
- The animals are weak and tired, they stop eating and have a *fever*.
- Pregnant animals often abort when they are very pregnant.
- Some animals have hot swollen joints. They become lame, especially when more than one leg has swollen joints. Some joints have *abscesses* in them.
- Sometimes a clear *discharge* comes from the eyes. The animals do not like bright sunlight. The centre of the eyes becomes white then red. Usually the eyes recover in a few days but a few animals become blind.
- Some young animals have *pneumonia* (p. 195) and many of these die. Most other animals recover.

How animals get contagious agalactia

They get it from direct contact with infected animals. They also get it from places and things *contaminated* by infected animals. Infection also comes from the milk. Young animals get the disease from drinking infected milk.

Contagious agalactia is caused by *mycoplasmas* [*Mycoplasma agalactiae*] – they are like *bacteria*.

Treatment

Treatment is usually not effective. But you can try giving an antibiotic such as tetracycline or tylosin (p. 331). This may work if you give it soon enough.

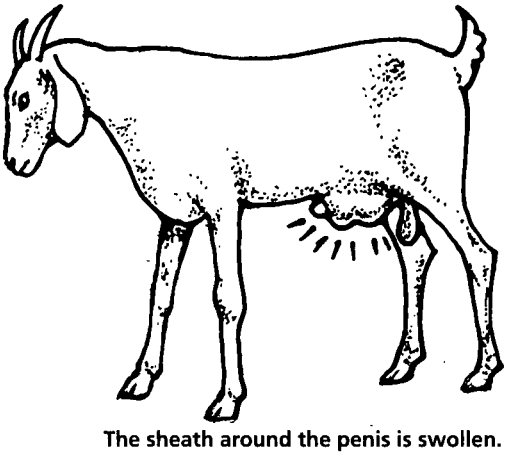
Prevention and control

- Isolate sick animals and disinfect buildings they have used.
- Vaccines are not always effective.
- Skilled workers test blood or milk samples to check for animals that carry infection. This can help you avoid bringing new animals with the disease into a group.

25 Diseases and problems mostly to do with urine

Blocked urethra

This happens most often to young male **cattle** and **sheep** and male animals that have been castrated. They cannot produce urine because the urethra (p. 37) is damaged or blocked with stones. The stones are made of minerals that come from the urine. Sometimes the urethra is damaged because the animal has been badly castrated.



The sheath around the penis is swollen.

Signs

- The animal feels pain and strains when it passes urine.
- It passes very little or no urine. There is no sign of urine on the ground near the animal.
- The animal has a rough coat. It will not lie down and rest. After a few days the animal's breath smells bad. The animal may have a high *fever*.

Treatment and prevention

- It is difficult to treat this. It is usually best to kill the animal for meat.
- Sometimes the bladder fills up with so much urine that it bursts and the animal becomes very sick and dies. Skilled workers can push a thin tube back up the *penis* to let the urine out or do an operation to repair the damage. This is complicated and expensive.
- Prevent this problem by giving plenty of fresh water to drink.

Babesiosis, Redwater fever

Cattle and **dogs** get *babesiosis* most often. **Buffaloes, horses, mules, donkeys, sheep, goats** and **pigs** occasionally get it.

Signs

Animals become sick 1–4 weeks after they get bitten by infected *ticks*. Adult cattle get more severe disease than young cattle.

- They have red urine.
- They become weak and tired and do not move or eat much. They have a high *fever*. The *mucous membranes* are pale and soon become yellow.
- The animal's breathing is fast and distressed. The heart beats very fast and loudly – sometimes you can hear it when you stand near the animal.
- Some animals die after 2–4 days. Most animals die after a few weeks with no treatment. Some animals recover after a long time. Some animals, especially cattle under six months old, only get mild disease. They recover after 3–4 weeks.

Animals that recover still carry infection and if they suffer *stress* they become sick again.

Horses, mules and **donkeys** get babesiosis, especially when they are young. It is usually mild but sometimes goes on for a long time.

- They often have a low fever and pale mucous membranes but no other signs.
- A few animals have red urine and some have yellow mucous membranes.

Dogs usually get a mild disease that goes on for a long time.

- They have pale mucous membranes.
- They are weak and get tired easily.
- They have a low fever for a few days.

Dogs that have never had infection before get very severe disease when they go to a place where infection is common.

- They suddenly have a high fever.
- The mucous membranes are very pale and become yellow.
- Some dogs die in a few hours.

Dogs that recover still carry the infection and ticks can spread disease from these dogs. Wild animals also carry infection and ticks get infection from them.

Skilled workers check for babesiosis by looking at *blood smears* (p. 118) with a microscope.

In a dead animal the flesh is yellow. The blood is thin and watery. The liver and the *lymph nodes* are larger than normal.

How animals get babesiosis

Animals get babesiosis when they are bitten by different kinds of infected *ticks* (p. 105). Babesiosis usually happens most in wet seasons, when there are many ticks. Different kinds of animals get different types of babesiosis so one kind of animal does not get babesiosis from ticks infected by other kinds of animal.

Babesiosis is caused by *protozoa* [*Babesia bigemina* and others] (Some people call these *microbes* 'piroplasms.')

Treatment

- Give imidocarb (p. 331). It is effective but many people use diminazene aceturate (Berenil) (p. 330) because it also treats *trypanosomosis* (p. 295). The sooner you begin treatment the quicker recovery will be.
- The powerful medicines used to treat babesiosis are also **poisonous**, especially for dogs and horses. These animals are difficult to treat because they need large doses that can poison them. You will need skilled help.
- It is often best not to treat animals for mild babesiosis, especially when they are young. Then they will become *immune* to the disease and be protected against getting infected again.

Prevention and control

- Prevent babesiosis by controlling ticks that carry the disease.
- There are live *vaccines* for babesiosis but they need careful handling and skilled use. There is no effective vaccine that is easy to use yet.
- Treat animals that have not had the infection before they go to a place where it is common. Watch the animals closely for signs of disease for several weeks after they arrive. Treat them if they become sick.
- **Horses, mules, donkeys and dogs** It is usually best to let a new horse or dog get naturally infected slowly and develop immunity. But watch the animal closely for signs of disease. Treat it immediately if it becomes sick.

26 Diseases and problems mostly to do with behaviour and movement

This chapter looks at common reasons why animals behave or move unusually but there are others, e.g. *ephemeral fever* (p. 278), *attack by flies* (p. 158), *scrapie* (p. 182).

Lameness

All animals suffer from lameness. Animals are often lame when they have injured a leg but not broken (p. 73) it.

Signs

- The animal limps and does not walk normally (p. 118).
- It is slower than other animals in its group.
- It only puts a little weight on the injured leg. It resents the leg being handled and examined.
- There is often heat, swelling and pain (*inflammation*) at the place that has been injured.

Treatment

To treat injuries to the leg that are not broken bones:

- Rest the animal until it recovers.
- Graze it near home.
- Put a hot *poultice* over the injured area for a few days (p. 327). Make sure the dressing is not too hot. You should be able to handle it comfortably.
- Skilled workers give special medicines, e.g. corticosteroid.

Arthritis

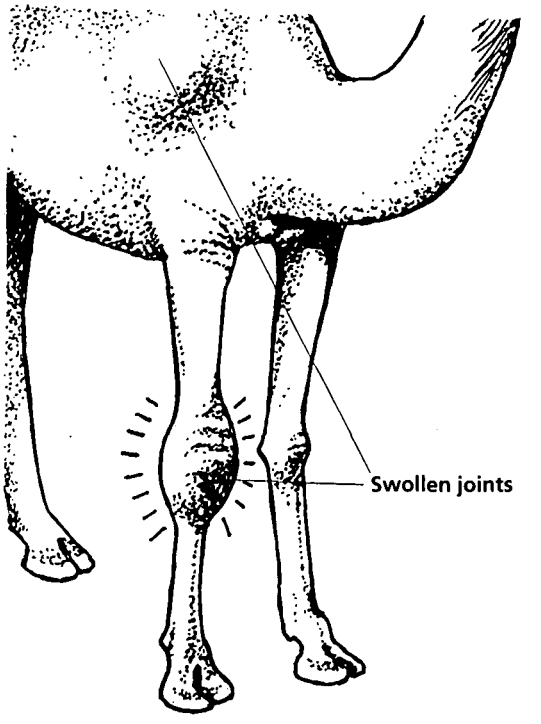
All animals can get *arthritis*.

Arthritis is the inflammation of a *joint*. Arthritis sometimes comes from infection. Baby animals get arthritis when infection gets into their blood through the *navel* soon after they are born. Infection is carried in the blood to the joints. Some people call this problem *navel ill* (p. 251)

Older animals and animals that have had severe infections get arthritis that goes on for a long time. Animals also get arthritis when they have some important diseases.

Signs

- The animal has pain in a joint and is usually lame on that leg.
- The joint is hot and swollen. The animal cannot bend the joint very much.
- Sometimes arthritis goes on for a long time and the joint is often swollen but not hot.
- The joint may make a grinding noise when the animal moves. If you put your hand over the joint you can feel the rough surfaces of the bones inside grinding against each other.



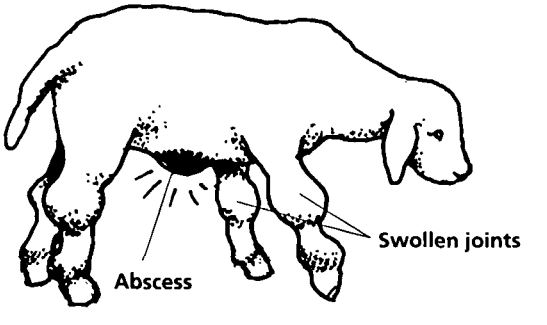
Treatment

- Antibiotic injections (p. 328) sometimes work when arthritis has not been going on for long. When it has been going on for a long time the joint is usually damaged and antibiotic does not work.
- Skilled workers can give special medicines to stop the *inflammation* and reduce the pain. (They give corticosteroid, butazolidone or aspirin.)

Navel ill, Joint ill

Signs

- A new-born animal is lame, it may be very lame with all its joints swollen. It does not eat and is weak and tired.



- It may have an *abscess* swollen with *pus* around the *navel*.
- Sometimes it has cloudy eyes.

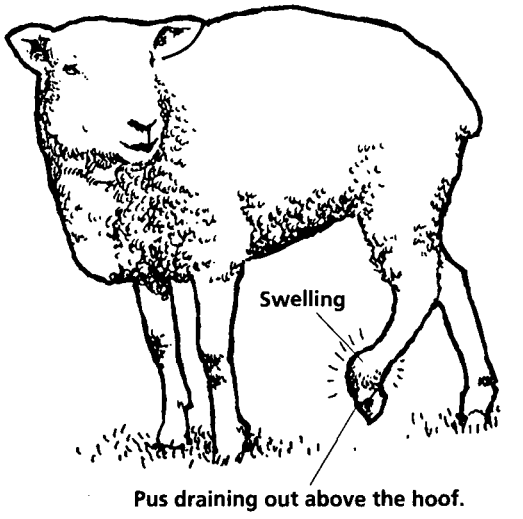
Treatment and control

- Drain the abscess (p. 186).
- Give an antibiotic (p. 328).
- Put antiseptic on the navel of new-born animals (p. 62).

Foot abscess

Signs

- Animals with an abscess in the foot are usually lame on one leg and the foot may be hot, sometimes there is swelling above the hoof. If you press under the foot the animal feels pain. An *abscess* can be deep inside the foot. It is caused by infection that gets in through a crack under the foot.



Pus draining out above the hoof.

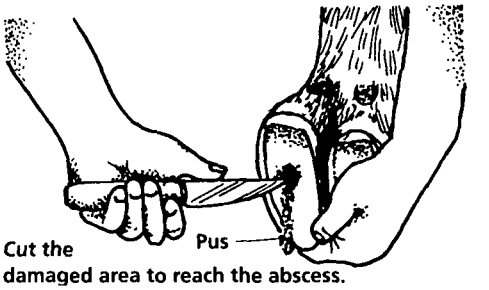
- **Horses, mules** and **donkeys** with infection in the foot may have yellow/white *pus* that comes from a wound, or the underneath of the foot may be wet, black and smell bad.
- **Camels** often get thorns in the pad of the foot and usually the thorn goes through the foot and comes out of the top without a problem. But sometimes they get an abscess and they need a *poultice* (327).

Treatment

- Wash the whole foot using water as hot as you can put your hand in.

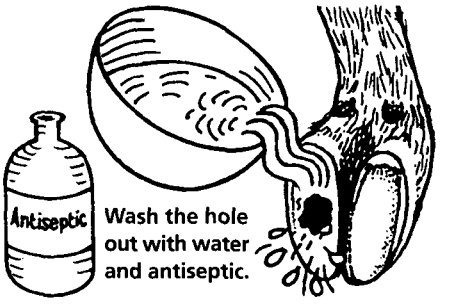
Wash the foot.

- Cut away at dark or damaged areas under the foot, especially if there is a crack. When you have cut far enough in to reach an abscess, pus will come out. Pus from cattle's feet is usually brown/grey and watery. Some blood sometimes comes out too.



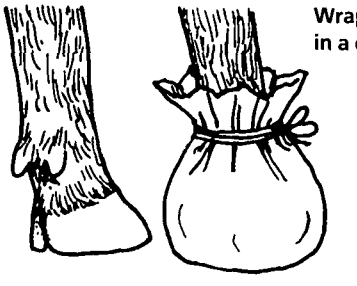
Cut the damaged area to reach the abscess.

- Wash out the hole you make with water or antiseptic (p. 324).



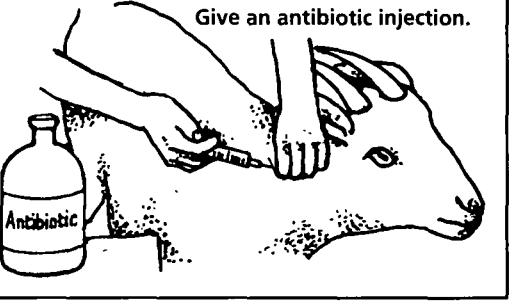
Wash the hole out with water and antiseptic.

- If the animal lives in a dirty place wrap the foot in a bandage for a few days to keep dirt out of the open hole. If the foot does not heal put a poultice on it (p. 327) – some people tie a wet goatskin round the foot.



Wrap the hoof in a clean cloth.

- Give an antibiotic by injection or put antibiotic into the wound (p. 328).
- Let the animal rest for a few days.

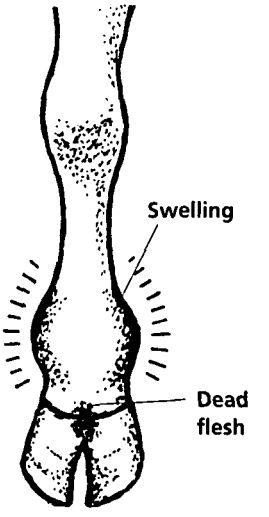


Give an antibiotic injection.

Footrot

Cattle, buffaloes, sheep and rarely **goats** get *footrot*. Only animals that live in wet places get it.

Signs



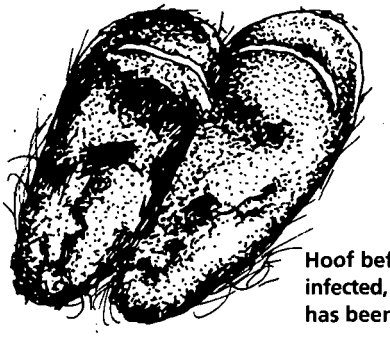
- Animals become very lame on one or more legs.
- There is swelling between the two claws and sometimes further up the leg. There is dead flesh between the two claws that looks damaged and crusty. Sometimes this dead flesh is very deep.
- Rarely *footrot* is severe and makes animals sick. They have *fever* and become thin.

How animals get footrot

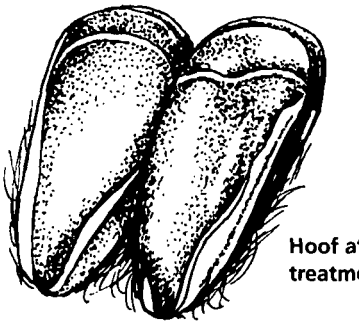
They get it from the soil where infected animals have been.
Footrot is caused by *bacteria* [*Fusiformis necrophorus* and others].

Treatment

- Isolate animals with severe footrot to stop infection spreading to others.
- Wash the foot, especially the skin between the claws. Use hot water – as hot as you can put your hand in – if possible. Put antiseptic in the water (p. 324).
- Cut away any decayed part of the hoof to remove the infection that is often underneath it.



Hoof before the infected, decayed part has been cut away.



Hoof after treatment.

- For cattle, use a stick or a feather to put a caustic chemical (p. 351) on the damaged place between the claws.

WARNING

Do not use copper for sheep as it poisons them if they lick it or eat it

- Put antibiotic spray or powder where you have cleaned away dead flesh.
- Inject an antibiotic; one injection is usually enough to treat the animal (p. 328).

Prevention and control

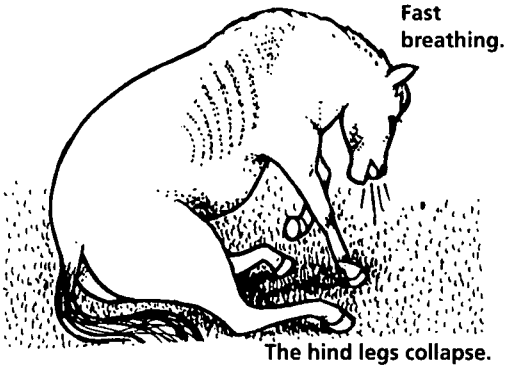
- Treat infected animals as soon as possible to stop infection spreading to others.
- People in East Africa move their animals across hot sand to drier places to control footrot.

Azoturia, Tying up, Exertional myopathy

Only **horses, mules** and **donkeys** get *azoturia*.

Signs

- The animal becomes sick 1–4 hours after it starts working.
- The animal sweats a lot.
- It has stiff back legs. It will not move even when encouraged.
- If you let the animal rest completely it may recover after a few hours. If it does not rest it often sits down on its back legs. Then it collapses and lies on its side. The animal looks distressed and tries to get up. It breathes fast and it may have a *fever*.



- The animal often passes little urine but with difficulty. The urine is dark brown/red.
- If the animal rests as soon as these signs appear it will usually recover in a few days. Animals that collapse and lie down for a long time do not recover. They often stop urinating and die after a few days.

In a dead animal when you cut into the big muscles of the back leg they look pale (like cooked meat). The *bladder* often has dark brown/red urine in it.

How animals get azoturia

This disease is not infectious – it does not spread from one animal to another. Azoturia only happens when animals that have been rested for a time suddenly work hard.

Treatment

- Rest the animal immediately but keep it standing up – even if you need a sling to help.
- When the animal begins to recover, encourage it to walk – slowly at first.
- Encourage the animal to drink as much water as possible. It is a good sign when it starts to urinate normally.
- There is no effective treatment but skilled workers can give special medicines to help recovery.

Prevention and control

- When working animals are not working make sure they have exercise and are not fed too much grain.
- Return animals to work gradually after they have rested for a long time.

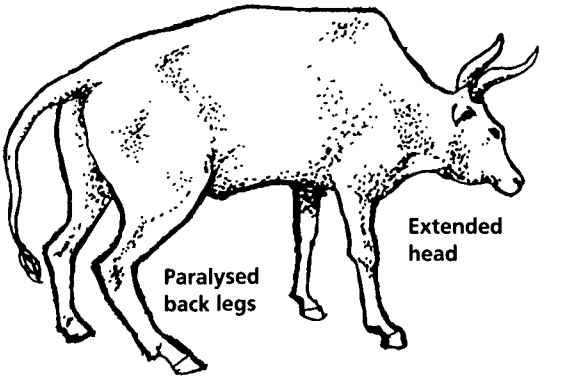
Botulism

All kinds of animals and **birds** get *botulism* occasionally. **Chickens** and **ducks** often get botulism.

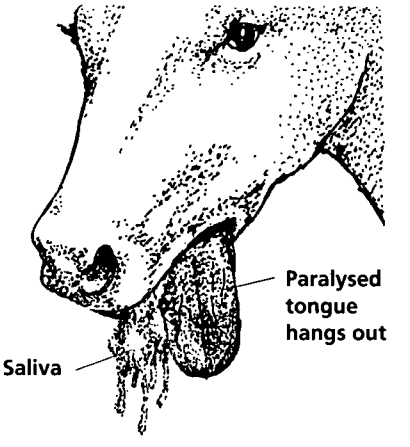
Signs

Often only one or two animals get botulism but when animals lack *phosphorus* many get it at the same time (see p. 257). Animals become sick 4–5 days after they eat food with botulism poison in it.

- The animals move about a lot and do not rest but they do not have a *fever*.
- The back legs become weak and paralysed and animals often collapse. The front legs and the head and neck become weak and paralysed. Cattle often lie on their chest with their head on the ground to one side



- The animal's tongue is paralysed and hangs out. Much *saliva* comes from the mouth. The animal cannot chew or swallow.



If an animal eats much poisoned food the disease happens fast. Some animals die in a few hours. Most animals die quietly after 3–5 days. A few animals recover after about a month.

How animals get botulism

Animals and birds get botulism from eating decayed food that has poison made by *botulism microbes* in it. These microbes are *bacteria* [*Clostridium botulinum*]. People get a different type of botulism, usually from badly preserved food. They do not get it directly from animals.

Botulism and lack of phosphorus

A lack of the mineral *phosphorus* makes animals behave unusually and eat everything, including stones, sticks and bones. The bones they eat sometimes still have pieces of decaying flesh on them. If the bones come from a body that was infected with botulism, the animals get botulism from these bits of flesh. The botulism poison is very strong, a piece of infected flesh smaller than the size of a finger can kill an adult cow.

In areas where there is little phosphorus in the soil or plants, many animals lack phosphorus and eat bones. In very dry times many animals die so there are many dead bodies for them to scavenge and many animals may suffer from botulism at once.

Treatment

There is no treatment for botulism.

- Help animals with only mild disease to recover. They will have difficulty eating so give them soft, wet food such as fresh grass.

Prevention and control

- Make sure animals get enough phosphorus. Give bone meal or provide licks containing phosphorus (p. 230).
- There is an effective *vaccine* for botulism. When one or two animals die from botulism, immediately vaccinate other animals that may have eaten the same food. In places where animals often lack phosphorus it is a good idea to vaccinate animals, especially cattle, every year.

Heartwater, Cowdriosis

This disease does not usually happen in Asia, it is common in Africa. **Cattle, goats, sheep** and rarely **camels** get *heartwater*.

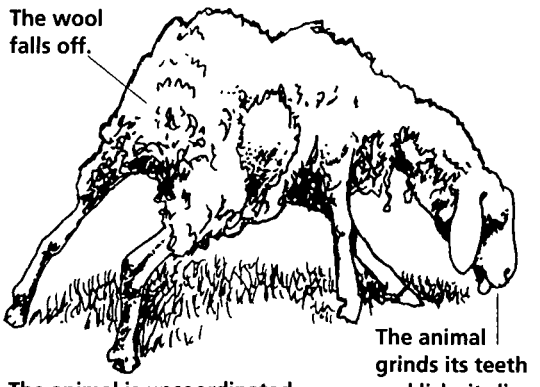
Signs

Animals become sick 1–4 weeks after they are bitten by infected *ticks*.
Occasionally the disease is **very severe** and happens very quickly.

- Animals suddenly have a high *fever*.
- They collapse, have *convulsions* and die in a few hours.

Usually the disease is **severe**.

- The animals eat less than normal. They have a high fever almost until they die.
- They become nervous and easily frightened. They are *uncoordinated* and lift their legs up very high when they walk. They go round in circles. Sometimes they run at things or people. They grind their teeth and lick their lips.
- They collapse, first onto their chest, then onto their side. They kick a lot, have convulsions and die after 1–7 days.



Some animals have **mild disease**. Sheep, goats and very young cattle usually only get mild disease.

- A few animals have diarrhoea. The faeces often have blood in them.
- The animals have a low fever but few other signs of disease.

In a dead animal the sac around the heart is full of fluid. Cattle have less fluid around the heart than sheep or goats. There is also fluid in the chest and the *abdomen*. The *spleen* and many *lymph nodes* are swollen.

Other diseases that look like this:

Anthrax (p. 141); East Coast fever (p. 276); *poisoning*: strychnine (p. 308); *tetanus* (p. 263); *rabies* (p. 260).

How animals get heartwater

They get it when they are bitten by *bont ticks* [*Amblyomma*] (p. 105). They do not get the disease from direct contact with other animals. Ticks get infection from animals with the disease and from infected animals with no signs of disease. These ticks also live on many different wild animals and birds some of the time and occasionally get infection from them.

Heartwater is sometimes very severe for young animals born on dry open pasture where there are no ticks. In a dry season these young animals are moved to grazing where there are ticks and they get infected. They have no *immunity* so they get severe disease. Many of them die. Animals imported from places where heartwater does not happen often get very severe disease.

Heartwater is caused by *rickettsia* [*Cowdria ruminantium*] – like small *bacteria*.

Treatment

- Treatment only works if it is started soon enough. Give an antibiotic, tetracycline and some other medicines are effective (p. 333).
- Check other animals in a group with a sick animal and immediately treat any that have a *fever*.
- Most of the sick animals that behave unusually, e.g. walk in circles, will die but you can help others to recover (p. 140).
- Skilled workers can use complicated medicines to help the animals recover.

Prevention and control

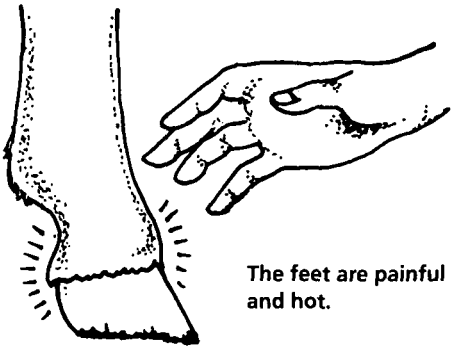
- Control the ticks that spread the disease (p. 105).
- Fodder sometimes has ticks in it so if possible avoid using fodder that might carry infected ticks.
- It is possible to immunise animals against heartwater but it is complicated and needs skilled help. Immunising is done by giving infected blood into a *vein* but this often makes animals sick and they have to be treated at the same time.

Laminitis

Horses and occasionally **mules** and **donkeys** get *laminitis*. Animals get laminitis when they have eaten too much grain or too much green food. They also get it when they have drunk too much cold water while they are still hot after they have worked. Sometimes females get laminitis when the *placenta* does not come out.

Signs

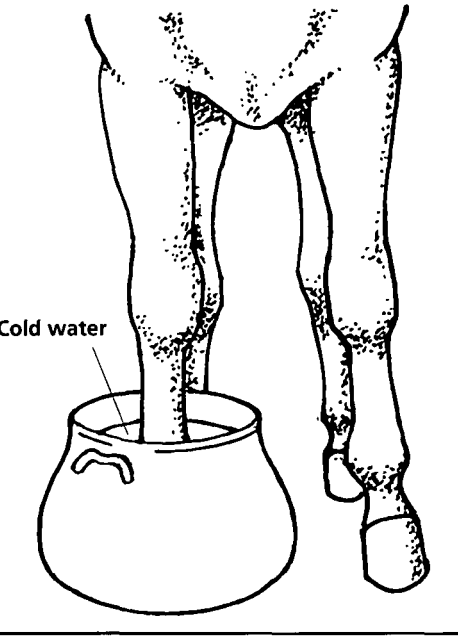
- The animal will not move. It keeps moving its weight from one foot to another and may lie down.
- The animal sweats.
- The feet are hot to touch.



The feet are painful and hot.

Treatment

- Remove the feed that might have caused the problem and give different food of poorer quality for a few days. Avoid feeding too much grain.
- Give a mild laxative such as bran mash (p. 347).
- Cool the feet down. Make the animal stand in a river or pour cold water on the feet in a metal bowl.
- Make the animal walk about as soon as it can.
- Some animals recover with no treatment. Skilled workers can give other medicines, e.g. corticosteroids, to help treat laminitis if it goes on for long.

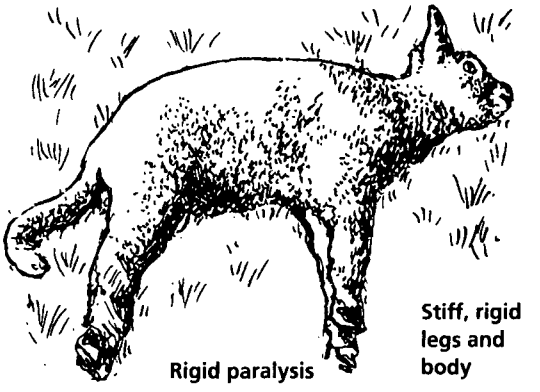


Paralysis

Animals sometimes cannot move all or part of their bodies, this is called *paralysis*. Animals become paralysed when they are badly injured or when they have some diseases that damage the nervous system.

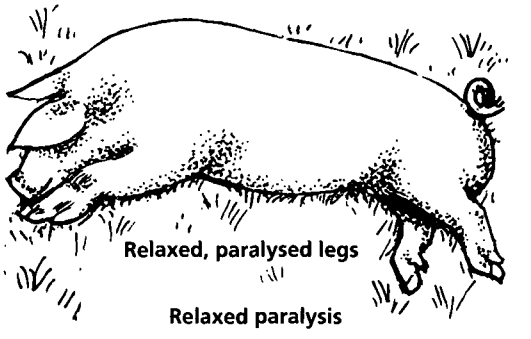
Rigid paralysis

Sometimes when animals are paralysed they are stiff and rigid. They cannot move their legs and you cannot bend them because they are too stiff.



Relaxed paralysis

Sometimes paralysed animals are relaxed and quiet, they cannot move their legs but the legs are relaxed and you can easily bend them.



Rabies

All animals can get *rabies*. **Birds** do not get rabies. **People** can get rabies and it can kill them (p. 6).

WARNING

People may offer to protect you or your animals from rabies through magic or religion. Some people believe this can protect them and their animals. THIS IS NOT TRUE. IT IS VERY DANGEROUS TO BELIEVE THIS. People and animals are not protected from rabies like this. People who believe that magic or religion makes them safe if they are bitten by an animal with rabies might not go to a health worker for proper help. Anyone bitten by an animal with rabies who does not go to a health worker as soon as possible for treatment might die. Once a person has become very sick with rabies there is no treatment.

People get rabies from the saliva of an animal with rabies. They get it when they are bitten or when the animal's saliva gets into the person's blood through a scratch or wound. The animal is very often mad and aggressive because of the disease. People almost never get rabies from other people.

- Keep children away from animals that start to behave strangely.
- Avoid any animal that has been bitten by a dog and has become aggressive. If you have to handle an animal like this be very careful to avoid its saliva. You do not have to get bitten to get rabies, you can get it if the animal's saliva gets on to a cut in your skin.
- Wash yourself very well with strong antiseptic (p. 324) if possible after handling an animal you think has rabies.

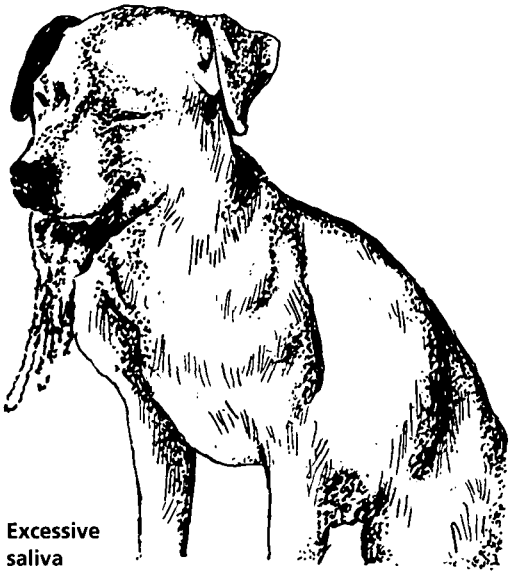
Signs

Animals usually become sick with rabies 1–2 months after they are bitten by an infected animal. They rarely become sick sooner and it may be a year before they become sick. Animals with rabies do not recover. They are usually only sick with rabies for a few days before they die.

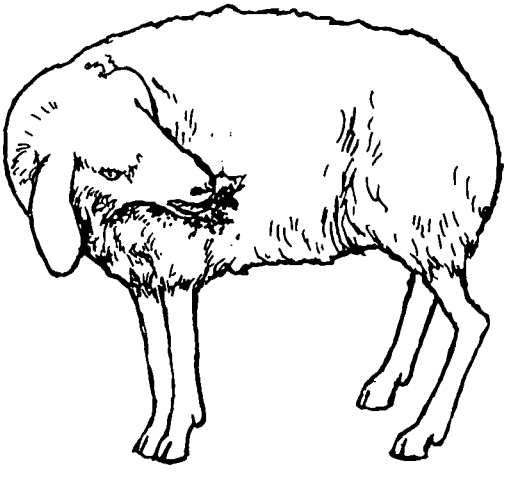
- Rabies usually happens in stages but the signs vary a lot. Some animals with rabies are never aggressive, others are very aggressive all the time until they collapse and die.

In the first stage of rabies animals behave unusually:

- A quiet animal may become noisy or an aggressive animal may become quiet.
- The animal does not eat or drink and usually does not have a *fever*.
- Sometimes *saliva* comes from the mouth. The saliva has infection in it even before the animal looks sick.
- Some animals start biting and barking like a dog. And some chew at the part of the body where they were bitten. Male animals may try to mate.



Excessive saliva



Animal chews the place on its body where it has been bitten.

In the second stage of rabies some animals are **aggressive**:

- After 3–5 days the animal loses all fear and becomes very aggressive. It bites anything and suddenly attacks people and things. Saliva comes from its mouth.

◆ It is *uncoordinated* and its voice changes.

In the second stage of rabies some animals are **quiet**:

◆ After 3–5 days the animal becomes paralysed. The back legs and muscles in the jaw and neck become paralysed first, then the rest of the body is paralysed (see p. 260). All the muscles relax. The animal is quiet. It cannot swallow or chew. Saliva comes from its mouth.

Then animals that have been aggressive and those that have been quiet become unconscious and die in a few hours.

Different animals and signs of rabies

Cattle often go away from other animals. They make a continuous low cry and grind their teeth. They kick the ground with their feet and run at people and things.

Sheep and **goats** cry out continuously. They become nervous and excited.

Horses, mules and **donkeys** often roll on the ground. They grind their teeth and cry out a lot. Their back legs become paralysed, they collapse and die.

Camels become nervous and sensitive to things around them. They bite the tails of other camels. They sometimes hold their head high and rush off, lifting their legs higher than normal. Sometimes they are aggressive to people but usually they are not. Male camels look like they do in the mating season (p. 51).

Dogs attack other dogs and people and bite with no warning. They eat strange things, such as pieces of wood, metal and stones. They make a low cry. They soon become very thin. Some have a watery *discharge* from the eyes. They usually die after they have been sick for about ten days. Dogs that are sick for much longer than 10 days usually do not have rabies.

In a dead animal there is nothing to see that tells you it has died of rabies. But dogs sometimes have sticks, stones or pieces of metal they have eaten in their *stomachs*. Skilled workers in a well equipped laboratory can examine the brain of a dead animal to see if it had rabies.

Other diseases that look like this:

Babesiosis (p. 248); *heartwater* (p. 257); *theileriosis* (p. 294). Sometimes animals that have been very frightened, such as by lions, or bitten by some kinds of snake look as if they have rabies.

How animals get rabies

They get it from the saliva when they are bitten by animals that carry infection. Animals that bite and most often spread the disease are: dogs, foxes, wolves, hyenas and bats.

Rabies microbes move from the wound where they get in along the nerves to the brain. The nearer the wound is to the brain the sooner the animal becomes sick.

The *microbes* that cause rabies are *viruses* [*Rhabdovirus*].

Treatment

There is no treatment for rabies. Animals that get rabies will die.
DO NOT TRY TO TREAT AN ANIMAL WITH RABIES. It is very dangerous. You can easily get rabies from the animal's saliva.

- Isolate an animal you suspect has rabies and be very careful about handling it. When an animal you think has rabies has bitten someone it is useful to keep it alive for a time to find out if it has rabies or not. But tie the animal up or keep it in a secure place where it cannot bite other people. If the animal lives for 14 days or more it has almost certainly not got rabies. If the animal dies, bury the body or burn it (p. 142). **DO NOT EAT IT**.
- If you are unsure or still think an animal has rabies kill it and bury or burn the body, do not eat it.

Prevention and control

- Control stray dogs. If you suspect a dog has rabies tell local health workers as soon as possible. Kill the dog and bury it (or tie it up for a time – see above). If the dog has bitten anyone take the person to a health worker for treatment as soon as possible.
- *Vaccines* for rabies are effective. (Rarely, an animal that has been vaccinated can still get another type of rabies that the vaccine does not protect against.) It is useful to vaccinate dogs to stop them spreading rabies to other animals and people. (Scientists are trying to make a rabies vaccine for giving to dogs with their food to make it easy to vaccinate many dogs without catching them.) It is rarely worth vaccinating cattle unless many of them become sick with rabies.
- Work together with others to help a control programme for rabies if there is one in your area.

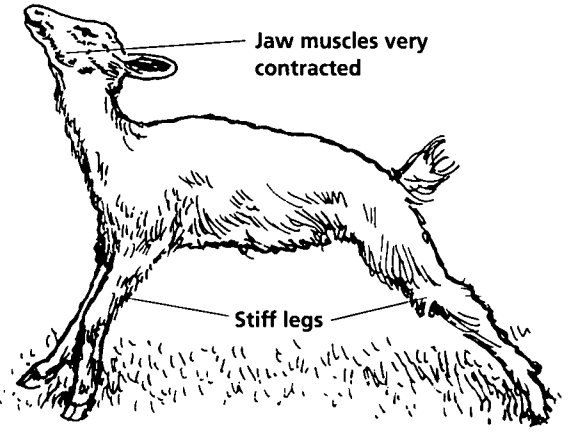
Tetanus

All animals can get *tetanus*. **Horses**, young **sheep** and **goats** suffer most.

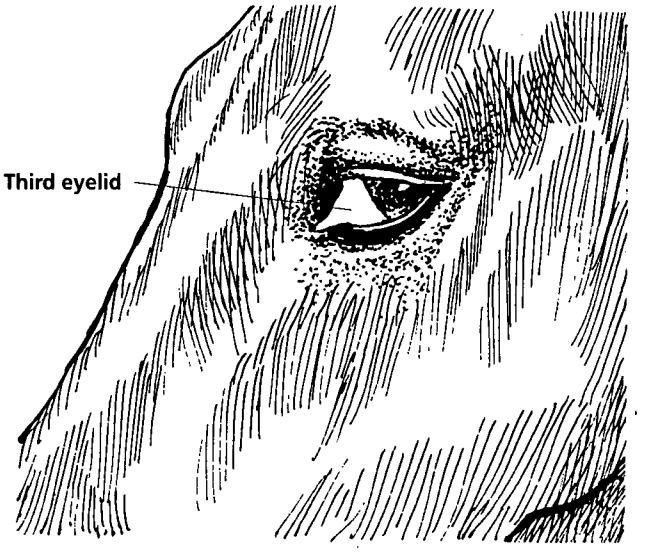
Signs

Animals become sick with tetanus 3–100 days after they get infected.

