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Health Education

for Tropical Schools

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McNEIL and ANDERSON

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HEALTH EDUCATION

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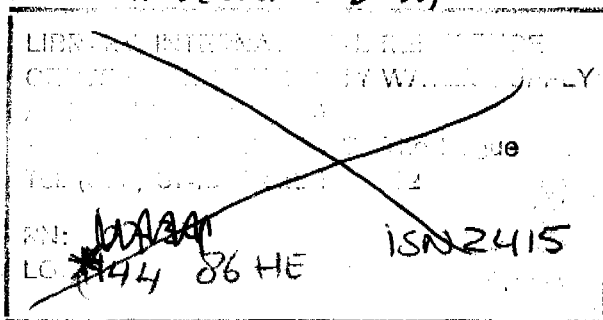
by

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COLLINS

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PREFACE

This book is intended as a text book for children in the upper classes of the Primary School. It covers four years' work in Health Education and is based on the work usually done in the classes mentioned. It is suitable for children of all races whether living in urban or rural areas. We have tried to make the subject alive and interesting with the object of inculcating in the child a desire for a healthier way of life. Since a great deal of ill health stems from ignorance, we have aimed at explaining what causes ill health and disease. The teacher should try to make the work as practical as possible and relate it to the environment of the pupils. At the end of each chapter there is a list of "Things to Do", which should help to make the work practical and is by no means a complete list. Other practical work may be encouraged by the teacher.

The book is written in simple English using vocabulary, sentence patterns and constructions with which the child should be familiar.

R. T. M.

M. E. A.

1. PERSONAL CLEANLINESS

In this chapter you are going to learn how to keep the body clean and why you should keep it clean.

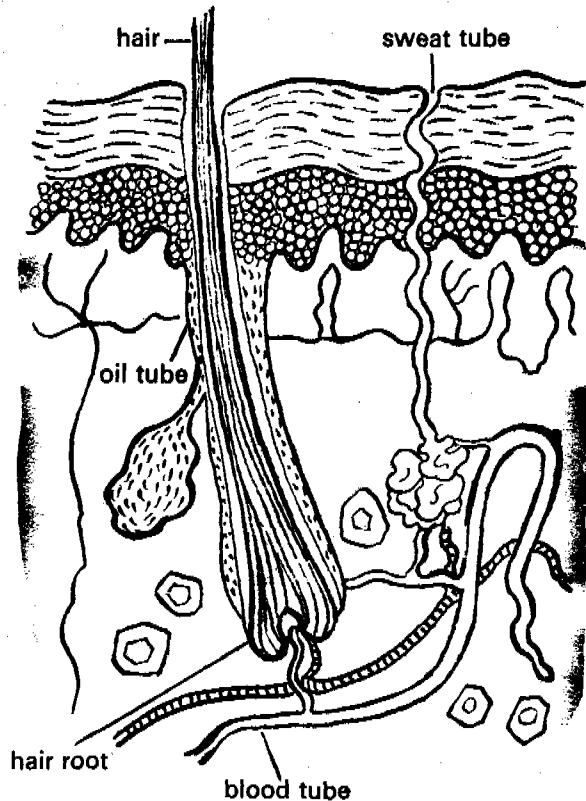
A dirty skin cannot do its work properly and it can be the cause of many illnesses. If your skin is dirty you do not look attractive to others and it may cause a very unpleasant smell. A clean body helps to keep you healthy, makes you look well and feel well.

How the skin becomes dirty

It is natural as children to play outside. While playing you run about a lot, pick things up off the ground and sometimes fall. The skin becomes hot and sticky and the dust from the ground sticks easily to the skin. Your skin becomes sticky for two reasons :

1. Under the skin are tiny tubes which hold sweat or perspiration. These tubes are not straight but twisted and coiled. They have an opening on the surface of the skin and the liquid sweat pours out on to the skin. Sometimes when it is very hot or when you have been playing hard, you can see the sweat as tiny drops of liquid on the skin. Even in cold weather the body sweats but the tiny drops of liquid cannot be seen. The sweat comes from the blood which wants to get rid of it

as it is waste or unwanted. The coiled ends of the sweat tubes are surrounded by blood tubes and the waste sweat passes from the blood tubes into the sweat tubes.



2. There are other tubes in the skin which hold oil and these tubes also have an opening on to the surface of the skin. These tubes are close to the hairs and the oil passes up the hairs inside the skin and pours out on to the skin. This oil does two things. Firstly, it makes the

