

## 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.

Instructions about special care you should take when using the medicine.

The trade name of the medicine.

The chemical name of the medicine.

The name of the maker.

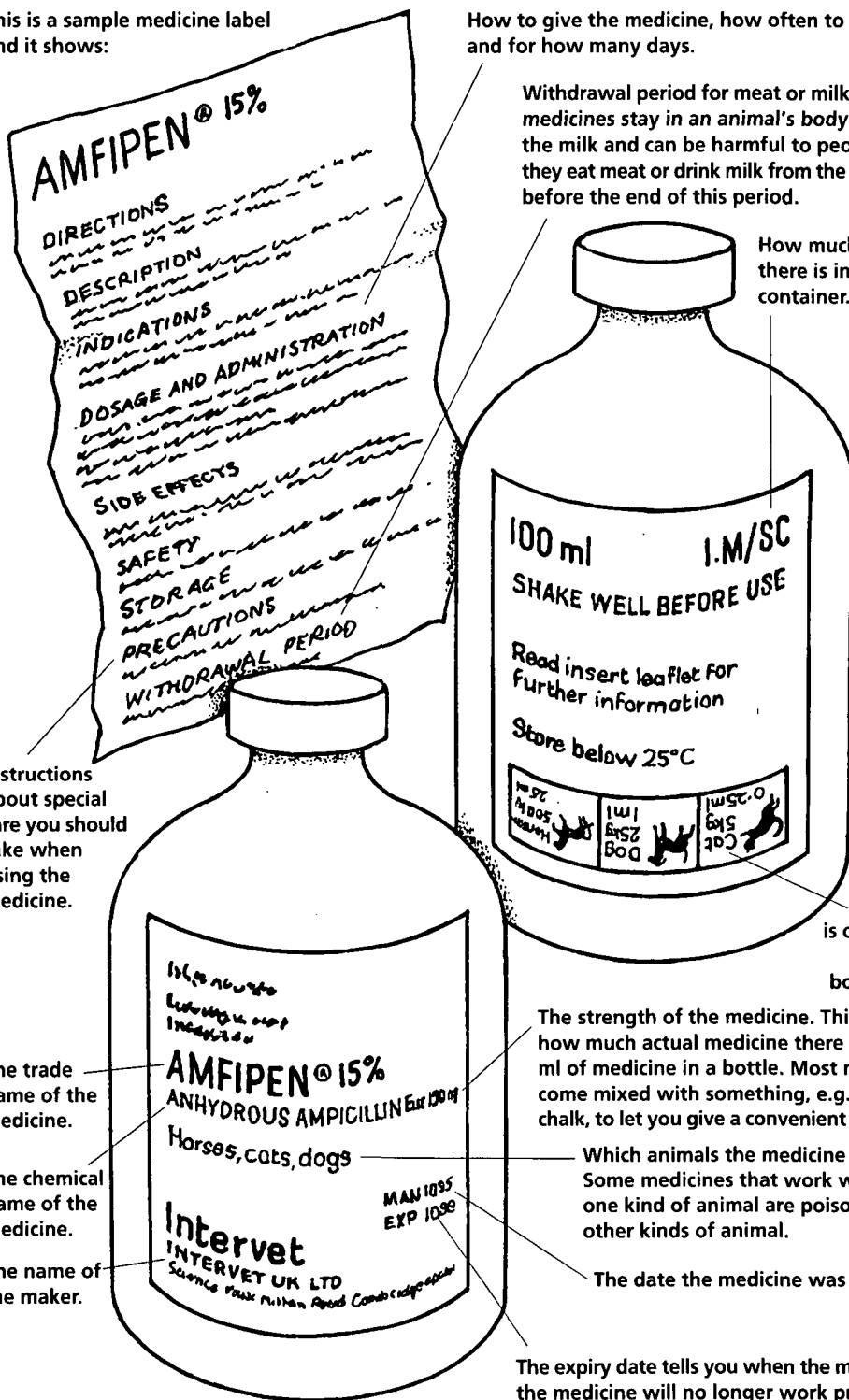
Dose. This is often given as mg/kg bodyweight.

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.

Which animals the medicine is for. Some medicines that work well for one kind of animal are poisonous for other kinds of animal.

The date the medicine was made.

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.

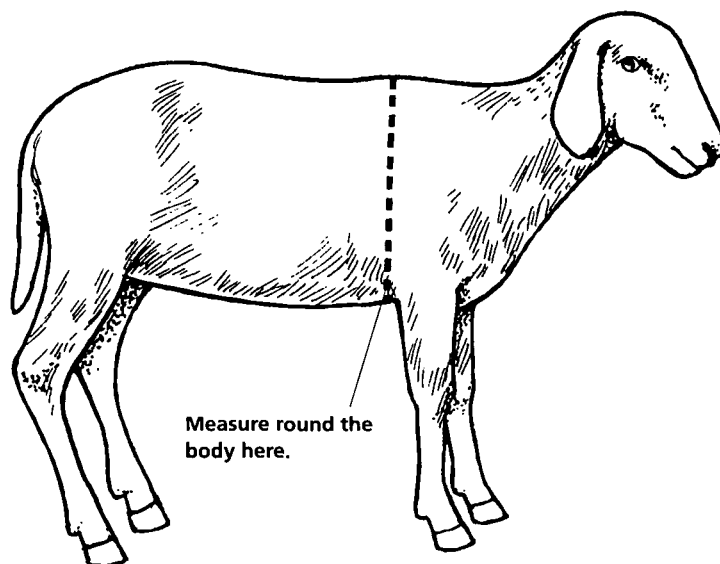
Many medicines come with doses that have already been worked out for you. For example, they will tell you to give adult cattle 100 ml or sheep 40 ml. But there are many makes of medicine of different strengths that do not work out the dose for you.