- The legs become stiff and the animal moves stiffly.
- The animal becomes nervous, especially when something disturbs it.
- The muscles of the jaw and cheeks contract in spasm and the animal cannot eat or drink. After several days many muscles contract in spasms and the whole body becomes rigid.



- The third eyelid comes across the eye.
- The animal has difficulty breathing.
- After 5–7 days it usually has convulsions, cannot breathe and dies. Animals rarely recover from tetanus.



Other diseases that look like this:

Poisoning: strychnine (p. 308).

How animals get tetanus

They get it when they are injured. Infection comes from the soil and gets into the body through a wound. Male animals often get it after they are castrated and females get it from the hands of people who assist with a difficult birth. Horses often get tetanus from wounds in their feet. Baby animals get infection through the *navel*. Infected animals pass tetanus microbes in their faeces. The microbes can live for many years in soil and people carry infection from the soil on their hands and arms.

Tetanus is caused by *bacteria* [*Clostridium tetani*].

Treatment

Treatment for tetanus is usually not effective. Skilled workers may use special medicines to help animals recover but they often do not work.

Prevention and control

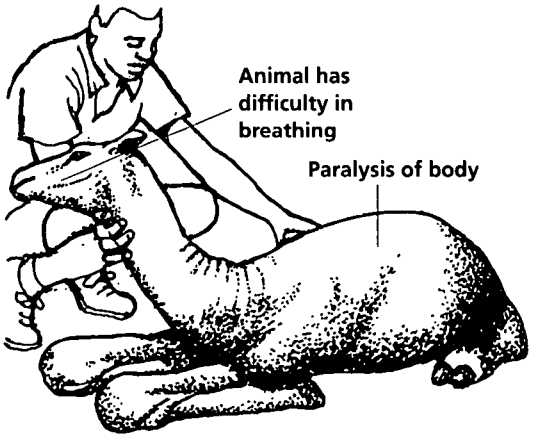
- Wash out deep wounds with antiseptic (p. 324).
- Do operations, such as castrations, in a clean place. Sterilise the instruments used for castrations and other operations (p. 71).
- Wash your hands and arms (p. 55) before putting them inside an animal to help with birth.
- Put antiseptic (p. 62) on the navel of new-born animals. Iodine is very good for this.
- *Vaccine* for tetanus works for a year. It is only worth vaccinating animals in places where tetanus is a big problem, or vaccinating valuable horses.

Tick paralysis

Most animals, especially young **cattle, camels** and **dogs** get *tick paralysis*. **Birds**, especially **ducks**, occasionally get it. **People**, especially children, rarely get it (p. 6).

Signs

- The animal cannot walk normally. The back legs become paralysed, then the front legs and the rest of the body. The muscles around the chest become paralysed and the animal cannot breathe.
- The body temperature is lower than normal.
- Dogs sometimes vomit.
- Animals collapse and, without treatment, they die in 1–5 days.



How animals get tick paralysis

They get it when they are bitten by ticks. This disease is not an infection. It happens because the *saliva* of some ticks is poisonous; even one tick can cause the disease.

Treatment, prevention and control

- Remove all the ticks from the animal as soon as possible (p. 108) and move the animal into the shade. Animals recover quickly after the ticks are removed.
- Move animals away from places where the ticks are. In Somalia, where many animals get tick paralysis, people even use trucks to move camels away from these places.
- Skilled workers can use special medicines to treat dogs.
- Control ticks to prevent this disease (p. 105).

27 Diseases and problems to do with many different parts of the body

Fever

All animals can have a *fever*. An animal has a 'high fever' when its body temperature is more than 2°C above normal. It has a 'low fever' if its body temperature is about 1°C above normal. See page 110 for normal temperatures.

Animals often have a fever when they are infected with *microbes*. Most microbes that make animals sick cause a fever. *Worms* and *flukes* make animals sick. They usually do **not** cause a fever.

It is dangerous for an animal to have a temperature that is too high. But fever can help animals to fight infection. When the body is hotter than normal, the processes inside it go faster than normal, including the processes that help animals to fight off microbes.

Fever, on its own, does not help you to tell what is wrong with an animal because it is such a common sign of disease. But it warns you that an animal has an infection. Together with other signs, it helps you decide what is wrong with an animal.

Signs

- The animal's body feels hot. Check with a thermometer (p. 110).
- The animal looks weak and tired (see p. 113).
- The coat looks rough and dull.
- The animal does not eat as much as normal but often drinks a lot of water.
- The eyes are dull and the nose is sometimes dry.

Treatment

- Isolate an animal with fever from others in its group (see p. 92).
- Shade it from the hot sun and give it plenty of clean water to drink.
- If the animal has a *high* fever do not offer it food for one day. Watch the animal closely to see if the fever goes down. As the fever goes down offer the animal good quality food.
- Look for other signs to find out why the animal has a fever. If you can decide which disease is causing the fever treat the animal for it as soon as possible.
- If the animal is sick and has a fever, give an antibiotic to kill *microbes* (p. 328) even if you do not know which disease it has. If the fever does not come down after you have given a full treatment with antibiotic – usually 3–5 days – try a different antibiotic.

Dehydration

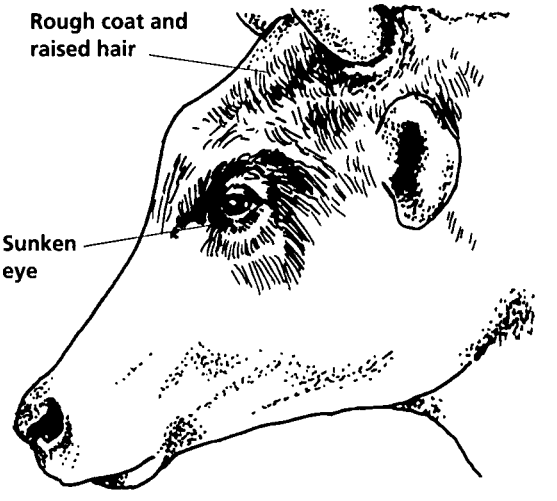
An animal is *dehydrated* when it has too little water in its body. Animals become dehydrated when:

- They have diarrhoea and lose a lot of water in the faeces.
- They are sick, especially with a disease that has gone on for a long time, or with a disease that damages the kidneys (p. 37).
- They do not have enough water to drink, especially when they are sick, or have a blockage in the *oesophagus* and cannot drink normally.
- They are very hot (p. 268).
- They lose a lot of blood.

More than half the weight of an animal's body is water. Blood (about one tenth of the animal's weight) is nearly all water. The rest of the water is in the flesh and bones. All the water inside an animal has salt, sugar, and other chemicals in it. When an animal loses a lot of water it also loses these important chemicals. **Animals lose water all the time**. They lose it in urine and faeces, in sweat from the skin and in the damp air they breathe out. They lose even more water when they produce milk or give birth. **They need to replace this water** by drinking or eating food with water in it.

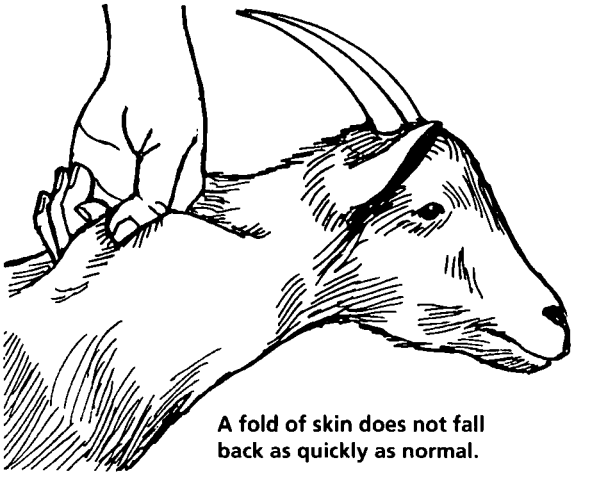
Signs

- ◆ The animal has a dry skin and rough coat with raised hair.
- ◆ The eyes sink into the head.
- ◆ It wants to drink often and is weak and tired.



- ◆ When you lift up a fold of skin it does not fall back as quickly as normal.
- ◆ The animal passes very little urine or has very dark urine. It has constipation, the faeces are dry.

When you see these signs an animal has probably lost about one tenth of its body water (large cattle could have lost 20–30 litres).



A fold of skin does not fall back as quickly as normal.

Treatment

- **Give the animal plenty of water to drink**. Or better still give water mixed with some sugar and salt. See *rehydration fluid* (p. 346).
- Treat diarrhoea quickly (p. 211).

Prevention

- Don't graze animals too far from water. Always give them enough water to drink. It is especially important to give sick animals plenty of water to drink.
- Keep animals shaded from the hot sun in the middle of the day if possible.
- Keep animals healthy so they do not get diarrhoea or diseases.
- Treat sick animals as soon as you can, especially for diarrhoea (p. 211).

Anaemia, Pale or white mucous membranes

Animals with *anaemia* have pale/white *mucous membranes*. Pale/white mucous membranes are common signs that animals have a disease or problem that causes anaemia, e.g. baby pigs have pale mucous membranes when they lack iron (p. 230). Together with other signs, pale mucous membranes warn you that an animal has an important disease and help you work out what the problem is.

Anaemia happens when there are not enough *red blood cells* in the blood or they are damaged. This is important because red blood cells carry oxygen that the body needs to stay alive.

Immediate treatment for pale mucous membranes

- Animals with mucous membranes that **quickly** become pale have usually lost a lot of blood or have severe disease. They may be bleeding inside. Try to find out where they are bleeding from and stop the bleeding (p. 66).
- Animals with mucous membranes that **slowly** become pale very often have *worms* or another disease that has gone on for a long time (p. 218). Treat them for worms or the disease you think they have.

Heatstroke, Sunstroke, Overheating

All animals and **birds** get *heatstroke*. **Sheep** get it most often because of their thick wool. **People** get heatstroke from extremely hot sun – they do not get it from animals.

Signs

- Animals become weak and stagger about.
- They breathe much faster than normal and the heart beats fast. They have a very high *fever* – it is often much higher than the fever that happens with most diseases.
- Some pregnant animals have abortions. This happens even after they seem to have recovered.
- **Sheep** with heatstroke often lose wool but it grows back when they recover.
- After a few hours they collapse, some animals have convulsions and die.

How animals get heatstroke

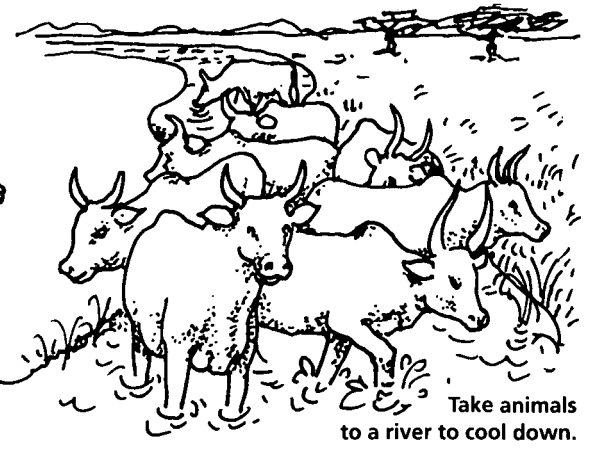
It happens when animals get too hot from the sun, and they get it inside very hot buildings. They are more likely to get heatstroke when they do not have enough water to drink and when they have to work hard in the hot sun.

The animals get so hot that they cannot control the temperature of their bodies.

Treatment

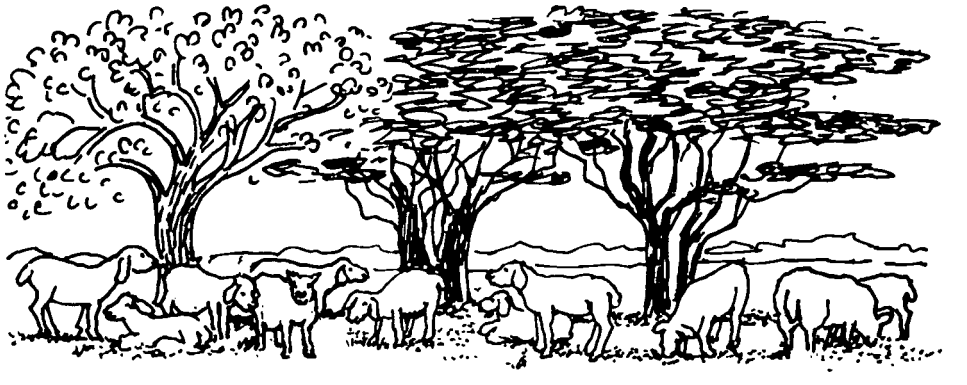
- Cool the animal down as fast as possible. Pour cold water over it or put it into some cold water. Move the animal into the shade. If the animal is part of a group, move the whole group into the shade.
- Continue to cool the animal until it looks better and it does not have a fever any more.

Pour cold water over an animal.



Take animals to a river to cool down.

Move animals into the shade.



Prevention and control

- Ensure that animals have enough to drink.
- Keep animals shaded in the middle of the day and try not to work animals too hard when the sun is very hot.
- **Buffaloes** and **pigs** have few sweat *glands* in their skin so they cannot cool themselves down by sweating and need water or mud to cool themselves in.

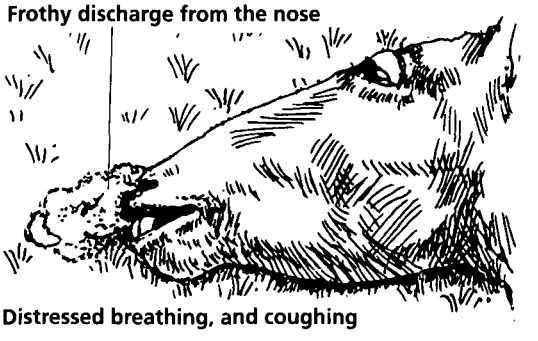
African horse sickness

African horse sickness happens in Asia as well as Africa. **Horses, mules** and **donkeys** get African horse sickness. Usually only imported animals get the disease, local horses and donkeys rarely become sick.

Signs

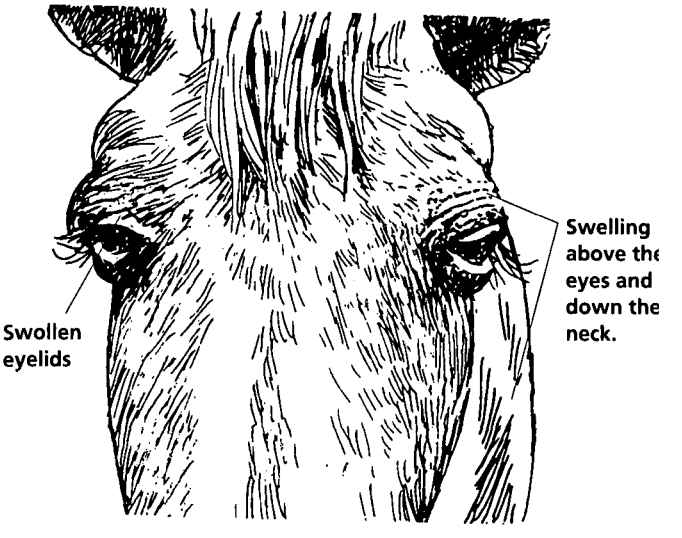
Many animals often get the disease at the same time. Animals become sick with African horse sickness 2–20 days after they get infected. Sometimes African horse sickness causes signs mostly to do with **breathing**.

- The disease quickly becomes very severe and animals have a high *fever*.
- They have distressed breathing and cough. They have much white/yellow frothy *discharge* from the nose.
- They have dark *mucous membranes*. Small blood vessels in the membranes look swollen.
- Animals soon collapse and die. They often die within a day.



Sometimes African horse sickness causes signs mostly to do with **swelling around the head**. Then the disease does not happen so quickly.

- Flesh in the hollows above the eyes swells up and the swelling may spread down the neck to the chest.
- Animals have a fever that sometimes lasts for a few days.
- They have dark red/blue mucous membranes. After a few days small blood vessels in the mucous membranes start to bleed. The gums and tongue are often dark red/blue. The eyes are red.
- After a few days the animals breathe very fast and are very distressed.
- Some animals die in 1–2 weeks. A few animals recover after 2–3 weeks.



Animals often have a mixture of both types of African horse sickness.

How animals get African horse sickness

Animals get African horse sickness when they are bitten by infected midges (p. 105) that fly at night. The midges can blow hundreds of kilometres in the wind and spread disease to places where it does not usually happen. The disease happens most at the start of a wet season when there are many midges. Animals imported from areas where the disease does not happen suffer most. (*Vaccinate* them).

In Africa the *virus* lives in zebras but does not make them sick. Dogs occasionally get African horse sickness from eating infected meat.

African horse sickness is caused by *viruses* [*Orbivirus*].

Treatment

There is no effective treatment for African horse sickness.

Prevention and control

It is important to prevent African horse sickness because there is no treatment.

- *Vaccine* for African horse sickness is effective. Vaccinate horses over six months old every year before a wet season. Do not give the vaccine to pregnant animals.
- Keep imported horses in midge-proof buildings at night in the wet season; it is almost impossible to control the number of midges (p. 105).

Anaplasmosis

Cattle get *anaplasmosis* most often. **Buffaloes, camels, sheep** and **goats** occasionally get it. Animals suffer most when they have never had the infection and move to areas where the disease is common. Other animals usually only get very mild anaplasmosis but they get severe disease when they go from areas without the disease to an area with much infection.

Signs

Animals become sick 20–28 days after they get infected with anaplasmosis.

- They soon have pale *mucous membranes* that may become yellow.
- They breathe faster than normal and have a very fast heartbeat. They have a high *fever*.
- They stop eating and do not pass faeces.
- *Pregnant cows abort.*
- Older animals that have never been infected before get very severe disease and often die in 3–4 days. Animals less than six months old do not get severe disease.

Some animals get **less severe** disease that goes on for a few weeks.

- They become weak and tired and become thin. They are unsteady on their legs.
- They have a fever that comes and goes.
- They recover after a few weeks but they are very weak.

Animals that recover from anaplasmosis are weak for a long time. They easily get other diseases and die.

In a dead animal the blood looks thin and watery. The flesh is pale/yellow. The *liver* is yellow/orange. The *gall bladder* is large and full of brown/green liquid. The *kidneys* are large and soft. The *spleen* is large and dark.

Other diseases that look like this:

Babesiosis (p. 248); *trypanosomosis* (p. 295); *liver fluke* (p. 285).

Cattle often get other diseases that *ticks* carry, e.g. *babesiosis* (p. 248) at the same time and the signs of disease are complicated.

Skilled workers can check a *blood smear* (p. 118) for anaplasmosis. But they do not always find the microbes because they disappear from the blood when the disease is most obvious.

How animals get anaplasmosis

Animals usually get anaplasmosis when they are bitten by infected *ticks*. The disease happens most often in wet seasons when there are many ticks. But biting flies can also spread the disease, and people occasionally spread it on injection needles or the knives used for castrations.

All animals that recover from anaplasmosis still carry infection and many animals get infected when they are young but do not become sick. These carrier animals sometimes become sick if they suffer *stress*.

Anaplasmosis is caused by *rickettsia* [*Anaplasma* species]. They are like small *bacteria*.

Treatment

Treatment works well if you start it soon enough. It is not effective after the mucous membranes have become very pale.

- Give an antibiotic, tetracycline works well (p. 333). Inject it into a *vein*. Or give imidocarb (p. 331) but this is less effective.
- Give animals good food and plenty of water to drink and give some wet green food or medicine to make the animal pass faeces (p. 346).

Prevention

- Prevent anaplasmosis by controlling the *ticks* that spread it (p. 105).
- Because young animals do not usually get severe disease they can develop *immunity* without becoming sick. It is safer to move young animals into areas where anaplasmosis is common.
- It is difficult and complicated to control anaplasmosis and needs skilled help. Skilled workers find out which animals carry the infection by checking *blood smears*. Sometimes they *vaccinate* animals using blood from infected animals. This often works but it makes some animals become sick and need treatment. They also use other types of vaccine. In areas where the disease is not common they also treat healthy animals that might carry infection.

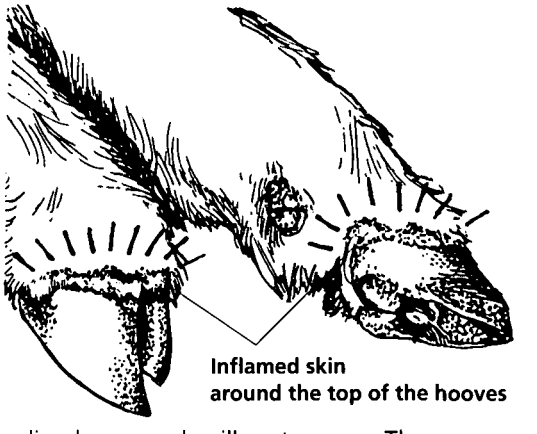
Bluetongue

Infection with *bluetongue* is common in most of Africa and Asia. But animals do not usually become sick except in South Africa and some parts of Asia or when they have been imported from places where there is no infection. **Sheep** and **goats** get bluetongue. **Cattle** and other animals carry infection but do not usually have signs of disease.

Signs

Animals become sick with bluetongue 1–14 days after they get infected.

- The *mucous membranes* inside the mouth and nose become dark blue/red after 1–2 days. The tongue and lips sometimes become dark blue/red and swollen. Sometimes the whole head swells up. Much *saliva* comes from the mouth (see p. 115).
- A clear *discharge* comes from the nose. Soon the discharge from the nose becomes white/grey/yellow, later it has some blood in it. The discharge dries and forms scabs that block the nostrils.
- The animals stop eating and they have a high *fever* that comes and goes.
- After 5–10 days the animals become stiff and lame. The skin around the top of the hooves becomes hot and red. Some animals have dark red/blue rings around the top of their feet.



Inflamed skin around the top of the hooves

- Many animals have such painful feet they lie down and will not move. They soon become thin and weak. Sheep often lose wool.
- Some animals die after about a week. Others recover after 1–2 months.

Other diseases that look like this:

Contagious pustular dermatitis (p. 167); *foot and mouth disease* (p. 279); *goat plague* (p. 282); *sheep pox* (p. 177).

How animals get bluetongue

Animals get infected with bluetongue when they are bitten by midges or occasionally by mosquitoes (p. 105) that carry infection. The disease happens most in wet seasons when there are many midges. In places where infection is common, such as, most of Africa and much of Asia, animals are *immune* and do not become sick but in places where the infection is not common, such as South Africa, animals that get infected become sick. Animals imported from places where there is no infection, such as Europe, become sick easily and you should vaccinate them.

Bluetongue is caused by *viruses* [*Orbivirus*].

Treatment

- There is no treatment for bluetongue. It helps to give an antibiotic by injection (p. 328) to stop infection by *bacteria* and to prevent *pneumonia*.
- Shade the animals from the hot sun. Wash the scabs around the mouth and nose with water and antiseptic (p. 324).

Prevention and control

- Move animals away from places where there are many midges. In a wet season move them to high ground where there are no midges (p. 105).
- Some people burn fires at night to make smoke to repel the midges.
- Some people use insecticides to repel midges, but they are expensive (p. 339).
- In Southern Africa some people keep cattle together with sheep and goats at night. Midges prefer to bite cattle so they do not bite the sheep and goats so much. Cattle do not get the disease so it does not matter if they are bitten.
- There are *vaccines* for bluetongue. Vaccinate animals a month before a wet season. The vaccine is effective in 10 days and protects animals for a year.
- Avoid moving animals from areas where there is no infection to places where infection is common, or vaccinate them. Vaccinate animals every year in areas without infection that are near to areas where it is common.

Canine ehrlichiosis, Nairobi bleeding disease

Only **dogs** get *canine ehrlichiosis*. This disease happens in many countries in Africa and Asia.

Signs

Dogs become sick 7–21 days after they get infected.

- The dog does not eat and it vomits. It has a *fever* that comes and goes. It is weak and tired.
- Some dogs recover in 7–14 days.
- Most dogs have small spots of bleeding on the *mucous membranes*. Some also have spots of bleeding on the skin where there is little hair.
- They have blood coming from the nose. They have red urine and blood in the faeces and vomit.
- Some dogs become very thin and die. Sometimes a dog seems to recover but after a few weeks it starts bleeding again. Often it suddenly has blood coming from one or both sides of the nose. Sometimes the bleeding is so severe that the dog dies in a few hours.

Other diseases that look like this:

Babesiosis (p. 248) – This often happens at the same time as ehrlichiosis; *distemper* (p. 275); *poisoning: rat poison* (p. 308); *trypanosomosis* (p. 295).

How animals get canine ehrlichiosis

Dogs get it when they are bitten by infected *ticks*. Dogs that have not had the infection before get very severe disease

Canine ehrlichiosis is caused by *rickettsia* [*Ehrlichia canis*] – they are like *bacteria*. It is spread by Brown Dog Ticks [*Rhipicephalus sanguineus*] (p. 105).

Treatment and control

- Give tetracycline (p. 333) **immediately**. It works when the disease happens quickly but not when the disease goes on for a long time or if it comes back.
- When dogs move from places where there are no ticks to places where this disease happens, watch them carefully for a few weeks, especially in wet seasons when there are many ticks. Treat them if they become sick.
- Control ticks that spread the infection (p. 00).

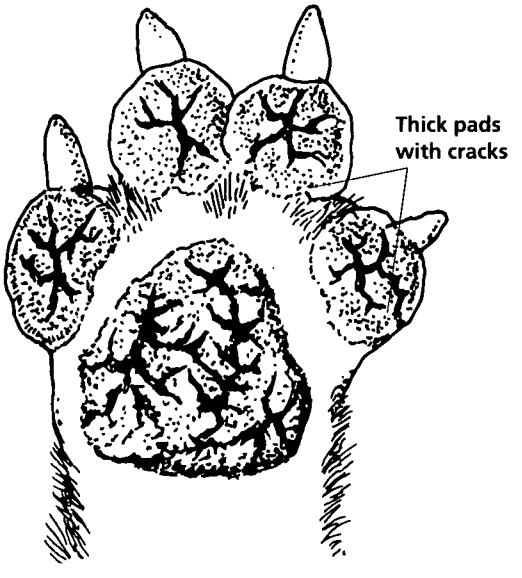
Distemper, Hardpad

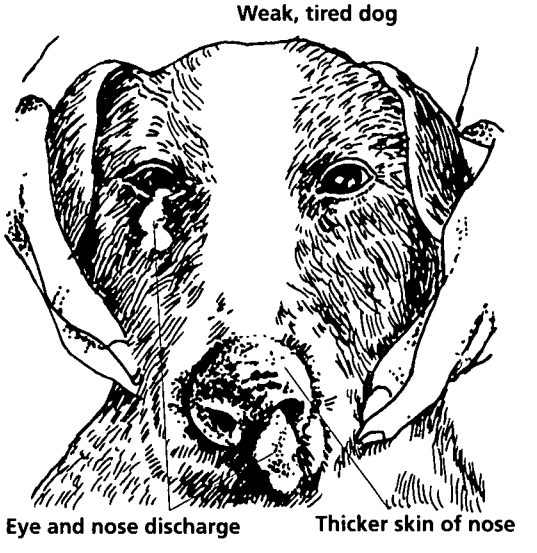
Dogs get *distemper.*

Signs

Animals become sick 1–3 weeks after they get infected.

- The animal has a *fever* for a few days. The fever goes down but it comes back again.
- The dog becomes weak and tired and does not eat as much as normal.
- The eyes are red. A grey/white/yellow *discharge* comes from the eyes and nose.
- Occasionally the skin of the nose and under the feet becomes thick and hard.





- The dog often has diarrhoea.
- Some dogs recover.

Sometimes a dog seems to recover but it becomes sick again.

- It behaves unusually. It cannot walk normally, sometimes the back legs are paralysed. It has muscle tremors. Much *saliva* comes from the mouth. It collapses, has convulsions and passes faeces and urine.
- Some dogs die after 2–3 weeks. Some die after several months.

How animals get distemper

They get it from direct contact with infected dogs, through the air or from things *contaminated* by infected dogs.

Distemper is caused by *viruses* [*Paramyxovirus*].

Treatment

There is no treatment but you can help dogs to recover:

- Give the dog plenty of water to drink and good food.
- Keep it out of the sun.
- Some people give dogs aspirin or paracetamol to help reduce the *fever*.
- Skilled workers use special medicines to help animals recover.

Prevention and control

- *Vaccination* for distemper is effective.

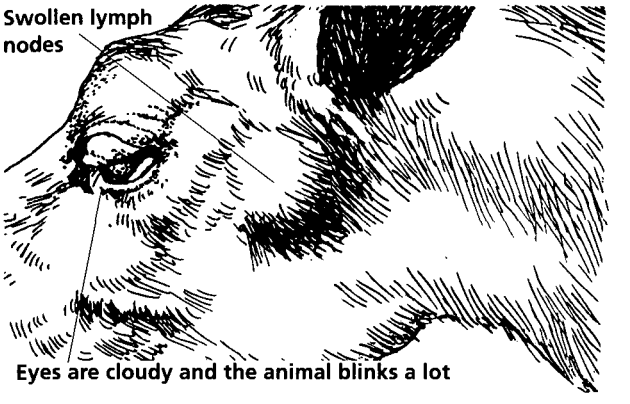
East Coast fever

East Coast fever only happens in Eastern and Central Africa. Only **cattle** get East Coast fever.

Signs

Animals become sick 10–20 days after they are bitten by infected *ticks*.

- *Lymph nodes* under the skin (p. 41) swell up under the ears where the ticks bite. (People often do not notice this sign.) Soon there are swellings in front of the shoulder and the knee and sometimes other parts of the body as other lymph nodes swell up.
- The animals have a high *fever*. They are tired and weak, eat little and become thin. They give little milk.



Eyes are cloudy and the animal blinks a lot

- Sometimes they cough and show signs of *pneumonia* (p. 195).
- Some animals have diarrhoea with blood in the faeces.
- Occasionally the eyes become cloudy and animals blink often.
- Sometimes cattle behave unusually and go round in circles. The back legs may become paralysed.

Cattle that move from places where East Coast fever does not usually happen to an area where it is common get very severe disease. It often kills nearly all of them; they collapse and die about three weeks after they were bitten by infected ticks.

- Sometimes cattle get *babesiosis* (p. 248) at the same time as East Coast fever.
- Skilled workers check for East Coast fever by looking at a *blood smear* with a microscope.

In a dead animal the *trachea* often has froth in it and froth comes out of the nose. Many lymph nodes are swollen with fluid and often dark with blood.

Other diseases that look like this:

Malignant catarrhal fever (p. 287); *tropical theileriosis* (p. 294); *corridor disease* (p. 278).

How animals get East Coast fever

They get it when they are bitten by infected ticks (p. 105). The disease does not spread directly from one animal to another. Sometimes infected ticks are moved long distances with forage and they can come from grass by the roadside.

East Coast fever is a form of *theileriosis* and is caused by *protozoa* [*Theileria parva parva*].

The ticks that spread East Coast fever are Brown Ear Ticks [*Rhipicephalus appendiculatus*]; these are different from the ticks that spread *babesiosis* (p. 248).

Treatment

- Treatment for East Coast fever is expensive. Medicines, such as buparvaquone, parvaquone and halofuginone, are effective (p. 330). Oxytetracycline (p. 333) also works if you give it very soon after an animal is bitten by infected ticks.
- Cattle often get *pneumonia* (p. 195) about a week after they recover from East Coast fever so watch the animals carefully and treat them with an antibiotic if they show any signs of this.

Prevention and control

- To control East Coast fever control the ticks that carry it (p. 105).
- Effective vaccines that are easy to use are not available yet.

Deliberate infection and treatment for East Coast fever

An effective way to prevent East Coast fever is to give animals the disease on purpose and treat it at the same time. This makes them *immune*. In Kenya veterinary

workers inject an animal under the skin just in front of the shoulder with crushed infected ticks. At the same time they give long-acting oxytetracycline to treat the disease, but about one animal in twenty becomes sick. You need to check the animals' temperature every day. If a *fever* develops they need more treatment. So skilled workers take samples from any sick animals to see if the fever is caused by East Coast fever. If it is they immediately treat the animal with buparvaquone (p. 330).

In places where East Coast fever is common young animals often get the disease once or twice. They become immune for life and will not get the disease again. Strong, well-fed young animals that get the disease will recover and not stop growing.

Corridor disease

Corridor disease looks like East Coast fever (p. 276) but is not so severe. **Cattle** get it from ticks that have fed on wild buffaloes that carry the disease.

Corridor disease is another form of *theileriosis*. It is caused by *protozoa* [*Theileria parva lawrencei*].

Treat and control Corridor disease like East Coast fever (p. 277).

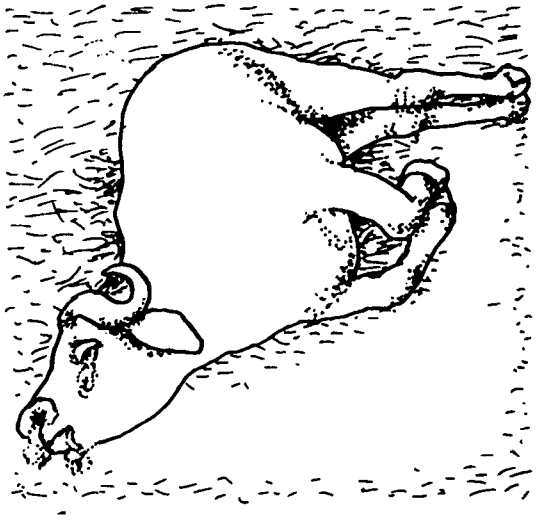
Ephemeral fever, Three day sickness

Only **cattle** and **buffaloes** get *ephemeral fever*. Well-fed animals in good condition get this disease most often. Very young cattle do not get it often.

Signs

Animals become sick 2–7 days after they are bitten by infected midges or mosquitoes.

- The animals suddenly give much less milk and stop eating.
- They suddenly have a high *fever* that soon falls but then the fever comes and goes.
- Some have a watery *discharge* coming from the eyes and nose and they often have much *saliva* coming from the mouth.
- After 1–2 days they have muscle tremors. The legs become stiff and weak and the animals do not walk normally. They often lie down. Their back legs are stiff and stick out. Some animals that lie down get *bloat* (p. 215).
- A few animals collapse and die but most animals start to eat again about three days after they became sick. Their legs are stiff and weak for about two more days. Then they recover but they will not produce more milk until the next lactation.



In a dead animal all the *lymph nodes* (p. 41) are large and watery.

How animals get ephemeral fever

Animals do not get it directly from other infected animals. They only get it when they are bitten by infected midges or mosquitoes (p. 105). Sometimes these insects carry the disease from infected wild animals. The wind can blow infected midges for hundreds of kilometres.

Ephemeral fever is caused by *viruses* [*Rhabdoviruses*].

Treatment

- There is no treatment. Animals almost always recover after a few days.
- When a sick animal lies down for many hours keep moving it from one side to the other.

Prevention and control

- There is not a good *vaccine* for ephemeral fever yet.
- It is not possible to control the midges that spread this disease.
- Animals that have had this disease rarely get it again.

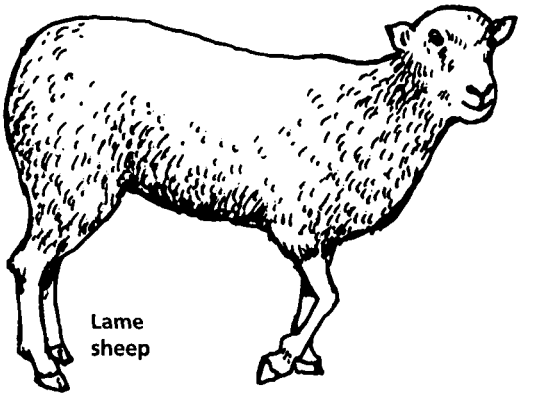
Foot and mouth disease

Cattle, buffaloes, camels, sheep, goats and **pigs** all get *foot and mouth disease*. European breeds of cattle get foot and mouth disease much more severely than Zebu and other local breeds.

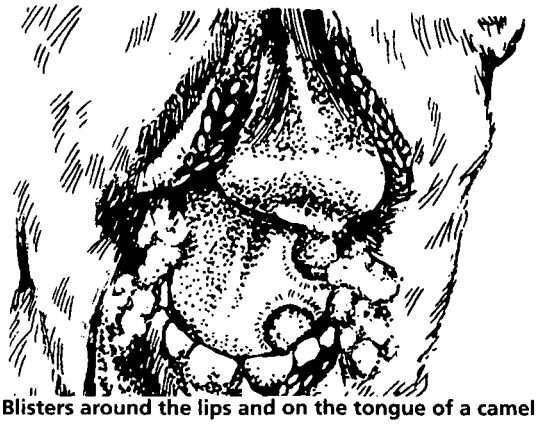
Signs

Animals become sick with foot and mouth disease 2–14 days after they get infected.

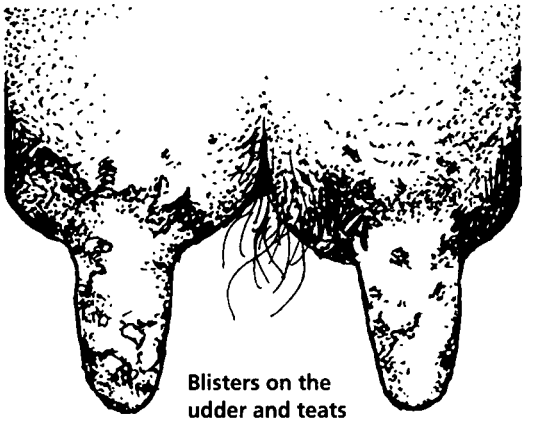
- The animals are very lame – usually all four feet are painful.
- The animals are weak and tired and have a high *fever*. They stop eating and become thin. Their coats look rough and dull. They produce no milk.
- They have blisters inside the mouth, especially on the tongue and much *saliva* comes from the mouth. They have blisters on the feet, especially just above and between the



Lame sheep

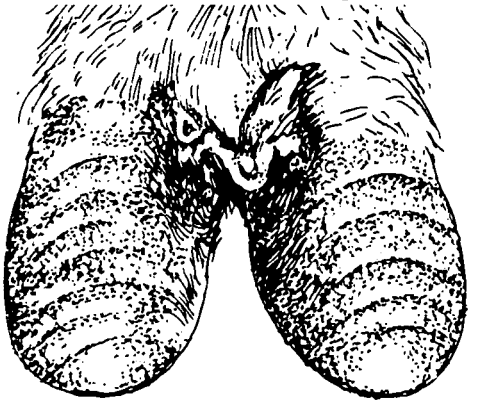


Blisters around the lips and on the tongue of a camel



Blisters on the udder and teats

Blisters between the claws of a goat's foot

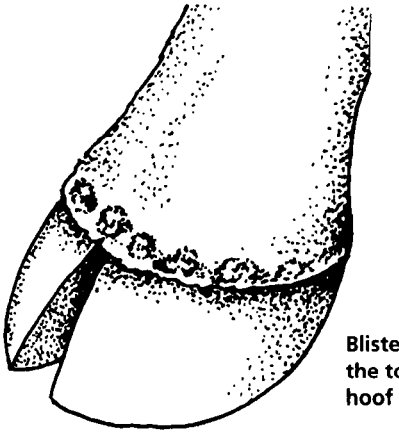


claws. Some animals also have blisters on the teats. When the blisters around the hoof are very bad the hoof may fall off. Blisters usually heal after two weeks. But they sometimes get infected by *bacteria* and take longer to heal.