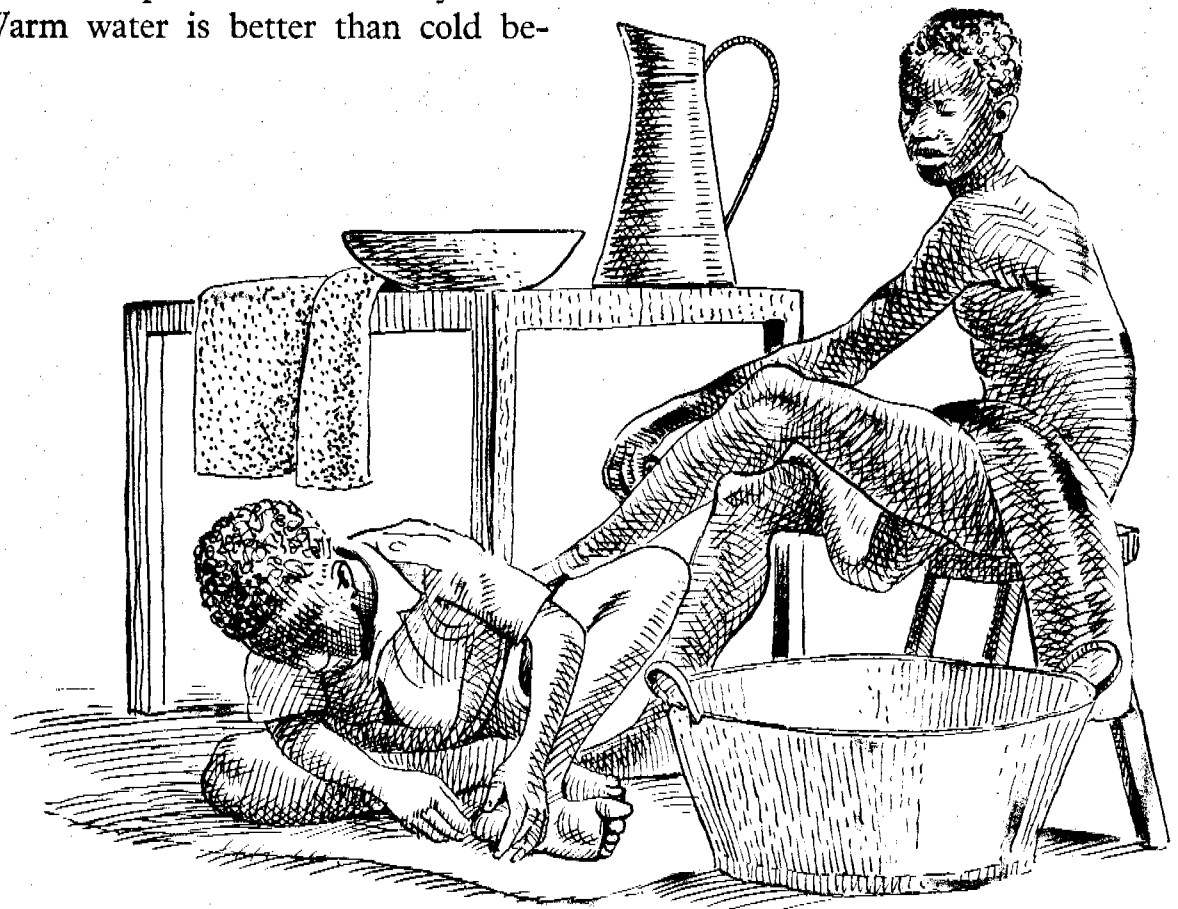
hair soft and shining and secondly, it makes the skin soft and stops it getting dry. The skin of old people is dry and wrinkled because as you get older the skin makes less oil.

You can now understand how dust and dirt easily stick to the skin. In a hot and dusty country such as ours you can see that you should wash the whole of your body more often than children who live in cold countries.

How to keep the skin clean

Water by itself will not clean the skin properly but if used with soap it will. Soap softens the oily dirt. Warm water is better than cold be-

cause it also helps to soften the dirt. You should wash the whole of your body every day before going to bed. If your house has no bathroom, take off all your clothes and wash the whole of your body standing up. Make sure that you wash all the soap off your body with clean water. If you do not, the soap will dry and dust will stick to it. Also, if you do not wash all the soap off, your towel will become very dirty when you dry yourself. Make sure you dry yourself properly, particularly on the back as you cannot feel





the water there and also dry between your toes. Your towel should be hung up to dry in the sun.

What to do every day

1. Wash your face, neck and hands before putting on your clothes in the morning.
2. Always wash your hands very carefully after going to the latrine.
3. Always wash your hands before eating, particularly if you eat your food with your hands. If you eat with dirty hands the dirt may have harmful germs in it which may get into your mouth and be swallowed with the food and make you ill.
4. Have a good wash before going back to school in the afternoon.
5. Have a bath before going to bed.

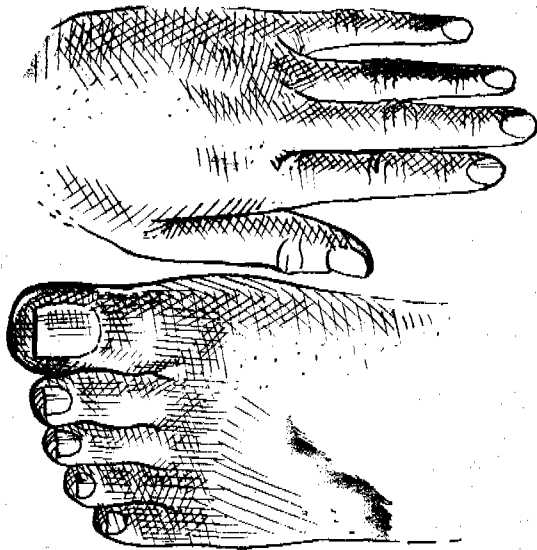
How to look after your nails

The finger and toe nails are made of the same material as the skin but it has become hard and flat to protect the ends of the fingers and toes from injury.