### *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.

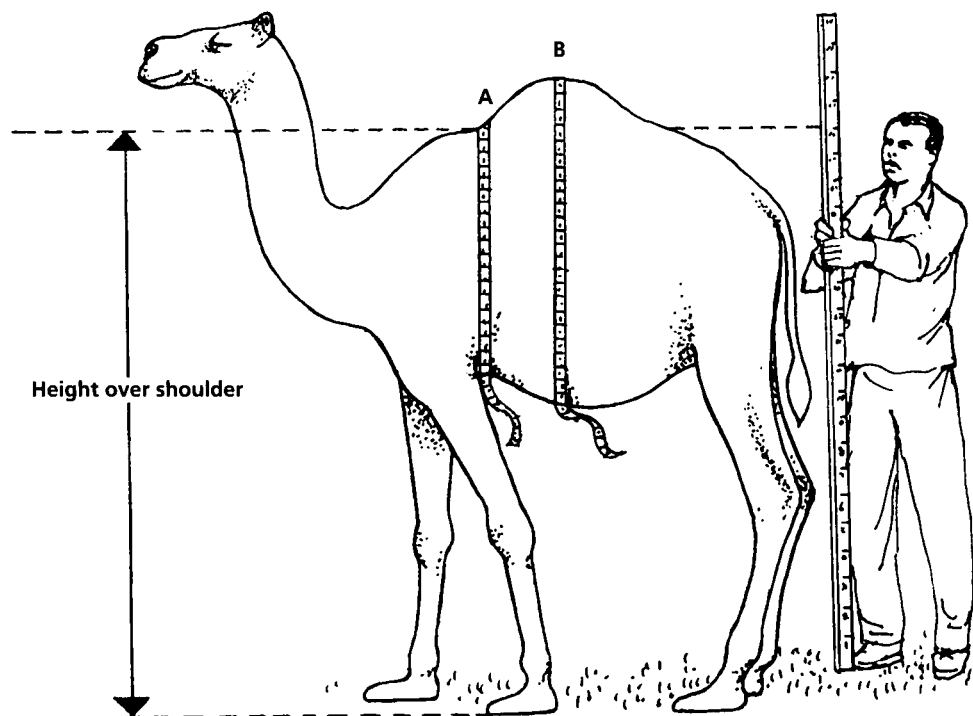


- Measure horses, mules or donkeys around where the girth of the saddle would be.
- Measure how far it is round the body in centimetres and calculate the weight from this table:

**Estimated weights of animals**

Distance round the body (cm)	Approximate weight		
	Cattle/Bufaloes (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  $\times$  Distance round the body at A  $\times$  Distance round the body at B (all measured in centimetres)  $\times$  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 body-weight 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.

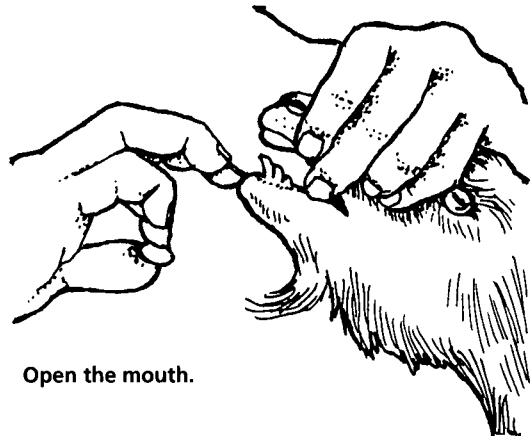
Keep food or water away from animals for a few hours before you treat them then they will be hungry or thirsty and will take all the medicine. Mix the medicine thoroughly with the food or water.

### ***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.

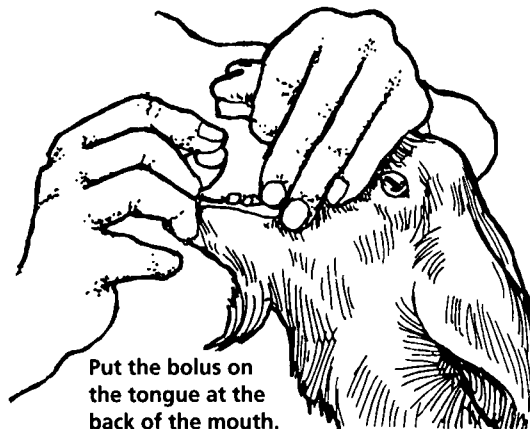
Tempt animals to eat boluses by wrapping them in leaves or other food they like. Make dry boluses easier to swallow by dipping them in vegetable oil.

- 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.

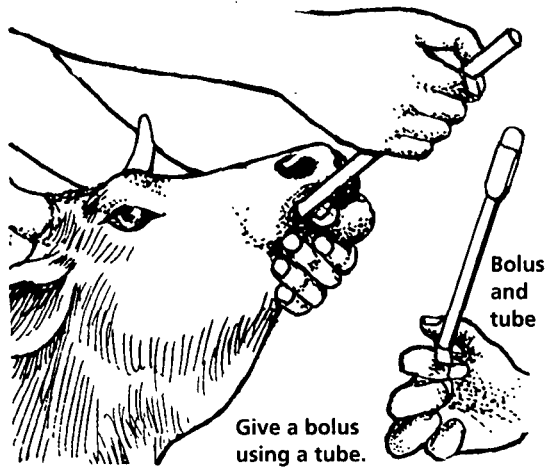
- If the animal chokes or coughs violently while you are trying to give a bolus release the animal and let it lower its head.



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.



### *How to give liquid medicine*

Putting liquid medicine into the mouth for an animal to swallow is a good way to give medicine.

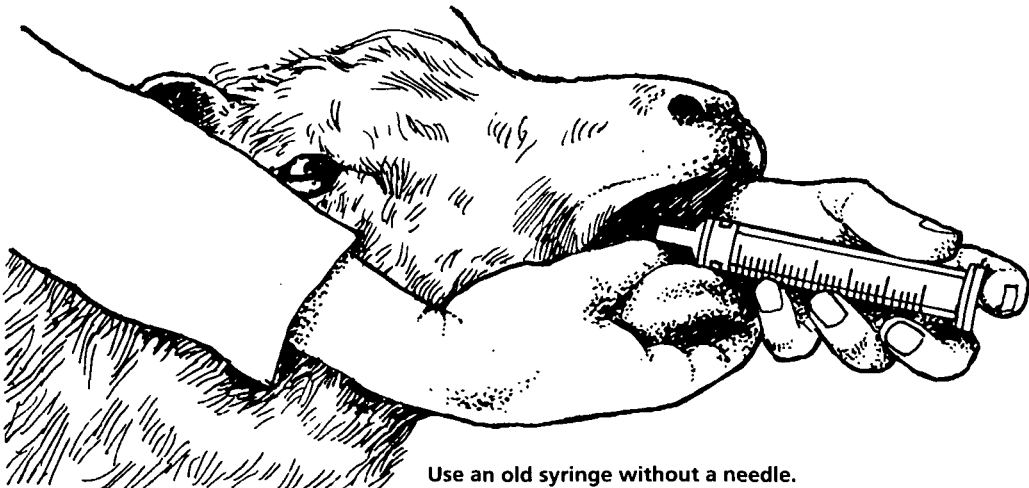
## **WARNING**

**Be careful not to get medicine in the *trachea*. It will go down to the lungs and cause pneumonia. The animal may die.**