- Pregnant animals often have abortions.

Most animals recover from mild disease. Many animals recover from severe disease but they are often very thin for a long time.

Baby animals sometimes get very severe foot and mouth disease and can die suddenly before they have signs of disease.



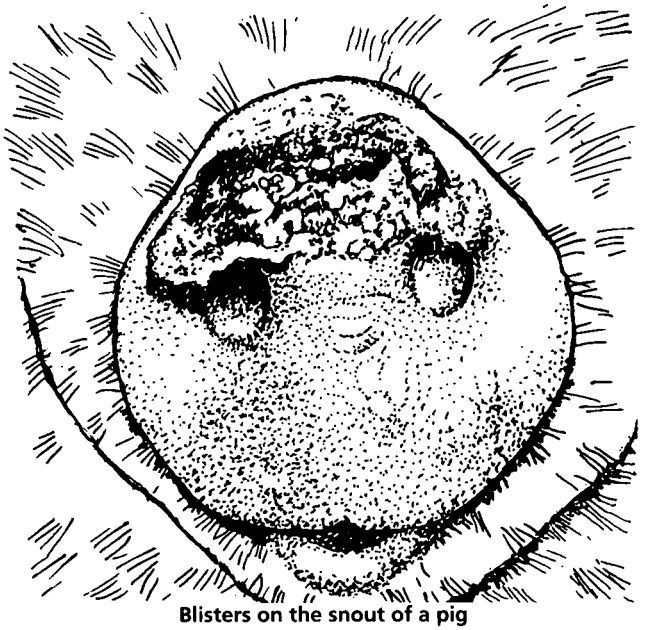
Blisters around the top of the hoof

Sheep and **goats** get a much milder type of foot and mouth disease.

- They have blisters in the mouth. The blisters are often very small. Most of them are on the dental pad. It is difficult to see blisters on the feet. But the feet are painful and the animals are often lame. They usually recover but are often thin for a long time.

Pigs eat very little and have much *saliva* and froth coming from the mouth and nose. They have blisters on the nose, mouth, feet and sometimes the udder. The feet are very painful and the hooves often fall off. Baby pigs often die with no signs of disease.

In a dead animal there are blisters in the mouth and *oesophagus* but not in the rest of the *intestine*. Sometimes there are blisters in the *rumen*. The heart muscle of baby animals has grey patches/stripes in it.



Blisters on the snout of a pig

How animals get foot and mouth disease

Animals get infection from direct contact with infected animals. Infection comes from the saliva, discharges from the nose and the coughing of infected animals. Feed gets infected by the saliva of infected animals. Animals also get infection from people or things that infected animals have touched. People carry infection for about 24 hours after they have been with infected animals. Infection can also spread hundreds of kilometres through the air, especially when it is cool and damp.

Animals that recover do not spread infection to other animals.

Foot and mouth disease is caused by *viruses* [*Apthovirus*].

Treatment

There is no treatment for foot and mouth disease but you can help animals to recover:

- Give them plenty of water and shade them from the hot sun.
- Encourage them to eat. Give soft green food. Fresh grass is better than hard hay. The blisters in the mouth make it painful for the animal to eat.
- Give an antibiotic (p. 328) to stop the blisters getting infected by *bacteria*.

Prevention and control

Foot and mouth disease is one of the most infectious diseases of livestock and it easily spreads a long way, so many governments try to control it and some have eradicated it. Work with others to help control programmes to stop the disease from coming back.

- Keep healthy animals a long distance from places where there is infection.
- *Vaccines* for foot and mouth disease are effective but they are expensive and complicated to use. You need a vaccine exactly the same type as the foot and mouth disease in your area. It is difficult to use these vaccines properly without skilled help. Usually you need to vaccinate twice every year.
- It is a good idea to vaccinate animals that work to prevent them becoming lame, even in places where the disease is mild and other animals are not vaccinated.
- In places where foot and mouth disease is common and often mild some people spread the disease on purpose so that animals get infected and develop *immunity*. They mix healthy animals with infected ones. The animals only get mild disease and recover quickly and cannot get the disease again. New-born animals from mothers that have been infected like this are also immune. They will be saved from the severe type of foot and mouth disease that very young animals suffer. Some animals become lame but these people spread the disease in time for animals to recover before they make a long journey to better grazing.
- Some herders who live where foot and mouth disease is common vaccinate their animals directly. They push a thorn into a blister on the tongue of an infected animal. Then they scratch the tongue of an uninfected animal with the infected thorn to infect the animal and make it become immune to the disease.

Goat plague, Peste des Petits Ruminants, PPR

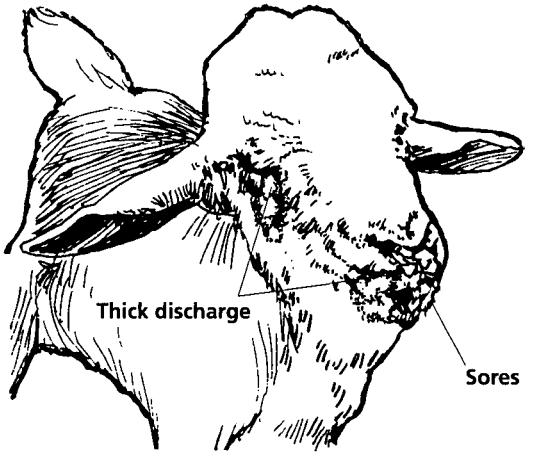
Only **goats** and occasionally **sheep** get *goat plague*.

Signs

Many animals usually get this disease at the same time. In places where the disease has not happened before, animals get severe disease that looks like *rinderpest* (p. 290) and many animals die.

In places where the disease happens often, **goats** sometimes only get mild disease, **sheep** usually only ever get mild disease.

- They have a clear *discharge* coming from the nose and they have sores in the mouth that come and go.
- They have diarrhoea that comes and goes and they have a low *fever*.
- Most of these animals recover after 10–20 days.



In a dead animal the eyes and nose have dirty white/grey *discharges* round them. The skin is usually covered with bad-smelling, watery faeces. The mouth has many sores in it. There is *pus* in the lungs.

Other diseases that look like this:

Bluetongue (p. 273); *CCPP* (p. 197). In India goats and sheep also get *rinderpest* (p. 290) and it looks the same as *goat plague*.

How animals get goat plague

Animals get infection from close contact with sick animals. The disease spreads like *rinderpest* does (p. 291).

Goat plague is caused by *viruses* [*Paramyxovirus*].

Treatment

- There is no treatment for goat plague but skilled workers can use special medicines to help animals recover.
- It helps to give an antibiotic (p. 328) to stop infection with *bacteria*.

Prevention and control

- Isolate animals with signs of goat plague immediately. Move healthy animals away to a clean place.

- *Vaccination* for goat plague is effective. Vaccinate all the sheep and goats that have been in contact with sick animals. Look at the vaccinated animals very closely every day. If one shows signs of disease put it with the sick ones that have been isolated.
- It is important to vaccinate animals in areas where the disease does not often happen if there is a risk of sick animals from elsewhere being brought through the area. The sheep and goats of nomadic herders are often *resistant* to goat plague but they sometimes are infected even if they do not look sick. The sheep and goats of settled animal keepers are usually not resistant and can get severe disease from the nomadic animals.
- If you take animals to a market but do not sell them and bring them back it is a good idea to keep them separate from other animals because they may have become infected at the market.

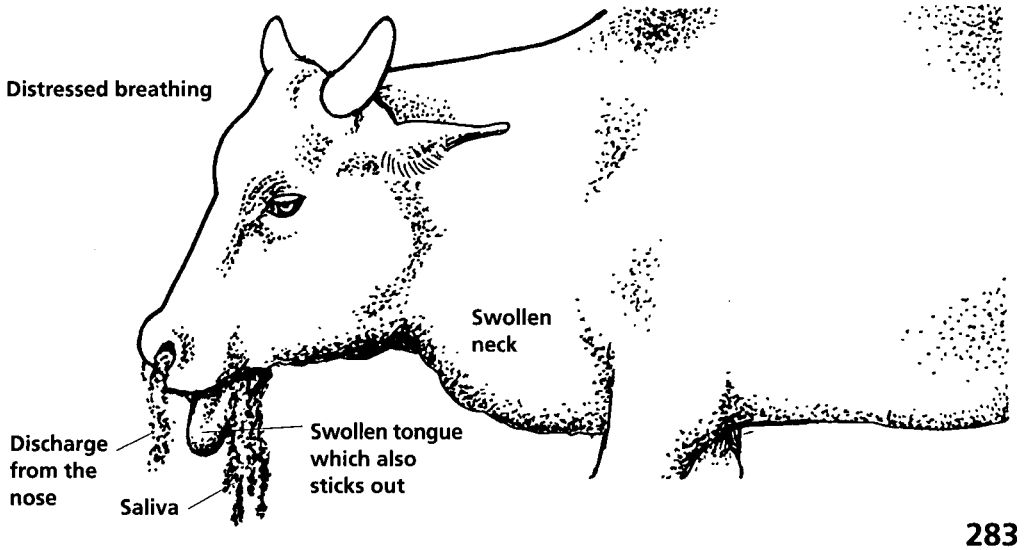
Haemorrhagic septicaemia, HS, Pasteurellosis

In Africa this disease happens occasionally and happens suddenly in places where it has not happened before. In Asia it is a serious problem and happens often, usually at the start of the wet season. At this time cattle and buffaloes are weak after the dry season and are starting to work. Because they are weak they get this disease more easily.

Cattle and **buffaloes** get *haemorrhagic septicaemia* most often. **Camels** sometimes get it.

Signs

- The animals stand still much of the time and it is difficult to move them. They are tired and weak and have a high *fever*.
- Very soon much *saliva* comes from the mouth and a clear *discharge* comes from the nose.
- The animals have a swelling under the jaw that spreads and the whole neck swells up. Sometimes the swelling spreads to the head and the front legs. The swelling feels warm. The animal's tongue swells up and sometimes it sticks out. The swelling stops the animal breathing properly. Some animals have distressed and noisy breathing.



◆ Most animals collapse and die within 1–2 days.

In a dead animal much yellow/brown fluid comes from the swelling if you cut into it.

Other diseases that look like this:

Anthrax (p. 141); *blackquarter* (p. 144), *pasteurellosis* (p. 202).

How animals get haemorrhagic septicaemia

Animals get the disease from direct contact with infected animals. It often spreads when animals are herded close together at night or when they are herded together for vaccination. Sometimes animals get it when they meet infected herds at watering places. Some animals that have no sign of disease carry the infection.

Haemorrhagic septicaemia is caused by *bacteria* [*Pasteurella multocida*].

Treatment

Treatment works well if it is started soon enough. If treatment starts too late it can make the disease suddenly much worse and the animal will die. It may even die while you treat it.

- Give an antibiotic, e.g. oxytetracycline (p. 333), as soon as you suspect an animal has haemorrhagic septicaemia and give an antibiotic to all the other animals that have been near to it.

Prevention and control

- Keep sick animals, and those that have been near them, away from healthy animals.
- Be careful not to carry infection from sick animals to healthy ones. People carry this disease on their feet, clothes and other things.
- *Vaccination* is useful in places where the disease happens often. It is effective from two weeks after you give it. It is difficult to use this vaccine properly. The best vaccines work for a year, other types only work for a few months. Vaccinate animals one month before you expect the disease to happen. In many places the best time to vaccinate is one month before the wet season.
- **Buffaloes** get haemorrhagic septicaemia very badly. Vaccinate them.
- **Camels** occasionally get haemorrhagic septicaemia; you can vaccinate them.

Leptospirosis

All animals can get *leptospirosis*. **People** can get leptospirosis (p. 6).

Signs

Animals become sick 5–20 days after they get infected with leptospirosis. Animals have so many different signs that it is impossible to tell whether a sick animal has leptospirosis without complicated laboratory tests.

The signs that animals have include:

- Many animals carry the infection but have no signs of disease.
- Animals have abortions. They give birth to weak offspring.
- Some animals: have a *fever*, are weak and tired, have *mastitis* (p. 244), produce less milk, do not eat, have yellow *mucous membranes*, have blood in the urine.
- **Dogs** vomit and have blood coming from the mouth and the mucous membranes. They have diarrhoea with blood in the faeces. They have yellow mucous membranes. A few dogs recover, most die.
- **Horses, mules and donkeys** Horses sometimes have damaged eyes (called periodic opthalmia or moon blindness) months after they have leptospirosis. They become frightened of sunlight. They have a clear discharge from the eyes. The eyes become cloudy and red. The animal recovers from this. But it happens again a few times and the animal becomes blind. There is no treatment for this.

How animals get leptospirosis

They get it from water and wet ground *contaminated* by urine or *discharges* from infected animals. They also get it from direct contact with infected animals.

Leptospirosis is caused by *bacteria* [*Leptospira hardjo, icterohaemorrhagiae* and others]. Many leptospirosis microbes live in an animal's kidneys.

Treatment

It is difficult to be sure that animals have *leptospirosis*. But if skilled workers think this disease is a problem they start treatment as soon as possible. Antibiotics, especially streptomycin, are effective (p. 332).

Prevention and control

Vaccination is effective and lasts for a year. But, except for dogs, it is complicated to choose the correct vaccine.

Liver fluke disease, Fasciolosis

Cattle, buffaloes, camels, horses, mules, donkeys, sheep, goats, pigs and **rabbits** get *liver fluke* disease. **People** sometimes get infected with liver flukes (p. 6).

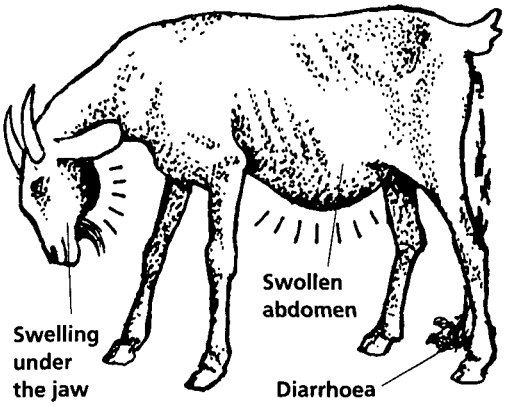
Signs

Severe liver fluke disease that happens quickly is called *acute liver fluke disease*. Sheep and goats usually get this type of disease, especially when they are young. Cattle do not get it often. Animals often get it at the start of a dry season when they graze in places that have just been flooded.

- Some animals die before they have signs of disease. Usually animals are very sick for a few days.
- They are tired and weak and stop eating but they do not usually have a *fever*.
- The *mucous membranes* are pale.
- Some animals die after 1–3 days. Many animals recover but are still sick with less severe disease for a long time.

Less severe liver fluke disease that goes on for a long time is called *chronic liver fluke disease*. **Cattle**, **sheep** and **goats** get this type of disease.

- Animals slowly become thin and weak and produce little milk.
- They do not usually have a *fever*.
- They often have diarrhoea and may have swelling under the jaw and some have a swollen abdomen.



- The *mucous membranes* are pale and may become yellow.
- A few animals die after about eight weeks with no treatment. Many animals recover after 3–6 months, but they are very thin.

Skilled workers can check faeces for liver fluke eggs. They only find eggs from animals with chronic liver fluke disease which is caused by adult liver flukes that lay eggs. Young liver flukes that cause acute liver fluke disease, when many of them infect an animal at the same time, are not old enough to lay eggs.

In a dead animal with *acute liver fluke disease* you can see small dark brown/black liver flukes in the liver. The liver is large and dark and there is much red/brown liquid in the abdomen, especially of sheep and goats. The flesh is often pale.

In a dead animal with *chronic liver fluke disease* you cannot usually see any liver flukes in the liver but parts of the liver may be thickened and tough. The flesh is often pale.

How animals get liver fluke disease

They get infected with liver flukes (p. 99) from wet places where snails live. Some animals get infected with liver flukes when they go to a wet place but only become sick later when they return home to a dry place. So animals can have liver fluke disease in dry areas where there are no liver flukes, a long way from where they were infected.

Liver fluke disease is caused by small flat *worms* [*Fasciola hepatica, Fasciola gigantica*].

Treatment

- Many *worm* medicines work well for chronic liver fluke disease. But only some medicines, such as triclabendazole, kill young liver flukes and work for acute liver fluke disease (p. 338).
- It is difficult to treat animals that have had liver fluke disease for a long time because the *liver* is damaged. Skilled workers may give injections of vitamin B to help recovery.

Prevention and control

See page 99.

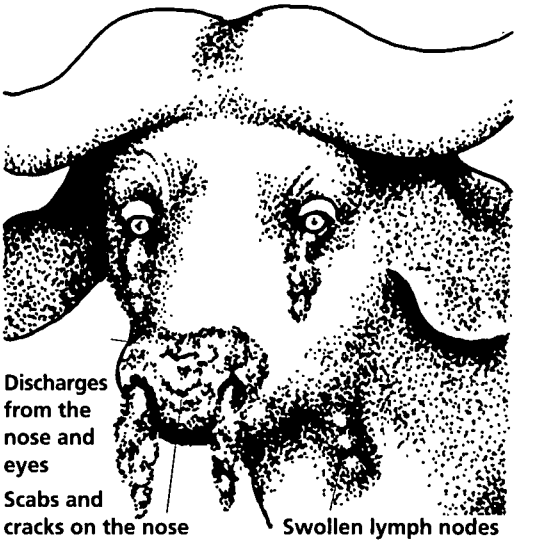
Malignant catarrhal fever, MCF

Cattle and **buffaloes** get *malignant catarrhal fever*.

Signs

Usually only one or two animals have this disease at the same time otherwise it looks like *rinderpest* (p. 290). Animals become sick 3–4 weeks after they get infected with malignant catarrhal fever.

- They become very weak and tired and stop eating. They have a high *fever* that does not go down. The *lymph nodes* in the head and neck swell up (p. 41).
- The *mucous membranes* are dark red. Soon there are sores on the membranes in the mouth and nose.
- A clear *discharge* that soon becomes white/grey comes from the eyes and nose. Much *saliva* comes from the mouth. The nose becomes cracked and covered in scabs. Dried *discharge* often blocks the nose.
- The animals blink a lot and try to keep away from bright sunlight. The centre of the eyes becomes white.
- Animals that get the disease from sheep often have diarrhoea, sometimes with blood in the faeces.
- Animals that get the disease from wildebeest rarely have diarrhoea.
- Some animals become lame. Some have tremors under the skin and become *uncoordinated* and aggressive.
- Most animals die after 1–2 weeks. Animals that recover often have weak or deformed offspring.



In a dead animal the body is thin and covered in wet faeces. The lymph nodes of the head and neck are very large. The *trachea* is lined with dead grey tissue.

Other diseases that look like this:

Bovine virus diarrhoea (p. 234); *foot and mouth disease* (p. 279); *rinderpest* (p. 290).

How animals get malignant catarrhal fever

Everywhere in the world animals get it from infected sheep, especially from new-born sheep. In Africa animals also get it from baby wildebeest; they can get it from the ground for up to one day after infected baby wildebeest have been there. Cattle do not get it directly from other cattle.

Malignant catarrhal fever is caused by *viruses* [*Herpes*].

Treatment

There is no treatment for malignant catarrhal fever.

Prevention and control

- There is no effective *vaccine* for malignant catarrhal fever.
- Keep cattle away from wildebeest that are giving birth. In places where cattle get malignant catarrhal fever from sheep, keep the cattle away from sheep, especially from sheep that are giving birth.

Nairobi sheep disease

Nairobi sheep disease only happens in East and Central Africa but a disease (Ganjam virus) that looks like this happens in India. **Sheep** and **goats** get Nairobi sheep disease.

Signs

Animals become sick 4–14 days after they get infected with Nairobi sheep disease. Adults get more severe disease than young animals.

- A grey/white *discharge* comes from the nose and eyes.
- The animals have diarrhoea. The faeces are often green and watery with blood and mucus in them.
- The animals are weak and tired, they stop eating and suddenly have a high *fever* that comes and goes.
- Pregnant animals often have abortions.
- Many animals die after 3–10 days.

Other diseases that look like this:

Goat plague (p. 282).

How animals get Nairobi sheep disease

They get it from infected *ticks* [*Rhipicephalus, Amblyomma*], they do not get it from direct contact with other animals. Only animals that have never had the infection become sick. Animals that move for the first time to areas with infected ticks get severe disease. Sometimes animals bring infected ticks to areas where the disease has not happened before.

Nairobi sheep disease is caused by *viruses* [*Nairovirus*].

Treatment and control

- There is no treatment. *Vaccines* are effective. Vaccinate animals that move to areas with infected ticks. Vaccinate them before they move or as soon as possible after they move.
- Animals that recover from Nairobi sheep disease are *immune* and do not get the disease again.

Rift Valley fever

Rift Valley fever happens in North and Central Africa and now in parts of West Africa. **Cattle, buffaloes, sheep, goats** and **camels** get Rift Valley fever. **People** get Rift Valley fever. Sometimes it kills them (p. 00). (The people who get Rift Valley fever are usually laboratory or veterinary workers and others who handle the dead bodies of infected animals.)

Signs

Animals become sick with Rift Valley fever 1–5 days after they get infected. The signs animals have depends on their age. **Baby** and **young animals** have very severe disease that happens fast:

- The animals have a high *fever*.
- They have a *discharge* coming from the nose and food comes back out of the mouth.
- They stagger about. Young animals usually collapse and die within a few days. Baby animals often collapse and die within a few hours.

Adult animals have less severe disease that happens slowly:

- The animals look weak and tired and have a low *fever*.
- Pregnant animals usually have abortions.

Most adult animals recover. But a few have severe disease, like very young animals, and die in 1–2 days.

It is dangerous to open the body of an animal with Rift Valley fever because people can get this disease. Dispose of the body carefully like the body of an animal with *anthrax* (p. 142).

How animals get Rift Valley fever

They get it when they are bitten by infected mosquitoes. This disease only happens every few years. It usually happens after a very wet time when many mosquitoes hatch from infected eggs that have been lying dormant in dry mud.

Rift Valley fever is caused by *viruses* [*Phlebovirus*].

Treatment

There is no treatment for Rift Valley fever.

Prevention and control

- There are *vaccines* for Rift Valley fever. But the disease does not happen often, so it is not usually worth vaccinating animals. Some government veterinary services vaccinate animals at risk when conditions are very wet and they expect the disease.
- It is best **not** to move animals from places where Rift Valley fever happens.

Rinderpest

Rinderpest happens in Africa and parts of Asia. It is now rare and has been *eradicated* in most areas but it stays alive in remote places where there is no vaccination. The disease spreads quickly and kills so many animals that it is important to **watch out for rinderpest**. Many countries do not have rinderpest now but it can come back again, even in places where it has not been seen for a long time. Outbreaks of rinderpest can happen when infected animals move into areas where there is no rinderpest.

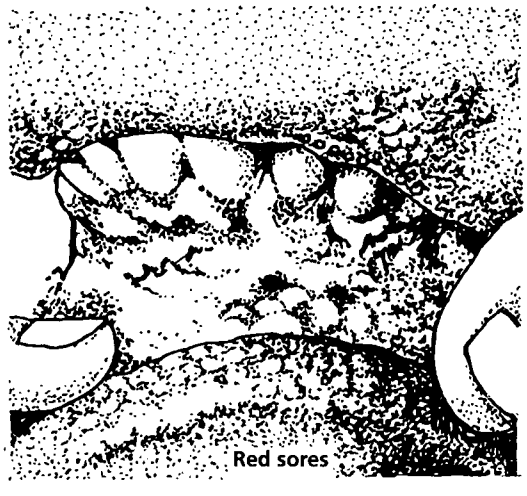
Cattle and **buffaloes** can get rinderpest world-wide. In Asia, **pigs** get rinderpest. In India, **sheep** and **goats** get it. **Horses, mules** and **donkeys** never get rinderpest. **Camels** do not get it and most scientists say that camels do not carry rinderpest or infect other animals with it.

Signs

In most outbreaks of rinderpest some animals suffer much worse than others. Some rinderpest microbes cause severe disease, others only cause mild disease. Some animals have some *immunity* to rinderpest so do not get severe disease. (This includes animals that have been badly vaccinated and animals about six months old that still have immunity from their mothers.) Animals about a year old usually suffer most in areas where people vaccinate for rinderpest. These young cattle have lost the immunity they got from their mothers and have often still not been vaccinated so they easily get severe disease.
Animals become sick with rinderpest 1–3 weeks after they get infected.

With **severe** rinderpest:

- Animals have a high *fever* – often over 40°C – two days before they look sick. After three days the fever slowly goes down.
- The animals will not rest and stand on their own. They are tired and weak and do not move much. They hold their heads down and their ears droop. They stop eating.
- They have a clear *discharge* from the eyes and nose about two days after the fever started. It soon becomes white/grey.
- Much *saliva* comes from the mouth and small grey patches appear inside the mouth, especially on the gums and dental pad. The patches become covered with white cheesy scabs that rub off leaving red sores.
- Animals have distressed breathing and often cough and grind their teeth. Their breath smells foul and their noses become dry and cracked.
- They have severe watery diarrhoea about five days after the fever started. The faeces have blood, mucus and strips of *intestine* that look like pieces of cloth in them. Animals strain with pain when they pass faeces. Very soon the animals become *dehydrated* and very thin.


Red sores

- Animals with most severe disease start to die about 14 days after the fever started. Animals that had less severe disease slowly begin to recover.

With **mild** rinderpest:

- The animals have a *fever*. They have some watery *discharge* from the eyes and nose and *saliva* comes from the mouth.
- They have small pale/white sores in the mouth that become red.
- Sometimes they have mild diarrhoea.

In a dead animal there are many ulcers in the abomasum and intestines. The contents of the intestines and the *rectum* are watery and often have blood in them.

Other diseases that look like this:

Malignant catarrhal fever (p. 287); *foot and mouth disease* (p. 279); *mucosal disease* (p. 234); *kerato-conjunctivitis* (p. 150).

How animals get rinderpest

Animals get rinderpest from close contact with sick animals and from drinking water *contaminated* with the faeces of sick animals. Infection comes from the breath, saliva, faeces, and discharges from sick animals. Infection gets into the body when the animal breathes in the rinderpest microbes. People do not usually spread the disease on their feet or clothes. Wild animals can carry the disease and can get infected by livestock. Wild animals soon stop carrying the disease when rinderpest is eradicated from animals that people keep in the area.

Zebu cattle are more *resistant* to rinderpest than other breeds. European breeds of cattle get rinderpest very severely. Only properly vaccinated adult animals and animals that have recovered from the disease are fully *immune* to it. Animals that recover from rinderpest only carry the disease for a few days.

Rinderpest is caused by *viruses* [*Paramyxovirus*].

Treatment

There is no treatment for rinderpest but you can help to stop animals with mild rinderpest from dying (p. 140).

Prevention and control

- Isolate rinderpest suspects from other cattle. Move healthy animals away from the sick ones.
- Tell the veterinary services **immediately** if you suspect rinderpest.
- Avoid buying animals from infected areas or taking healthy animals to areas with the disease. Only buy animals that have been properly vaccinated and marked.
- Keep new animals separate from yours for three weeks. Make sure they have no signs of this disease before you mix them with your own group.
- **Work together with control programmes to *vaccinate* animals against rinderpest** and mark them with the official ear mark. Animals with the mark will be easier to sell and may be more valuable because other people can tell that they have been vaccinated and are safe from the disease. Modern rinderpest vaccines are effective and some of them can tolerate not being kept cold. But they must be kept cold and used as soon as they are diluted (p. 353).

- Allow veterinary workers to take *blood samples* for tests. This does not harm the animals and lets veterinary workers find out if vaccines have worked.
- Learn how to recognise rinderpest – and help others to as well.

Rinderpest control programmes

Most countries have a control programme for rinderpest. The Pan African Rinderpest Campaign (PARC) operates together with governments in many countries across Africa and aims to control the disease by vaccination. Work together with others to help the control programme in your area. Help veterinary workers by giving them good information (p. 47).

Swine fever, Hog cholera

Swine fever happens in many places in Asia. It does not usually happen in Africa except in parts of West Africa and Madagascar. Only **pigs** get swine fever.

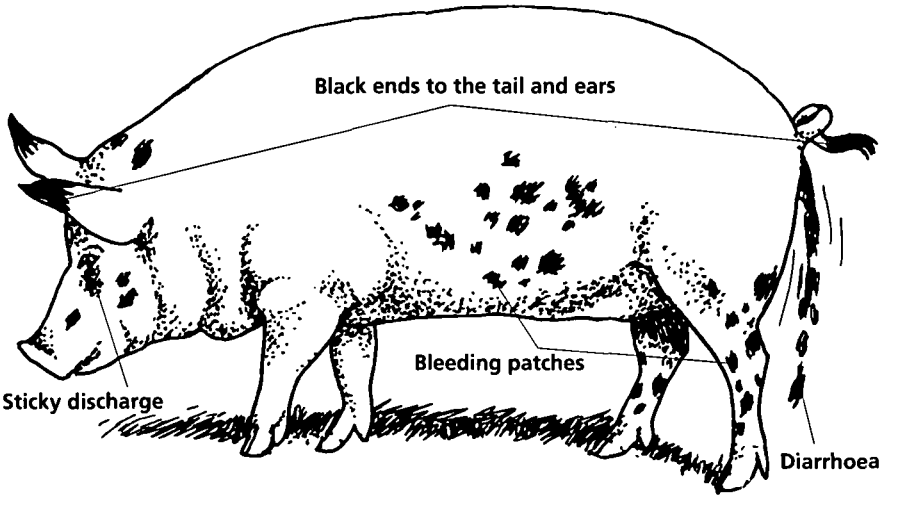
Signs

Some pigs get infected with swine fever **before they are born**:

- The mother often has an abortion. Some new-born pigs are very weak and soon die.
- Some new-born pigs have no sign of disease but they carry infection for a long time and pass it on to their own offspring.

Some pigs get infected with swine fever **after they are born**:
Pigs become sick 4–10 days after they get infected with swine fever.

- They have severe diarrhoea and they vomit. They stop eating but they drink a lot of water.
- They become weak and tired and often lie close together. They soon have a high *fever*.
- A sticky *discharge* comes from the eyes that sticks the eyelids together.



- Often the ends of the ears and the tail become black. Some pigs have brown patches on the abdomen, head and legs.

- ◆ The pigs walk unsteadily and go round in circles. They have tremors.
- ◆ The back legs are paralysed and many pigs collapse and die. A few pigs recover but they have a fever that comes and goes and are sick for a long time.

In a dead animal the intestines, lungs, kidneys and lymph nodes often have patches of blood on them.

Other diseases that look like this:

African swine fever (below).

How pigs get swine fever

Some pigs get infection from their mothers before they are born. Some get it through the air or from direct contact with sick pigs. They get it from food *contaminated* by discharges, urine or faeces from sick pigs. They also get it when they eat waste food with infected pig-meat in it.

Swine fever is caused by *viruses* [*Pestiviruses*].

Treatment

There is no treatment for swine fever.

Prevention and control

Swine fever is such a severe disease and spreads so quickly that many countries have control programmes for it. If you suspect this disease, tell the veterinary services. Some countries control the disease with vaccination or try to keep the disease out completely. They do not allow people to import pigs or pig-meat and they make pig keepers boil all the waste food they feed to their pigs.

- ● *Vaccinating* pigs regularly for swine fever is effective.
- ● Avoid feeding pig-meat to pigs because it can carry this infection. Boiling waste food used to feed pigs kills infection in any pig-meat that is in the waste food.
- ● Bury the bodies of pigs that die of swine fever, **do not eat them**.

African swine fever

African swine fever does not usually happen in Asia. Only **pigs** get African swine fever.

Signs

African swine fever looks like the type of swine fever that pigs get when they get infected after they are born (p. 292).

How animals get African swine fever

Pigs get African swine fever when they are bitten by infected *ticks*. Infection comes from warthogs and wild pigs that the ticks also live on. The wild animals carry the infection but they do not become sick. Pigs also get the disease from eating waste food with pieces of

pig-meat in it. They also get it by direct contact with sick pigs. Infection spreads quickly from sick pigs to healthy ones in a group.

African swine fever is caused by *viruses* [*Iridoviruses*]. (They are different to the ones that cause *swine fever*). African swine fever is spread by soft *ticks* [*Ornithodorus*] (p. 106).

Treatment

There is no treatment for African swine fever.

Prevention and control

- *Vaccines* for African swine fever are not very effective. *Swine fever* vaccine is not effective for African swine fever.
- Fence the pigs in to keep them away from wild pigs.

Tropical theileriosis, Mediterranean Coast fever

This disease only happens in North Africa and Asia. **Cattle** and **buffaloes** get *tropical theileriosis*. Imported animals get it most. Cattle get it most when they are young. In Northern Africa and parts of Asia **sheep** get another type of theileriosis that looks like this (*malignant ovine theileriosis*)

Signs

Animals become sick 7–28 days after they get infected.

- The animals have distressed breathing but they do not cough. They have a *fever*.
- A clear *discharge* comes from the eyes and the nose.
- The *lymph nodes* just under the skin swell up (p. 41).
- The *mucous membranes* are pale and become yellow.
- The animals eat less than normal and have constipation. After about a week the constipation changes to diarrhoea. Sometimes the faeces have blood in them.
- Pregnant animals often abort.
- Many animals die after 10–14 days.

Skilled workers can look at *blood smears* with a microscope to check for tropical theileriosis.

Other diseases that look like this:

Anaplasmosis (p. 271); *babesiosis* (p. 248). It also looks like another type of theileriosis – *East Coast fever* (p. 276) but East Coast fever only happens in Central and East Africa where this disease does not happen.

How animals get tropical theileriosis

They get it when they are bitten by infected *ticks* [*Hyalomma*]. Tropical theileriosis is a type of theileriosis and is caused by *protozoa*: **cattle** [*Theileria annulata*], **sheep** [*Theileria hirci*].

Treatment

- Treat and control tropical theileriosis like *East Coast fever* (p. 276).
- Buparvaquone is the best treatment (p. 330), tetracycline is not very effective.

Prevention and control

- The best way to control theileriosis is to control the *ticks* that spread it (p. 105).
- In some places animals get infected but they do not have signs of disease. There is a balance between infection and the animal's *resistance* to it. In these places there is no need to control the disease (p. 106).
- Sometimes skilled workers protect animals by deliberately infecting them and treating them at the same time, like they do for *East Coast fever* (p. 277).

Trypanosomosis spread by tsetse flies

Trypanosomosis that is spread by tsetse flies (see p. 103) **only happens in Africa south of the Sahara**, where there are tsetse flies, but is **common and probably the most important animal disease there.**

All animals can get trypanosomosis spread by tsetse flies. **People** get trypanosomosis when they are bitten by tsetse flies – sleeping sickness (p. 6). (In Africa and Asia animals get other kinds of trypanosomosis not spread by tsetse flies, see: *dourine* (p. 297) and *surra* (p. 298).

Trypanosomosis of any kind is also called *trypanosomiasis*.

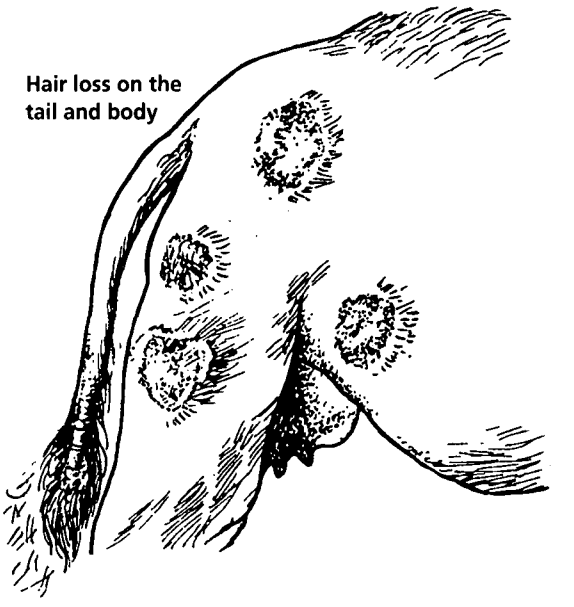
Signs

Animals become sick with trypanosomosis 1–3 weeks after they are bitten by infected tsetse flies. The disease usually goes on for a long time.

- The animals are weak and easily tired; they do not keep up with the rest of their group.
- They have rough, dull coats and slowly lose weight and become thin. Females give less milk.
- A watery *discharge* comes from the eyes and sometimes the eyes are cloudy. The animals blink a lot.
- They have swollen *lymph nodes* (p. 41) that are easy to see just under the skin.
- The *mucous membranes* are often pale and slowly become paler over some weeks.
- The animals have a *fever* that comes and goes. They usually have fever for several weeks then the fever goes down but it comes back. Even when the animals no longer have a fever they become weak and thin.
- Pregnant animals often abort or have weak offspring and some animals become infertile.
- Poor feeding, *stress* or overwork make this disease more severe.
- Some animals recover slowly without any treatment, others become very sick, collapse and die after a few months. This happens especially when they have been bitten again

by infected tsetse flies. Occasionally the disease is severe and happens very quickly, then some animals die after about two weeks.

All animals have signs like these but other kinds of animals also have other signs:
Horses, mules and **donkeys** may have swollen legs and swelling under the abdomen.
Camels The hump becomes smaller and hair falls out especially from the tail – but this happens with other diseases that go on for a long time too.
Pigs sometimes get very severe disease that happens fast. (This makes it difficult to breed pigs where there are tsetse flies.) They breathe very fast and stop eating and have a high *fever*. They collapse and die in one or two days.
Dogs often have cloudy eyes, sometimes they cannot see.



Skilled workers check for trypanosomosis by looking at *blood smears* (p. 118) with a microscope but the *microbes* are not always in the blood when the animal is sick and sometimes are hard to see.

In a dead animal the flesh is paler than normal. Sometimes there is much water around the heart.

Other diseases that look like this:

Worms (p. 218); *poor feeding* (p. 45).

How animals get trypanosomosis

Animals get infected with this kind of trypanosomosis when they are bitten by infected tsetse flies (p. 103). Tsetse flies get infected when they bite infected animals. Some animals carry the infection for years without becoming sick. Many wild animals carry *trypanosomes* but do not become sick; tsetse flies often get infection from these wild animals and spread it to livestock.

Trypanosomosis is caused by *protozoa* called *trypanosomes*. Most trypanosomes that make animals sick are spread by tsetse flies [*Trypanosoma brucei, T.congolense, T.simiae, T.suis, T.vivax*].

Other trypanosomes are not spread by tsetse flies, see: *dourine* (p. 297) or *surra* (p. 298).