The nails should be kept fairly short. If they are allowed to grow long dirt collects under them and this dirt may have in it harmful germs. If you put your fingers in your mouth these germs may be swallowed and cause illness. If you scratch yourself with dirty nails and break the skin, germs may get into the body. You should cut your finger nails frequently and they should be curved at the ends. To keep them clean they should be scrubbed daily with a small brush and soap and water. Do not use sharp

things made of metal to clean the nails as they will scratch the underside of the nail and make a place for dirt to collect.

Toe nails should be looked after in the same way as finger nails and are just as important, but toe nails should be cut straight across.



How to take care of the hair

Hair is a very good trap for all kinds of dust and dirt. We find hair in different parts of the body for this very purpose. The nose and the ears have tiny hairs in them to catch dust and dirt, so stopping it getting into the body. The hair of the eyelashes is to stop dust or other small objects getting into the eye. The skin under the hair on the head sometimes becomes dry and small bits break off. This is called dandruff. If you brush your hair daily with a fairly hard

brush you will remove most of the dandruff and also any dust which has collected. Hair should not be washed too often as this removes the oil and the hair becomes dry and breaks off. Once a week is quite enough. It should be washed with warm water and soap. Make sure you wash all the soap off with clean water. Hair brushes and combs should be washed every week with warm water and soap to get rid of the dirt. Your hair should be cut every three weeks. Short hair is cooler and easier to keep clean.

THINGS TO DO

1. Look at your skin through a magnifying glass. Can you see the holes in your skin?
2. Next time you get oil on your hands, try to wash it off with (a) cold water, (b) cold water and soap, (c) warm water and soap. Which is best?
3. After a P.E. lesson, when you are very warm, rub your forehead with a piece of clean rag and see how much dirt comes off.
4. Look at your nails through a magnifying glass. Look under the nails as well as on top.

QUESTIONS

1. Why does dust and dirt stick to the skin?
2. What is perspiration?
3. Where does it come from?
4. Why should we wash with soap and warm water?
5. Name two very important times in the day when you should wash your hands.
6. Why should the nails be kept short?
7. Why is brushing good for the hair?

2. CARE OF THE TEETH

When a baby is born it has two sets of teeth in the gums but none showing. At about seven months of age the first set of teeth begin to break through. A baby does not need teeth for the first six or seven months of its life as it is fed on milk and very soft foods. The reason for having teeth is that the food can be broken up into tiny pieces and it can then be swallowed easily. If you look after your teeth carefully and visit the dentist regularly they will last until you are quite old and you will not suffer a great deal of pain from toothache.

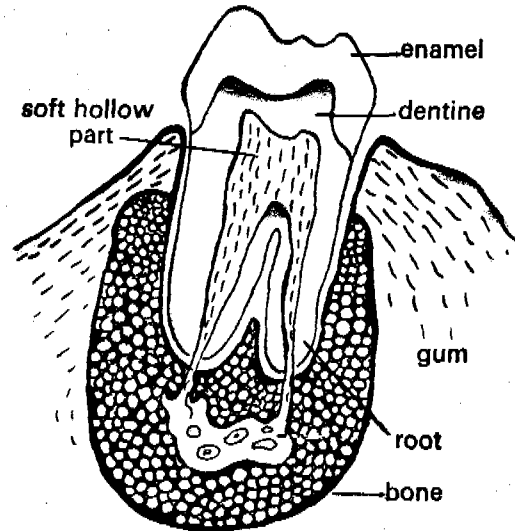
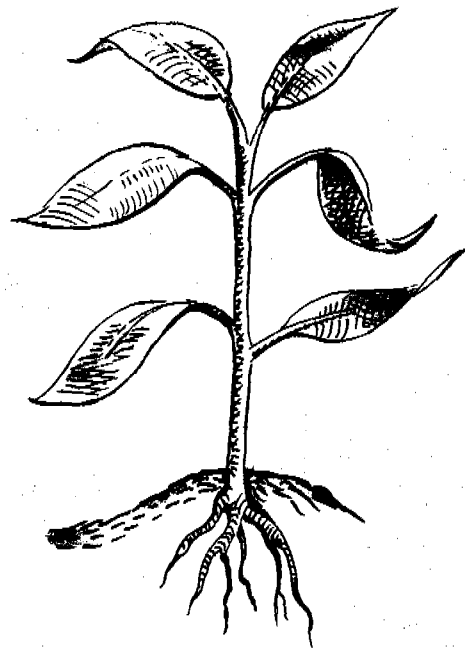


Diagram of tooth

What a tooth is made of

Teeth are fixed firmly into holes in the bone of the jaw by their roots, rather as a plant is held firmly in the ground.