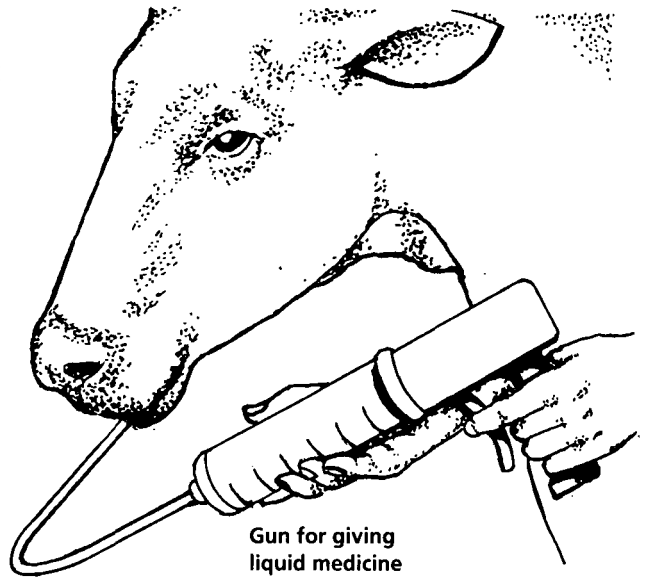
**It is dangerous to give liquid medicine to horses, mules or donkeys. They have a high lump on the back of the tongue that can make liquid go down the *trachea* into the lungs. For horses, mules or donkeys it is safer to use boluses or pastes. Or get skilled help to use a *stomach tube* instead (p. 318).**

**It is dangerous to give liquid medicine by mouth to any animal that has very distressed breathing.**

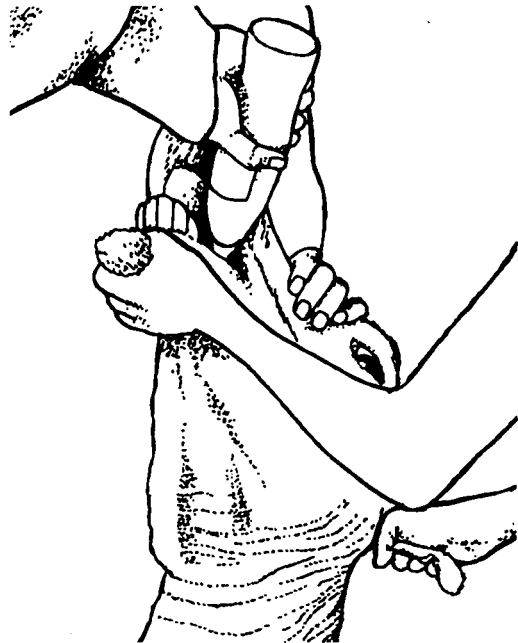
- Make sure you have got the right medicine ready and the dose is correct.
- A soda bottle is good for giving liquid medicines; put a piece of rubber tube over the end to make it safer if the animal bites the bottle (see p. 9). People in Nepal use a length of bamboo.
- For small animals use an old syringe with no needle, or a spoon.



- 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.



- 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.



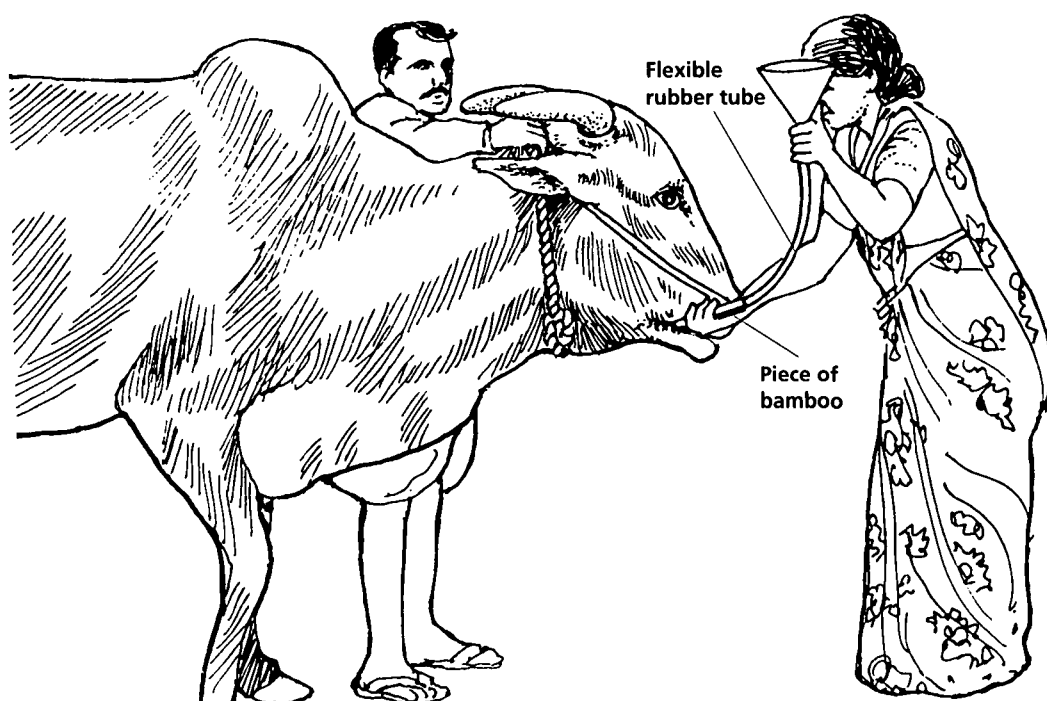
### *How to give medicine with a stomach tube*

## 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).

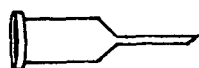
**Dogs** If the dog is aggressive wrap pills or boluses in some food or mix liquid medicine with some food. If the dog is quiet hold the upper jaw with one hand with your finger and thumb pressing up against the inside of the top of the mouth (see p. 316). Hold the bottom jaw with the other hand. Put 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).

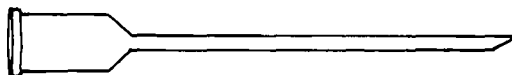
## *How to give injections*

### *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.



20 gauge 1 cm long



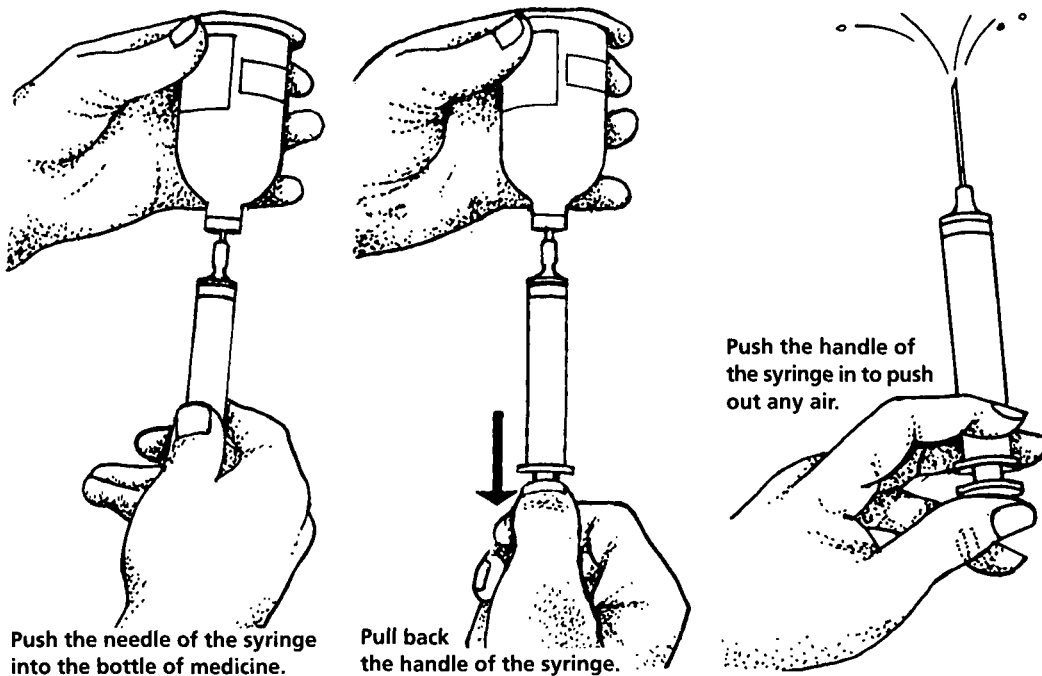
14 gauge 5 cm long

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.