Treatment

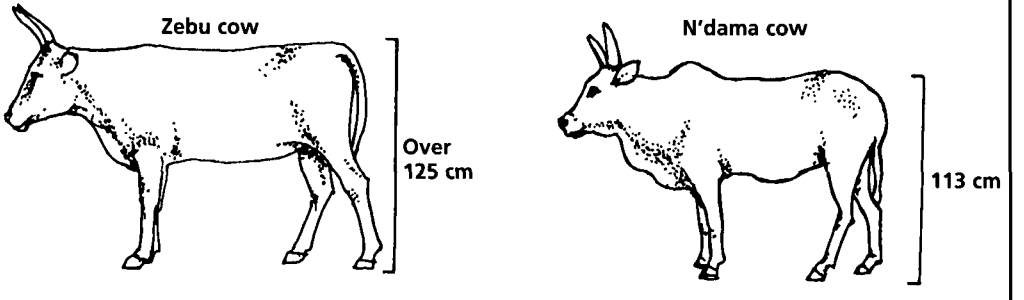
- Medicines for trypanosomosis are effective. But they are difficult to use properly because trypanosomes easily become *resistant* to medicines (p. 334).
- Some medicines prevent trypanosomosis, others treat it (p. 334).
- There are no effective local or traditional treatments for trypanosomosis.
- Some animals recover with good food and rest from work but they can become sick again.

Prevention and control

- Avoid areas with tsetse flies if you can. Most herders know where tsetse flies are and understand where and when it is safe to graze their animals (p. 103).
- Use trypanosome medicines to protect animals while they have to move through an area with tsetse flies.
- Avoid using trypanosome medicine routinely to prevent trypanosomosis if possible and seek skilled help if you do. It is better to control tsetse flies if you can (p. 103).

Trypanosome-tolerant breeds of cattle

Some types of cattle, such as **N'dama** cattle, which have lived in Africa for 7000 years, tolerate trypanosomes to an extent – they do not get trypanosomosis as severely as other cattle do. Some people use this type of cattle as a way to avoid trypanosomosis. N'dama cattle are good for meat but are small and not very good for work. They do not produce much milk. **Zebu** cattle are much more common in Africa and are more productive. They have been in Africa for more than 1000 years but have not become tolerant to trypanosomes. People have tried breeding N'dama cattle with Zebu cattle. But nobody has yet found an easy way to breed them so that they have tolerant offspring.



Trypanosomosis: dourine

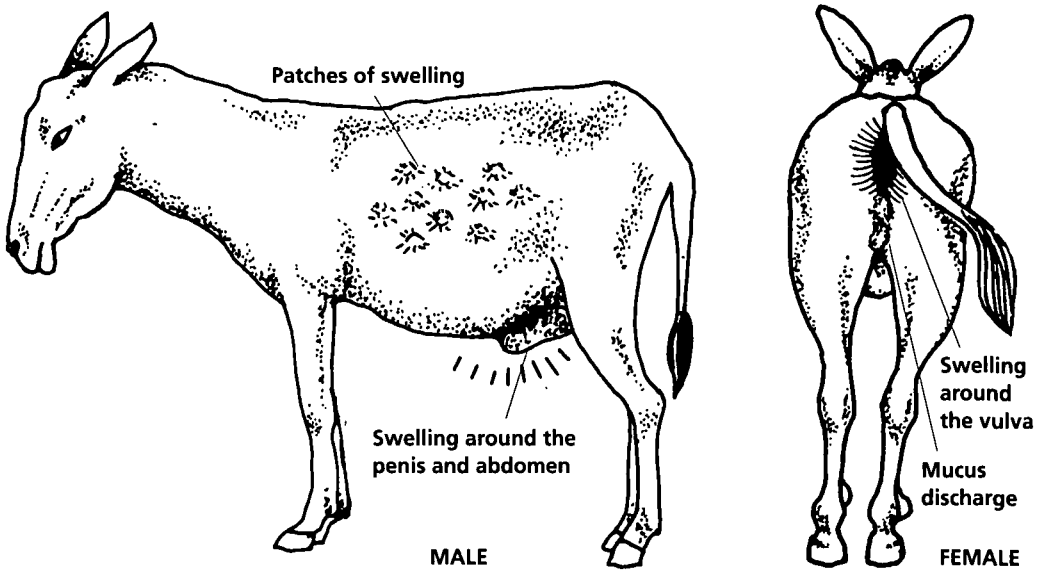
Dourine happens in Asia and Africa – especially in North-East, Southern and parts of West Africa. Only **horses** and **donkeys** get dourine.

Signs

Animals become sick several weeks after they get infected. The disease happens **slowly**.

- Clear mucus comes from the *penis* or *vagina*. The genitals swell up and swelling may spread forwards under the abdomen and even under the chest.
- Sometimes swollen raised patches appear on the side of the animal. These patches go away after about a day.
- The animals become very weak and thin and have a low *fever* that comes and goes.

◆ The back legs become very thin and animals become lame. After many months the animals become paralysed. Sometimes animals are *uncoordinated.*
◆ With no treatment, animals die after a year or more.



How animals get dourine

They get it when they mate with an infected animal. One infected male can spread the disease to many females very quickly.

Dourine is caused by *protozoa* [*Trypanosoma equiperdum*].

Treatment

- Treatment is rarely effective. Try to stop animals getting this disease.
- Some trypanosome medicines may help (p. 332) but these medicines are very strong and can be poisonous for horses if you give too much of them.

Prevention and control

- Avoid bringing infected horses to areas without the disease.
- Do not use new horses for breeding until you are sure they do not carry this disease. Skilled workers can examine a blood sample to see if a horse carries the infection. If a horse is carrying dourine, kill it or stop it from breeding by castrating it.

Trypanosomosis: Surra, Camel trypanosomosis

This disease happens in Asia and Northern Africa; occasionally it happens in places in Africa where trypanosomosis is also spread by tsetse flies.

Camels and **horses** suffer most from *surra* but **cattle, buffaloes, mules, donkeys, dogs** and **Asian elephants** also get it. Other animals get the infection but do not usually become sick. **This is probably the most important infectious disease that camels get. People** do not get surra.

 *Signs*

Animals become sick with surra 7–10 days after they get infected by flies.
When surra is **severe** and happens quickly:

- Animals soon become tired and weak and stop eating. They have a high *fever*.
- They have a clear *discharge* from the eyes. Sometimes the eyes are cloudy and the animal cannot see.
- The urine often becomes dark and some animals have diarrhoea.
- Some animals have abortions.
- Some animals die after a few days.
- **Horses** often have swelling under the abdomen and down the legs.
- **Camels** sit in the sun and do not seek the shade of trees like the rest of the group. The inside of the thighs becomes white or pale coloured. (The inside of the thighs are normally stained dark, orange/black with dried urine.) Some people can tell from the smell of a camel's urine that it has surra.

When surra is **mild**:

- Animals have some of the signs like animals with more severe disease but they are sick for a long time.
- The animals slowly lose weight and they have a *fever* that comes and goes.
- With no treatment animals become very weak and die.
- **Camels** often lose hair especially from the tail (see p. 296). (But this happens when an animal has been sick for a long time from other diseases too.)

Skilled workers can check for surra by looking at a *blood smear* (p. 118) with a microscope.

How animals get surra

They get surra when bitten by flies that carry infection from infected animals. Surra happens most in hot, wet seasons with many flies. The flies that spread surra are **not** tsetse flies, but biting flies, such as stable flies (p. 160). They live in wet, bushy places and very quickly spread surra from infected animals to healthy ones nearby. Camels often get infected by flies that have bitten infected sheep or goats that carry infection but do not look sick.

Surra is caused by *protozoa* [*Trypanosoma evansi*].

Treatment

- Trypanosome medicines are effective but difficult to use properly. They are poisonous if you give too much.
- Trypanosomes easily become *resistant* to medicines (p. 334).

Be careful using cattle trypanosome medicines for camels. Many of them do not work for camels and some of them are poisonous. **NEVER USE BERENIL (DIMINAZENE ACETURATE) FOR CAMELS** – it usually kills them (p. 335).

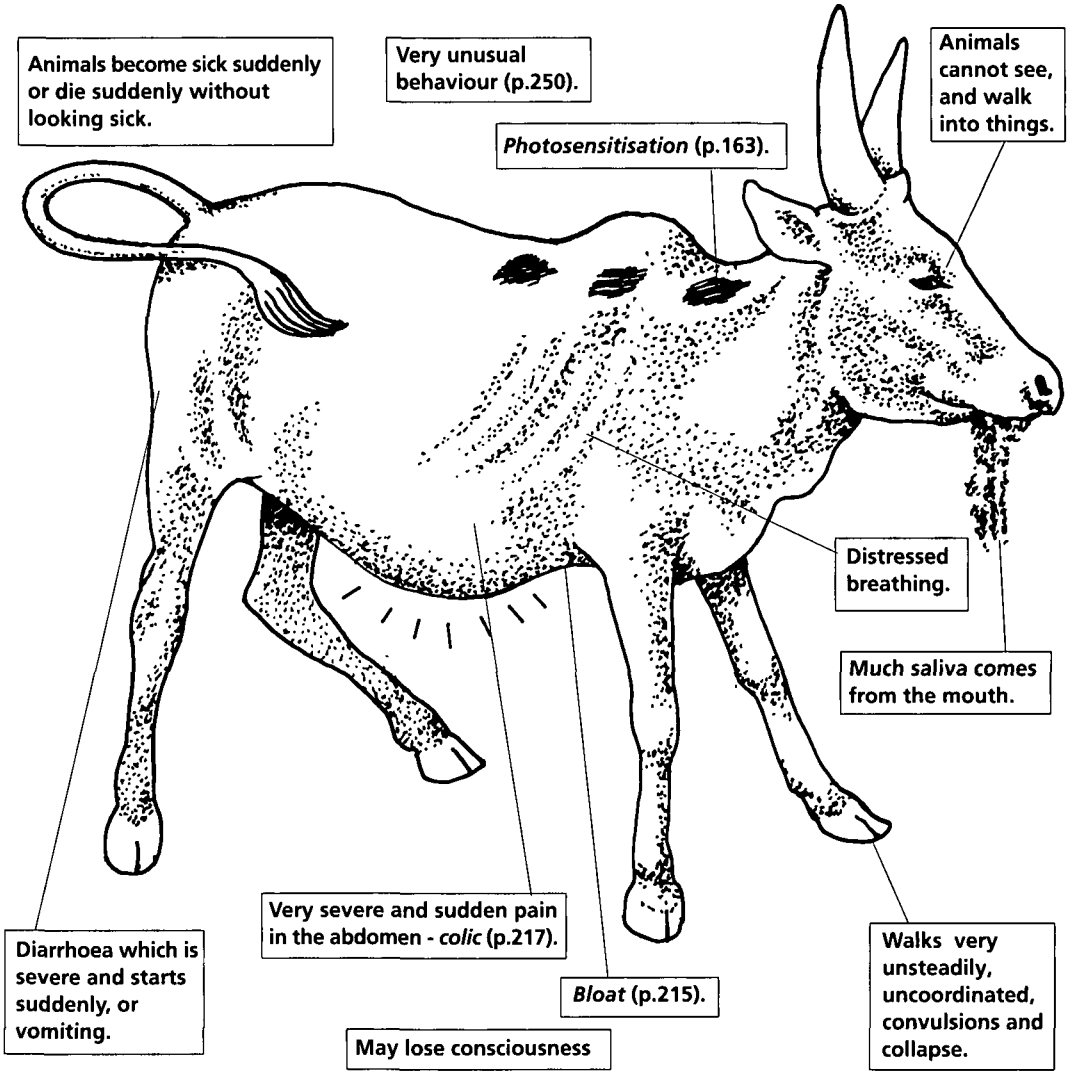
Prevention and control

- Keep animals away from places where there are many biting flies, such as river banks where there are many trees. Be especially careful when there are other animals there. Wait at least half an hour after other animals have moved on before herding animals into these places. The flies that spread surra usually spread infection straight from one animal to another because trypanosomes usually cannot live on the fly for more than about half an hour.
- If you have to take animals to places where other animals may carry trypanosomes, take them in the middle of the day. There are less flies when the sun is very hot.
- Move camels often to keep them away from the flies that hatch from faeces. Flies that spread surra lay their eggs in faeces.

28 Common poisons and what to do about them

Signs of poisoning

Signs that an animal has been poisoned vary a lot and are confusing but may include:



It is often difficult to find out what has poisoned an animal – or whether the signs are caused by a disease rather than a poison. It is also difficult to treat poisoning, even for skilled veterinary workers.

EMERGENCY TREATMENT

- Try to find out what has poisoned an animal. If you find out what the poison is, take it away from the animals or take the animals away from the poison. If you discover the container that a poison came from, read the label on it. It often has directions about treatment.
- If you are convinced an animal is poisoned but cannot find out what the poison was, treat the animal for whatever signs you see. You can do some safe, simple things that may help for many kinds of poisoning.
- Make sure the animal has plenty of water to drink and try one of these treatments:

For animals that look very tired or drunk or collapse:

- Encourage the animal to move about.
- Boil strong tea or coffee and let it cool. Give it to the animal to drink if it will. If it won't drink, give the liquid by mouth.
- You can give one of the treatments below as well.

For animals that are nervous, distressed or have pain in the abdomen:

- Give 100 g magnesium sulphate in half a litre of water by mouth to small animals. Give 500 g in a litre of water by mouth to large animals. Only use about 50 g for horses. Magnesium sulphate is useful for treating poisoning. It makes more water go into the *intestine* from the body and gives the animal diarrhoea so any poison in the intestine mixes with water and comes out quickly in the faeces.
- Or give about 1–2 litres of one of these liquid medicines to large animals or about 1/2–1 litre to small animals:

1 Mix a small handful of fine charcoal powder in about one litre of water. Give by mouth. Give every day for a few days if needed.
2 Mix kaolin (fine white clay powder) in water until it is a milky liquid. Give by mouth. For a large animal use about 200 g of kaolin, for a small animal use about 10 g. Give every day for a few days if needed.

- Give vegetable oil by mouth.
- Give milk or coconut milk by mouth.
- Mix ground cereals or rice with water and give by mouth.
- Mix six eggs and 1/2 kg sugar with about one litre of water and give by mouth.

Prevention

You can help to stop animals being poisoned if you:

- Make sure animals are well fed and healthy. They are much less likely to eat poisonous plants or scavenge for food and eat poisons by mistake.
- Do not graze animals where you know there are poisonous plants (p. 306).
- Avoid pasture that has just been sprayed with herbicides or pesticides.
- Do not let animals graze near rubbish where people have thrown things that may be poisonous, such as old paint.

An A–Z of common poisons and what to do about them

Acids

Sometimes animals are poisoned by acid that comes from vehicle batteries.

 Signs

- ◆ Diarrhoea.
- ◆ Vomiting.
- ◆ Pain in the abdomen.

Treatment

- ● Give sodium bicarbonate (baking powder), chalk or clay (pp. 345, 348).
- ● Mix one of these with water and give plenty to the animal to drink. If the animal will not drink, give this in a bottle by mouth (p. 317). Then give vegetable oil or milk by mouth.

Aflatoxin

Aflatoxin is a poison that comes from a fungus [*Aspergillus flavus*] that grows in badly dried groundnut meal.

 Signs

- ◆ **Cattle** grind their teeth, cannot see, walk in circles, collapse.
- ◆ **Pigs** have yellow *mucous membranes*, become weak and do not eat.
- ◆ **Dogs** have very severe diarrhoea that is nearly all blood. Many dogs die.
- ◆ **Birds** have very distressed breathing. They do not move much and are weak. They do not walk normally. They become thin and often die. Chickens with mild poisoning lay few eggs and do not grow normally. Ducks and turkeys are very sensitive to this poison.

Treatment

There is no treatment.

- ● Change the food.
- ● Avoid using groundnut meal for turkeys or ducks.

Arsenic

Animals sometimes get poisoned by old insecticides that were made of arsenic.

 Signs

- ◆ The animals are weak and tired.
- ◆ They have much *saliva* coming from the mouth, abdominal pain, stagger, collapse and die.

Treatment

- ● Treatment is difficult.
- ● Skilled workers use special medicines (Dimercaprol or sodium thiosulphate).

Bleach

Sometimes animals are poisoned by bleach (and other alkalis).

 Signs

- ◆ Diarrhoea.
- ◆ Some animals vomit.
- ◆ There is abdominal pain.

Treatment

- ● Mix vinegar, preferably, or fruit juice with water and ground cereal and give about 2 litres to large animals or 1/2–1 litre to small animals by mouth.
- ● Then give vegetable oil or milk (p. 347).

Cassava

Some kinds of cassava have cyanide in the roots unless they are boiled.
See cyanide (p. 304) for signs and treatment.

Castor-oil plant or castor-oilseed cake

Castor-oil plants are common; people crush the plants to produce castor oil. Castor-oilseed cake is what is left when the plants have been crushed for oil.

 Signs

- ◆ Animals start to get sick a few hours after they eat the poison.
- ◆ They have very watery severe diarrhoea. Sometimes there is blood in the faeces.
- ◆ They are weak and tired. They look very sick.
- ◆ **Cattle** collapse. They have convulsions and die.

- **Pigs** vomit.
- **Horses, mules** and **donkeys** have severe pain in the abdomen – *colic* (p. 217), sweat and stagger about.

Treatment

- There is no treatment.
- Many animals recover if they stop eating the cake but a few of them die.
- Skilled workers can give sedatives to calm the animal.

Copper sulphate

Copper is very poisonous for sheep. They sometimes get poisoned by copper used in foot-baths or for killing the snails that carry *liver fluke*.

Signs

- Abdominal pain.
- Much *saliva* coming from the mouth.
- Diarrhoea.
- Animals collapse and die.

Treatment

- Try one of the liquid medicines on page 302.
- Skilled workers give special medicines (ammonium molybdate and sodium sulphate).

Cyanide

Some plants have the poison cyanide in them such as: cassava, linseed, Sudan grass and many types of sorghum. New green plants that grow very fast after rain have most cyanide in them and cause poisoning most often.

Cattle suffer from cyanide poisoning more often than other animals but other animals, especially sheep, get poisoned by cyanide.

Signs

- Cyanide poisoning happens quickly. Animals die suddenly.
- The animals have distressed breathing.
- They have brilliant red *mucous membranes*.
- The animals stagger about, collapse, have convulsions and usually die in a few minutes but sometimes they die in a few hours.

Treatment

- Take all the animals away from the food you think is poisonous.
- Try giving charcoal and water or one of the oily liquid medicines on page 302. But this is usually not effective.
- Skilled workers can only treat cyanide poisoning as soon as signs of poisoning are seen. They usually give an injection into the *vein* immediately. (Sodium nitrite 20 mg/kg and sodium thiosulphate 40 mg/kg.) After the injection the animal still needs more medicines until it recovers. Give sodium thiosulphate (large animal: 15g, small animal: 5g) by mouth every half hour until the animal seems better.

Derris

The *Derris elliptica* plant is used as an insecticide and it poisons animals that eat it or the powder made from it. They cannot walk normally; they stagger and die. Treat as for insecticide poisoning (p. 305).

Insect bites and stings (bees, wasps, hornets, scorpions)

Some insect bites or stings cause very severe reactions with much swelling. Horses especially have severe reactions.

Signs

- They have diarrhoea.
- Distressed breathing.
- Some have yellow *mucous membranes*.
- Some have red urine.

Treatment

- Wash the swelling with sodium bicarbonate and water.
- Skilled workers give special medicines (antihistamine and corticosteroid).

Insecticide

Find out what type of chemical the insecticide is. Most modern insecticides are organophosphates (below), some are pyrethroids (p. 305). If you cannot find out what the chemical is but are certain that insecticide is the problem, treat for organophosphate poisoning.

Organophosphate insecticide

Many modern insecticides are organophosphates. **These are strong and dangerous poisons**. They can get into an animal (or a person) by mouth or through the skin.

Signs

- The animals behave unusually. They often stagger about and have tremors or *twitches* under the skin.

- Much *saliva* comes from the mouth. A clear *discharge* comes from the eyes and the eyes have very small pupils.
- Animals have pain in the abdomen. They do not eat much. Some animals vomit. They may urinate more often than usual.
- They have distressed breathing.
- They soon become paralysed. They collapse and die.

Treatment

- Wash any chemical off the body with plenty of water. Water with soap is better.
- Get a skilled worker to give atropine sulphate injection. (Inject 0.1 mg/kg slowly into a *vein*. Or inject 0.4 mg/kg under the skin.) Give another injection after half an hour if the animal does not start to recover.
- If an animal has swallowed the poison give a medicine such as powdered charcoal (p. 346).

Pyrethroid insecticide

Pyrethroid insecticides are poisonous; many of them go through the skin. Animals are easily poisoned if you use too much insecticide. The signs and treatment for pyrethroid insecticides are like those for organophosphates.

Kerosene (paraffin)

Sometimes animals are poisoned by kerosene or other fuel. They usually get poisoned when there is little clean water for them to drink so they drink dirty water with fuel in it.

Signs

- The animals are weak and tired.
- Some animals vomit.
- They collapse.

Treatment

Give vegetable oil by mouth.

Lantana camara

This is a common plant in many places. The leaves poison cattle especially.

Signs

- The animals are weak and tired, they have diarrhoea with blood in it, they have yellow *mucous membranes* (p. 112) and *photosensitisation* (p. 163).
- They stagger about and may become partly paralysed. Some animals die in 3–4 days.

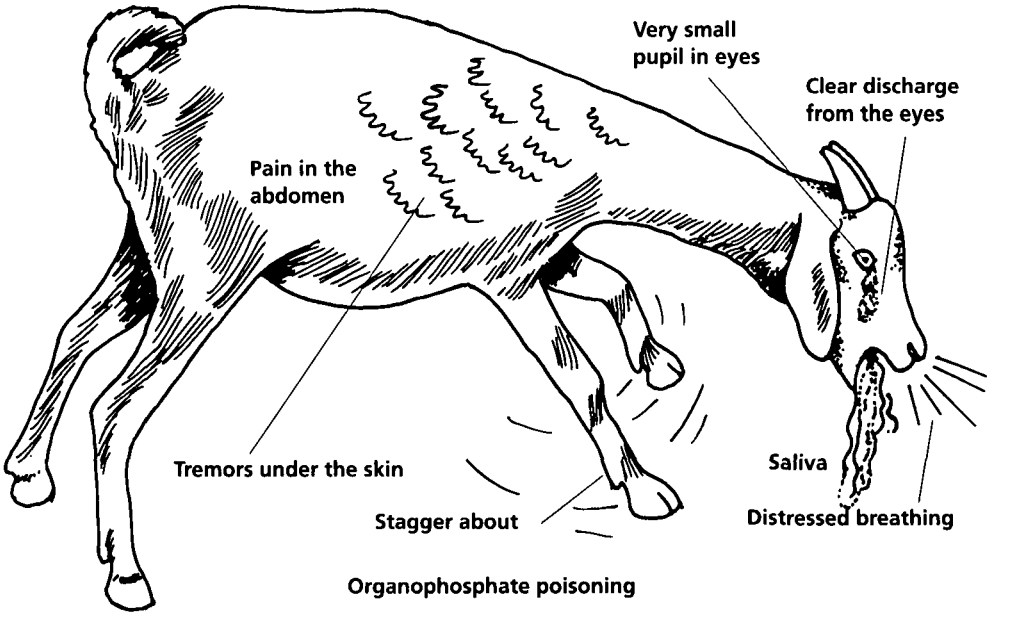
Treatment

- Shade the animals from the sun until they recover and give them plenty of fresh water.
- Give charcoal and water by mouth (p. 302).
- Treat the *photosensitisation* (p. 164).

It is best to dig the plants out and burn them but it is often difficult.

Lead

Animals are poisoned by lead from paint or old vehicle batteries.



Organophosphate poisoning

 Signs

- They are weak and tired, they do not eat much and have pain in the abdomen.
- They have constipation or diarrhoea.
- Much *saliva* comes from the mouth.
- They become nervous, they cannot see and they have convulsions.

Treatment

- Give one of the liquid medicines on page 302.
- Skilled workers give special medicines (EDTA).

Leucaena leucocephala

This tree is often used as forage for animals. They get poisoned if they eat too much of it. The tree has a poison called mimosine in it. Horses are poisoned most often but cattle, sheep, goats and pigs can be poisoned. Some animals are more sensitive to this poison than others.

 Signs

- Animals lose some hair or wool. **Horses** lose hair especially on the neck and tail.
- Animals become thin. They may be *uncoordinated*. Sometimes they cannot see for a time.
- Occasionally pregnant animals that have eaten a lot of *Leucaena* have abortions. They may give birth to dead or weak offspring. The new-born animals sometimes have a swelling under the neck or are deformed.

Treatment

- Stop feeding *Leucaena* immediately. Only start feeding it again in small amounts.
- Avoid giving animals more than half their food as *Leucaena*. It is best only to give about a tenth of the animal's food as *Leucaena*.

Mercury

Mercury usually comes from seed dressings.

 Signs

- Animals become sick a few weeks after they have eaten the poison.
- They do not eat much.
- They cannot walk properly.
- They cannot see.
- They have diarrhoea.

Treatment

- Treatment is difficult.
- Skilled workers give special medicines (Dimercaprol).

Overeating grain

Animals get poisoned if they eat too much grain or other concentrated food (p. 227), e.g. when they break into a food store. If an animal is very sick it is often best to kill it for meat.

Poisonous plants

Strange pastures

Animals often live where there are many poisonous plants. They usually do not eat them or do not eat enough of them to get poisoned. Somehow the animals 'learn' to avoid the poisonous plants. When animals go to a strange pasture they need to 'learn' to avoid poisonous plants there. To let animals 'learn' about a strange pasture without being poisoned, only **put them on the new pasture for a short time each day** then gradually increase the time they spend on it.

Dangerous pastures

After very dry times, fires or when pastures have been overgrazed often the only plants that survive are poisonous plants with deep roots. The animals have no choice but to eat these plants which they normally avoid and they get poisoned. To avoid this, **take extra forage to the animals if you possibly can** while the pasture recovers.

 Signs

There are many different signs of plant poisoning, including *photosensitisation* (p. 163). Suspect that animals have been poisoned by plants when they have been grazing strange or dangerous pasture and you can find no other reason why they are sick.

Treatment

- When you know that a sick animal has eaten a lot of poisonous plants, give one of the liquid medicines on page 302.
- If cattle, buffaloes, sheep or goats are very sick because of plant poisoning, skilled workers can cut open the *rumen* and take out the plants by hand. If the plants are very poisonous this sometimes saves the animal's life.

Rat poison

See **Warfarin** (p. 308).

Seeds

Seeds for planting to grow crops have often been covered with chemicals to protect them from insects and disease. These chemicals are often coloured, but not always, and they are often poisonous. Do not let animals eat seed that is for planting. If animals do eat seeds, try to find out what the seeds were covered with and treat for that.

Seeds are often covered with **mercury** (p. 306) or **organophosphate** (p. 304).

Senecio plants

There are hundreds of different kinds of senecio plants; they all look different but nearly all of them have yellow flowers. Senecio plants are poisonous and they survive dry times or fires and make pastures dangerous. All animals can be poisoned by senecio but **cattle, horses, sheep** and **goats** get poisoned most often.

 Signs

When animals only eat **small amounts** of these plants the poisoning takes a long time.

- The animals eat little and become thin.
- They have diarrhoea or constipation and may strain to pass faeces.
- Some have yellow *mucous membranes*.
- When animals eat **a lot** of senecio plants at one time the poisoning is sudden. The animals die suddenly before they look sick.

Treatment

- There is no treatment for senecio poisoning.
- Try to take animals away from the plants. In settled places remove senecio from the fields. Dig out or pull up and remove the senecio and burn it. Dry senecio plants are dangerous, animals like to eat them because they are less bitter than fresh green ones.

Snake bites

Snakes usually avoid animals but if they attack, they often bite animals on the legs or on the head.

 Signs

- Most animals have a swelling on the leg or face at the place where they were bitten and few other signs. When animals are bitten by cobra-type snakes the swelling often does not happen until 3–4 days after the animal is bitten.
- Some animals behave nervously, become tense and stand with a curved back.
- They may have blood coming from the nose and have red urine. A few die in less than one hour.

Treatment

- Keep animals in a quiet place. Do not make the animal walk or move about.
- If you can find the bite marks, make a small cut just through the skin to let the snake poison out. Do not cut deep into the swelling, it does not help.
- Pour cold water over the swelling.
- Tie a rope or bandage tightly above the bite. But after 20 minutes release the rope for a minute or two then tighten it again for another 20 minutes. Do this two or three times.
- Give an antibiotic (p. 328) by injection into muscle, especially if the animal was bitten by any type of adder. The poison from adders kills flesh and the dead flesh gets infected quickly.
- Give *antiserum* by injection; inject some into muscle and a little into the place where the snake bit. Skilled workers often have antiserum that they can give to animals or people. If snake bite is common in your area, keep some antiserum cold in a refrigerator.
- Skilled workers also give special medicines (corticosteroid).

Electric shock treatment for snake bites (and other bites)

Some people use electric shocks to treat people with snake bites and insect stings. A few people use this treatment for animals.

- Give four or five shocks with 5–10 seconds between them at the place that was bitten. Earth the part of the body near to where you give the shock.
- A spark plug lead from an engine or an electric cattle prod works. (Each shock should be 20–25 kva at less than 1 ma for 1–2 seconds.)

Sorghum

Sometimes sorghum plants have cyanide in them, especially new green plants that grow very fast after rain. See **cyanide** (p. 304) for signs and treatment.

Strychnine

Strychnine is very poisonous, people use it to kill predators such as jackals.

 Signs

- Animals are nervous and easily excited.
- They have much *saliva* coming from the mouth. Some animals vomit.
- They become rigid and have convulsions.

Treatment

- Treatment is difficult.
- Skilled workers use sedatives or anaesthetics to calm the animal.

Toads

Dogs sometimes eat toads that are poisonous.

 Signs

- They have much *saliva* coming from the mouth and do not eat much.
- They become distressed. Many animals recover with no treatment.

Treatment

- Wash the mouth out with water or water and sodium bicarbonate.
- Skilled workers give special medicines (atropine, antihistamine or corticosteroid).

Tobacco/Nicotine sulphate

These are powerful poisons, sometimes used as insecticides.

 Signs

- Animals have much *saliva* coming from the mouth, some animals vomit.
- They have pain in the abdomen and diarrhoea.
- They stagger, are *uncoordinated* and have convulsions.
- They become paralysed and die.

Treatment

There is no treatment

Warfarin

This is a common rat poison and animals, especially dogs, often eat it by mistake.

 Signs

- Animals have pale membranes and are weak and tired.
- They have diarrhoea and some animals vomit.
- They become lame.

Treatment

- Skilled workers give special medicine (vitamin K1).

Weed-killers (herbicides)

Try to find the weed-killer container. It often has directions about treatment. Or give one of the liquid medicines, e.g. charcoal or kaolin and water (p. 302).

Section 8 Medicines

29 Medicines for different diseases

General information about medicines

Medicines never do all the work of making animals better. **Always make sure a sick animal has good food, plenty of water and fresh air as well as treating it with medicines.**

Some human medicines do not work for animals, however many human medicines are effective for animals. Use them if you have no choice, but give the correct dose for an animal **not** the dose for a person.

WARNING

Medicines made for use on animals do not always work on people. Some of them are dangerous to people.

Do not use animal medicines for treating people, get help from a health worker.

Some medicines made from plants are useful and are included in this section. But they do not keep for long and they take time to collect and make. They are often not as effective or as easy to use as modern medicines.

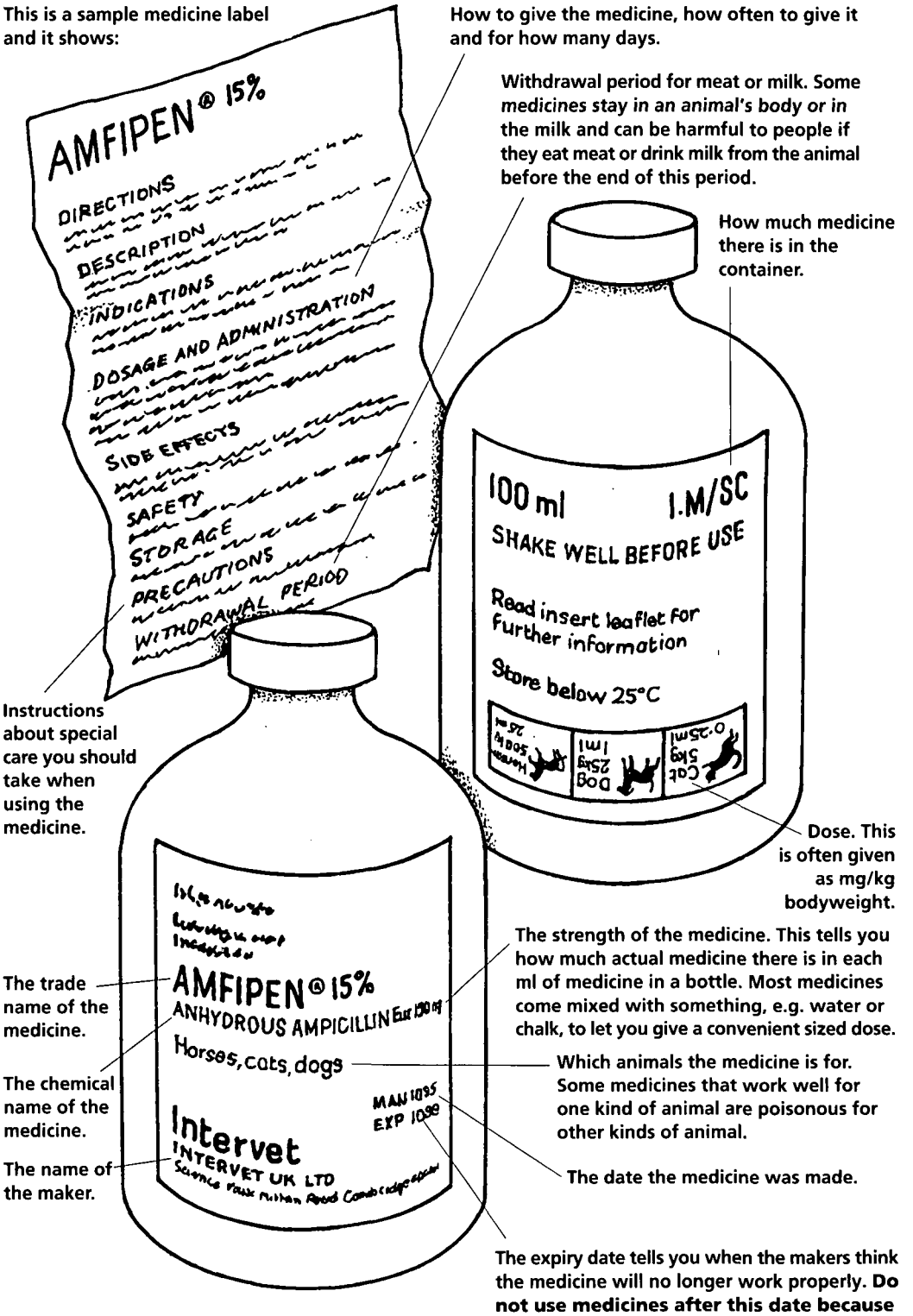
Reading a medicine label

Most medicines have two names; a *chemical name*, e.g. 'oxytetracycline' and a *trade name*, e.g. 'Terramycin' that the makers of the medicine call it.

WARNING

Traders sometimes sell fake medicines that do not work and can be dangerous.

To check that a medicine is genuine look closely at the label. Most genuine medicines come with the kind of information shown in the example on page 312 and many come with detailed printed directions on a sheet of paper (a data sheet) – often in more than one language – in the box or packet. **Do not trust medicines that come with hand-written labels**. Genuine medicines often come in boxes with a label similar to the label on the


This is a sample medicine label and it shows:
How to give the medicine, how often to give it and for how many days.
Withdrawal period for meat or milk. Some medicines stay in an animal's body or in the milk and can be harmful to people if they eat meat or drink milk from the animal before the end of this period.
How much medicine there is in the container.
AMFIPEN® 15%
DIRECTIONS
DESCRIPTION
INDICATIONS
DOSAGE AND ADMINISTRATION
SIDE EFFECTS
SAFETY
STORAGE
PRECAUTIONS
WITHDRAWAL PERIOD
100 ml
I.M/SC
SHAKE WELL BEFORE USE
Read insert leaflet for further information
Store below 25°C
Horse 500kg 25ml
Dog 25kg 1ml
Cat 5kg 0.25ml
Instructions about special care you should take when using the medicine.
Dose. This is often given as mg/kg bodyweight.
The strength of the medicine. This tells you how much actual medicine there is in each ml of medicine in a bottle. Most medicines come mixed with something, e.g. water or chalk, to let you give a convenient sized dose.
The trade name of the medicine.
AMFIPEN® 15%
ANHYDROUS AMPICILLIN
Horses, cats, dogs
Which animals the medicine is for. Some medicines that work well for one kind of animal are poisonous for other kinds of animal.
The chemical name of the medicine.
MAN 1095
EXP 1098
The date the medicine was made.
The name of the maker.
Intervet
INTERVET UK LTD
The expiry date tells you when the makers think the medicine will no longer work properly. Do not use medicines after this date because they may not treat the animal properly and may not work at all. Using medicines after this date can help make microbes become resistant to the medicine. Check this date when you buy medicines, some traders try to sell old medicines, do not buy them.

bottle or packet inside. Genuine medicines of the same kind and make are usually the same colour and thickness. **Check the seal on the container, it should not have been opened**. Some traders open medicines to steal some of the medicine then add water or something else so they can sell what still looks like a full bottle.

Buying and keeping medicines

- Check the expiry date (p. 312).
- Some makes of medicine are much cheaper than others. Some people think that only one make or trade name is a good medicine. They are usually wrong. Another medicine with a different trade name but with the same chemical name may be just as good and much cheaper.
- Check the strength of a medicine to work out the cost of the actual amount of medicine in a container. Some medicines with the same chemical name have more actual medicine in each ml in a bottle.
- Medicine is often cheaper in large containers, but do not buy such large containers that you will not use them quickly. Medicine left in a container after you have opened it is quickly damaged by air and may become *contaminated*. Only buy about the amount of medicine you expect to use well before a medicine expires.

If you do not keep medicines properly they will be damaged. **They may not work and can become dangerous**. Beware that some traders sell medicine that has been damaged, such as by over-heating in a hot store.

- Store medicines in a dark place. Many medicines are damaged by sunlight. This is why they often come in dark bottles.
- Keep medicines dry, especially powdered medicines.
- Keep medicines cool. Some vaccines must be kept in an insulated cold box (p. 354).
- When a bottle of medicine has been opened use it as soon as possible.
- Some vaccines **must** be used immediately.
- Do not keep medicines after the expiry date. Destroy old medicines that have changed colour or look damaged.
- Keep medicines where children cannot get them.
- Keep medicines well labelled and keep directions for use with the medicine.

How much medicine to give

Some medicines, such as oily medicines for bloat, do not need accurate doses so this book just tells you how much to give a 'large' or a 'small' animal. 'Large' animal in this book means about 400 kg – the size of large adult cattle, 'small' means about 50 kg – the size of adult sheep and 'very small' means 1–10 kg – the size of a baby sheep. Animals vary in size (e.g. some adult cattle weigh much less than 400 kg and one adult sheep can be twice the size of another) so adjust these doses if you think an animal is in between these sizes.