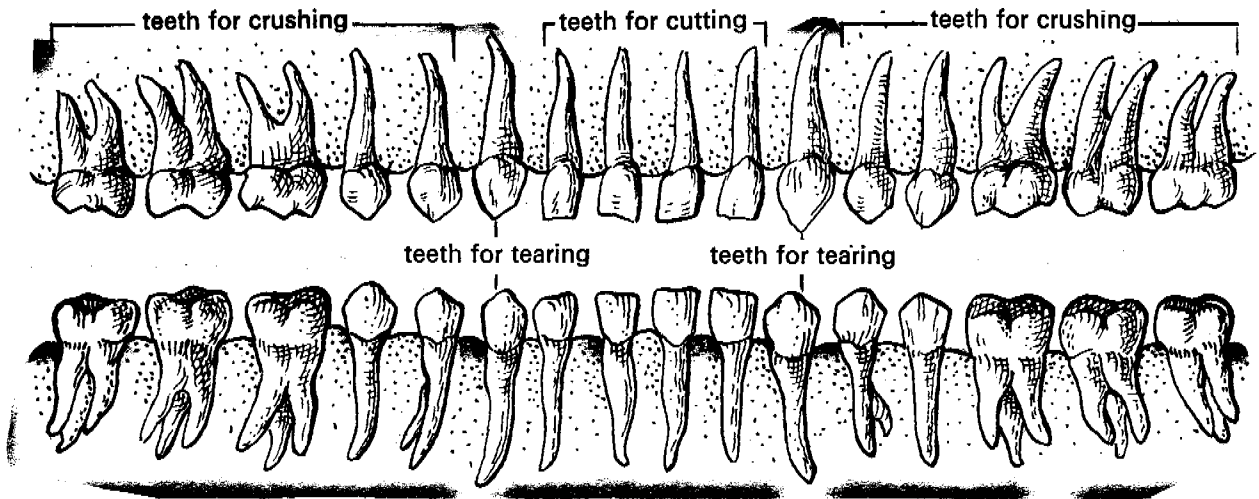
The part of the tooth you can see is covered with a very hard substance called enamel. This covering of enamel prevents the tooth from wearing away. Under the enamel is a substance called dentine which is like ordinary bone. Most of a tooth is made of this substance. Inside the dentine is a hollow full of soft material which contains tiny blood tubes and the nerve of the tooth. These enter the tooth through a small hole in the root.



How teeth grow and fall out

The first set of teeth are often called the "milk teeth". They should all be showing by the age of two, but they do not appear all at once. At about the age of six the first teeth gradually become loose and fall out and the second set begins to appear. The second set should all be in place by the age of thirteen. Many people

sharp straight edges. These are for cutting food. On either side of these are sharp pointed teeth. These are for tearing food. Animals such as lions which live on meat have many teeth shaped like this. Behind these sharp teeth are two kinds of teeth with flat tops. The ones near the front of the mouth are smaller than the ones behind them. These are for



think that the second teeth push the first ones out but this is not completely true. When the second teeth are ready to break through, changes take place which allow them to come through the gums. These changes make the first teeth loose and they finally drop out.

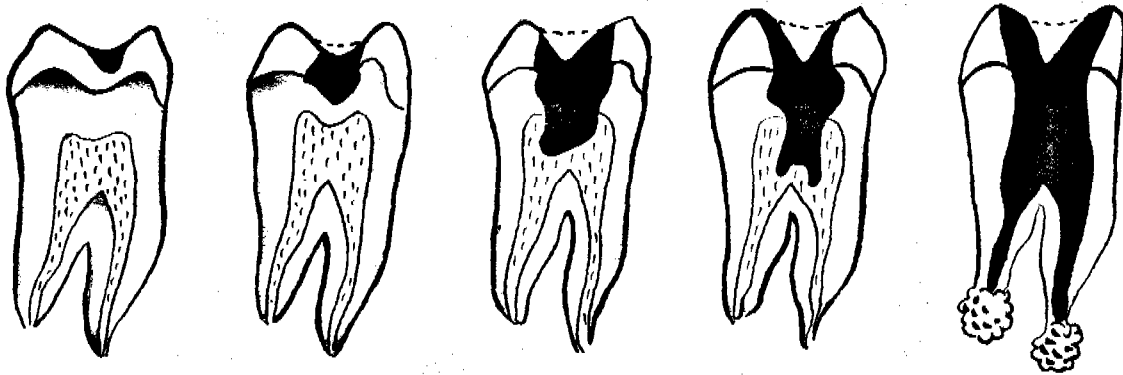
Different kinds of teeth

All your teeth are not the same shape and size. There are four different kinds of teeth in the mouth. Each of these kinds does a different job. The front teeth are flat with

crushing food. Animals such as elephants which live on vegetable matter, which has to be crushed before eating, have many of these teeth. They have two or three roots but the smaller front teeth have only one.

How teeth decay

Most of us get toothache sometime during childhood. This is because the teeth rot or decay. When this happens the nerve of the tooth is exposed and is very sensitive to heat and cold and this causes the pain of toothache.