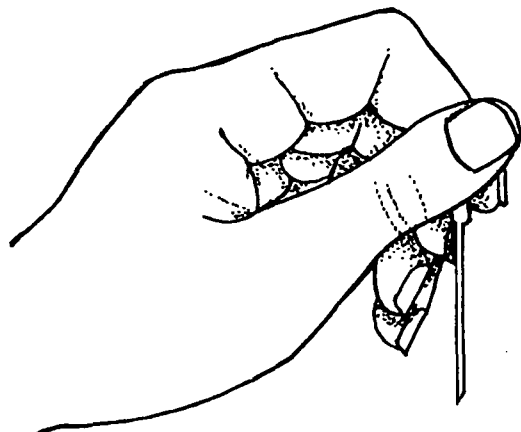
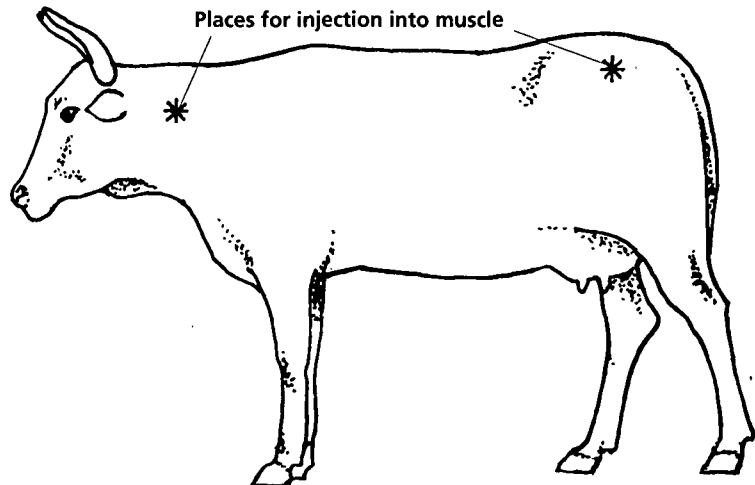
- Some medicines are powder in a bottle that needs water to be added. Many medicines that come as powder are in a vacuum bottle and will suck the water into the bottle easily when you inject it into the bottle. If the medicine is not in a vacuum bottle, before you add the water take some air out of the 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.

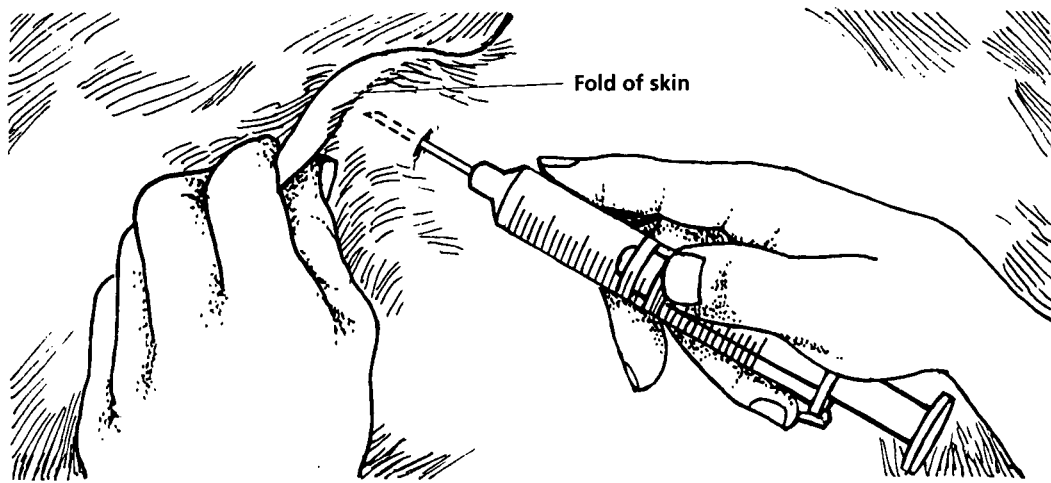
**Horses, mules and donkeys** Any injection into muscle can make an animal stiff for a while. This can make the animal lame for a time. So, especially for animals that work, it is better not to give the injection into the back leg. Instead give the injection into the side of the neck. This is also safer 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.