Stronger medicines, such as antibiotics, **need accurate doses**. This book gives exact doses as the amount of actual medicine in milligrams (mg) or grams (g) to give for each kilogram (kg) the animal weighs, e.g. as 'mg/kg bodyweight'.

- Giving too little medicine might not work and can help make microbes resistant to medicines.
- Giving too much medicine can poison an animal. It is also a waste of money.
- Giving more than a correct dose of medicine does not treat an animal any faster or more effectively.

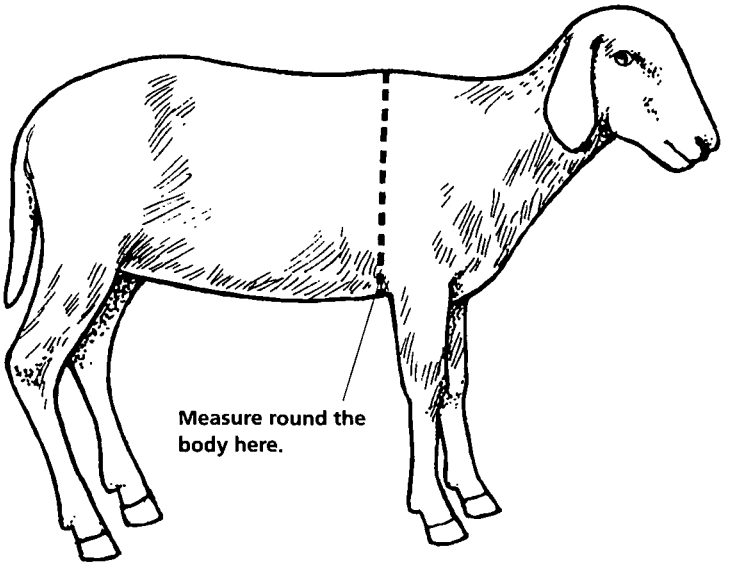
Many medicines come with doses that have already been worked out for you. For example, they will tell you to give adult cattle 100 ml or sheep 40 ml. But there are many makes of medicine of different strengths that do not work out the dose for you.

To calculate a proper dose for any make of medicine

Accurately estimate the weight of animals you treat. Weigh at least some of them if you can. **People usually guess the weight of their animals wrongly**.

To estimate the weight of an animal without weighing it

- Make the animal stand on level ground and put a measure (or use a piece of string and measure it against the ruler on this book) round its body just behind the front legs.

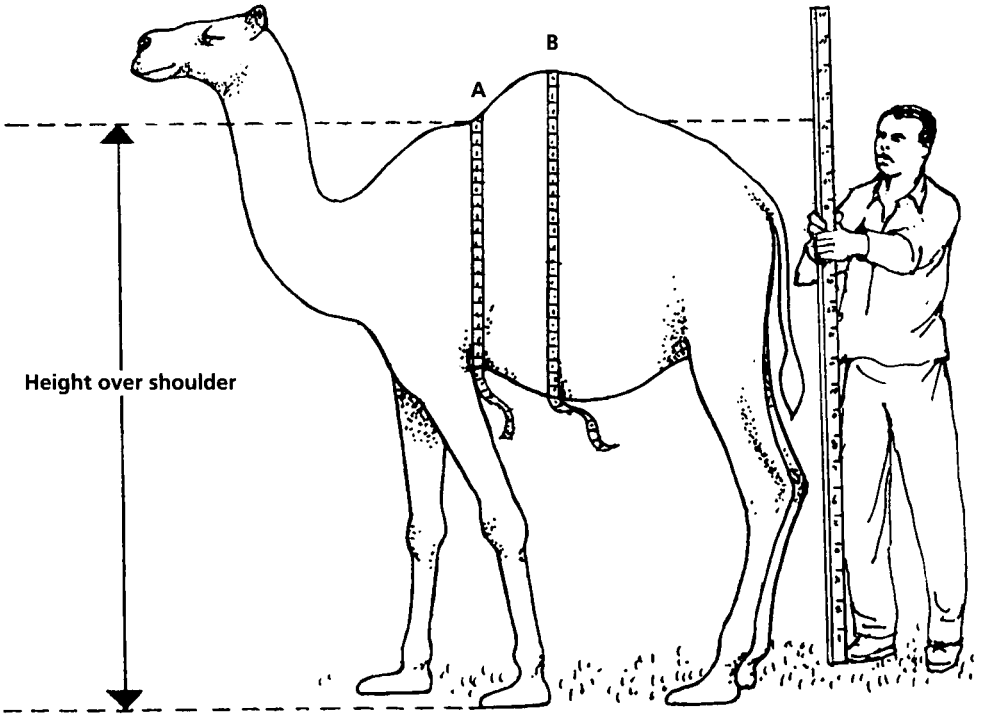


- Measure horses, mules or donkeys around where the girth of the saddle would be.
- Measure how far it is round the body in centimetres and calculate the weight from this table:

Estimated weights of animals

Distance round the body (cm)	**Approximate weight**		
	Cattle/Buffaloes (kg)	**Sheep/Goats (kg)**	**Horses/Mules/Donkeys (kg)**
60		20	
65		24	
70	40	30	
75	45	36	
80	50	42	44
90	70	55	62
100	98	75	87
120	150		147
140	232		222
160	330		313
180	485		426
190	558		490

Camels are measured differently. To estimate the weight of a camel measure the height and the distance round the body at A and B (see diagram). The camel's weight in kilograms is: Height x Distance round the body at A x Distance round the body at B (all measured in centimetres) x 50.



How to calculate how much medicine to give

Say you estimate an animal weighs 50 kg and the dose tells you to give 10 mg/kg bodyweight of oxytetracycline.

Multiply the animal's weight (50 kg) by the dose rate (10 mg/kg) to find that the animal needs 500 mg of actual medicine.

$50 \times 10 = 500$

The medicine you have says it contains 50 mg/ml of oxytetracycline – the strength is 50 mg of actual medicine in each ml of the injection.

Divide the amount of actual medicine the animal needs (500 mg) by the strength of the medicine (50 mg/ml) to find that the animal needs 10 ml of medicine.

$$\frac{500}{50} = 10$$

(Some medicines are measured in International Units (IU) rather than milligrams. The dose will be given as IU/kg bodyweight and the strength of the medicine as IU/ml of medicine. You calculate how much to give just as you would if the medicine were measured in milligrams.)

How to give medicines by mouth

How to give medicines with food or water

Only give medicine in food or water to animals that eat or drink normally or to a group of animals that each eat about the same amount, otherwise some animals will get all the medicine and others almost none.

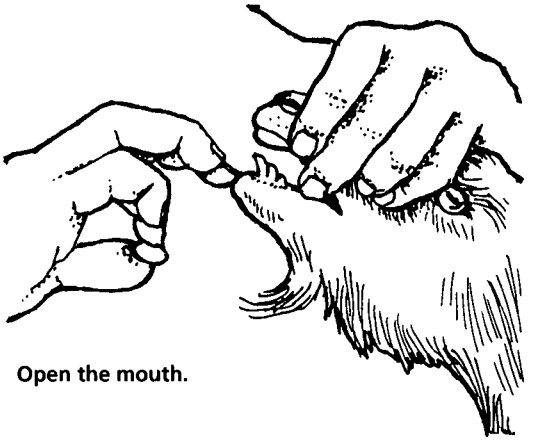
Keep food or water away from animals for a few hours before you treat them then they will be hungry or thirsty and will take all the medicine. Mix the medicine thoroughly with the food or water.

How to give boluses (large pills) and pastes

Boluses are one of the easiest and most reliable ways to give medicines. You do not have to mix them with water and it is easy to measure the dose. You can often break boluses into two or four parts to get the dose right.

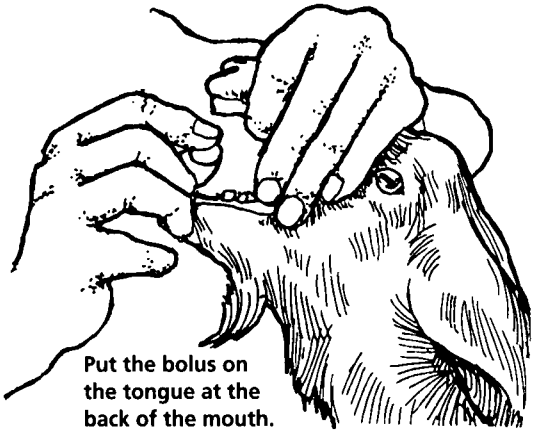
Tempt animals to eat boluses by wrapping them in leaves or other food they like. Make dry boluses easier to swallow by dipping them in vegetable oil.

- Hold the animal securely, with one hand firmly over the top jaw like this to open the mouth (see also p. 24).



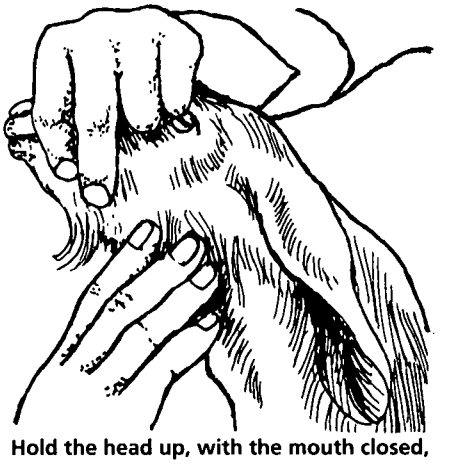
Open the mouth.

- Put the bolus on the tongue near the back of the mouth, then hold the mouth closed and upwards and stroke the throat to help it swallow.



Put the bolus on the tongue at the back of the mouth.

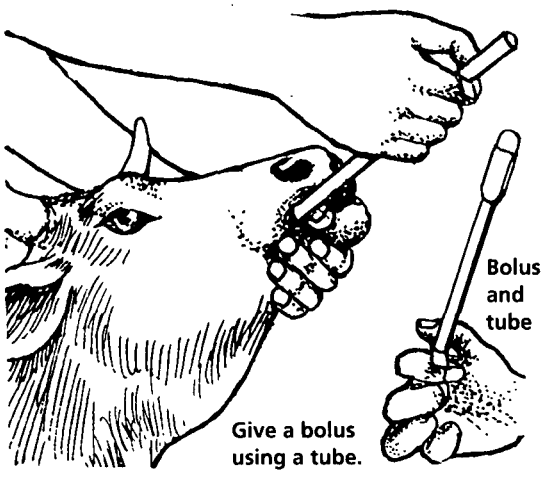
- If the animal chokes or coughs violently while you are trying to give a bolus release the animal and let it lower its head.



Hold the head up, with the mouth closed, and stroke the throat.

You can give boluses by hand or with a special tool. You can easily make a simple tool to do this by using any kind of tube or make a long handled pair of forceps.

Some people crush boluses into powder to give with an animal's food or water. It is easy to measure a dose like this and easier than giving the bolus by mouth. But make sure the animal takes all the food or water with the boluses in it. Or crush the bolus and add water, milk, oil or honey to make a paste. Spread the paste on the animal's tongue with a stick or give the paste with a large syringe with no needle.



Give a bolus using a tube.

How to give liquid medicine

Putting liquid medicine into the mouth for an animal to swallow is a good way to give medicine.

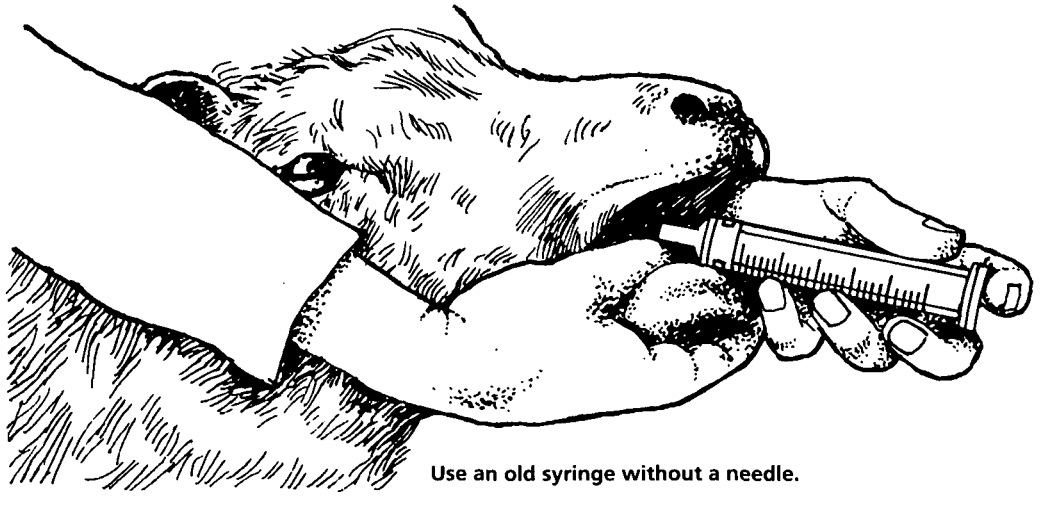
WARNING

Be careful not to get medicine in the *trachea*. It will go down to the lungs and cause pneumonia. The animal may die.

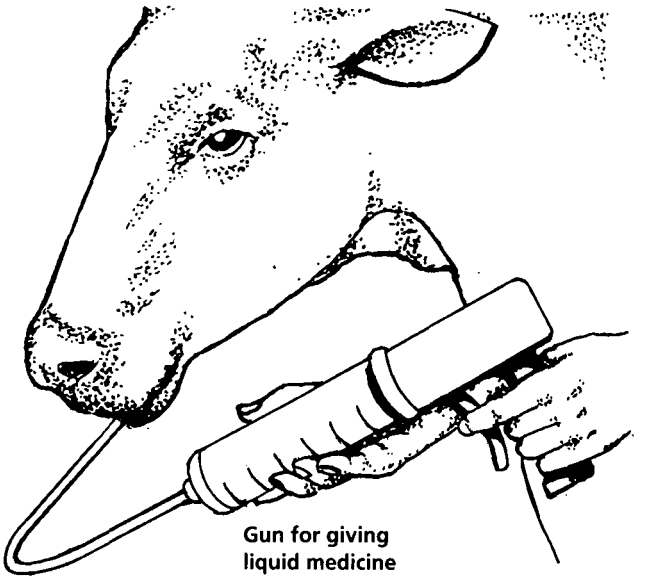
It is dangerous to give liquid medicine to horses, mules or donkeys. They have a high lump on the back of the tongue that can make liquid go down the *trachea* into the lungs. For horses, mules or donkeys it is safer to use boluses or pastes. Or get skilled help to use a *stomach tube* instead (p. 318).

It is dangerous to give liquid medicine by mouth to any animal that has very distressed breathing.

- Make sure you have got the right medicine ready and the dose is correct.
- A soda bottle is good for giving liquid medicines; put a piece of rubber tube over the end to make it safer if the animal bites the bottle (see p. 9). People in Nepal use a length of bamboo.
- For small animals use an old syringe with no needle, or a spoon.

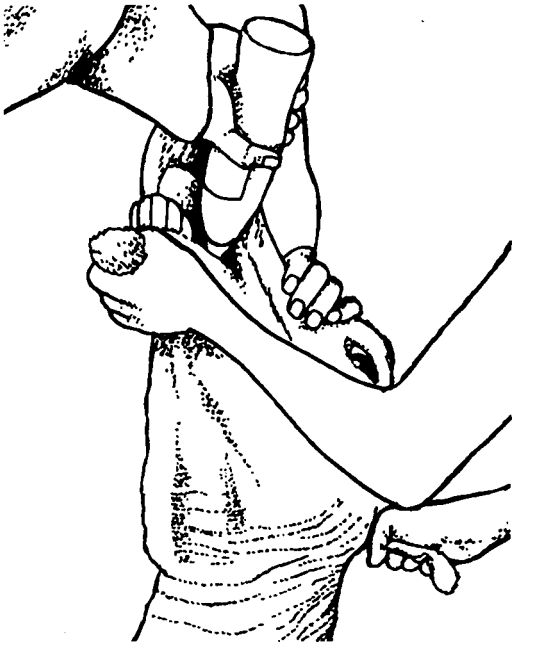

Use an old syringe without a needle.

- Special guns that refill themselves are useful for treating many animals at one time. A gun with a hook makes it easier, you do not need to hold the animal so tightly.
- Make sure the animal is held still.
- Raise the head a little.
- Open the side of the mouth.



Gun for giving liquid medicine

- Put the neck of the bottle or the tube into the mouth on top of the tongue. **Do not hold the animal's tongue**. The animal needs to use its tongue to swallow the medicine.
- Give the medicine slowly. Give the animal time to swallow.
- If the animal starts to cough, stop giving the medicine, lower the animal's head and let it recover.
- When the animal has swallowed the medicine take the bottle or tube out. With smaller animals, hold the mouth closed briefly to make sure the animal gets all the medicine.

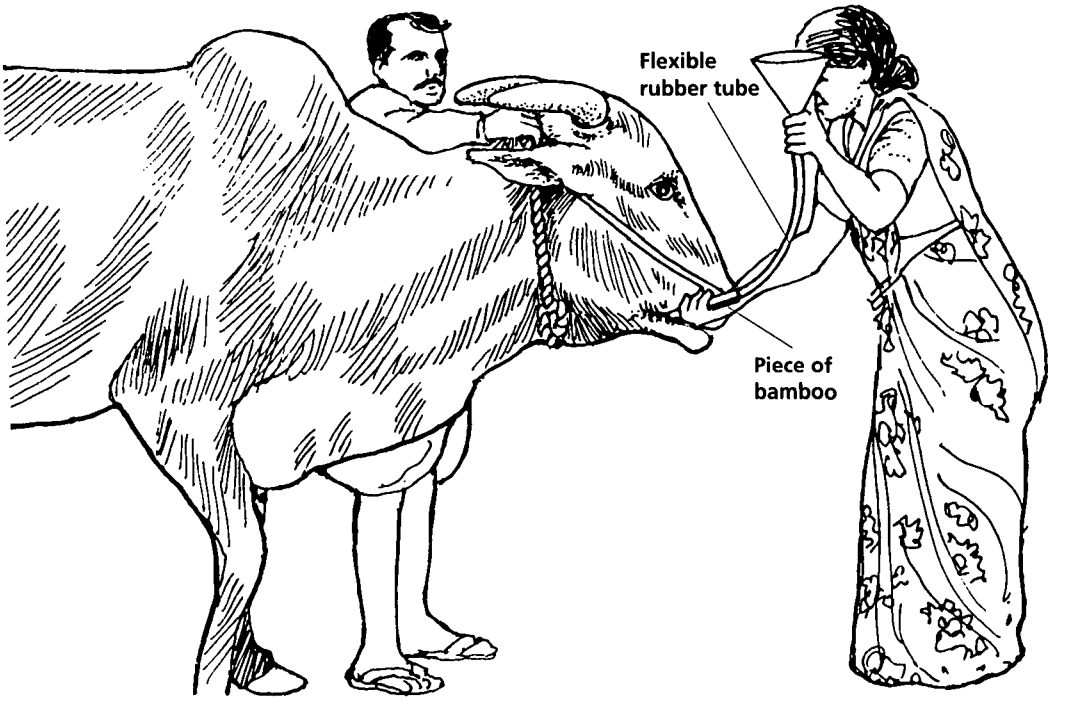


How to give medicine with a stomach tube

WARNING

It is difficult to use a *stomach tube* properly and dangerous for the animal if you do not do it properly. If the tube goes into the *trachea* and you put fluid into the lungs instead of the *stomach*, the animal will probably die. Get a skilled person to use a stomach tube. Or get a skilled person to train you to use one properly.

Use a stomach tube for giving large amounts of medicine at one time. The tube goes into the mouth and down the *oesophagus* into the stomach. It is good for giving large amounts of fluid. You can also use a stomach tube to release gas from an animal with *bloat* (p. 215).



- Use a flexible tube that is not sharp at the end. For large animals use a tube about 1.5 m long and about 1.5–2.0 cm across. For sheep and goats use a tube about 50 cm long and about 0.5–1.0 cm across.
- Use a gag (p. 24) to stop the animal biting the tube.
- If you do not have a gag use a rigid outer tube about 50 cm long for cattle, about 20 cm long for sheep and goats. This can be metal or wood, such as bamboo. It helps to stop the animal chewing the stomach tube itself.
- If you are using the outer tube push it into the side of the mouth over the tongue to the back of the mouth. Then push the stomach tube through the outer tube.
- Otherwise push the stomach tube along the top of the mouth and continue till it goes into the *oesophagus*.
- As the animal swallows, push the tube further in. Sometimes you can see where the tube is under the skin on the neck.
- If the animal coughs the tube is probably in the *trachea*. Pull it out and try again. When the tube goes in to the *rumen* gas often comes out that you can smell.

Check that the tube is in the stomach before you pour medicine down the tube.

- Blow down the tube. If the tube is in the stomach or rumen you can feel *resistance* when you blow down the tube.
- If there is a smell of rumen gas coming from the tube it is in the rumen
- If there is no resistance when you blow down the tube it may be in the lungs.
- Shake the animal's neck. If the tube is in the trachea you can sometimes hear it rattle.
- When you are sure the end of the tube is in the stomach/rumen, pour the medicine down the tube.
- When all the medicine has gone, blow the last bit out of the tube and quickly put your thumb over the end of the tube and pull the tube out quickly.

Horses, mules and donkeys To give a stomach tube to a horse you put it down one nostril. **This is dangerous** and is best done only by a skilled worker who has been properly trained.

How to give medicine by mouth to different animals

Camel You can mix some medicines with feed for camels and they will eat it. You can give liquid medicine by mouth quite easily, either with a bottle or with one of the dosing guns used for cattle.

Sheep, goats When you give liquid medicine to sheep or goats, do not lift the animal off the ground or lift the head so high that the nose is above the eyes.

Birds Give medicines to birds by mouth with a dropper or a straw. Hold the head level to stop the medicine going into the trachea by mistake.

Pigs Lie the animal down on the ground on its front and get someone to hold it or tie the pig up by its top jaw (p. 22).

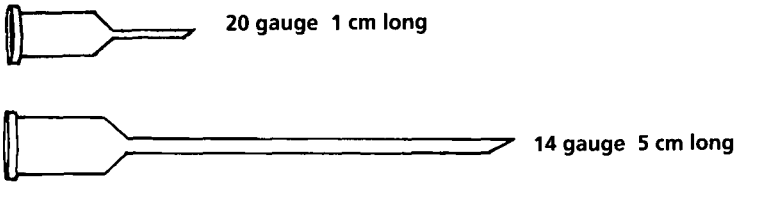
Dogs If the dog is aggressive wrap pills or boluses in some food or mix liquid medicine with some food. If the dog is quiet hold the upper jaw with one hand with your finger and thumb pressing up against the inside of the top of the mouth (see p. 316). Hold the bottom jaw with the other hand. Put the pill as far back on the tongue as you can. Close the dog's mouth and hold it closed gently until the animal swallows.

To give liquid medicine it is easiest to use a syringe without a needle. Hold the head up. Put the end of the syringe into the side of the mouth between the front and back teeth. Push the medicine slowly onto the back of the tongue. Hold the mouth closed gently until the animal swallows (p. 316).

How to give injections

Syringes and needles

- Keep syringes and needles clean to avoid spreading infection from animal to animal. Sterilise the needle and syringe between uses.
- Wash the needles and syringe (take the needle off the syringe and pull the plunger out of the syringe first), then put them into boiling water for ten minutes (see p. 9). Some plastic syringes are damaged by boiling water so just wash them clean and rinse them with water that has been boiled and cooled. When you treat many animals at the same time it is not always possible to do this between each animal. But do this or use a clean syringe after you have treated about 20 animals or before you treat another group.
- For large animals you usually need 20–50 ml syringes.
- For small animals 5–10 ml syringes are big enough for most doses.
- Needles are different lengths and of different thickness. The thickness of the needle is called the 'gauge'. The smaller the number of the gauge the thicker the needle: 20 gauge needles are thin, 14 gauge needles are thick. You need thicker needles for larger doses and for thick medicines. Use the thinnest needle that the required dose of medicine will go through easily.

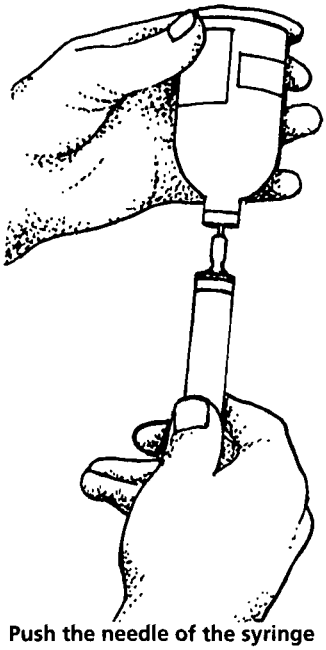


Useful needle sizes	Gauge	Length
Large injections for large animals	14–16	4–5 cm
For sheep and goats	18	2–3 cm
For injecting under the skin	16–18	2–3 cm
For dogs	20	1 cm

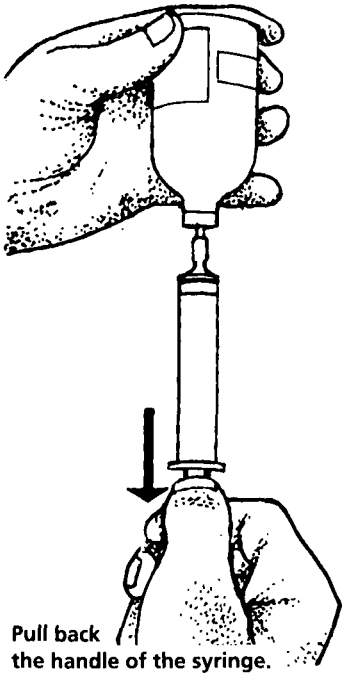
- Some syringes and needles have different fittings at the end. Get needles that fit your syringes.

How to fill a syringe

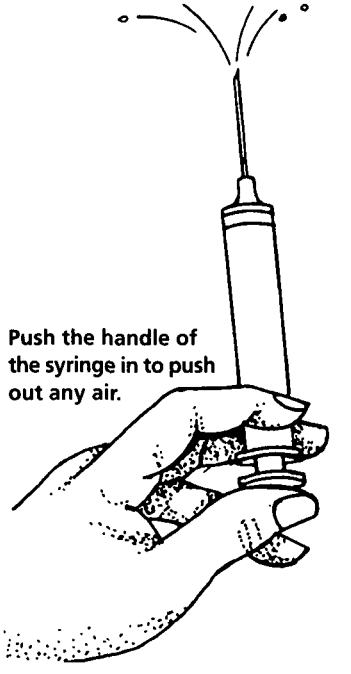
- Before you take liquid out of an injection bottle it helps to put about the same amount of air into the bottle first. Push some air into the bottle from the empty syringe. Or push the needle into the bottle first to let air into the bottle and then put the syringe on the needle and fill it.
- Then with the needle in the bottle pull back the handle of the syringe until it has the dose you want in it. Remove the needle from the bottle.
- When you have filled the syringe hold it up and push out any air at the top, then check again that it has the amount of medicine you want in it.



Push the needle of the syringe into the bottle of medicine.



Pull back the handle of the syringe.



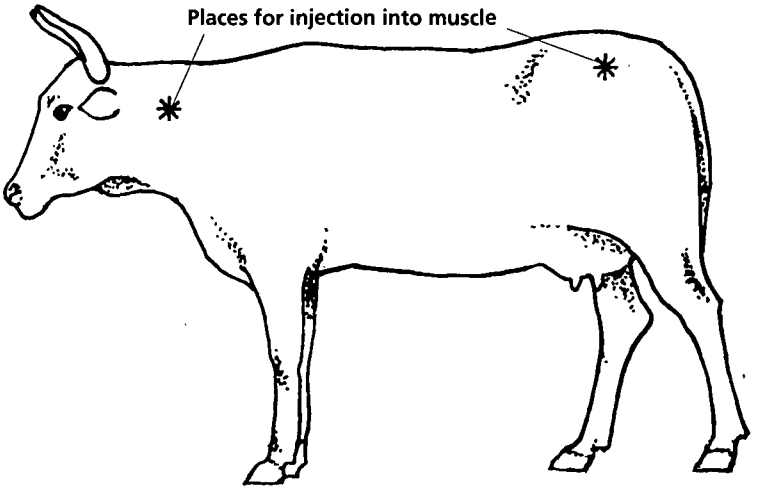
Push the handle of the syringe in to push out any air.

- Some medicines are powder in a bottle that needs water to be added. Many medicines that come as powder are in a vacuum bottle and will suck the water into the bottle easily when you inject it into the bottle. If the medicine is not in a vacuum bottle, before you add the water take some air out of the bottle with an empty syringe and needle. Only use *sterile* water (boil it and let it cool) or use the special liquid that comes with the medicine to mix with the powder.
- An easy way to take many injections from one bottle is to put a needle into the bottle and leave it there. Attach the syringe to this needle to fill it each time then use a different needle to give the injections. If there is medicine left in the bottle that you want to keep, **take the needle out**.

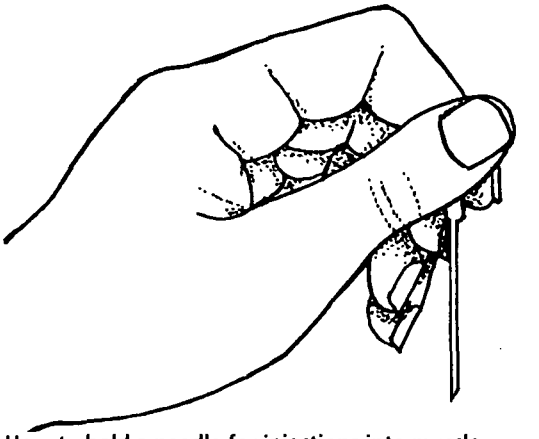
How to give an injection into muscle

You can give an injection into any large muscle. Once you have put the needle into the muscle, pull the plunger back a little before you inject the medicine, if blood comes back into the syringe the needle is in a *vein*. **You do not want to inject into the vein** so take the needle out, put it in a different place and try again.

Cattle, buffaloes



- Give the injection over the back leg or into the side of the neck.
- For animals with thick skins take the needle off the syringe and hit the animal with the back of your hand once or twice on the place where you want to put the needle in. Then quickly put the needle in and the animal will not notice it.
- Then put the full syringe onto the needle and press the plunger down.
- For animals with thinner skins leave the needle on the syringe and push the needle in quickly.



How to hold a needle for injections into muscle.

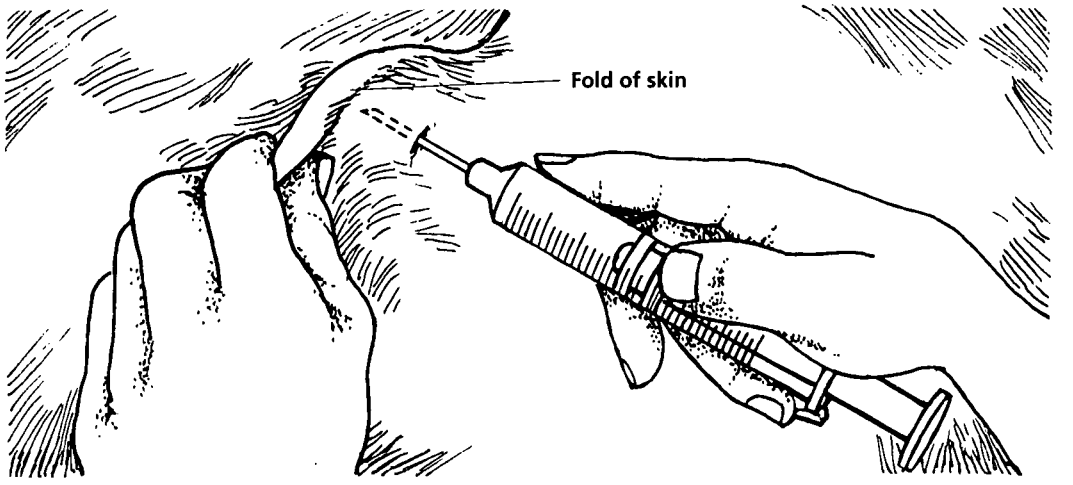
Horses, mules and donkeys Any injection into muscle can make an animal stiff for a while. This can make the animal lame for a time. So, especially for animals that work, it is better not to give the injection into the back leg. Instead give the injection into the side of the neck. This is also safer because it is more difficult for the animal to kick you. But you have to hold the animal securely.

- Give the injection into the top half of the neck above the *veins* and *trachea*.
- Take a pinch of skin and then put the needle in where you have pinched the skin and the horse will not notice the needle going in.

Sheep, goats, camels, pigs and **dogs** Give the injection into the side of the thigh. You can also inject camels in the side of the neck.

How to give an injection under the skin

- Pick up a fold of skin and push the needle through the skin but not into the flesh underneath.
- In smaller animals a fold of skin on the back of the neck is easiest.
- In larger animals use a fold of skin on the shoulder or under the neck.
- For pigs use the skin behind the ear or in front of the back leg.

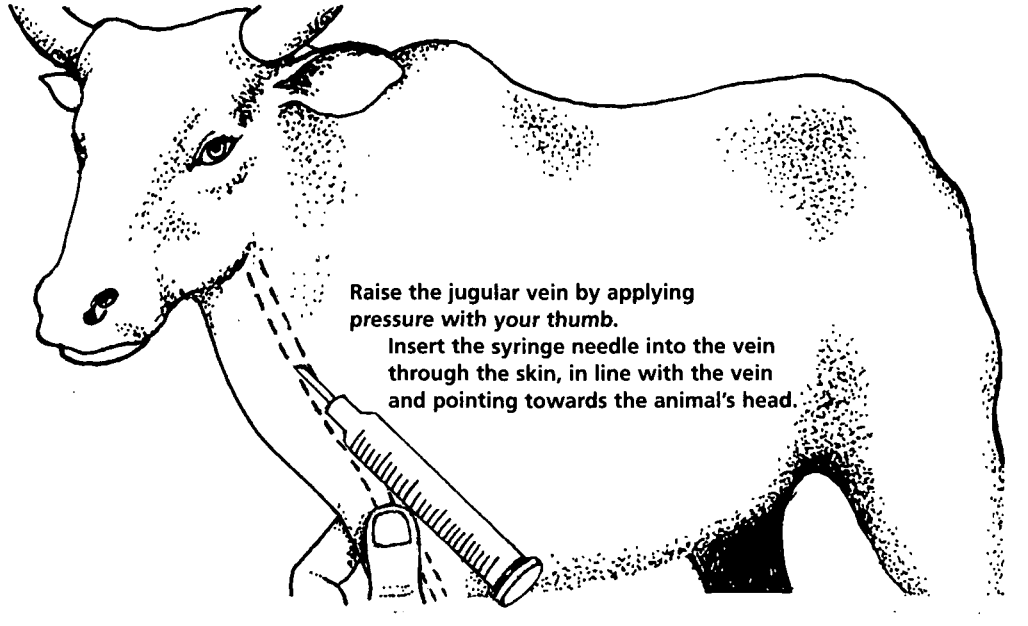


Dogs Giving an injection under the skin over the top of the neck is a good way to give many medicines to dogs.

- Get someone to hold the dog.
- Lift up a fold of skin and with the needle pointing along the back towards the head give the injection under the skin. Be careful not to push the needle through the skin the other side as well.

How to give an injection into a vein

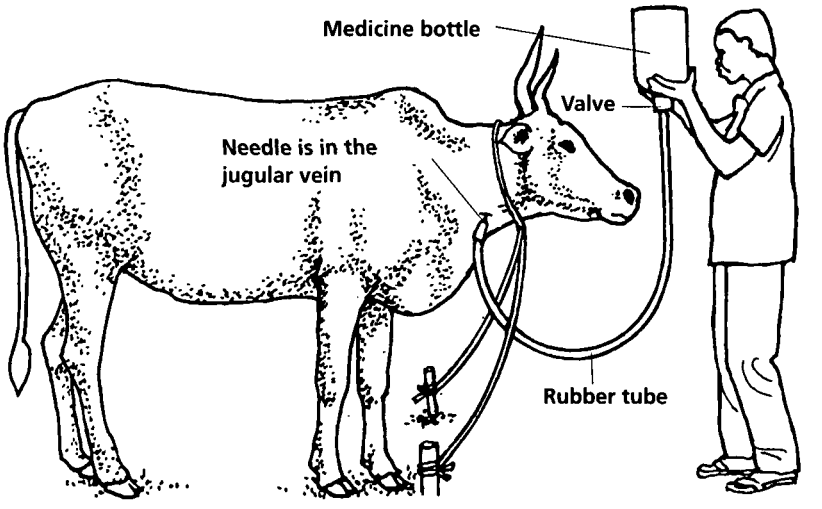
- Hold the animal securely.
- Push on the *jugular vein* till it swells up (1). Do this with your finger or with a rope. Make the skin wet to see the vein more easily.
- Push the needle through the skin, then into the vein. Push the needle in line with the vein and pointing towards the head, then you will not push the needle through the vein and out the other side (2). You can do this with the needle alone, when the point of the needle is in the vein blood comes out of the other end of the needle.
- Attach the syringe to the needle that you have put in the vein.



- Or you can find the vein with the needle already on the syringe. Fill the syringe with medicine and find the vein as you would with just the needle. When you think the needle is in the vein pull the handle back. If the needle is in the vein some blood will come back into the syringe.
- When you are sure the needle is in the vein **slowly** push the medicine in. It takes about 5–10 seconds to empty a large syringe.

These injections into the vein are used when it is important for the medicine to work as quickly as possible, especially when diseases are severe. Some special medicines only work properly when you inject them into a vein.

Sometimes you need to give a very large injection into a vein. Then you can use a special valve and tube attached to a bottle.



Different animals and giving injections into a vein

Pigs It is difficult to give injections into the vein of pigs. Use a vein on the ear. Skilled workers can give injections into a vein that goes into the chest.

Camels To give a camel an injection into a vein, raise the head and close the vein with a rope around the neck. The jugular vein will stand out clearly.

Bad reactions to medicines

Soon after they have been given medicine a few animals may have difficulty breathing or have inflamed reddened skin with swellings. This happens because they have an *allergy* (p. 162) to that medicine.

Antiseptics, disinfectants and wound dressings

Disinfectants are strong chemicals for cleaning *contaminated* things, such as feed bowls, knives, and places where infected animals have been. **It is dangerous** to put strong disinfectants onto wounds or animals' skin. *Antiseptics* are weaker chemicals for putting onto wounds; they kill *microbes* but should not be so strong that they kill an animal's flesh as well.

Do not mix different kinds of antiseptics or disinfectants together and when you mix them with water **use clean water**. Whenever you use water to put on wounds, use **clean** water – boil it and let it cool.

WARNING

Many disinfectants are poisonous. Do not let people or animals drink them. Be careful when you throw them away that they cannot get into water that people or animals drink.

Where there are no disinfectants or antiseptics use plenty of clean water or better still, use water with salt in it.