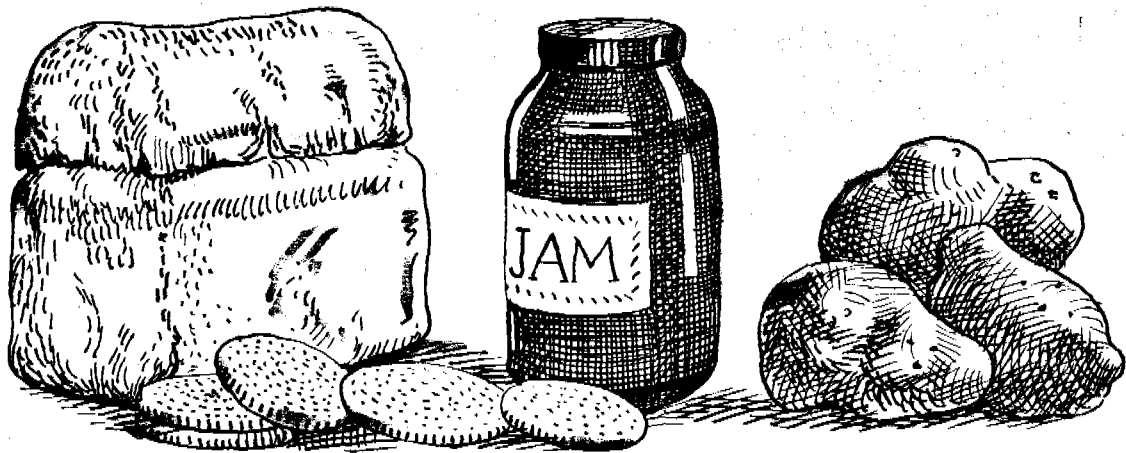
Stages of decay

Decay starts by a tiny hole being made in the hard enamel. The hole is probably made by the kind of food you eat or because you do not clean your teeth often enough or at the proper times. Once the hole is made it gets bigger and bigger. If the hole is not too big, a dentist can repair it. First he removes all the decayed tooth with a drill and then he fills the hole with a soft material which quickly becomes very hard. If the hole is very big he cannot do this and has to take the tooth out.