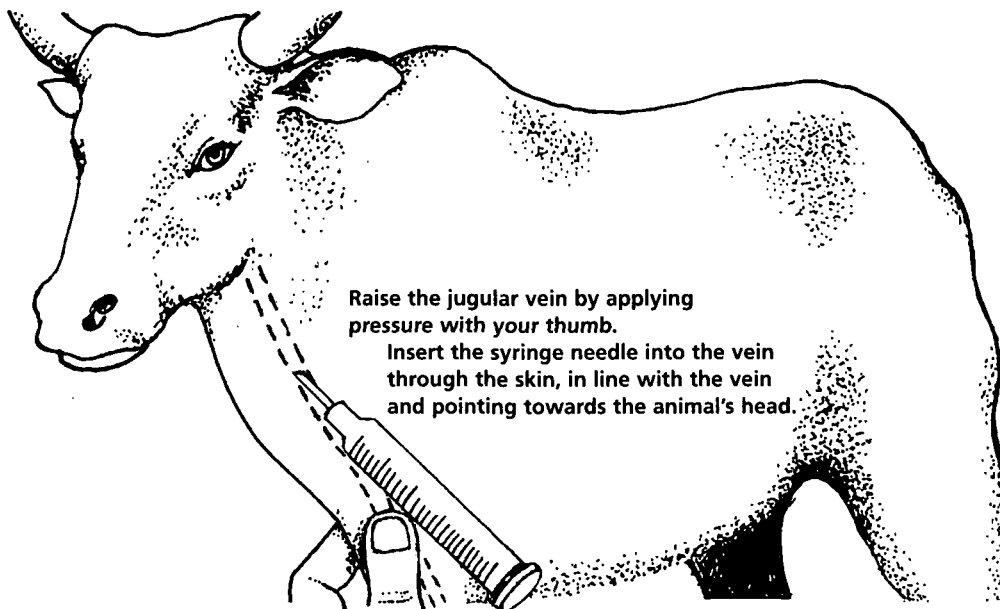


**Dogs** Giving an injection under the skin over the top of the neck is a good way to give many medicines to dogs.

- 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*

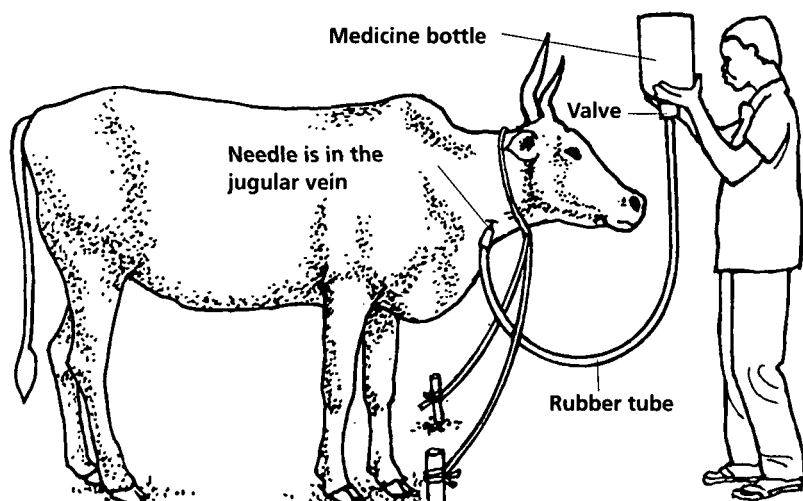
- Hold the animal securely.
- Push on the *jugular vein* till it swells up (1). Do this with your finger or with a rope. Make the skin wet to see the vein more easily.
- Push the needle through the skin, then into the vein. Push the needle in line with the vein and pointing towards the head, then you 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).



**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.

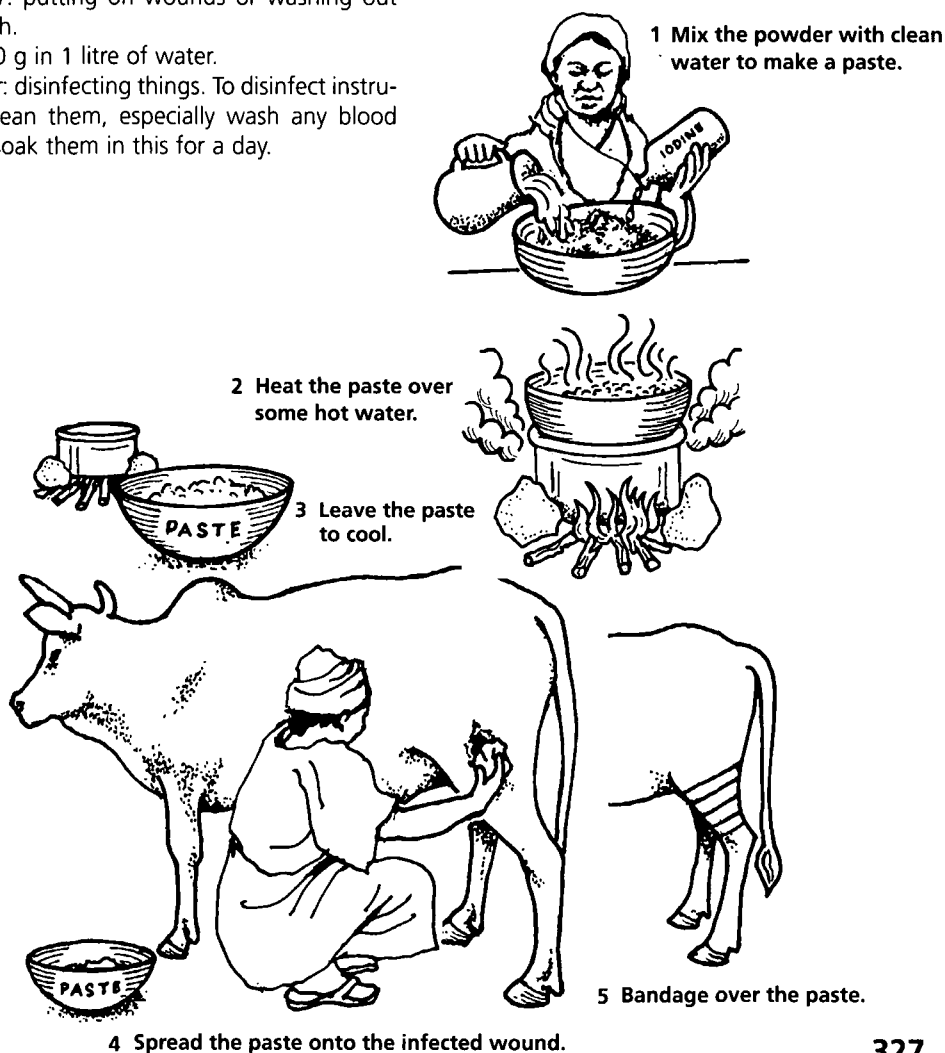
## Poultices ..... ..

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.



## 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*.

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.**

### **Amprolium**

*Trade name:* Amprolmix.

*Useful for:* *Coccidiosis* (p. 224).

*Normal dose:* For animals give 20 mg/kg every day for five days.

## **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.**

### **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 dipropionate (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

### **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 dipropionate

*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.

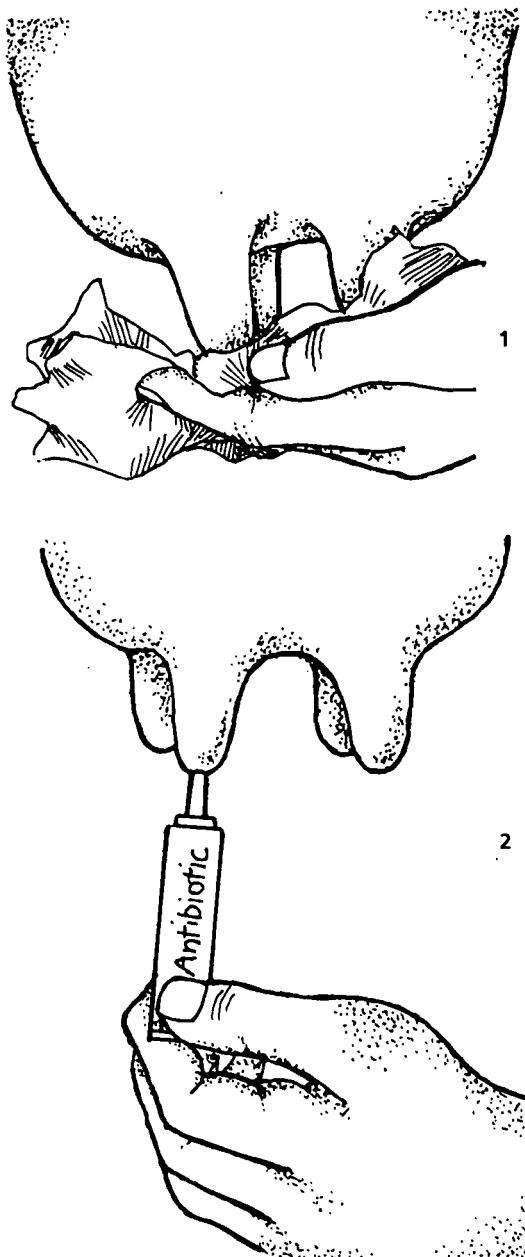
## WARNING

**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:* Tribissen, Trivetrim.

*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.