An A-Z of antiseptics, disinfectants and wound dressings

Alcohol

Alcohol may be ethyl alcohol (ethanol) or methyl alcohol (surgical spirit, 'meths'). It is usually clear but is sometimes mixed with colouring. It is a good disinfectant. Mixed with at least the same amount of water it is an antiseptic but avoid putting undiluted alcohol on wounds. Whisky and other spirit drinks are alcohol (about 40 per cent) mixed with water, they are not as strong as surgical alcohol (about 70 per cent) but they do work as disinfectants or antiseptics.
Useful for: cleaning an animal's skin or your hands before you do an operation, (it is not the best disinfectant for sterilising knives and instruments because it does not kill *microbe spores*.) Mix it with water to put it on wounds.

Aloe [*Aloe* species]

Juice from fresh aloe leaves helps to stop bleeding.

Alum

Mix 10 g of alum in 1 litre of water.
Useful for: washing the mouth, especially for animals with diseases, such as *foot and mouth disease* (p. 279).

Annona squamosa

People in India use the crushed leaves of *Annona squamosa* plants to put on wounds to repel flies and kill fly eggs.

Ash

Some people use clean ash from a wood fire to put on wounds to stop bleeding, reduce infection and prevent fly damage. Clean ash from a fire is *sterile* and does not cause infection. Many other antiseptics control infection better.

Antibiotic sprays and powders

Many antibiotics come in spray cans for putting on wounds. The antibiotic is often mixed with some colour and something to dry wounds up. These sprays work but they are expensive. Mix gentian violet and tetracycline (10 per cent) powder to make a good cheap substitute for them. Antibiotic powder is cheaper and is also good for putting on wounds.

Bleach (hypochlorite)

Hypochlorite is a common kind of bleach. Most kinds of bleach are good disinfectants. They kill many *bacteria* and *viruses*. Bleach is cheap and often easy to find. **You must mix it with water** to use it on animals.

- Mix 20 ml in 1 litre of water to make a useful disinfectant wash.
  Useful for: washing the udder or very infected wounds.
- Mix at least 200 ml in 1 litre of water to disinfect buildings and equipment.

Boracic acid

- Mix 20 g in 1 litre of water for washing wounds.
- Mix 10 g in 1 litre of water for washing infected eyes.
- Mix 1 g with 50 g of vegetable oil or Vaseline for putting on wounds.

Caustic soda (sodium hydroxide)

This is a very strong disinfectant that kills infections, many *microbe spores* and *viruses* that other disinfectants do not kill, such as *foot and mouth disease* viruses (p. 279).
Useful for: cleaning up *contaminated* things and places where infected animals have been. **Be careful**, this can burn your skin and damage metal.

- Mix 10–20 g in 1 litre of water for disinfecting buildings.

Copper sulphate

Useful for: *footrot* (p. 254) and other infections of the feet.

- Mix 100–200 g in 1 litre of water.
  Use crystals to cauterise flesh (p. 00).

WARNING

Copper sulphate is poisonous for sheep if they eat or drink it.

Creosote

Useful for: disinfecting buildings.

Dettol

Trade name for a brown/yellow fluid that goes cloudy in water.
Useful for: wounds and for cleaning hands and instruments.

Formalin

Usually sold as 40 per cent solution of formaldehyde. Follow the maker's directions.
Useful for: treating infections of the feet.

- For a footbath use a 1–2 per cent solution of formaldehyde.

Gentian violet

- Mix about 20 g in 1 litre of water.

Useful for: wounds. It helps wounds to dry out.

Guava trees [*Psidium* species]

People in Asia soak or boil a handful of guava leaves in water, then let the liquid cool and put it on wounds to reduce infection or repel flies and kill fly eggs. Modern antiseptics or insecticides are more effective.

Hydrogen peroxide

It usually comes as 3 per cent or 6 per cent solution.

- Mix 300 ml of 3 per cent solution with 1 litre of water.
- Mix 150 ml of 6 per cent solution with 1 litre of water.

Useful for: deep wounds. Hydrogen peroxide makes a froth that pushes dirt and pus out of deep wounds and abscesses. Sores in the mouth.

Insecticide dressings

Some people use dressings made from plants to kill flies and fly eggs. Some of these work but they do not usually kill fly eggs as well as modern insecticides.
See also *Annona squamosum* (p. 325); guava trees [*Psidium* species] (below); Neem trees [*Azadirachta indica*] (p. 327); *Solanum incanum* (p. 328); sulphonamide and insecticide (p. 328).

Iodine

Often comes as tincture (weak solution in alcohol) of iodine. This is a dark brown fluid.
To make a tincture of iodine:

- Mix 20 g of iodine crystals, 25 g of potassium iodide and 25 ml of water in 1 litre of alcohol.

Useful for: wounds, putting on the *navel* of newborn animals to stop infection. Wash the wound or the navel thoroughly with the liquid.

- Mix tincture of iodine with petroleum jelly (vaseline) to make an oily cream to put on sores.

Jeyes fluid

A powerful disinfectant – follow the maker's directions.
Useful for: buildings and *contaminated* things.

Magnesium sulphate (Epsom salts) .....

- Mix 100 g in 1 litre of water.

Useful for: washing wounds. Making a *poultice* (p. 327): mix magnesium sulphate and finely ground sugar with clean water or glycerine to make a paste, add a few drops of iodine if you have some.

Mercurochrome

A useful antiseptic.

- Mix 20 g in 1 litre of water.

Useful for: putting on wounds.

Mixture for knives and instruments

- Mix 10 ml of Savlon and 4 g of sodium nitrate in 1 litre of water.

Useful for: putting knives and instruments that you use for operations in to keep them *sterile*.

Neem trees [*Azadirachta indica*]

Many people soak the leaves and other parts of Neem trees in water (some people boil the leaves first and let the liquid cool) and use the liquid to put on wounds to reduce infection. This does not always work, many other antiseptics work better.

Phenol

Very strong disinfectant.

- Mix 1 part in 50 parts of water.

Use for: cleaning *contaminated* things.

Potassium permanganate

Potassium permanganate comes as a dark, nearly black, powder. It turns dark blue/red when you mix it with water. A useful antiseptic or disinfectant.

- Mix 1 g in 1 litre of water – the liquid should only be a pale colour.

Useful for: putting on wounds or washing out the mouth.

- Mix 10 g in 1 litre of water.

Useful for: disinfecting things. To disinfect instruments, clean them, especially wash any blood off, and soak them in this for a day.

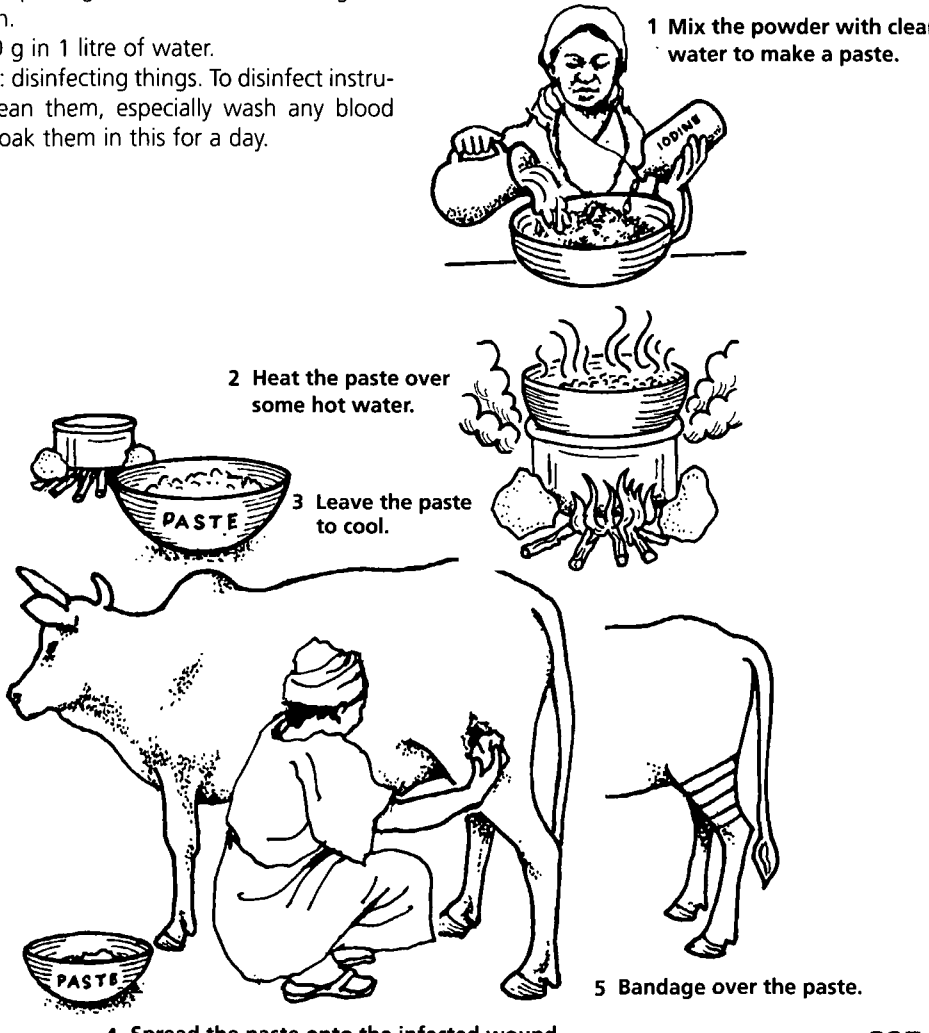
Poultices ....

Thick dressings to put over very infected wounds and abscesses to help extract pus and infection. *Useful for*: making abscesses burst and for bruises and strains.

Make a poultice by mixing powder, e.g. kaolin, with water and if possible some antiseptic, e.g. iodine.

- Mix the powder with clean water to make a paste (1).
- Then heat the paste over some hot water (2).
- When the mixture has cooled enough to easily hold in your hand (3), spread it over the injured part (4), and hold it there with bandages (5).
- The paste absorbs pus and blood so take the poultice off and put on a new one at least once a day.

Ground up leaves, e.g. Neem [*Azadirachta indica*] leaves, and pulp from many fruits also make good poultices.



1 Mix the powder with clean water to make a paste.

2 Heat the paste over some hot water.

3 Leave the paste to cool.

4 Spread the paste onto the infected wound.

5 Bandage over the paste.

Salt

Salt and water is one of the safest and most useful antiseptics. Salt is cheap and easy to find.

- Mix 50–100 g in 1 litre of water.

Useful for: washing all wounds. Use plenty of it to wash wounds, it does not harm the animal's flesh. You can use it with more water to wash eyes (p. 349).

Savlon

Savlon is a mixture of chlorhexidine and cetrimide. It comes as a wound dressing or as concentrated antiseptic to mix with water.

- Mix about 5 ml in 1 litre of clean water for putting on wounds.
- Mix about 30 ml in 1 litre of clean water for cleaning instruments. Or follow the directions to dilute the concentrate.

Do not keep instruments in just Savlon for long because they will rust.

Soap

Used with water – preferably hot – it is good for washing hands and buildings and things.

Solanum incanum

People in Kenya use the soft insides of *Solanum incanum* fruits to put on wounds to repel flies and kill fly eggs.

Sulphonamide

Many wound dressings contain sulphonamide medicines to kill infection. They are usually powders and are good for any wounds.

Sulphonamide and insecticide

- Mix sulphonamide powder with an insecticide such as Neguvon to make a wound dressing that kills infection and kills fly eggs or *larvae*. It also helps to repel flies. You can buy wound dressing powders like this, e.g. Negasunt. These dressings are good for wounds, especially when there are many blowflies.

Sunlight

Sunlight is a very good disinfectant, it kills most *microbes*. It is free. Scrape or wash any thick coating with blood or faeces off *contaminated* things and put them out in the sunlight. When animals have infection on the skin, e.g. *ringworm* (p. 180), keep them out in the sunlight.

Urine

Many people use human or animal urine as an antiseptic. Urine from a healthy person or animal is acid and does not have infection in it so it can help to kill some *microbes*. People use urine from cows, camels and humans. Some camel herders even urinate onto a castration wound to reduce infection.

Urine is not the best antiseptic. Salt water is better.

Washing soda (sodium carbonate) .....

Useful for: disinfecting buildings and *contaminated* things. It kills *viruses*, e.g. *foot and mouth* viruses (p. 279).

- Mix 40 g in 1 litre of water.

Withania

People use the roots of *Withania* plants to make a wash for wounds. They wash the roots, chop them, soak them in water then sieve the mixture and use the liquid to wash wounds. They also use the liquid to wash infected eyes.

Zinc oxide

Zinc oxide comes as a white powder.

Useful for: any small wounds, sores made by ropes and saddles.

- Put the powder directly onto a wound or mix 10 g of powder with 100 g of petroleum jelly (vaseline) to put on small wounds.

Antibiotics and other medicines for infections

(The word *antibiotic* really means one particular kind of medicine, but this book uses the word to include many medicines used to treat infections.)

This section gives doses and directions for some common, useful antibiotics. There are many other types of antibiotic and medicines for infections. You will often need skilled help

to decide which medicine is best. Most antibiotics work well for all kinds of animals but some of them should not be used for certain animals.

Always follow the maker's directions carefully.

How to use antibiotics

Many antibiotics, for example penicillin (broad-spectrum), sulphonamide and trimethoprim, tetracycline, work well for **several different diseases** – they kill many different microbes. Some antibiotics, for example griseofulvin, penicillin (narrow-spectrum), streptomycin, tylosin, only work for a **few diseases** because they only kill certain microbes.

- To treat very severe diseases that happen very quickly, use an antibiotic you can inject into a *vein*. Give injections into a vein **slowly**.
- Use antibiotics that come as a dry powder in a bottle as soon as possible after they are mixed with water. They do not keep long after they are mixed with water.
- Avoid injecting more than about 20 ml of antibiotic into muscle in one place. Give doses larger than 20 ml, half in one place and half in another.
- If you cannot get medicines made for animals you can use human medicines. If you have to do this, find out how much actual medicine there is in the human medicine and calculate the normal dose for the animal you are treating (p. 315). Some people crush antibiotic tablets used for humans and mix them with water to make injections for animals.
- Antibiotics do not usually work for diseases and infections caused by *viruses*. But they can **stop** animals **dying** from diseases caused by viruses. This is mostly because antibiotics treat *bacterial* infections that animals often get when they are already weakened by a virus disease.

How long to give an antibiotic for

- Give an antibiotic until one day after a *fever* has gone. For most infections giving an antibiotic for 3–5 days is enough.
- Try one antibiotic for at least three days before you decide it is not effective. If the animal does not seem to improve after 3–5 days try a different type of antibiotic. Sometimes when diseases go on for a long time, especially when there are abscesses, you have to give an antibiotic for many days.
- Some antibiotics only work for a few hours and you must give them every day. 'Long acting' antibiotics are specially made to go on working for longer. These often have the letters LA or PA after their name. You do not have to give these so often and one injection is usually enough to treat an animal.
- Most antibiotics come with directions about how long after treatment to wait before using milk or meat from treated animals. If there are no directions it is best not to use the milk for about three days and not to kill animals for meat for about three weeks after you inject antibiotics.

Horses, mules and donkeys Horses often have reactions at the place where you give an antibiotic injection – they have a swelling that becomes hot and painful and may develop into an *abscess* (p. 186). **Only use antibiotics that the makers recommend for horses**. Avoid giving oily antibiotics to horses – these medicines feel oily if you rub a drop or two between your fingers. If you must give an antibiotic not recommended for horses or one you are unsure about, inject it into the muscle between the front legs. Then if the antibiotic does cause a reaction it will not make the animal lame, and the wound will drain.

Camels Many antibiotics come with no directions for camels. (The medicines come from countries where there are no camels.) If there is no other guide, give the doses given for cattle.

Rabbits Rabbits are sensitive to some antibiotics, they are poisoned by them. **Avoid** giving penicillins or streptomycin to rabbits. Use tetracycline.

WARNING

Adult cattle, buffaloes, camels, horses, mules, donkeys, sheep, goats. DO NOT GIVE ANTIBIOTIC BY MOUTH TO THESE ANIMALS.

Adult animals that eat grass and plants *digest* tough plant fibres with the help of *microbes*. The microbes also make nutrients that the animal needs. Giving antibiotics by mouth to these animals kills these valuable microbes and quickly makes the animals sick. After about 12–24 hours they stop eating and become dull. Cows soon stop giving milk. Animals stop ruminating and cannot digest the fibre in their food. You can see undigested fibre from the plants they have eaten in their faeces.

Adult horses given antibiotics by mouth usually get severe diarrhoea. Sometimes the diarrhoea does not stop and the animal dies.

An A–Z of antibiotics and other medicines for infection

Amicarbalide

Trade name: Diampron.
Useful for: Babesiosis (p. 248).
Normal dose: For **horses** give 8 mg/kg to treat most kinds of *babesiosis*.

WARNING

Give an accurate dose because this medicine can be poisonous, especially for horses, if you give too much.

Amprolium

Trade name: Amprolmix.
Useful for: Coccidiosis (p. 224).
Normal dose: For animals give 20 mg/kg every day for five days.

Berenil (diminazene aceturate)

Useful for: Trypanosomosis (p. 295) but it also treats *babesiosis* (p. 248). It is good for animals that have *babesiosis* and *trypanosomosis* at the same time. Also see imidocarb diproprionate (p. 331).
Normal dose: For *babesiosis* mix one bag (23.6 g) of Berenil with 125 ml of clean water. When you have mixed the powder with water keep it out of bright sunlight and use it within four days. Inject 3.5 mg/kg bodyweight into muscle.

- Large animal 25 ml.
- Small animal 2.5 ml.

You need skilled help to find out which kind of *babesiosis* happens in your area because for some kinds of *babesiosis*, e.g. *B. bovis, B. equi, B. gibsoni* you need to give 5 mg/kg bodyweight.

These doses will treat the disease and protect animals for 2–3 weeks.

WARNING

Give an accurate dose because this medicine can be poisonous, especially for horses, if you give too much. NEVER GIVE BERENIL TO CAMELS OR DOGS.

Buparvaquone

Trade name: Butalex.
Useful for: East Coast fever (p. 276), *theileriosis* (p. 294).
Normal dose: Follow the maker's directions. For *East Coast fever* inject 5 mg/kg bodyweight once into muscle. Or inject 2.5 mg/kg and repeat after two days.

Furazolidone

Trade name: Neftin.
Useful for: *Coccidiosis* (p. 224), *salmonellosis* (p. 235), *fowl typhoid* (p. 231). Young cattle and pigs with *diarrhoea*.
Normal dose: For *fowl typhoid* put 15–25 g in 100 litres of water for 10 days. This helps prevent carrier birds too.

Griseofulvin

Trade names: Fulcin, Grisovin.
Useful for: Ringworm (p. 180).
Normal dose:

- For **horses, mules, donkeys** give 10 mg/kg bodyweight every day in food.
- For **cattle** give 7.5 mg/kg bodyweight every day in food.
- Give for about 7–10 days. **This is expensive**.

Halofuginone

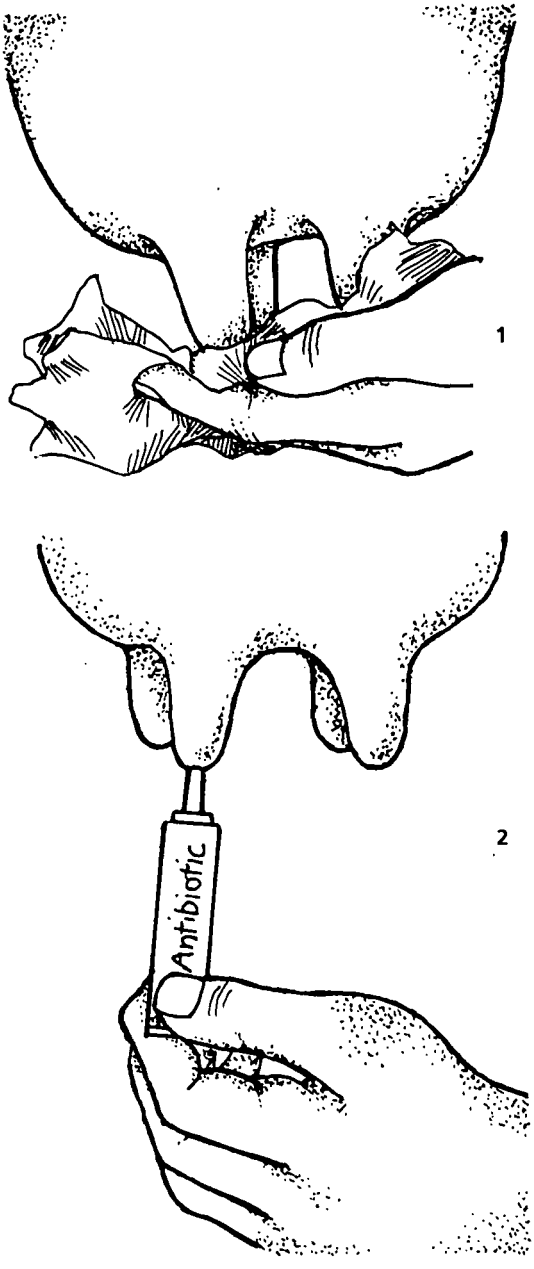
Trade name: Terit.
Useful for: *East Coast fever* (p. 276), *theileriosis* (p. 294), preventing *coccidiosis* (p. 224).
Normal dose: Follow the maker's directions. For *East Coast fever* give 1 mg/kg bodyweight liquid medicine by mouth.

Imidocarb diproprionate

Trade name: Imizol.
Useful for: Anaplasmosis (p. 271), *babesiosis* (p. 248).
You can treat animals and protect them from *babesiosis* for 6–8 weeks. You will need skilled help to decide which kind of *babesiosis* an animal has. Some animals, especially horses, have types of *babesiosis* that are difficult to treat.

WARNING

Give an accurate dose because this medicine can be poisonous, especially for horses, if you give too much.



Mastitis antibiotics

Some antibiotics come in special tubes that you can put directly into the teat.

- Milk the udder until it is empty.
- Clean the end of the teat (1).
- Put the tip of the tube into the teat and squeeze the antibiotic up into the udder (2).
- Massage the teat and that part of the udder.
- If the mastitis is severe and the animal is sick give antibiotic injections as well. Give penicillin and streptomycin or tetracycline.

Mixed antibiotics

Some makers sell different antibiotics already mixed together in the bottle. Sometimes two antibiotics mixed together work better than either of them does on its own. People use mixed antibiotics because they are cheaper than some of the antibiotics that kill many different kinds of microbes.

WARNING

DO NOT MIX ANTIBIOTICS YOURSELF. Many antibiotics do not mix with others. They can stop each other working. Do not inject more than one kind of antibiotic into the same animal without advice from a skilled worker.

Parvaquone

Trade name: Clexon.
Useful for: *East Coast fever* (p. 276).
Normal dose: Inject 20 mg/kg bodyweight into muscle. Give one injection. Or give two injections 10 mg/kg two days apart.

Penicillin

There are different kinds of penicillin. Some of them (called **broad-spectrum**) treat many different infections, some of them (called **narrow-spectrum**) only treat a few kinds of infection. You can use penicillin made for humans to treat animals; it works well.

You usually need to give penicillin for 5–7 days.

Penicillins that treat many different infections:

Ampicillin
Trade names: Amfipen, Embacillin, Penbritin.
Normal dose: Inject 2–7 mg/kg bodyweight.
This is an oily antibiotic, you can use it for horses but be careful (p. 329).

Amoxycillin
Trade names: Betamox, Clamoxyl, Qualamox.
Normal dose: Inject 2–7 mg/kg bodyweight.

Penicillins that only kill a few kinds of infection, e.g. *Anthrax* (p. 141), *leptospirosis* (p. 284).

Benzyl penicillin (Penicillin G)
Trade name: Crystapen.

Procaine penicillin
Trade names: Ethacilin, Lenticillin.
Normal dose: Give 10–15 mg/kg bodyweight. Inject once or twice every day for four days into muscle.

Benzathine and Procaine penicillin (mixed)
Trade names: Ethacilin PA, Lentrax, Propen.
Normal dose: This is a long-acting penicillin, you often only need to give one injection.

Penicillin and streptomycin (mixed), Penstrep
Trade names: Streptopen, Strypen.
Useful for: Many infections, *footrot* (p. 254), *mastitis* (p. 244).

Phenamidine

Trade name: Lomadine
Useful for: *babesiosis* (p. 248). Also useful for dogs.

WARNING

Give an accurate dose because this medicine can be poisonous, especially for horses, if you give too much.

Quinuronium sulphate

Trade names: Acaprine, Babesan.
Useful for: *babesiosis* (p. 248).

WARNING

Give an accurate dose because this medicine can be poisonous, especially for horses, if you give too much.

Streptomycin

It is usually best to use the type that comes mixed with penicillin.

Sulphonamides, Sulpha medicines

Useful for: Many infections (especially of *stomach* and *intestines*), diarrhoea, *coccidiosis* (p. 224). There are many different sulphonamides, this is one example:

Sulphadimidine
Trade names: Bimadine, Vesadin.
Form: This comes for giving by injection, for giving by mouth or for putting in feed or water.
Useful for: *Coccidiosis* (p. 224), young animals with diarrhoea. Use this medicine first when young animals have diarrhoea but do not have a very high *fever* and are not very sick, otherwise use oxytetracycline.

Normal dose (to give by injection): Inject 1 g/10 kg bodyweight under the skin or into a *vein*. Give every day for four days.
Normal dose (to give by mouth): Give 200 mg/kg bodyweight. Give for 3–5 days until the animal recovers. **Do not give this medicine for more than five days**.

- To **treat** young animals with *coccidiosis*, give 140 mg/kg by mouth every day for three days
- To **protect** young animals from *coccidiosis*, give 30 mg/kg in food for 10 days.
- For **birds** with *coccidiosis* give sulphadimidine in drinking water for three days then again two days later for another three days.

Sulphonamide and trimethoprim

Trade names: Tribrissen, Trivetrin.
Useful for: Many infections.

Tetracycline

There are two main kinds of tetracyclines: chlortetracycline and oxytetracycline. They are similar. **These are some of the most effective types of antibiotics to use in hot places**. They are not damaged by heat as easily as many other antibiotics. They are easy to use and they treat many different infections. They come as injections, boluses, powder to mix with water or add to food and in wound dressings.

Chlortetracycline

Trade name: Aureomycin.
Useful for: Many infections; birds with signs of difficult breathing.
Normal dose: Give 1 g of powder in 1 kg of feed for 5–7 days.

Oxytetracyline

Trade names: Alamycin, Embacycline, Oxytetrin, Terramycin, Rasomycine.
Useful for: *Fever*; most diseases and infections. Use for all animals and birds.
Normal dose: Inject 50 mg/10kg bodyweight deep into muscle. Give once every day for 3–4 days. Inject the same dose into a *vein* if the disease is very severe.

- For *anaplasmosis* (p. 271) inject 10 mg/kg bodyweight into a *vein*.
- For a valuable bird with severe infection, inject 25 mg/kg oxytetracycline into muscle.

To give by mouth:
Useful for: Severe diarrhoea with a *fever*; birds with severe diarrhoea.
Normal dose: For animals give 25 mg/kg bodyweight. Give once a day every day for four days as tablet, bolus, paste or with water. **Do not give by mouth to adult animals that eat plants (p. 330)**.

Long-acting oxytetracycline

This is specially made so that one injection goes on working for about three days. You often only need to give one injection to treat an animal. It is easy to use, **but it is expensive**. If the animal does not recover after three days give another dose. The medicine is good for all animals of any age. The injection is very strong so divide the dose in half and inject each half in a different place.
Trade names: Rasomycine LA, Terramycin LA.
Useful for: Most infections and diseases. Use for all animals.
Normal dose: Inject 20 mg/kg bodyweight deep into muscle. Example:

Terramycin LA (contains 200 mg/ml)	**Dose**
Large animal	30–40 ml
Small animal	5 ml
Very small animal	1 ml

Thiabendazole for *ringworm*

Thiabendazole is a *worm* medicine (p. 338) but you can also use it to treat *ringworm* (p. 180). Make a 4 per cent oily dressing. Put on every three days. Do this four times.

Tylosin

Trade name: Tylan.
Useful for: Diseases with signs of difficult breathing (p. 128).

Medicines for trypanosomosis, trypanocides

The best way to prevent *trypanosomosis* spread by tsetse flies (p. 295) is to **control tsetse flies** by trapping them if possible (p. 104). Using medicines regularly to prevent *trypanosomosis* is not always completely effective. It needs skilled help, is expensive, difficult to achieve and depends on constantly importing expensive medicines.

Trypanosomosis is caused by different kinds of *trypanosomes* (p. 296). Each trypanosome medicine works best for a certain kind of trypanosome. **Get skilled help**, if you can, to decide which trypanosomes cause disease in your area and to decide which medicine to use.

Trypanosome medicines for different animals

	Berenil	**Cymelarsan**	**Naganol, Suramin**	**Novidium**	**Samorin, Trypamidium**
Cattle, sheep, goats (tsetse)	Treat			Treat	(Treat)/Prevent
Buffaloes (non-tsetse)	Treat		(Treat)		(Treat)/Prevent
Camels (tsetse)	Danger		Treat		Treat
Camels (non-tsetse)	Danger	Treat	(Treat)		(Treat)
Horses (tsetse)	Danger		Treat	Treat	Treat/Prevent
Horses (non-tsetse)	Danger				Treat/Prevent
Horses (Dourine)	Danger		Treat (but see p. 00)		
Dogs (tsetse)	Danger		Treat	Treat	(Treat)
Dogs (non-tsetse)	Danger		Treat		

Where (Treat) is in brackets like this it may be better to use another medicine or to save this medicine for using to prevent disease if possible.
Another medicine, quinapyramine is useful for treating *surra* but it is rarely available now.

Resistance to trypanosome medicines

Trypanosomes easily become *resistant* to medicines, then those medicines do not work. Trypanosome medicines have been used for more than 40 years, often badly, and trypanosomes have become resistant to them in many areas.

Give the right dose of medicine for trypanosomosis. Always follow the maker's directions.

Doses that are too small only kill some trypanosomes; others survive and become resistant to medicines. These resistant trypanosomes breed and soon there are many of them.

Some governments only allow veterinary services to use medicines for *trypanosomosis*. They try to make sure the medicines are used correctly so that resistance won't happen. But in some countries people can get trypanosome medicines to use themselves. It is complicated to use trypanosome medicines well so **get skilled help if at all possible** to avoid making more trypanosomes become resistant.

Berenil (diminazine aceturate) 'Yellow powder' ....

Other trade names: Trypazen, Veriben, Diminazen.
Use for: cattle.
To treat animals with signs of disease:
Normal dose: Mix one small (2.36 g) packet of powder with 12.5 ml of clean water. (This is the dose for one adult cow.) Keep the liquid out of bright sunlight and use it within four days. Inject 3.5 mg/kg bodyweight deep into muscle. Some kinds of *trypanosomosis* need a dose of 7–8 mg/kg bodyweight. Get skilled help to be sure which type you are treating and be careful to give the correct dose.

WARNING

Berenil is poisonous if you give too much. DO NOT USE BERENIL FOR DOGS. NEVER GIVE BERENIL TO CAMELS. It can kill them.

If trypanosomes are resistant to Berenil, use Samorin or Novidium.

Cymelarsan (Melarsamine) ....

Form: Dry white powder (100 mg) in a bottle.
Use for: camels with *surra* (p. 298).
To treat animals with signs of disease:
Cymelarsan is usually the best treatment for camels for disease that happens quickly or that goes on for a long time.
Normal dose: Mix 100 g with 20 ml of *sterile* or clean water. Use the medicine as soon as it is mixed with water. Inject 0.25 mg/kg bodyweight deep into muscle in the neck. One bottle (100 mg) is the dose for an adult camel weighing 400 kg.

Do not treat camels for *surra* just after they have been drinking a lot of water. Wait for a few days after they have drunk much water, before you treat them.

Naganol (Suramin) ....

Other trade names: Antrypol, Moranyl, Suramin. (This medicine is not on the market now but some people still have some.)
Use for: **camels**, (if you have no choice it can also be used for **cattle**, **horses** or **dogs**).
To treat animals with signs of disease:
Normal dose: Mix a 5 g foil packet of powder in 50 ml of *sterile* or clean water.

- **Cattle**: Inject 12 mg/kg slowly into a *vein*.
- **Horses**: Inject 8 mg/kg slowly into a *vein*. Repeat after one week and again after two weeks.
- **Camels**: Inject 10 mg/kg slowly into a *vein*. One packet (5 g) in 50 ml of water is the dose for an adult camel. Some trypanosomes that make camels sick are *resistant* to Naganol. Try Samorin/Trypamidium to treat animals attacked by these trypanosomes.

To prevent disease:
Naganol only protects animals against *trypanosomosis* for about 10 days.

- **Pigs**: Get skilled help to make a complicated medicine that includes suramin.

Novidium (homidium chloride or bromide) ....

Other trade name: Ethidium.
Form: Dark red/blue tablets (250 mg in each tablet).
To treat animals with signs of disease:

- **Cattle**: Mix one tablet (250 mg) with 10 ml of *sterile* or clean water. Use the medicine as soon as it is mixed with water. Inject 1 mg/kg bodyweight deep into muscle in the neck. (One 250 mg tablet treats an animal weighing 250 kg.)

To prevent disease:
Treatment can protect animals from infection for 4–6 weeks. If trypanosomes are resistant to Novidium use Berenil.

Samorin/Trypamidium (isometamidium chloride)

Other trade name: Trypamidium.
Form: Red/brown powder.
Use for: **cattle**, **buffaloes**, (**camels** if you have no choice), **horses** or **dogs**.
Normal dose: Mix a 'one cow' packet (125 mg) of powder in 12.5 ml of water to make a dark liquid. Make sure all the powder dissolves. Use the medicine within two days after it has been mixed with water. Inject deep into muscle in the neck. You can also inject Samorin/Trypamidium slowly into a *vein*, but make sure that all the medicine goes into the vein.

To treat animals with signs of disease:

- Give 0.25–0.5 mg/kg bodyweight.
- **Horses**: Inject 0.5 mg/kg slowly into a *vein* to avoid the reactions that happen if you inject into muscle.
- **Camels**: Samorin/Trypamidium can cause a bad reaction when you inject it into the muscle. Mix 1 g of powder in 50 ml of clean water and inject 0.5 mg/kg bodyweight into a *vein*. (This will treat five adult camels.)

To prevent disease:

It is possible to use Samorin/Trypamidium to protect animals from *trypanosomosis* but it is expensive and if not done carefully makes trypanosomes become resistant.

- Give 0.5–1.0 mg/kg bodyweight.
- Treatment can protect animals for 3–4 months.
- If you use Samorin/Trypamidium to protect animals, treat animals every three months. Also treat the animals at least once a year with a different kind of medicine, such as Berenil, to avoid *resistance*. If you do this, give Berenil 15 days before or after one of the Samorin/Trypamidium treatments.
- If trypanosomes are resistant to Samorin/Trypamidium, use Berenil.
- Do not eat meat from around the place where the injection was.

Medicines for worms

(Medicines used to kill *worms* are often called *anthelmintics*.)

How to use worm medicines

See also Chapter 12 page 94 on 'How to control parasites inside the body'.

To treat a group of animals with *worm medicine* use the weight of the heaviest animals in a group, not the average weight of the group, to calculate the dose of worm medicine (p. 315).

Some human worm medicines work for animals and are useful, especially for treating young goats and sheep.

Most worm medicines come in different forms, either for giving by mouth or by injection. **Some medicines are only for certain kinds of animal and are dangerous for others**. The dose is often different for different animals and depends on the *parasite* you are trying to control. For example, the dose for *liver flukes* (p. 99) may be larger than the dose for *roundworms* (p. 94). Directions that come with worm medicines tell you which animals to use them for and which dose to give. The directions often do not give doses for **camels** but most worm medicines work well for camels, except levamisole (p. 337) which some people say poisons them. Otherwise you can usually use the dose given for cattle.

WARNING

- **Some worm medicines irritate people's skin. If you get worm medicine on your skin or in your eyes, wash it off immediately with plenty of clean water.**
- **It is dangerous to give some worm medicines to pregnant animals, especially for a few weeks after mating and in the few weeks before an animal gives birth.**
- **ALWAYS FOLLOW THE MAKER'S DIRECTIONS.**

An A-Z of medicines for worms and flukes

This A-Z gives normal doses for some of the most common worm problems of different animals.

Albrizia anthelmintica

People in Kenya crush the bark of this tree with a stick and soak it in cold water. They strain the liquid and give it by mouth to treat for some worms. Modern medicines are more effective.

Albendazole

Trade name: Valbazen.
Useful for: Roundworms (p. 218), *tapeworms* (p. 101), *liver flukes* (p. 285).
Normal dose: Give at the end of a dry or cold season.

- For *roundworms*: **Cattle, buffaloes, sheep, goats**: 5–7.5 mg/kg bodyweight by mouth.
- For *liver flukes*: **Cattle**: 10 mg/kg. **Camels**: 7.5 mg/kg bodyweight. **Sheep, goats**: 4.75 mg/kg bodyweight.

Closantel

Trade names: Flukiver, Supaverm.
Useful for: Chronic and *acute liver fluke disease*, some *roundworms*. Only used for **sheep** and **goats**.
Normal dose: For *liver flukes*: 10 mg/kg for chronic and acute disease.

Fenbendazole

Trade name: Panacur.
Useful for: Lungworms (p. 200), *roundworms* (p. 218), *tapeworms* (p. 101).
Normal dose: Give at the end of a dry or cold season. **Cattle, buffaloes, sheep, goats**: 5–7.5 mg/kg bodyweight by mouth. Also use for **horses, mules, donkeys, pigs, dogs, birds**.

Haloxon

Useful for: Roundworms (p. 218), *stomach bots* (p. 159).
Normal dose: **Horses, mules, donkeys**: 50–70 mg/kg bodyweight by mouth.

Ivermectin

Trade names: Equalan, Ivomec, Oramec.
Form: Comes in different forms for giving by mouth, by injection or using as a pour-on.
Useful for: Lungworms (p. 200), *roundworms* (p. 218), *stomach bots* (p. 159), *heartworms* (p. 199) (Dog). Also good for controlling *parasites* on the skin (p. 154).
Normal dose: Give at the end of a dry or cold season. **Cattle, buffaloes, sheep, goats**: 0.2–0.5 mg/kg bodyweight. Also use for **horses, mules, donkeys, pigs, dogs**.

WARNING

Some breeds of dogs, such as Collie dogs with long hair, are poisoned by ivermectin.

Levamisole

Trade names: Levacide, Levacur, Nilverm, Ripercol.
Useful for: Lungworms (p. 200), *roundworms* (p. 218).
Normal dose: This is **not** the best medicine to use at the end of a dry or cold season. For medicine to use at these times see albendazole, fenbendazole, ivermectin, oxfendazole or thiophanate. **Cattle, buffaloes, sheep, goats**: 7.5 mg/kg bodyweight. Also use for **pigs, birds**. **Do not use for camels**

Levamisole and oxyclozanide (mixed)

Trade name: Nilzan.
Useful for: Liver flukes (p. 285), *roundworms* (p. 218).
Normal dose: **Cattle, buffaloes, sheep, goats**: 0.25 ml/kg bodyweight.

Mebendazole

Trade names: Ovitelmin, Supaverm.
Useful for: Lungworms (p. 200), *roundworms* (p. 218), *tapeworms* (p. 101).
Normal dose: **Cattle, buffaloes, sheep, goats**: 15 mg/kg bodyweight by mouth. Also use for **horses, mules, donkeys, dogs, birds**.