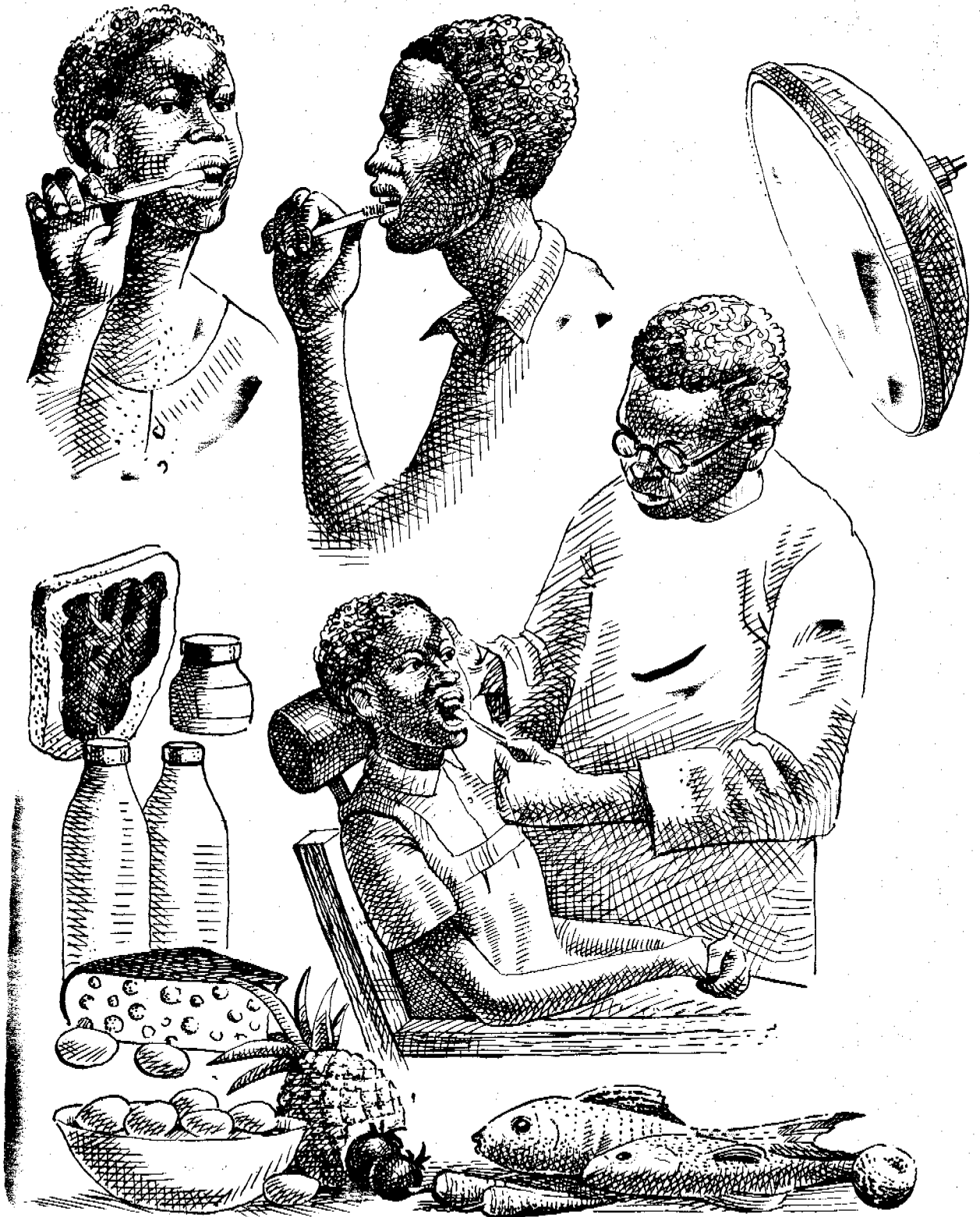
Why teeth decay

There are two main reasons why your teeth decay :

- I. Because of the kind of food you eat. Soft sweet foods have in them a substance called starch. The starch mixes with the saliva in the mouth and makes acids. Acids make things rot or decay. If you get a strong acid on your hands it will burn the skin away. In a similar way the acids formed in the mouth attack the enamel and make tiny holes in it.



Soft foods bad for the teeth



Foods which contain a lot of starch and are bad for the teeth are bread, potatoes, maize, biscuits, rice and sweets. Your food must include some of these but not in very large quantities.

2. Because you do not clean your teeth often enough or at the right time. You should clean your teeth after every meal and particularly before going to bed at night. This is most important as we sleep for a long time which gives the acids made in the mouth a long time to attack the teeth.

How to clean the teeth

The best way to clean your teeth is with a toothbrush and toothpaste. If you have not the money to buy these a chewed stick can be used instead of a toothbrush, and salt and water instead of toothpaste. The back of the teeth as well as the front should be cleaned by using a circular movement of the brush. To clean between the teeth, which is where food becomes trapped, use an upward and downward movement. After cleaning the teeth wash out your mouth with fresh water and also wash your toothbrush carefully.

Some hints on the care of teeth

1. Visit a dentist every six months. He may not find anything wrong which is good. If you go twice a year and he does find something

wrong it will be fairly small and easily repaired.

2. Eat food which is hard to chew. The teeth like all other parts of the body need to be used in order to keep healthy. If you ate nothing but soft food for a very long time your teeth would eventually become loose.
3. Eat plenty of fresh, uncooked fruit. Most fruits have fibre in them and the fibres which are like tough cotton thread help to clean between the teeth.
4. If you get toothache, go to the hospital or to a dentist as soon as possible.
5. Never forget to clean your teeth.

THINGS TO DO

1. Using a mirror, have a good look at your own teeth. Notice the different shapes of the teeth.
2. If you are still losing your first teeth, examine one that has fallen out.
3. If you find the skull of an animal on a day out in the country, examine its teeth and try to tell what kind of food it lived on.

QUESTIONS

1. Why does a baby not need teeth for the first six months of its life?
2. How do the first teeth fall out?
3. Why are our teeth different shapes?
4. Why do teeth decay?
5. Name some of the foods which are bad for the teeth.
6. Name some of the foods which are good for the teeth.
7. Describe the best way of cleaning teeth.

3. CARE OF THE EYES

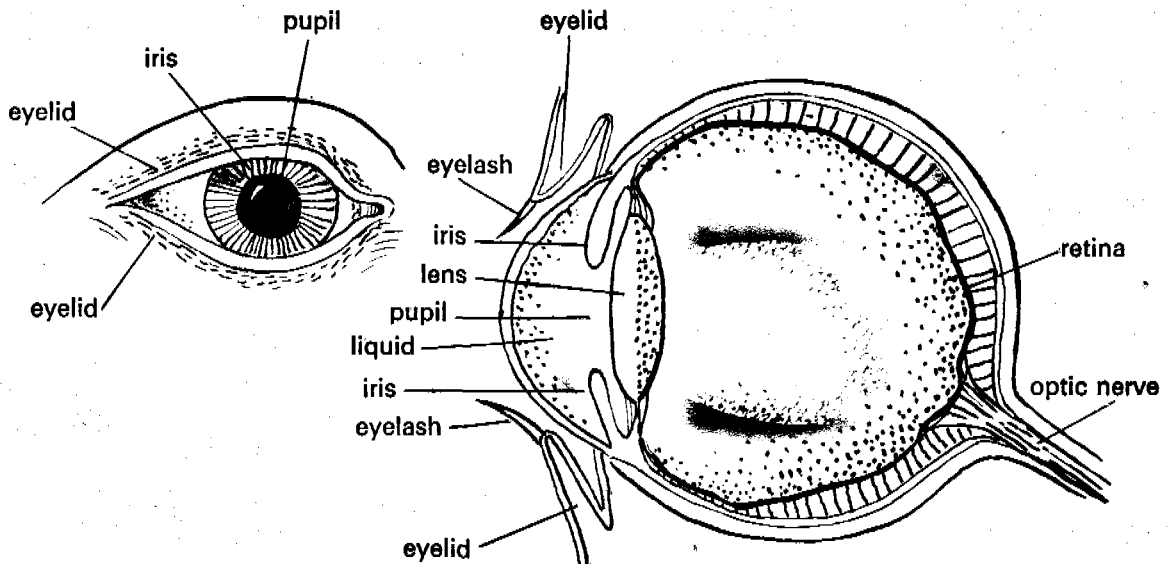
It is very important to look after your eyes. Poor eyesight prevents you from doing many things. When you leave school and you are looking for a job bad eyesight may prevent your getting the kind of work you want. For many jobs you must have good eyesight. For some jobs you have to be examined by a doctor to make sure that you are healthy and strong enough to do the job. In the examination the doctor always tests the eyes. Poor eyesight also makes it difficult for you to play games.