Oxytetracycline

*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:

<b>Terramycin LA (contains 200 mg/ml)</b>	<b>Dose</b>
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.



## An A-Z of trypanosome medicines

### 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 oxcyclozanide (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.

## Nitroxylin

*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:* Oxfax, 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:* Nemafox.

*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.

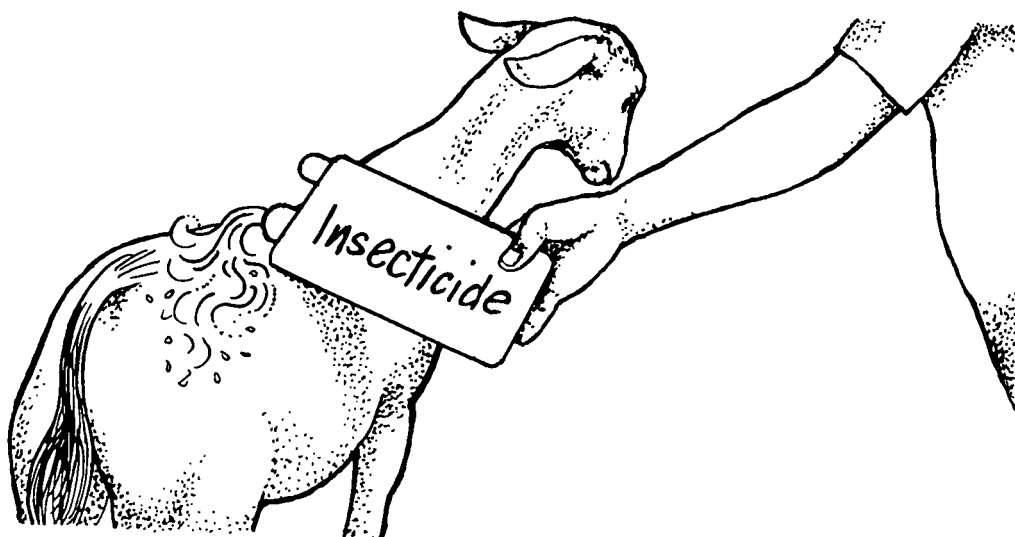
The makers may also recommend you to:

- 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.

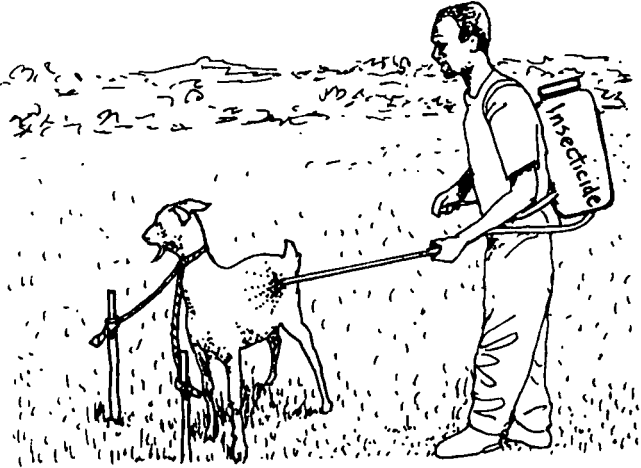


Pour-on insecticides, such as deltamethrin, rub off the animals you treat onto other animals in a group, so many people only treat some animals in a group and hope the chemical rubs off onto the others and protects them against flies too. But some animals do not get much insecticide on them and this 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.

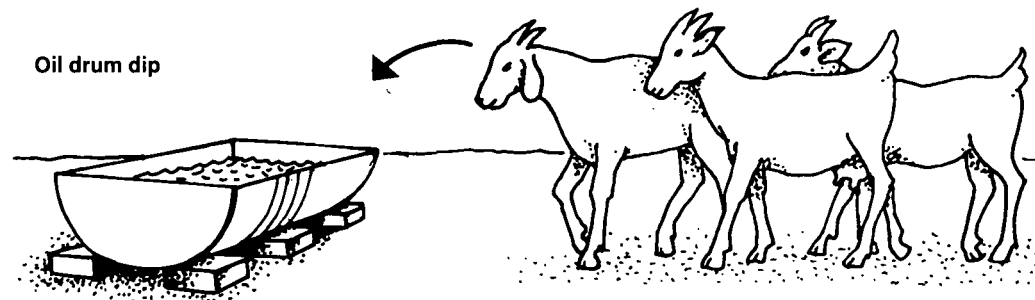


### ***How to dip animals in insecticide***

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.



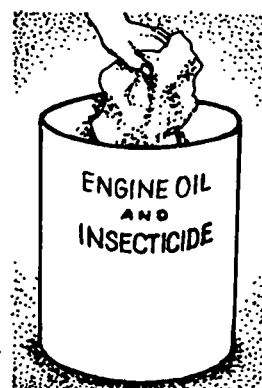
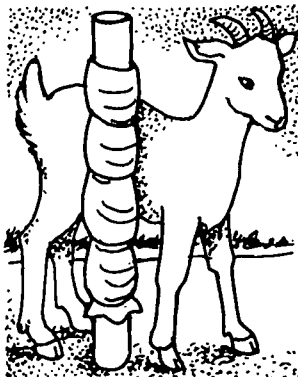
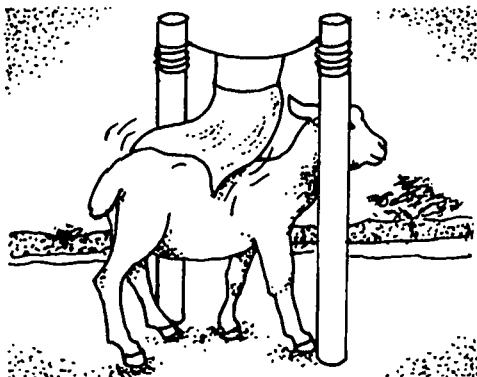
Some important things to remember about using a dip are:

- 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.

Hang the cloth between two poles for animals to walk under and rub against the cloth.



Dip a cloth in an oil and insecticide mixture.

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.