Morantel

Trade name: Exhelm.
Useful for: Roundworms (p. 218).
Normal dose: **Cattle**: 1.5 mg/kg; **sheep, goats**: 5.9 mg/kg.

Nitroxynil

Trade name: Trodax.
Useful for: Chronic and *acute liver fluke disease* (p. 286), some *roundworms* (p. 218).
Normal dose: Give by injection under the skin. **Cattle, buffaloes, sheep, goats**: *Chronic* disease: inject 10 mg/kg under the skin. *Acute* disease: inject 15 mg/kg under the skin. **Camels**: For *roundworms*, *liver flukes* and *nasal bots*, inject 10 mg/kg under the skin.

Oxfendazole

Trade names: Oxafax, Systamex.
Useful for: Lungworms (p. 200), *roundworms* (p. 218) *tapeworms* (p. 101).
Normal dose: Give at the end of a dry or cold season. **Cattle, buffaloes, sheep, goats**: 4.5–5 mg/kg bodyweight by mouth. Also use for **horses, mules, donkeys, dogs**.

Oxyclozanide

Trade name: Zanil.
Useful for: Chronic liver fluke disease (p. 286).
Normal dose: **Cattle, buffaloes**: 15 mg/kg; **sheep, goats**: 10 mg/kg.
You can also get Oxyclozanide and Oxfendazole mixed.
Trade name: Systamex Plus Fluke.
Useful for: Liver flukes (p. 285), *roundworms* (p. 218), *tapeworms* (p. 101).
Normal dose: **Cattle, buffaloes, sheep, goats**: 0.2 ml/kg by mouth.

Piperazine

Trade names: Canovel, Citrazine, Endorid.
Useful for: Roundworms (p. 218), *ascaris worms* (p. 220).
Normal dose: Give by mouth or in food or water. **Horses, mules, donkeys, pigs**: 160 mg/kg by mouth. **Dogs**: For *ascaris worms* give 80 mg/kg by mouth. For *hookworms* give 120 mg/kg by mouth. **Birds**: For *ascaris worms* give a chicken 200 mg by mouth.

Pramnia maxima

Some people use the fruits of this plant for *worms*. They crush the fruits and mix them with water. They give the liquid by mouth to treat for worms. Modern worm medicines are more effective.

Praziquantel

Trade name: Droncit.
Useful for: Good for treating dogs with *tapeworms* to prevent *hydatid disease* (p. 102).
Normal dose: **Horses**: 10 mg/kg bodyweight by mouth. **Dogs**: 5 mg/kg by mouth or inject 3.5–7.5 mg/kg bodyweight into muscle or under the skin.

Thiabendazole

Trade name: Thibenzole,
Useful for: Roundworms (p. 218), *Lungworms* (p. 200) in sheep and goats.
Normal dose: **Cattle, buffaloes**: 66–110 mg/kg; **Sheep, goats**: 44–66 mg/kg; **Camels**: 90 mg/kg.

Thiophanate

Trade name: Nemafax.
Useful for: *Lungworms* (p. 200), *roundworms* (p. 218).
Normal dose: Give at the end of a dry or cold season. Use for **cattle, buffaloes, camels, sheep, goats, pigs**. Give by mouth or in the feed.

Triclabendazole

Trade names: Fasinex 5 per cent or 10 per cent.
Useful for: Preventing or treating *chronic* and *acute liver fluke disease* (p. 286).
Normal dose: **Cattle, buffaloes**: 12 mg/kg bodyweight. **Sheep, goats**: 10 mg/kg bodyweight. Also use for **horses, mules, donkeys**.

Medicines for parasites outside the body, insecticides

Chemicals for killing *parasites* outside the body are usually called *insecticides*, some people call insecticides for killing, mites and ticks *acaricides* or *tickicides*.

How to use insecticides

WARNING

Take care when using insecticide.

- Do not leave insecticides where children or animals can reach them.
- Do not eat or smoke when you are using insecticides.
- Avoid rubbing your eyes when you may have insecticide on your hands.
- Wash your hands and any equipment you used after you use insecticides.
- Do not put waste insecticides into streams or lakes. Dispose of them on a piece of ground away from where people and animals are and away from water. Insecticides, especially organophosphates (p. 305), can poison people and animals and poison fish if they get into water.

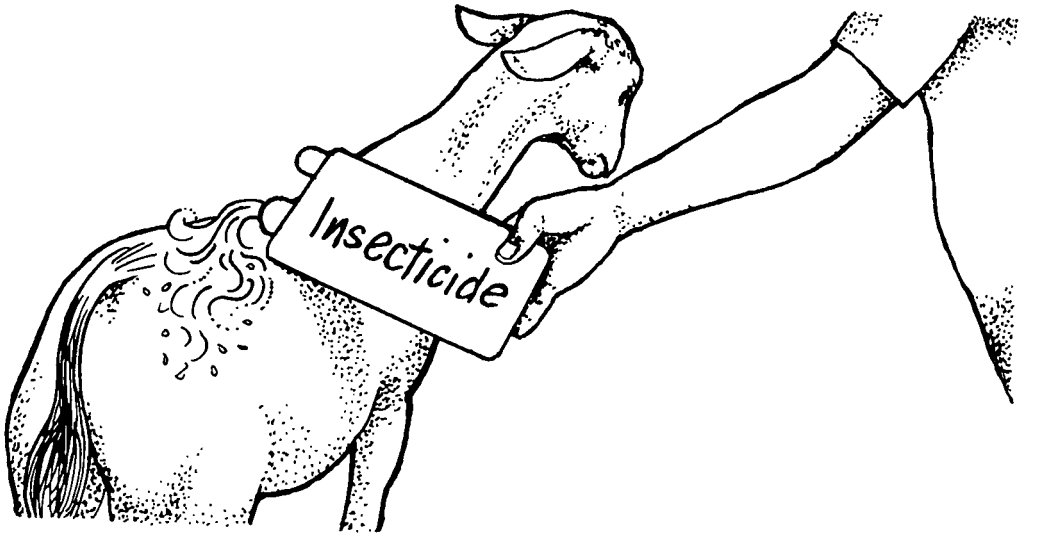
The makers may also recommend you to:

- Wear protective clothing when you use insecticide.
- Avoid drinking milk from treated animals for two days after treatment.

To handle, use and dispose of insecticides **always follow the maker's directions.**

Pour-on insecticides

Some insecticides work when they are poured on to the skin of an animal. **Only** medicines that have been specially made to go through the skin work like this. They are easy to give, they don't need mixing with water and you do not have to hold the animals very securely. But they are strong and you must give the correct dose. **Be careful** with pour-on insecticides because they can go through your skin and may be poisonous.

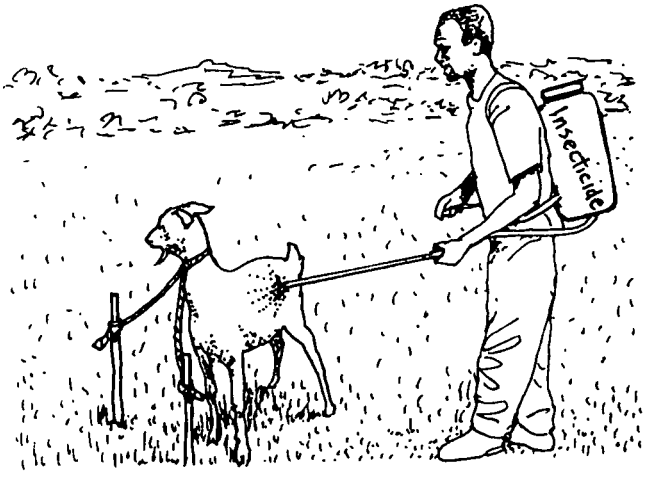


Pour-on insecticides, such as deltamethrin, rub off the animals you treat onto other animals in a group, so many people only treat some animals in a group and hope the chemical rubs off onto the others and protects them against flies too. But some animals do not get much insecticide on them and this can help make insects become *resistant*.

How to spray animals with insecticide

Spraying animals is a good way to use insecticide when you treat only a few animals. Some chemicals can be sprayed onto pregnant animals that should not be dipped, but to treat a large group of animals, especially if you treat them often, a dip is better.

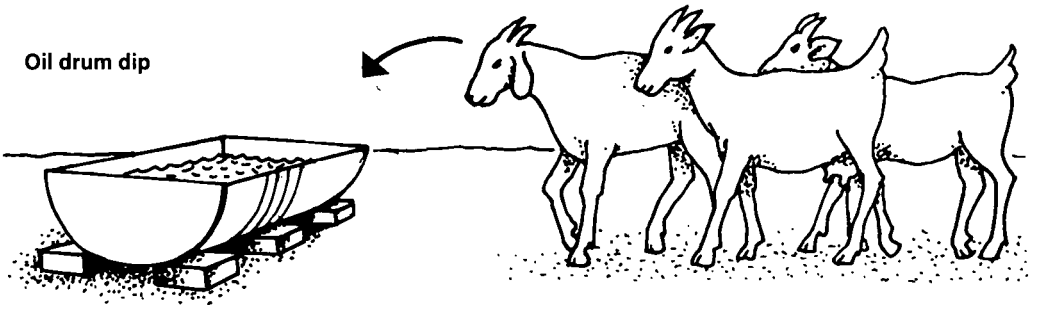
- Tie the animal securely.
- Make sure you spray all over the animal: spray the feet, spray under the tail and between the back legs, spray under the abdomen, along the sides and over the back, spray the front legs, spray the neck and head and into the ears.



How to dip animals in insecticide

Dipping is a good way to make sure that animals are properly covered all over with insecticide. But you need a lot of water and it is complicated to mix the right amount of insecticide with water and to keep the dip at the correct strength. A dip tank for many large animals needs to hold at least 15,000 litres (75 oil drums) of water and insecticide. Even a small dip tank for a few animals needs to hold about 10,000 litres. It is a big project to build a proper dip for animals. Get skilled advice before you build a dip and skilled help to use one. If you only need to dip a very few sheep or goats you can make a good dip tank using half an oil drum.

Dip animals in water which has insecticide in.

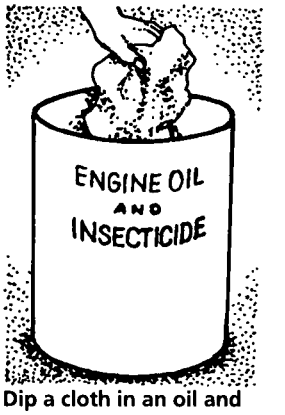


Some important things to remember about using a dip are:

- Make sure animals cannot reach dip chemicals before they are mixed with water, **they are poisonous**.
- Clean out the dip tank at least every year and keep the tank and the place where animals go in and out clean. Remove faeces, soil and grass.
- Check the level of the dip before you use it. Add enough water and the right amount of dip to keep the tank full up. Get a skilled person to check the strength of the dip in the tank.
- It is best to dip animals when it is warm and dry.
- Keep animals in a pen and give them water to drink before they are dipped to stop them drinking the dip.
- Dip animals of about the same size at the same time.
- Guide animals into a dip so they cannot turn round and only put one animal into the dip at a time.
- **DO NOT DIP ANIMALS THAT WILL VERY SOON GIVE BIRTH**.
- Only keep animals in a pen for a short time after you have dipped them. Let the dip drain off then send them back to pasture.
- Keep a record of which animals you dip, when, and the name of the chemical you used.

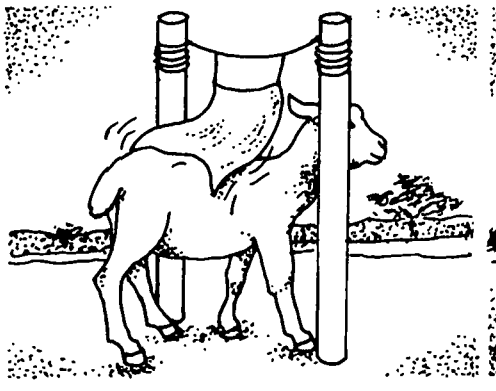
How to make an insecticide rub

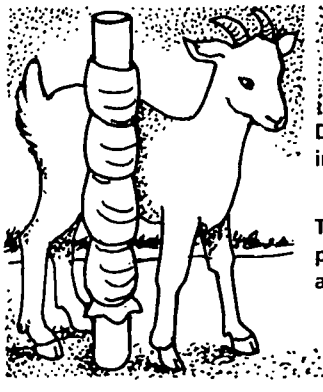
- Soak some cloth or an old sack with a mixture of oil (old engine oil will do) and insecticide (below) and put it where animals will rub against it.
- Hang the cloth from a pole so animals walk under it or tie the cloth round a pole in the ground.



Dip a cloth in an oil and insecticide mixture.

Hang the cloth between two poles for animals to walk under and rub against the cloth.





Tie the cloth around a pole for animals to rub against it.

An A-Z of insecticides

These are some useful common insecticides. Remember they can make insects become *resistant* (p. 108) and that **many of them are poisonous**. Many governments have regulations about which insecticides can be used and some stop people using certain insecticides that are dangerous for animals or people.

WARNING

Horses, mules and donkeys are easily poisoned, or even killed, by some insecticides, for example, Amitraz causes severe colic.

Amitraz

Trade names: Aludex, Taktic, Triatix
Useful for: *Lice*, *mites* and *ticks* (p. 103).
Use as a dip, pour-on or spray.

WARNING

Do not use for horses, it can cause severe colic.

Ash

Before they had insecticide powders people in West Africa used ash to treat their **chickens** for fleas and lice. They made ash from burned millet straw into a fine powder with some sand and covered the whole bird with the powder. Modern insecticides work much better. Mix ash or fine sand with some insecticide to make a dusting powder.

Benzene hexachloride, BHC, Lindane

....

Trade names: Coopers Lice and Mange Dressing, Gammatox
Useful for: *Lice* (p. 157), *mange (mites)* (p. 154), repelling midges and some flies. Useful for **horses**, and also for **birds** with *parasites* on the skin, feathers or legs.

People in Nepal use BHC to make a dusting powder for birds with lice. They mix about 100 g of BHC powder with 1 kg of fine ash. They put this mixture on the animal every week until there are no more lice.

For *mange*:
Mix BHC with any oil to treat mange, Useful for **horses**, **mules** and **donkeys**. Put on the skin and repeat after 10 days.

For *mange* in the ear:
Mix BHC with vegetable oil. Put some plain oil into the ear first and rub the ear gently to clean out the crust and the *mites*. Then put in some oil mixed with insecticide. Do this every day for a few days until the animal stops rubbing and shaking its head.

WARNING

Benzene hexachloride is poisonous and it is often better to use more modern insecticides.

Benzyl benzoate

Form: This usually comes as an oily liquid.
Useful for: *mange* (p. 154), especially useful for *mange* in the ears of **any animal**.

Castor-oil bean plants

People in Ethiopia use leaves and stems of these plants as an insecticide. They mix a large handful of chopped leaves with 10 litres of water. They boil the water with the leaves in it, then let the liquid cool. They press down the boiled leaves. They use the liquid to wash and scrub an animal to treat *mange* (p. 154) and for some other insect *parasites*, especially for goats with *mange mites* that burrow into the skin.

WARNING

Castor-oil plants, and juices from them, are poisonous if people or animals eat much of them.

Charcoal

Some people make a paste with fine charcoal – sometimes they use the black powder from inside old batteries – and rub that on to parts of the skin with *mange* (p. 154) to kill *mites*.

Coumaphos (organophosphate)

Trade name: Asuntol.
Useful for: *Flystrike* (p. 161), *hump sore* (p. 174) and many external *parasites*.
Use Asuntol to make a dusting powder. Mix 10 g of Asuntol powder with 1 kg of fine sand and brush onto the animal. Also useful for mixing with oil to make an insecticide rub (p. 341).

Cypermethrin (pyrethroid)

Trade names: Barricade, Cypor, Parasol.
Useful for: *Flies* (p. 158), *flystrike* (p. 161), *lice* (p. 157) and some *ticks* (p. 105).

Cyromazine

Trade name: Vetrazin.
Form: Comes as a 'Pour-on' liquid.
Useful for: *Flystrike* (p. 161).

Deltamethrin (pyrethroid)

Trade names: Spot On, Butox, Glossinex.
Form: Usually comes as a 'Pour-on'.

Useful for: Many insects and *ticks* (p. 103). Repelling some flies. Helps repel tsetse flies (p. 103) and prevent *trypanosomosis* (p. 295).

Derris

Roots of the plant *Derris elliptica* contain insecticides. Some people make a powder from dried roots and mix about 500 g of this powder and 100 g of soap with 5 litres of water. Or they crush fresh roots and mix about 1 kg of them and 250 g of soap with 10 litres of water. They strain the liquid and use it as a spray or wash to kill *ticks*, *mites*, or *lice* (p. 103).

Dichlorvos

Use as a liquid medicine and give by mouth to control horse bots. This insecticide also comes in plastic strips to hang up in buildings to control flies.

Diazinon (organophosphate)

Trade names: Coopers dip, Diazidip, Neocidal.
Useful for: Fly control on animals and around buildings, *flystrike* (p. 161), *mange* (p. 154).

Ditrifon (organophosphate)

Useful for: *Lice*, *mites* and *ticks* (p. 103).
Form: White powder.
Mix 15 g in 10 litres of water and soak a whole animal in the liquid by spraying, dipping or pouring over the animal. Treat the animals again after two weeks.

Engine oil

Some people who do not have insecticides use old engine oil to treat *mange* (p. 154). They rub the oil into the parts of skin with *mange* to kill *mites*. Do not put engine oil over the whole body at once. If a large area of skin has *mange* only treat part of it at a time then treat the rest the next day.

Engine oil and sulphur

Some people mix 30 g of sulphur with 100 ml of used engine oil. They rub this over the parts of the skin with *mange* to kill *mites*.

Engine oil and nicotine

Some people in Kenya mix 100 ml of nicotine (7 per cent) with about 1 litre of used engine oil to make an only dressing to kill *ticks* (p. 107).

Eucalyptus trees [*Eucalyptus* species]

The leaves from eucalyptus trees may repel insects. But there are many kinds of eucalyptus trees. Some work better than others do.

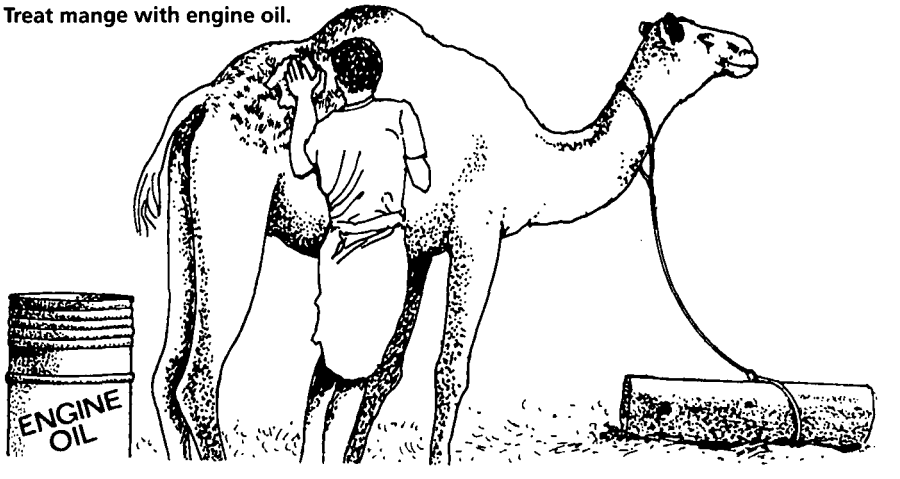
Fenthion

Trade names: Tiguvon, Baytex.
Form: Use as a 'Pour-on'.
Useful for: *Lice* (p. 157), *mange (mites)* (p. 154), *flystrike* (p. 161).

Fish poison bean, *Tephrosia vogelii*

Some people in East Africa use the leaves of this plant as an insecticide. They crush about four large handfuls of leaves from this plant in a litre of water and let it soak for a few hours. They brush the liquid onto an animal's body to kill *ticks* and other insects. Some people also use crushed leaves to rub around wounds to repel flies.

Treat mange with engine oil.



Flumethrin (Pyrethroid)

Trade name: Bayticol dip.
Form: Comes as a liquid to mix with water for sprays or dips.
Useful for: Some flies, *lice* (p. 157), *mange (mites)* (p. 154) and some *ticks* (p. 105).

Insecticide rub

Soak a piece of cloth in any insecticide to make an insecticide rub or soak a cloth with insecticide to kill *ticks* by hand (p. 108). Mix insecticide with water or oil to soak the cloth. Use insecticide about ten times the strength used for making a dip.

Ivermectin

Trade names: Ivomec, Oramec.
Form: Comes in different forms for giving by mouth, by injection or for using as a 'Pour-on'. **It is expensive** and may be difficult to get.
Useful for: Some *lice* (p. 157), *mites (mange)* (p. 154), *flystrike* (p. 161). It helps to control a few kinds of tick but is not usually the best chemical for *ticks* (p. 105). Ivermectin is used often for *worms* (p. 337) and using it too often for *parasites* outside the body may help to make worms become *resistant* (p. 197).

WARNING

Some breeds of dog, especially Collie dogs with long hair, are poisoned by ivermectin.

Lindane

See **BHC** (p. 342).

Neem trees [*Azadirachta indica*]

See **Wound dressings** (p. 327).

Neguvon (organophosphate)

See **Trichlorphon** (p. 345).

Nicotine sulphate

To treat birds with *parasites* in the feathers and on the skin, put nicotine sulphate on the poles they perch on. Spread about 75 g of (40 per cent) solution along every 10 metres of perch. Make sure there is plenty of fresh air in the birds' house.

Some people mix about 25 ml of nicotine sulphate (40 per cent) solution with 1 litre of used engine oil to make an insecticide rub for animals. Nicotine sulphate works but not as well as modern insecticides. **It is also very poisonous** (p. 308).

Organophosphate insecticides

Useful for: Controlling all insects on the skin and for the *larvae* of flies in wounds. For most insect problems treat animals twice 2–3 weeks apart. Organophosphate insecticides are **very poisonous** for people and animals, especially before they are mixed with water (p. 305). People and animals can absorb organophosphates through their skin. **Be careful when you use them.**
Common organophosphate insecticides are: Coumaphos, Diazinon, Ditrifon, Phosmet, Propetamphos, Trichlorphon.

Permethrin

Trade names: Exspot, Coopex, Ridect, Ryposect, Stomoxin.
Useful for: Lice (p. 157), flies, fleas, repelling flies (p. 103).

Phosmet (organophosphate)

Trade names: Nupor, Porect, Prolate.
Form: Use as a 'Pour-on'.
Useful for: Flystrike (p. 161), *lice* (p. 157) and *mange (mites)* (p. 154).

Propetamphos (organophosphate)

Trade name: Seraphos.

Pyrethroid insecticides

Pyrethroid insecticides are similar to a natural chemical that comes from the flowers of pyrethrum plants. They are good for controlling and repelling flies. Common pyrethroid insecticides: Cypermethrin, Deltamethrin, Flumethrin, Permethrin.

Salt

Many people use salt to help control *parasites* on the skin. They wash their animals in salt water from very salty wells or take them to salty places to control many parasites on the skin.

Solanum incanum

To treat *flystrike* (p. 161) some people use seeds of the plant *Solanum incanum*. They boil the seeds with camel urine and make this into a thick paste with the black sap from *Acacia tortilis* trees. They put the paste on the skin when the mixture is still warm. Some people also use this mixture to treat *mange* (p. 154).

Stockholm tar

Useful for: Repelling some flies and is good for treating infections and wounds of the feet.

Sulphur

Sulphur comes as a yellow powder. You can also get manufactured medicines that contain sulphur. Some insecticides are made of sulphur mixed with lime. Some sulphur medicines can be mixed with water and used as a wash or a dip. Many people use sulphur to treat *mange* (p. 154). They mix sulphur powder with vegetable oil to make a paste and put it on the skin every week for about a month to kill *mites* (p. 154).

Tick grease

Tick grease is easy to use to kill *ticks* (p. 108) on only a few parts of the body. Tick grease is cheap. It is usually reliable because traders cannot cheat people just by adding water to it.

Tobacco

Tobacco is useful as an insecticide because it contains nicotine. You can also use nicotine sulphate (p. 344).

People in Nepal mix about 2.5 kg of tobacco and 1.5 kg of soap in 15 litres of water and boil it until only 5 litres remain. They let the liquid cool and filter it through a cloth to use it as an insecticide wash for controlling many insect *parasites*. Some people soak about 500 g of tobacco leaves and 20 g of salt in 1 litre of water for 2–3 hours. Then they rub the animal with the wet tobacco leaves to control *ticks* (p. 105).

Trichlorphon

Trade names: Dipterex, Dylon, Dylox, Neguvon, Ruelene, Taktic.
Useful for: *Mange (mites)* (p. 154), *ticks*. (Neguvon is a type of trichlorphon that is also made for giving as a liquid by mouth to control *worms*.)

Toxaphene

Trade names: Coopertox, Strobane.
Useful for: dips.

Medicines for problems with eating and digestion

Medicines for diarrhoea

- For animals with diarrhoea that have a fever give an antibiotic (p. 328).
- For animals that have diarrhoea but no fever – **and** to help animals with a fever – give one of these medicines.

Acacia trees

People in Kenya use bark from *Acacia seyal* trees for animals with diarrhoea. They soak the bark in cold water or in hot water and leave it to get cool. The liquid then looks dark red, almost like blood. They give some of this liquid by mouth to help animals recover from diarrhoea.

People use the bark of other kinds of acacia trees [*Acacia nilotica, Acacia nubica*] in the same way. They also use the roots of *Acacia brevispica* in the same way.

Chalk

Chalk usually comes as a white powder. If it comes in lumps grind it into a powder. Mix it with some water till it is a milky liquid. Give by mouth.
Normal dose:

- Large animal: Give 120 g in some water.
- Small animal: Give 50 g in some water.

Charcoal

Grind charcoal very finely and mix with water. Mix about 200 g (four handfuls) in 1 litre of water.

Kaolin

Kaolin is fine white clay powder. Mix with water until it is a cloudy liquid. Give by mouth for a few days till the diarrhoea stops.

Normal dose:

- Large animal: Give 100–250 g twice every day.
- Small animal: Give 20–100 g twice every day.

Guava trees [*Psidium* species]

In Asia some people boil 500 g of guava leaves in a litre of water and let it cool. They give the liquid 2–3 times a day by mouth to help animals to recover from diarrhoea.

Tea

Some people boil a handful of tea leaves in 1 litre of water, then strain it and let it cool. They give the liquid by mouth to help animals recover from diarrhoea.

Rehydration fluid

You can give plain water as a rehydration fluid but **it is better to make a special fluid by adding sugar and salt to the water**. Use clean water. (If the water is not clean it may have *microbes* in it that will make the animal more sick.) If you are not sure that water is clean, boil it and let it cool.

- Give as much as the animal will easily drink. If an animal is very *dehydrated*, try to give about one tenth of the animal's bodyweight each day (about one litre of fluid for every 10 kg of bodyweight) for two or three days.
- Give this in small amounts often. Or give about half the amount in the morning and half in the evening.
- Give the same amount every day for four days if needed.
- If the animal will not drink or swallow the fluid, use a *stomach tube* (p. 318).
- It is important to give some rehydration fluid **before** you give medicines when animals are very sick.

Rehydration fluids you can make

1 Mix 10 g of salt with 20–50 g of sugar in 1 litre of clean water. Add half a small spoon of sodium bicarbonate (baking soda) if possible.
Normal dose:
- Large animal: 2–3 litres.

Give 2 or 3 times a day.
- Small animal: 500ml–1 litre.

Give 2 or 3 times a day.

2 Mix 5 g of salt with 1 litre of water that has been used for cooking cereal.
Normal dose:
- Large animal: 1–3 litres.

Give 2 or 3 times a day.
- Small animal: 500ml–1 litre.

Give 2 or 3 times a day.

Injecting rehydration fluid into a vein

When animals are very *dehydrated* or when they have lost a lot of blood, skilled workers often inject fluids slowly into a *vein*. They use *sterile* fluids.

Rehydration medicines

Trade names: Ionalyte, Ion-aid, Lectade, Scourproof.

These usually come as powder in a packet. Follow the maker's directions to mix them with the right amount of clean water.

Medicines for constipation, laxatives

Use one of these medicines to help make constipated animals (p. 212) pass faeces. Give these doses every day for 1–3 days, unless it says otherwise, until the animal starts to pass faeces.

Wet, green food

Give animals food, such as fresh, wet grass. Do not give them hard, dry food.

Liquid paraffin

Form: A clear oily liquid.

WARNING

Liquid paraffin is not the same as the paraffin (kerosene) that is used for fuel.

Liquid paraffin is a powerful laxative, avoid using it for more than two or three days, especially for small animals.
Normal dose:
- Large animal: Give 1–2 litres by mouth once a day.
- Small animal: Give 50 ml by mouth once a day.

Magnesium sulphate, Epsom salts .....

Form: A white powder that looks like salt. Mix 100 g in a litre of water until it goes clear and give it by mouth. **Do not use this medicine for very small and new-born animals**.
Normal dose:
- Large animal: Give 300–500 g.
- Small animal: Give 50–100 g.

For **horses, mules** and **donkeys**:
- Adult: Give 30–50 g.
- Young animal: Give 5–10 g.

Castor-oil

Normal dose:
- Large animal: Give 100–200 ml.
- Small animal: Give 20–50 ml.

Other vegetable oil

Any edible vegetable oil, e.g. groundnut oil, works well. Give by mouth. Give the dose twice a day for two or three days.
Normal dose:
- Large animal: Give 250–500 ml.
- Small animal: Give 100 ml.

Dried aloes [*Aloe* species]

In India people give 50–100 g of dried pulp from aloe leaves to make animals pass faeces.

Bran mash

Useful for: **Horses** that do not pass faeces. It also helps to make a sick horse start eating normally. Mix 1 kg of bran with 2 litres of hot water. If you can, add 30 g of salt and about 300 ml of molasses to encourage the animal to eat it. Let the mash cool but give it to the animal before it goes cold.

Milk

People in Mali often give 4–5 litres of milk to a cow to make it pass faeces.

Medicines for frothy bloat

Give one of these medicines by mouth for *frothy bloat* (p. 215), oily medicines are often the most useful.

Vegetable oil

Give any edible vegetable oil or solid cooking fat, butter oil, ghee or even milk.
Normal dose:
- Large animal: Give about 500 ml.
- Small animal: Give about 100 ml.

Washing-up liquid

Mix about 50 ml of washing-up liquid in 1 litre of water.

Pepper or ginger

People use medicines with pepper or ginger in them but they do not usually work as well as oily medicines.

Bloat medicine

Give a manufactured bloat medicine.
Trade names: Stop Bloat, Bloatguard, Birp.
You often need only a small dose of these medicines. Follow the maker's directions that come with the medicine.

Medicine to make sick animals eat normally

Tamarind pulp juice [*Tamarindus indica*]

Many people give tamarind pulp juice by mouth to help make sick animals eat normally.

Normal dose:

- Large animal: 500 ml.
- Small animal: 200 ml.

Medicines for animals that eat too much grain

When an animal eats too much grain, such as when it has broken into a food store, the grain turns to acid in the *rumen*. The acid makes the animal sick and stops it digesting food properly. These alkali medicines work to neutralise this acid.

Give these medicines as soon as possible. Give them until the animal recovers but not for more than four days.

Sodium bicarbonate

Form: This comes as a white powder.
Mix the dose with enough water to dissolve it – the liquid goes clear. Wait till it has stopped bubbling and give by mouth.
Normal dose:

- Large animal: Give 400 g in water, repeat after a few hours if needed.
- Small animal: Give 50 g in water, repeat after a few hours if needed.

Aluminium hydroxide (powder)

Normal dose:

- Large animal: 20 g. Give by mouth 2–3 times every day.
- Small animal: 2 g. Give by mouth 2–3 times every day.

Medicines for other problems

Anaesthetics

Local *anaesthetics* are medicines used to stop animals feeling pain. **General** anaesthetics also make an animal unconscious and skilled workers use them to do complicated operations on animals. Local anaesthetics just work on the part of the body where you put the anaesthetic.

Local anaesthetics

Trade names: Xylocaine, Lignocaine, Bupivicaine.
They usually come as clear injections and tell you the strength, e.g. 2 per cent injection. Follow the maker's directions. You usually inject 1–5 ml under the skin at the place where you need it.
Useful for: castrating and removing the horns of young animals and other small operations, e.g. stitching wounds.

To make eyewash for *eyeworms* (p. 150), mix 10 ml of 2 per cent local anaesthetic with 40–50 ml of clean water.

WARNING

Keep an animal somewhere sheltered from the wind for 10–20 minutes after you put anaesthetic into its eye. This is to stop grit and dust going into the eyes. After you put local anaesthetic on the eye an animal cannot blink to protect itself.

Medicines for eyes

Only put medicines into the eye that are specially made for the eyes.

Water

Use clean fresh water to wash eyes if there is nothing else. If you are not sure the water is clean, boil it and let it cool. Or use one of these eyewashes:

Water and salt

Mix a pinch (1–2 g) of salt in 1 litre of clean water.

Water and boracic acid

Mix 10 g of boracic (boric) acid in 1 litre of clean water.

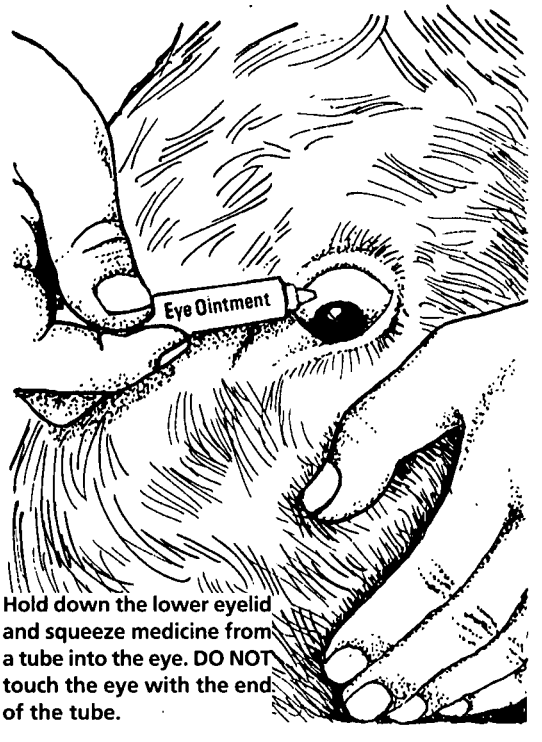
Coconut milk

Use milk from a freshly opened coconut. It is *sterile* and good for washing the eye.

Milk

People use milk to help eye injuries and disease to recover. They bathe the injured eye with a few drops of milk every day to help the eye to recover.

Antibiotics for infected eyes



Hold down the lower eyelid and squeeze medicine from a tube into the eye. DO NOT touch the eye with the end of the tube.

These come as ointment, drops or powder. Give eye medicine several times a day because the medicine is soon washed away by tears. You usually need to do this for about four days until the animal recovers but it may take longer. Some antibiotics are made to last longer and you only need to give them every two or three days.

To put ointment on the eye, hold down the lower eyelid and squeeze the medicine out of the tube. Do not let the tip of the tube touch the eye.

You can put soluble antibiotic powder, eg, chlortetracycline powder, onto the eye but his can irritate the eye more than ointment or drops do. It is easiest to use powder that comes in a plastic puffer bottle.

Puff antibiotic powder into the eye.

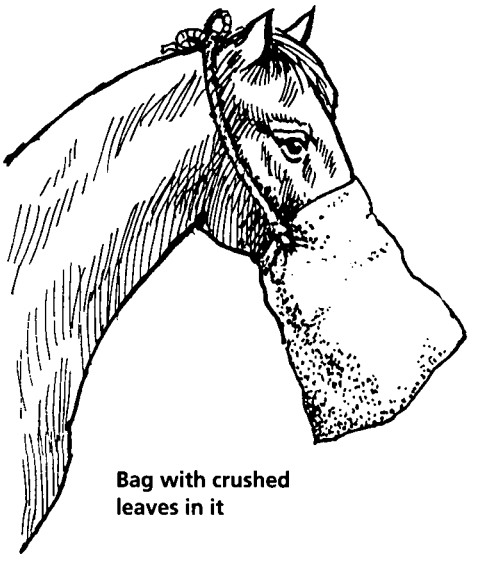
Medicines for ears

- Warm water and soap or vegetable oil is useful for cleaning infected ears or ears with much wax because of ear *mites* (p. 152).
- Mix vegetable oil or paraffin with insecticide, e.g. Gammexane, and put a few drops into the ear for ear *mites*.

Medicines for breathing problems

Animals with breathing difficulties that have a *fever* or have signs of *pus* around the nose have infection and need antibiotics (p. 328). But there are other ways to help animals with difficult breathing.

- If the animal lives in a house make sure it has plenty of fresh air. If the place is dusty move the animal outside.
- Many people use leaves and other things that give off an aroma for an animal to breathe to help it recover from breathing problems. People in Senegal crush the leaves of *Boscia senegalensis* trees. They put about two handfuls of crushed leaves and fruits into a bag. They hang the bag over the animal's nose to help it recover from breathing problems. But the fumes are **very poisonous** and they do not do this for more than five minutes.



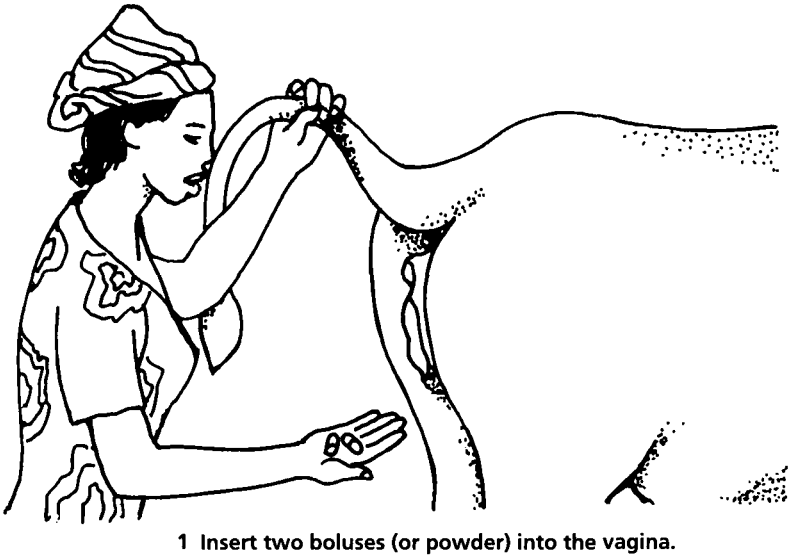
Bag with crushed leaves in it

Medicines for retained placenta

- If the *placenta* does not come out for a long time or there is a foul smell from the *vagina* or if the animal is very sick give an antibiotic injection (p. 328).
- Many people give medicines made from plants to an animal with a retained placenta. They soak the chopped up roots and other parts of the plant *Cotyledon barbey* in water. They give the animal about 1 litre of the liquid by mouth and say it helps to make the placenta come out. Another plant people use for this is *Salvadora persica*. But if the animal is sick give an antibiotic as well.