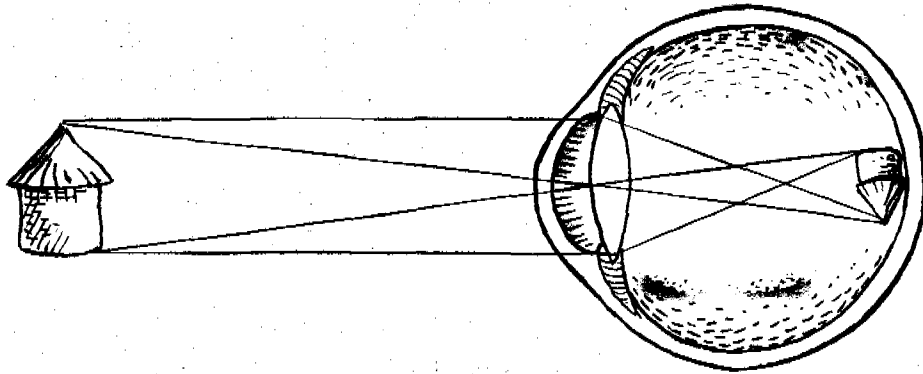
Not everyone has good eyesight. You may be born with poor eyesight. If your eyes are poor you can stop

them getting worse by looking after them. If you are lucky to be born with good sight you can spoil it by not taking care of your eyes.

What the eyes are made of

The eyes are very delicate organs. In the skull are two deep hollows into which the eyes fit. They are protected from injury by the bone of the skull. In front, the eyes are protected by the eyelids. If there is any danger to the eyes, such as dust, the eyelids come down over the eyes very quickly. Along the edges of the eyelids are tiny hairs called eyelashes. The hairs are a trap for dust and other small objects.



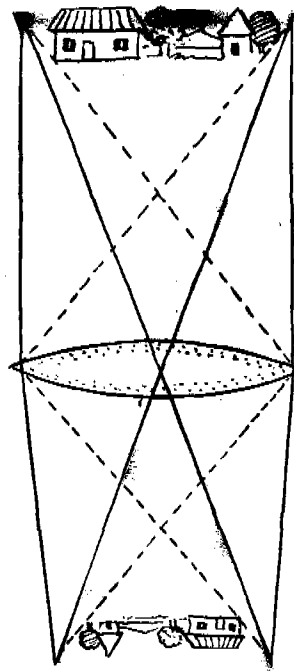


The eyes are shaped like globes and are covered by three different layers. The inside layer is called the *retina*. The eyes are divided into two parts by the *lens*. Both parts are full of a special liquid. This liquid gives the eyes their shape in the same way as the air inside a football makes it round. In front of the lens is a hole through which light passes. This hole is called the *pupil*. Round the pupil, which is black in colour, is the coloured part of the eye called the *iris*. The eyes are joined to the brain by a nerve called the *optic nerve*.

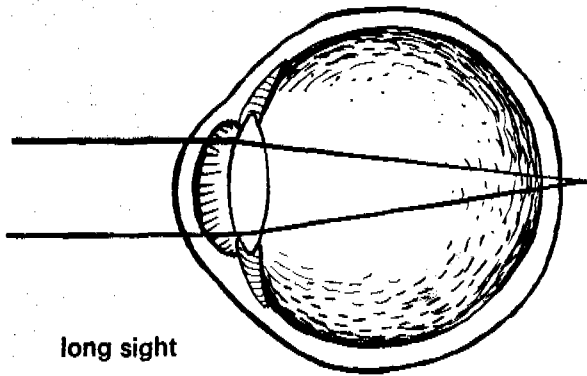
In a perfect eye the rays of light meet on the retina at a special place called the *yellow spot*. When the rays of light meet here it causes a message to be sent to the brain through the optic nerve. The brain then tells you what you are looking at.

How we see things

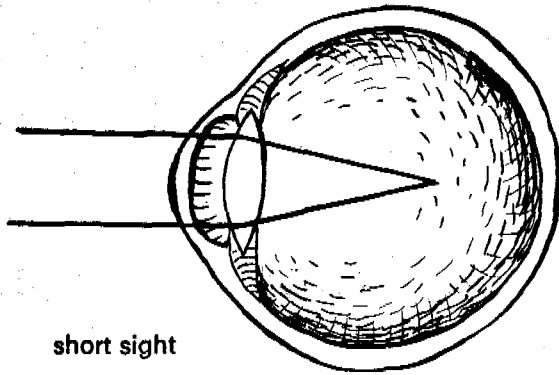
When you look at an object, rays of light from that object pass through the pupil and then through the lens. When rays of light pass through a lens, shaped like the one in the eye, they are bent in as you can see in the diagram.