**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.

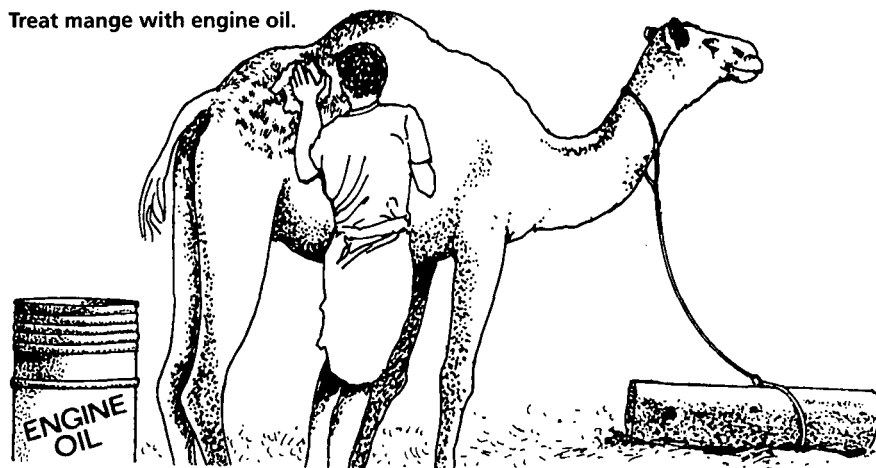
*Form:* Use as a 'Pour-on'.

*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.

## 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.

### 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.

### 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, Bupivacaine.

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.



**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.

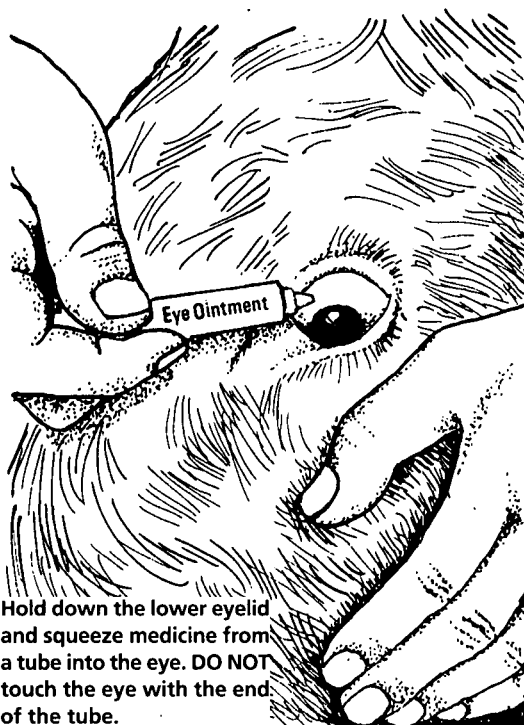
### Coconut milk

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



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 this can irritate the eye more than ointment or drops do. It is easiest to use powder that comes in a plastic puffer bottle.



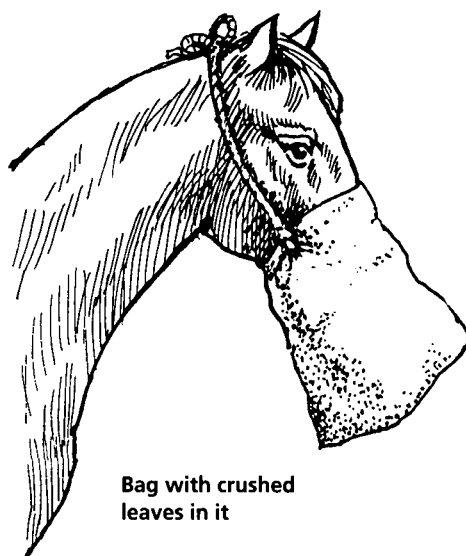
## Medicines for ears

- 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.

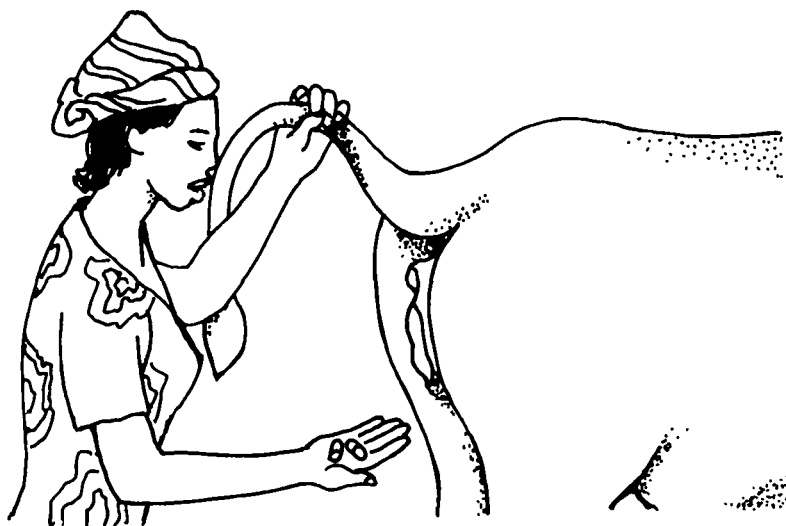


## Medicines for retained placenta

- 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.

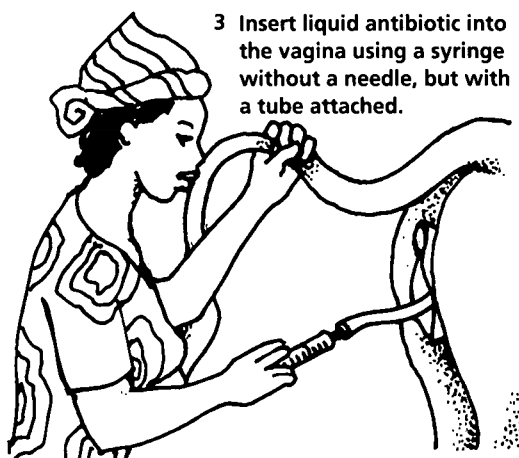
## Medicines for the uterus and vagina

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.



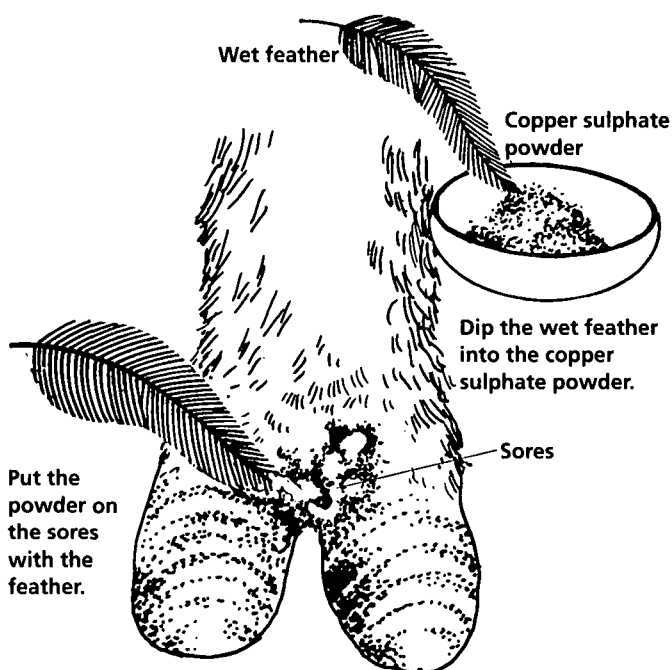


can also use antibiotic powder or antibiotic made for injection. Put powder into the vagina or uterus with your hand or mix it with water and give it as a liquid, using a syringe with a rubber tube on the end (3), or a syringe without a needle hidden in your hand.