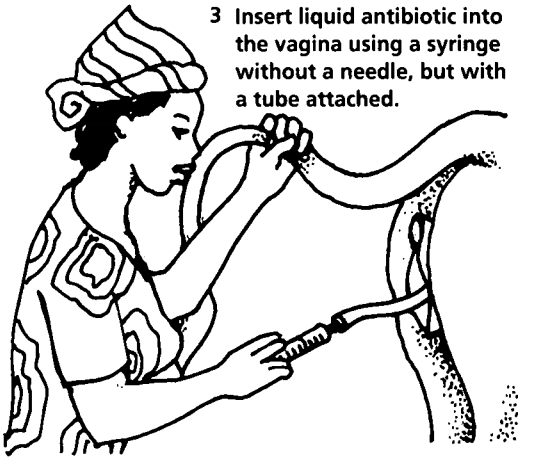
Medicines for the uterus and vagina

It is often useful to put antibiotic into the *vagina* or *uterus* to treat or prevent infection, especially after a difficult birth and to treat *metritis* (p. 241). Some antibiotics are specially made for this and come as boluses. **Wash your hand and arm** (see p. 55) and carefully put the boluses as far into the vagina or uterus as you can reach (1 and 2). You



1 Insert two boluses (or powder) into the vagina.

2 Push the boluses as far into the vagina as possible.



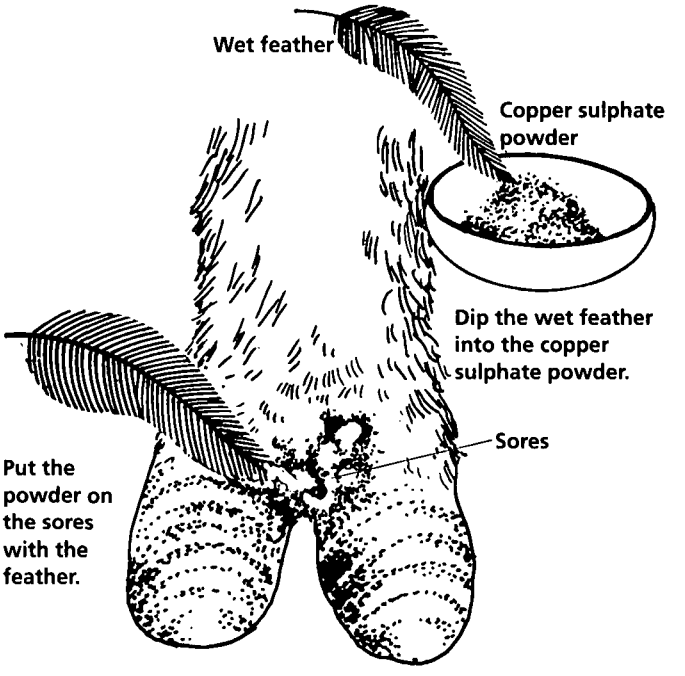
3 Insert liquid antibiotic into the vagina using a syringe without a needle, but with a tube attached.

can also use antibiotic powder or antibiotic made for injection. Put powder into the vagina or uterus with your hand or mix it with water and give it as a liquid, using a syringe with a rubber tube on the end (3), or a syringe without a needle hidden in your hand.

Cauterising chemicals

Cauterising chemicals 'burn' the flesh. They are useful when infection causes a fleshy growth, for example the sore that sometimes grows between the claws when animals have *footrot* (p. 254). They also help to stop small wounds from bleeding.

- Use a little copper sulphate powder; you can put it on with a wet feather.
- Some people use the juice from some kinds of euphorbia trees, such as *Euphorbia kibwezi* to cauterise some sorts of *abscesses* (p. 170).



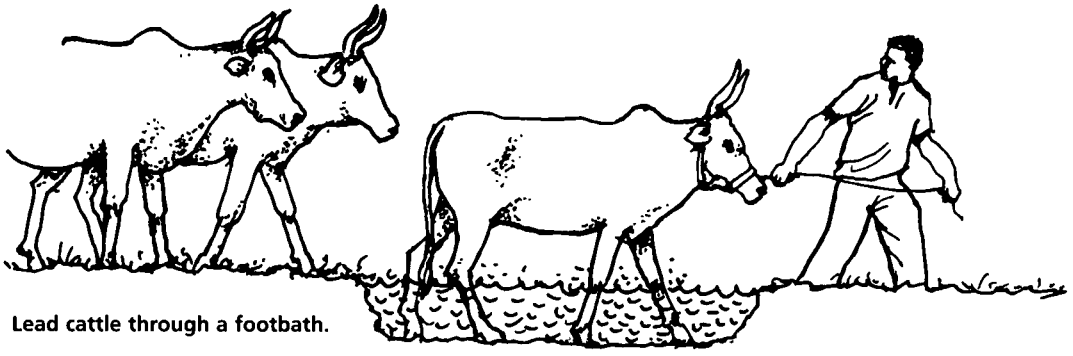
WARNING

Be careful with these chemicals and never let them get into the eyes.

Footbaths

A useful way to treat many animals at the same time for *footrot* (p. 254) or other foot infections is to make them walk through a *footbath*.

- Fill the bath with copper sulphate (5–10 per cent).
- Walk the animals through the bath once a week until they recover.



Lead cattle through a footbath.

WARNING

Copper sulphate is very poisonous for sheep if they drink it.

- When footrot is severe or when there is bad infection of the foot give an antibiotic injection: penicillin and streptomycin mixture (p. 332) is good for this.
- Put antibiotic spray or powder or crush antibiotic boluses into powder to put on the sore place.

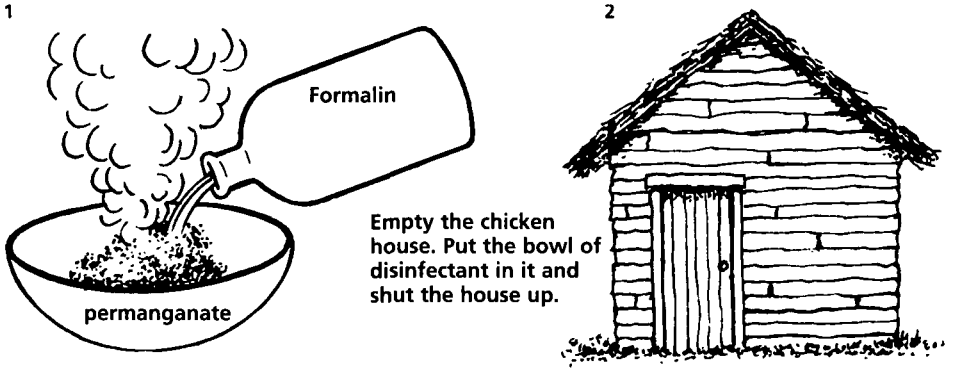
How to repel birds

Birds that live on animals can spread disease. They damage an animal's skin when they feed on insects. To repel birds you can put some chemicals on the skin, e.g. Stockholm tar, Aloe juice [*Aloe* species.], *Tephrosia vogelii* leaves.

Fumigation

Houses where birds live often become contaminated with infection. Then disease spreads to new birds that come into the building. To kill *microbes* that spread diseases in buildings:

- Empty the building.
- In a bowl on the floor, mix 130 g of formalin onto 85 g of potassium permanganate (1). This produces gas that disinfects the building. It will produce enough gas to disinfect about 3 cubic metres. The gas is produced quickly and is dangerous for people.
- As soon as you have mixed the disinfectants leave the building and close it behind you (2).



WARNING

Always put formalin onto potassium permanganate not the other way round.

30 Vaccines

***Vaccines* are complicated to use properly.**

- You need skilled help to decide which vaccine to use and which animals to vaccinate and when.
- It is often important to use a type of vaccine specially made for the disease that happens in your area.
- Always follow the maker's directions that come with a vaccine.

This book tells you in the description of each disease whether there is an effective vaccine for it. If there is, it gives some guides about how to use it.

What are vaccines and how do they work?

Vaccines can protect animals from getting diseases. They are for **preventing** diseases, **not for treating** them. Vaccines are different to other medicines for infections. A vaccine only protects an animal against the particular disease that the vaccine is for. Other sorts of medicines for infections, e.g. antibiotics, can each work for many different diseases.

Vaccines are made of weak or dead *microbes*. The microbes in a vaccine are the same kind as the ones that cause disease but they have been specially treated (or killed) to make them too weak to cause disease. When you vaccinate an animal, the animal fights against the weak microbes in the vaccine but does not get disease. It produces *antibodies* (p. 89) in the blood to fight the microbes in the vaccine. If an animal then gets infected with real microbes of this kind it has antibodies ready to fight them off.

Live vaccines

(These are sometimes called attenuated vaccines.)
Live vaccines are made of live, specially weakened microbes. They can give stronger protection against diseases than dead vaccines because they make the animal respond more. The weakened microbes breed inside the animal when you inject the vaccine so there do not need to be so many of them in the vaccine. They often protect an animal for a long time and you do not need to give another vaccination so soon. For example, modern live vaccine for *rinderpest* (p. 291) lasts for an animal's life.

Live vaccines need to be looked after very carefully because they have live microbes in them. They have to be kept **cool** in a refrigerator or cold box (p. 354) until you use them.

Some live vaccines are already mixed with liquid. Others are made with dried microbes – they look like powder or a tablet in the bottom of the bottle. You have to mix these with special liquid before you use them. The dry microbes that live vaccines are made of are 'asleep' until you 'wake them up' with the special liquid. The liquid used to do this is usually

a mixture of salt and water called *saline*. You can make this liquid with water and special salt tablets. **Always use clean water** to make this fluid. Boil the water and let it cool. Do this wherever the water has come from. Even if the water has come from a tap. Water that comes from modern taps has often been treated to kill microbes. If you do not boil the water it can kill the microbes in a vaccine.

WARNING

DO NOT GIVE LIVE VACCINES TO PREGNANT ANIMALS.

Dead vaccines

(Dead vaccines are also called killed or inactivated vaccines.)
Dead vaccines are made of microbes that have been killed. Because the microbes in them are dead they cannot breed inside an animal. So there have to be many of them to make the animal produce antibodies. Dead vaccines usually have special chemicals mixed with them to make them stronger. You often have to give two vaccinations a few weeks apart. Some dead vaccines can cause swellings at the place where you give the injection.

Dead vaccines do not usually protect animals against disease as strongly as live vaccines do. They do not usually protect the animal for long. Often you have to give another vaccination every year or even more often. Dead vaccines usually come already mixed up with liquid in the bottle and are ready to use. Keep them cool and out of bright sunlight. They do not always need to be kept in the refrigerator or cold box like live vaccines do. Dead vaccines are often more expensive to use than live vaccines.

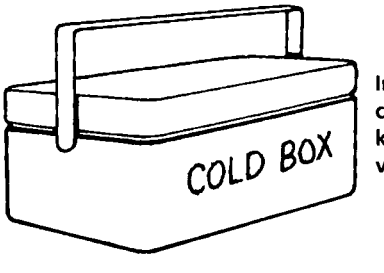
Traditional vaccination

Some people vaccinate animals without modern medicine. They take infection from a sick animal, e.g. from a scab or sore, and vaccinate healthy animals with it. They sometimes make the infection less strong by putting the scab in water for a time. Then the infection does not cause disease when they do the vaccination. People who have learned how to do this sometimes successfully vaccinate animals for one or two diseases in their area. It is difficult to learn how to do this reliably. It is not possible to do this for many diseases. It does not always work and may easily spread disease and make animals sick.

How to keep vaccines

Before you get vaccines, make sure that you will be able to store them properly.

- Vaccine should be well packed so that it does not break and has clear labels that do not fall off.
- Vaccines should have directions with them that tell you how to keep them and how long they will keep.
- Keep vaccines in a dark place.
- All vaccines are best kept in cool places. Between 2°–8°C is best. Live vaccines need to be kept in a refrigerator or cold box. Even dead vaccines need to be kept in cool places. **Do not freeze vaccines**. Freezing damages some vaccines.



Insulated cold box to keep vaccines cool.

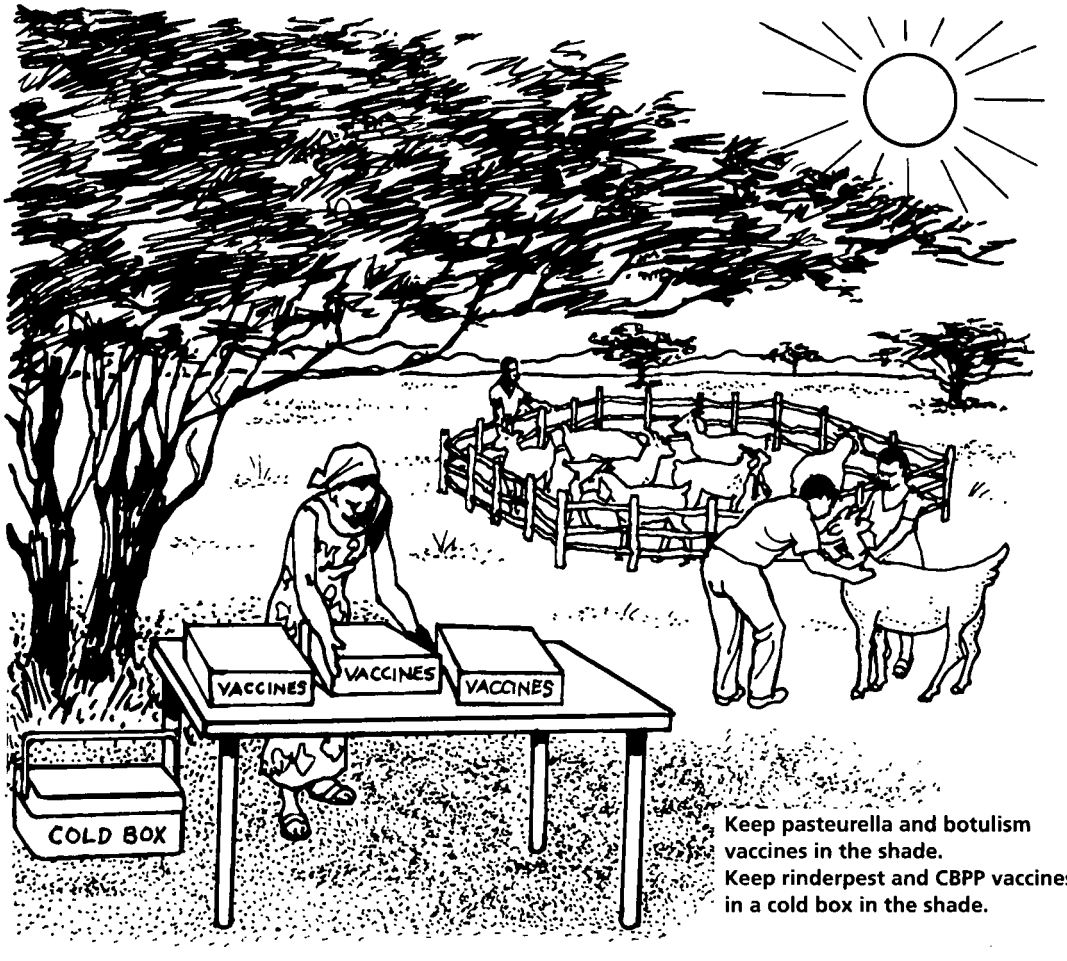
- Some special vaccines are called 'Heat stable'. These vaccines will last for a certain number of days after they have been taken out of a refrigerator, but only **before** they have been mixed with liquid.

  Example
  Two types of modern rinderpest vaccine, Thermovax and Pestobov T, will last for a month in a cool place out of a refrigerator. Keep them away from hot sun. Always keep vaccines in the shade and cool.

A 'cold chain' for vaccines

Vaccines are often used a long way from the country where they were made. They have to be kept cold **all the time** while they are transported to where they will be used **and** stored in a cold place when they arrive. Make sure that you have somewhere cold to store the vaccines **before** they arrive. Make sure there is a cold box to transport the vaccines from your village to the animals you are vaccinating. Use this cold box to keep the vaccines cold **while** you vaccinate other animals.

This herder is having her cattle vaccinated for *pasteurellosis* (p. 202), *rinderpest* (p. 290), *CBPP* (p. 195) and *botulism* (p. 256). The *pasteurellosis* and *botulism* vaccines do not need to be in the cold box because they are dead vaccines. But the vaccinators are still shading them from the hot sun. The *rinderpest* and *CBPP* vaccines are live vaccines and are in the cold box.



Keep pasteurella and botulism vaccines in the shade. Keep rinderpest and CBPP vaccines in a cold box in the shade.

How to use vaccines

- Vaccines work best on healthy, well-fed animals that are not suffering from *worms* (p. 218) or other diseases. **Avoid vaccinating animals when they are weak and hungry**.
- You only need a small amount (often 1–2 ml) of most vaccines. But this may contain millions of dead or specially weakened microbes that are too small to see.
- Usually wait until a young animal is about 2–3 months old before giving live vaccines. Young animals get some *antibodies* in the milk from their mothers (p. 90). These antibodies help a young animal to fight off infection but they also fight against microbes in live vaccines. The antibodies a young animal gets from its mother's milk stop working after a few weeks. When they have stopped working you can vaccinate the animal. If you vaccinate before this, you usually have to vaccinate again a few weeks later to make sure the vaccine has worked.
- It is important that people who do vaccinations are properly trained and that they do their job properly. Poorly-trained vaccinators, who do not do the job carefully, may only protect about half the animals they have tried to vaccinate.
- Some vaccines are expensive but many of them are not. You do not need to vaccinate animals regularly for diseases that do not happen often, except very serious diseases, such as *rinderpest* (p. 00). But it is often sensible to have vaccines available in case a disease comes to your area.
- To vaccinate many animals at one time it is useful to have a special syringe for giving many doses. Change the needle or boil it between vaccinating different groups of animals or between every 20 animals if you are vaccinating a large group.
- Do not use disinfectants or alcohol to *sterilise* the syringes and needles you use for vaccinating as they can damage the vaccines.
- Be ready to use a dry vaccine as soon as you have mixed it with liquid. It will only last for about two hours after the liquid has been added. Still keep it in a cold box after you have mixed it with liquid.
- Unless vaccines have been specially made to work together – these are usually already mixed in the same bottle – **DO NOT MIX DIFFERENT VACCINES IN THE SAME SYRINGE**. They will often kill each other and they will not work.
- Keep a record of vaccinations with other records about animals (p. 47).

Section 9 Where to get more help

Books

These books give more useful information about keeping animals. I used some of them to help with writing this book.

Diseases that people get

African Indigenous Medicine, David Nyamwaya, AMREF (African Medical and Research Foundation), Wilson Airport, PO Box 30125, Nairobi, Kenya.

See also *Where There is No Doctor*, David Werner, Macmillan, UK, for further information on how to treat people who get diseases from animals.

Medicines and diseases

Animal Diseases in the Tropics, Sewell & Brocklesby, Baillere Tindall.
Animal Health Volumes 1 and 2, Archie Hunter, Macmillan, UK.
The Camel, R. Trevor Wilson, Longman Group UK Ltd.
Helminth Parasites of Ruminants, Hansen & Perry, ILRAD.

Plants

Trees and Shrubs of the Sahel, Hans-Jügen von Maydell, GTZ.

Organisations that can help you

Government veterinary services

Some countries have effective, helpful veterinary services that offer information, training and help with animal disease problems. Start to get more help by asking these services in your country.

Local Non-Government Organisations (NGOs)

They can often provide help. Try to find one in your area before you look for help from further away.

Other countries

Many countries have overseas development departments that can help with projects, for example British DFID or German GTZ. Find a person from one of these countries to help you contact their embassy or consulate in your own country.

Universities

Those in your own or other countries can help, especially with information or training.

- Centre for Tropical Veterinary Medicine (CTVM)
  University of Edinburgh, Easter Bush, Roslin, Midlothian EH25 9RG, UK.
- Institute of Development Studies (IDS)
  University of Sussex, Brighton BN1 9RE, UK.
- Tufts University
  200 Westboro Road, North Grafton, Massachusetts MA 01536, USA.

Other organisations

Oxfam

They have offices in many countries around the world. Contact their office in your country or: International Division, Oxfam, 274 Banbury Road, Oxford OX2 7DZ, UK. They help with projects and often work with local NGOs.

The ACP-EU Technical Centre for Agricultural and Rural Co-operation (CTA)

Postbus 380, 6700 AJ Wageningen, NETHERLANDS. Subscribers to CTA's Publications Distribution Service can obtain information and *free* books on agriculture and rural development from CTA. Subscriptions are available *only* to residents of the ACP countries (Sub-Saharan Africa and most of the Caribbean and Pacific Island States).

FARM-Africa

10 Southampton Place, London WC1A 2DA, UK. They help smallholders and herders with projects (especially with goats) in Africa.

Arid Lands Information Network (ALIN)

Caisse Postal 3, Dakar, SENEGAL. They are a network of people who exchange information between animal keepers across Africa. They publish *Baobab* magazine.

Heifer Project International (HPI)

PO Box 808, Little Rock, Arkansas 72203, USA. They help with some projects and produce a newsletter called 'Heifer Project Exchange'.

International Institute for Economic Development (IIED)

3 Endsleigh Street, London WC1H 0DD, UK. They help people with information and publish many books. They publish 'Haramata', a newsletter for pastoralists.

Intermediate Technology Development Group (ITDG)

Myson House, Railway Terrace, Rugby CV21 3HT, UK.

International Livestock Research Institute (ILRI)

PO Box 5689, Addis Ababa, ETHIOPIA and PO Box 30709, Nairobi, KENYA.

Save the Children Fund (SCF)

Mary Datchelor House, 17 Grove Lane, London SE5, UK.

Strengthening Veterinary Services (SVS)

Central Post Office, Box 1015, Ulaanbaator 13, MONGOLIA.

VETAID

They help with projects. Contact them at the CTVM address on page 360.

Vétérinaires Sans Frontières (VSF)

Espace Rhône-Alpes Cooperation, 14 Avenue Berthelot, 69361 Lyon cedex 07, FRANCE.

Word list

(Words in *italics* can also be found as main entries in the word list.)

abdomen The large part of the body behind the diaphragm. The *stomach*, *intestines*, liver, kidneys and *uterus* are all inside the abdomen (p. 34).
abomasum The fourth *stomach* of a *ruminant*. Like the stomach of other animals.
abortion Pregnancy ending before the young is born normally.
abscess A sac full of *pus*, anywhere in the body but often just under the skin.
acaricide Chemical for killing mites and ticks.
acute disease Animals with an acute disease become sick very quickly; they are usually very sick; they are only sick for a short time before they recover or die. Example: *black-quarter* (p. 144).
alfalfa A green *legume* plant. It has much *protein* in it.
anaemia Animals with anaemia have pale *mucous membranes*. They have fewer *red blood cells* than normal or the cells have not got a normal amount of pigment in them. Many diseases cause anaemia.
anaesthetic Medicine for making animals unconscious. (See also *local anaesthetic*.)
anthelmintic Medicine that kills *worms* (p. 336).
antibiotic A medicine that kills *microbes* or stops them growing.
antibody A special chemical (a kind of protein) made in the blood or *lymph* when *microbes* or other chemicals from outside the body (*antigen*) attack an animal.
antigen A *microbe* or chemical that is not usually part of the body and that makes an animal produce *antibodies* if it gets inside an animal's body.
antiseptic A chemical that kills *microbes* or stops them growing.
antiserum A type of *vaccine*.
anus The last part of the digestive system, opening under the tail of the animal.
artery A blood vessel that carries blood pumped out from the heart. Blood in arteries is bright red because it is full of oxygen. Arteries are often close to *veins* but they are usually deeper in the body. Blood inside arteries is under pressure because the heart beating is pumping it through them. Arteries are strong and elastic.
arthritis *Inflammation* of *joints*.
bacteria Living *microbes* that can cause disease. They are too small to see. *Antibiotics* kill most bacteria.
berseem Green *legume* plant like clover.
bile Green fluid produced in the liver.
bile duct Tube that takes *bile* from the liver into the *intestines*.
bladder The sac holding urine from the kidney. It is emptied by urinating.
blister A sore that is covered with a bubble of skin with fluid under it. Often the liquid in a blister is clear/yellow and watery. Sometimes blisters have *pus* in them.
bloat Disease where the *rumen* is full of gas or froth.
blood cell One of the tiny cells that blood is made of (they are too small to see, about 1000 of them would stretch across a little finger nail.) **Red blood cells** carry oxygen and make blood look red. **White blood cells** help fight *microbes*. Some of them produce *anti-bodies* that fight off infection and some eat microbes. They also produce chemicals that help the body react to injuries.

blood pressure The pressure of blood inside the *arteries* as the heart pumps the blood round the body.
blood sample A small amount of blood, taken from a vein, which can be tested to find out if an animal has a particular disease.
blood smear A thin layer of blood spread on a piece of glass for looking at with a microscope (p. 118).
blowfly Blowflies are usually bright green/blue flies. They lay eggs on wounds and on meat.
bran The shell of a grain without the flour.
bronchus The *trachea* divides into two *bronchi* that take air into and out of the lungs (p. 37).
burdizzo Tool for castrating animals (p. 11).
caecum Part of the *intestines* (p. 36).
carrier An animal that is infected with a disease and can spread it to others but is not sick.
cauterise To burn flesh with something hot or with a strong chemical.
cervix The entrance to the *uterus* from the *vagina*.
chronic disease Animals with a chronic disease become sick slowly; they are often not very sick; they are sick for a long time before they recover or die.
clot A thick lump of blood.
clover A green *legume* plant. It has much *protein* in it (p. 45).
colic Severe pain in the *abdomen* that makes an animal behave unusually (p. 217).
colostrum The first milk a female produces after giving birth (p. 62).
compensate Make up for something, for example, by paying for the loss of something.
contaminate Contaminated things have infection, e.g. *bacteria*, *viruses* or *parasites*, on them.
conjunctiva Thin skin under the eyelids and over the eye itself (p. 42).
convulsions A fit or shaking caused by odd activity in the brain.
cornea The clear covering of the front of the eye (p. 42).
crop Sac in which food is stored in most birds.
cyst A sac full of fluid. *Tapeworm* cysts are sacs full of fluid with *tapeworm larvae* in them (p. 101).
dehydration Lack of water in the body (p. 267).
diarrhoea Passing many thin watery *faeces* (p. 211).
discharge Any unusual liquid, e.g. *pus*, that comes from any of the holes in the body, such as the eye, ear, mouth, nose, *anus*, *vulva*, *penis* or teats.
digestion Breaking down food into nutrients that can easily be taken from the *intestine* into the body.
disease Any change from normal in the way that an animal or part of an animal works. (An *infectious* disease is a disease caused by *microbes* that can spread from one animal to another.)
disinfectant A chemical that kills *microbes*.
dislocation A dislocated bone is not in its normal position at a *joint* with another bone.
enteritis *Inflammation* in the *intestines*.
enzootic A disease of animals that is common in a particular area. **Enzootic stability** is when there is a balance, or stability, between a disease, its cause, and the resistance of animals to the disease.
epizootic A disease of animals that does not usually happen in a particular area.
eradicate To get rid of a disease completely so that it will not be able to happen again.
faeces The waste material at the end of the digestive process. It comes out of the body at the *anus*.

fertiliser Minerals which can be added to soil to allow better crops to be grown. There are **natural** fertilisers and **artificial** ones.
fever Higher than normal body temperature (p. 266).
foetus A young animal developing inside the *uterus*.
flukes Small flat *worms*, *liver flukes* and other *flukes* (p. 99).
flystrike Damage done by fly *larvae* when they hatch from eggs that blowflies lay in wounds (p. 161).
fungus Some fungi (more than one fungus) are *microbes* that cause disease. They are larger than *bacteria*.
gall bladder The small sac in the liver. It contains dark green *bile* (p. 36).
gastro-enteritis *Inflammation* of the *stomach* or *intestines*.
gizzard Part of the *intestine* of a bird made of thick *muscle* (p. 35).
gland Part of the body that produces liquids with chemicals in them, e.g. milk, *saliva* or *hormones*.
haemorrhage Bleeding. This may be inside the body or outside the body.
heat The time when a female animal will mate with a male and can become pregnant (sometimes called *oestrus*) (p. 48).
helminths *Roundworms* (p. 94). Many of them are *parasites* and live inside animals.
hormone A chemical produced in one part of an animal's body that goes in the blood to control things (like producing milk) that happen in different parts of the body.
hosts Animals or people that things such as tapeworms live in.
hydatid cyst Fluid-filled sac full of young *tapeworms* (p. 7).
immunity The ability of an animal to fight off an infection it has had before (p. 89).
incubation (of disease) The time between an animal getting infected with a disease and having signs of the disease.
incubation (of egg) The time between an egg being laid and hatching.
infection When animals have living *microbes* inside them that are not normally there. Infection often causes *disease*.
infectious disease A *disease* that can spread to other animals. Usually caused by *microbes*. Example: *rinderpest* (p. 290).
infertile Not able to reproduce.
inflammation Reaction of a part of the body to attack by *microbes* or injury. Parts of the body with inflammation are red, hot and painful.
insecticide Chemical for killing insects.
intestine Part of the digestive system (p. 36).
isolate Set apart from others.
joint The part of the body where two bones meet and are joined together.
jugular The large *vein* in the side of the neck (p. 40).
lame Cannot walk normally.
laminitis *Inflammation* of the foot.
larva Young form of an insect or worm. *Larvae* hatch from eggs and often develop into *nymphs* that become adults. Larvae are often different to the adults they develop into.
latrine An outhouse, privy, hole or pit in the ground for people to use as a toilet.
laxative Medicine that makes an animal pass *faeces*.
legume Green plants that have much *protein* in them. These plants have special roots that help them make *proteins* (p. 45).
local anaesthetic Medicine that stops feeling in part of the body.
lymph Clear fluid that comes from the blood. It carries *white blood cells* through the tissues of the body and is collected by *lymph vessels* (p. 41).
lymph vessel Thin vessels (like very thin *veins* or *arteries*) that carry *lymph* (p. 41).

lymph node Solid lumps on *lymph vessels*. They filter the *lymph* that flows through them and trap *microbes*. They help the body to fight off disease. They often become large when an animal is infected by microbes and has a disease (p. 41).
mange Disease of the skin caused by *mites* (p. 154).
mastitis *Inflammation* of the udder (p. 244).
melanoma A type of skin *tumour*.
microbe Any very small living *organism*. Many types of microbes cause diseases (p. 88).
microscope A tool that makes things look larger than they are. Used for looking at things like *microbes* that are too small to see normally. A microscope can make things look 1000 times larger than in real life. To look at things, such as *blood smears*, with a microscope you have to put them onto a flat piece of glass called a microscope slide.
mineral Any chemical, e.g. calcium or phosphorous, that is naturally part of the soil. Animals need some minerals in their food to be healthy (p. 229).
mucous membrane The thin, wet skin that lines the inside of the body, like the skin inside the eyelids (p. 112).
mucus Clear fluid that keeps the *mucous membranes* wet.
muscle The parts of the body that contract to make animals move (p. 32). They are the red flesh of the body.
mycoplasma *Microbes* similar to *bacteria* (p. 88).
myiasis *Flystrike* (p. 161).
navel The place where the blood vessels from the *placenta* go into the *abdomen* of a young animal.
nematodes *Roundworms* (p. 94).
nerves Thin white fibres that carry messages through the body to and from the brain.
nymph The stage in the life of an insect between being a *larva* and an adult.
oesophagus The tube that goes from the mouth to the *stomach* (the throat) (p. 33).
oestrus Another word for *heat*. The time when mature female animals will let males mate with them and can become pregnant.
omasum One of the four *stomachs* of a *ruminant* animal.
organism Any living thing that can reproduce itself. A *virus* is an organism, so is a camel.
ovary The part of a female animal that produces eggs that go into the *uterus*.
oxygen A clear gas that all animals need for life. Almost a quarter of the air is oxygen.
oxytocin A *hormone* that makes milk flow and the *uterus* contract.
paralysis A paralysed animal cannot move. Sometimes the paralysis is relaxed: you can easily bend the legs and the animal is quiet. Sometimes the paralysis is rigid: you cannot bend the legs and the animal is stiff.
parasite An organism that lives on animals and harms them, e.g. *liver fluke* (p. 99).
parasitic gastro-enteritis (PGE) Disease caused by worms in the *intestines* or *stomach* (p. 218).
penis The part of the male body through which sperm pass into the female body during mating.
placenta The blood vessels and other membranes that connect a *foetus* to the *uterus* (p. 39).
pliers Tools for cutting or holding things.
pneumonia *Inflammation* of the lungs.
protein The complicated chemical that plants and animals are mostly made out of. Animals need to eat some protein to grow and be healthy. *Muscles* are made of protein.
protozoa Living *microbes* that can cause disease. They are bigger than *bacteria* but still too small to see. Some *antibiotics* and other medicines kill them. They are often spread from one animal to another by insects.
poultice A soft paste spread on a wound or abscess.

pus Thick grey/white/green/yellow fluid that comes from *abscesses* and infected wounds. It is mostly made of dead *white blood cells* and dead *microbes* that *white blood cells* have killed.
rectum The last part of the *intestines* between the large intestine and the *anus*. It is where the animal stores *faeces* until it passes them out of the anus (p. 36).
repel Make to keep away, such as using chemicals to keep away flies.
resistant Not affected by something, as when worms are no longer affected by the medicines used to kill them, or animals are no longer affected by some diseases.
retina The back of the eye, which is sensitive to light.
reticulum One of the parts of the *stomach* of a *ruminant* animal.
rickettsia *Microbes* like very small *bacteria*.
roundworms Worms that are usually small, thin and white. Many roundworms live inside animals and are *parasites* (p. 94).
rumen One of the four *stomachs* of a *ruminant* animal (p. 35).
ruminant Any animal that has a *rumen*: cattle, buffaloes, sheep, goats and camels.
ruminate To bring food back up from the *rumen* and chew it in the mouth again (p. 35).
saliva Clear fluid produced inside the mouth (p. 33).
sarcoid A type of skin *tumour*.
scab Layer of dry blood or *discharge* or dead skin usually over a wound. Wounds have scabs over them while they heal.
scrotum The sac of skin around the *testicles*.
semen Fluid produced in the *testicles* that comes out of a male's *penis* when it mates. It has sperm in it (p. 40).
septicaemia The existence of *microbes* or poisons in the blood.
sperm The sperm produced by a male fertilise eggs produced by a female after mating (p. 40).
spermatic cord The nerves and vessels that go to and come from the *testicle* inside the *scrotum* (p. 40).
spleen The spleen is dark red and you find it near the *stomach*. It helps the animal to fight infection (p. 36).
spore A form of *microbe* with a thick wall round it that can live for a long time in difficult conditions.
sterile Something that is free from *microbes*. (Animals are also called sterile if they cannot breed.)
sterilise To kill *microbes*. Equipment that has been sterilised has no microbes on it and cannot cause infection. The easiest way to sterilise something is to boil it (p. 71).
stomach Part of the digestive system, between the *oesophagus* and *intestines*, where most of the food is digested.
stress The response of an animal (or person) to anything that troubles it. For example, animals are stressed by: poor feeding, giving birth, having an infection, or fear. When an animal has stress it cannot fight off disease well. This is because stress makes the animal produce *hormones* that work against *inflammation* (p. 92).
supplement Something added to food, such as minerals.
suture Stitch or sew.
tapeworm Worms that are usually long and flat. They have a head and a body made of segments. They are often *parasites* (p. 101).
tendon The end part of a *muscle*, which attaches the muscle to a bone.
testicles The *glands* in which *sperm* grow.
third eyelid Part of the *conjunctiva* that works like a third eyelid and can partly cover the eye (p. 42).

thyroid gland A gland near the *trachea* which produces a hormone which affects the rate at which the body works (metabolism).
trachea The windpipe that connects the mouth to the lungs (p. 37).
trochar and cannula *Tool used to make a hole in the rumen to treat bloat* (p. 13).
tumour An unusual growth anywhere in the body. (Also called cancer.) Tumours are often hard lumps that you can see on the skin (p. 183). They also happen inside the body where you cannot see them. Some tumours are benign and don't spread to other parts of the body. Malign tumours do spread.
twitch Tool used to control horses (p. 19).
ulcer A type of sore where the flesh is eaten away.
umbilical cord A tube like a rope joining the *foetus* to the mother. The foetus takes nutrients from the mother from the blood which goes through the umbilical cord.
uncoordinated Loss of control of movements, which do not work together.
urinate The removal of liquid from the body.
uterus The sac inside a female for a *foetus* to develop in. It has the *ovaries* at one end and opens into the *vagina* at the other (p. 38).
vaccine A special medicine that helps an animal to fight off a particular disease (p. 353). (See also *antiserum*.)
vagina The part of the female genitals that opens to the outside at the *vulva*. It is separated from the *uterus* by the *cervix* (p. 38).
vein A blood vessel that carries blood back from the different parts of the body to the heart. Veins are often close to *arteries* but they are usually nearer the surface. The blood in veins is very dark.
vessel The tubes, such as *arteries* and *veins*, that carry blood, *lymph* or other fluids around the body.
virus Living *microbes* that usually cause disease. They are much smaller than *bacteria*. They are much too small to see, even with an ordinary *microscope*. *Antibiotics* do not kill viruses.
vitamins Chemicals that are naturally in much of the food that animals eat. Animals need small amounts of vitamins to be healthy.
vulva The opening to the *vagina* of females (p. 38).
wean To stop an animal drinking milk from its mother and to start eating solid food.

Note:
Words ending in: *-osis* or *-iasis* usually mean a *disease* e.g. *babesiosis* (p. 248).
Words ending in: *-itis* usually mean something that is *inflamed*, e.g. *metritis* (p. 241).

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Abbreviations

(A short way of writing a word; a letter or sign represents a whole word or several words.)

p means **page** in the book
+ means **and** or **plus**
x means **multiply by**
= means **the same as**, or **is equal to**
% means **per cent**

Measurements of weight, volume and length

1 kilogram	(kg)	=	1000 grams	=	2.2 pounds
1 gram	(g)	=	1000 milligrams (mg)		
1 litre	(l)	=	1000 millilitres (ml)	=	1.8 pints (5 cups)
1 kilometre	(km)	=	1000 metres	=	0.62 miles
1 metre	(m)	=	100 centimetres	=	39.4 inches or 1.09 yards
1 centimetre	(cm)	=	10 millimetres (mm)		
1 pound	(lb)	=	16 ounces	=	454 grams (½ cup)
1 ounce	(oz)	=	28.4 grams		
1 gallon	(gal)	=	8 pints	=	4.55 litres
1 pint	(pt)	=	20 fluid ounces	=	568 millilitres (3 cups)
1 fluid ounce	(fl. oz)			=	30 millilitres (approximately)

Estimated weights of animals

Distance round the body (cm)	APPROXIMATE WEIGHT		
	Cattle/Buffaloes (kg)	Sheep/Goats (kg)	Horses/Mules/Donkeys (kg)
60		20	
65		24	
70	40	30	
75	45	36	
80	50	42	44
90	70	55	62
100	98	75	87
120	150		147
140	232		222
160	330		313
180	485		426
190	558		490