## 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).



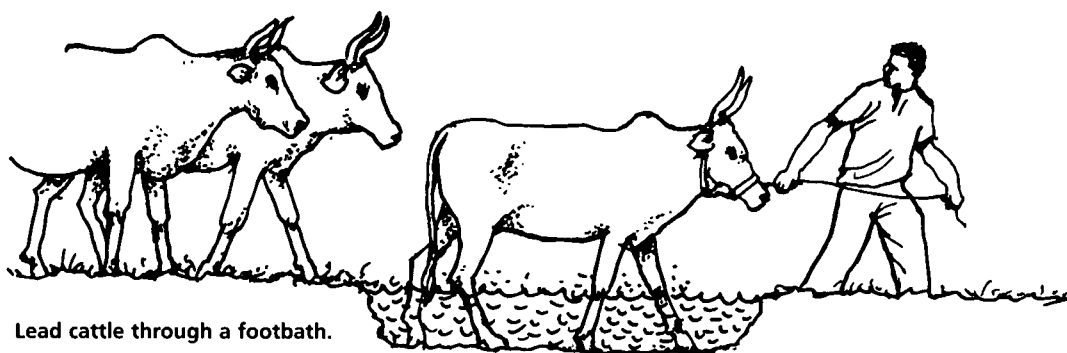
## WARNING

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.



## 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.

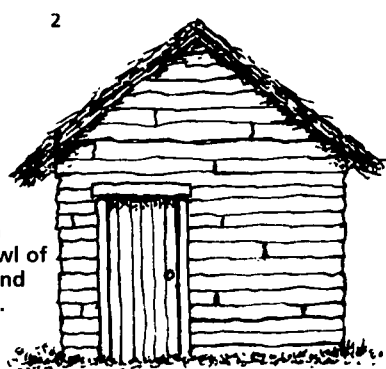
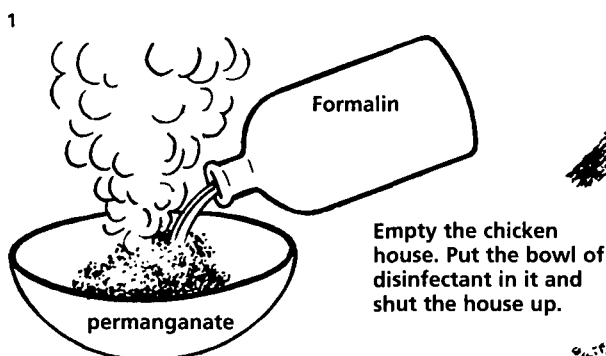
### *How to repel birds*

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.

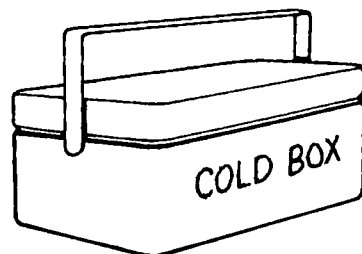
## Traditional vaccination

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.

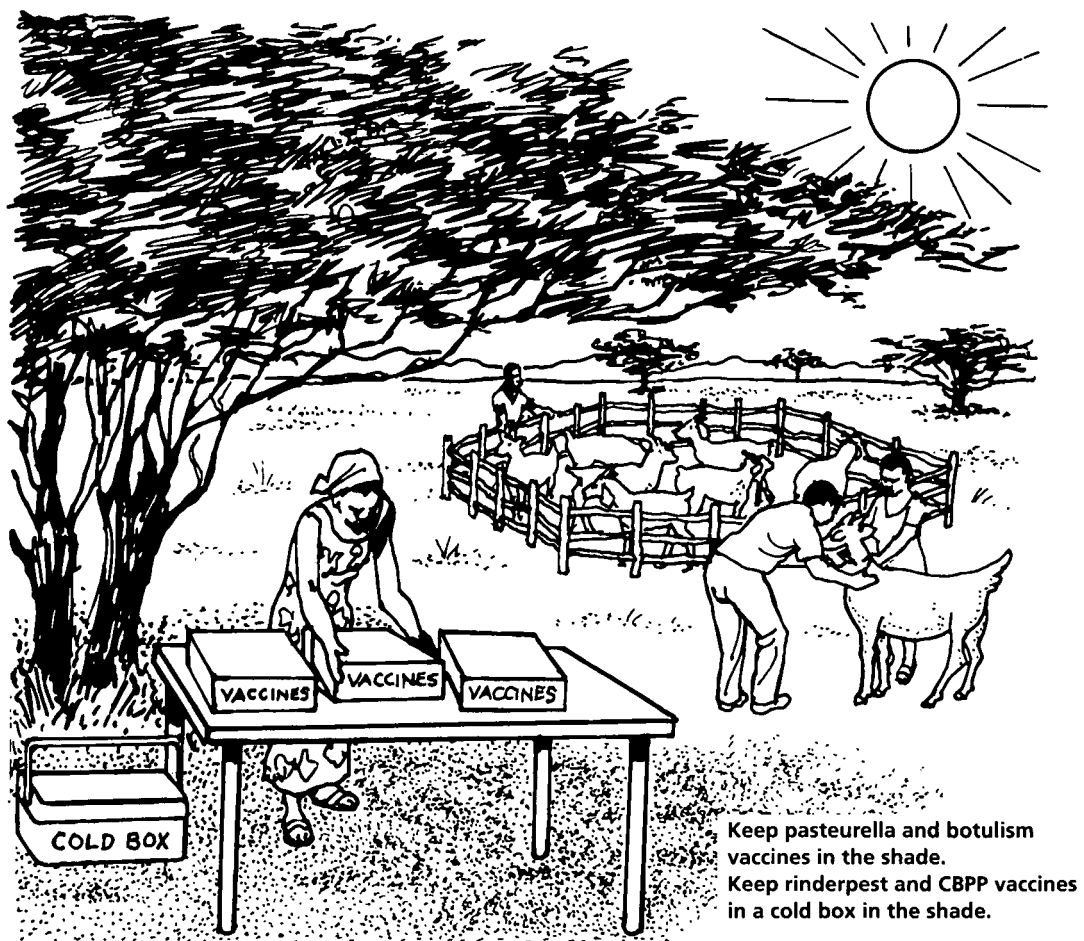
#### Example

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.



# 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 *antibodies* 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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CENTIMETRES

## 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 (1/2 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/Bufaloes (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