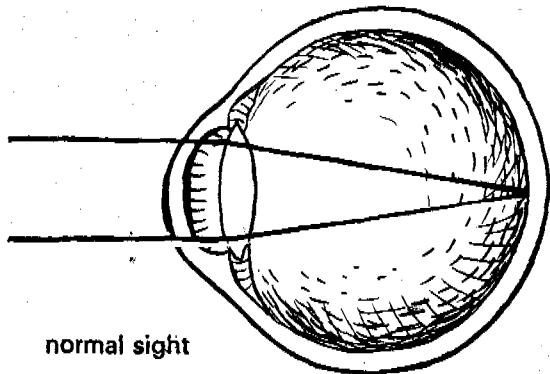
The pupil of the eye can make itself bigger or smaller. If you are outside in very bright sunlight, the pupil becomes very small. If you are inside a dark room the pupil becomes large. Animals can see very well in the dark because their pupils become very big.



long sight



short sight



normal sight

Why some children have to wear spectacles

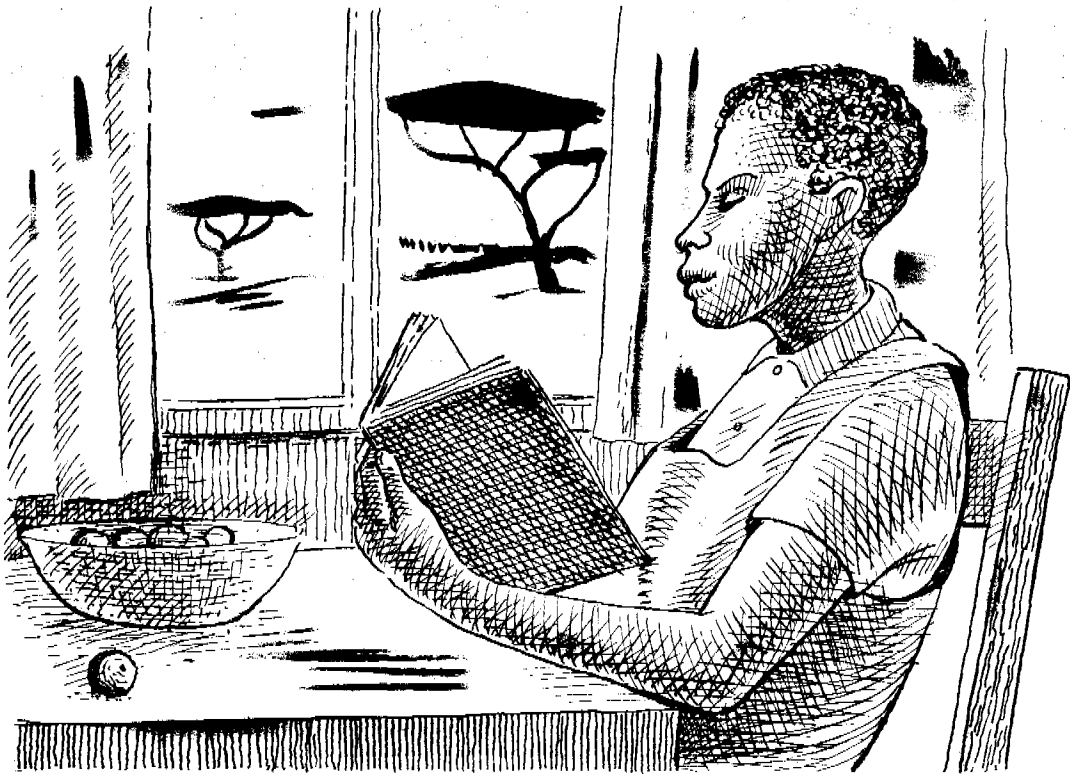
Sometimes the eyes are not the proper shape. If the eyes are too short from the front to the back the rays of light do not meet on the retina, but behind it. The thing you are looking at is not seen clearly.

If the eye is too long from the front to the back, the rays of light then meet in front of the retina. Again the object you are looking at is not seen clearly.

If either of these things happen, spectacles are needed. If you cannot see things properly you should see a doctor and he will tell you what kind of spectacles you need. Not all spectacles are the same. What the spectacles do is to make the rays of light meet on the retina. You should never wear spectacles unless told to do so by a doctor.

Infections of the eye

CONJUNCTIVITIS. One of the commonest diseases of the eye is conjunctivitis. This is caused by a tiny germ. The white part of the eye turns pink in colour. When you awake in the morning the eyelids may have stuck together slightly. This is because the eyes become covered with a sticky fluid. Conjunctivitis quickly spreads to other children. It is most important that no one else uses the towel or handkerchief of a child who has the disease. It is easily cured by a doctor.



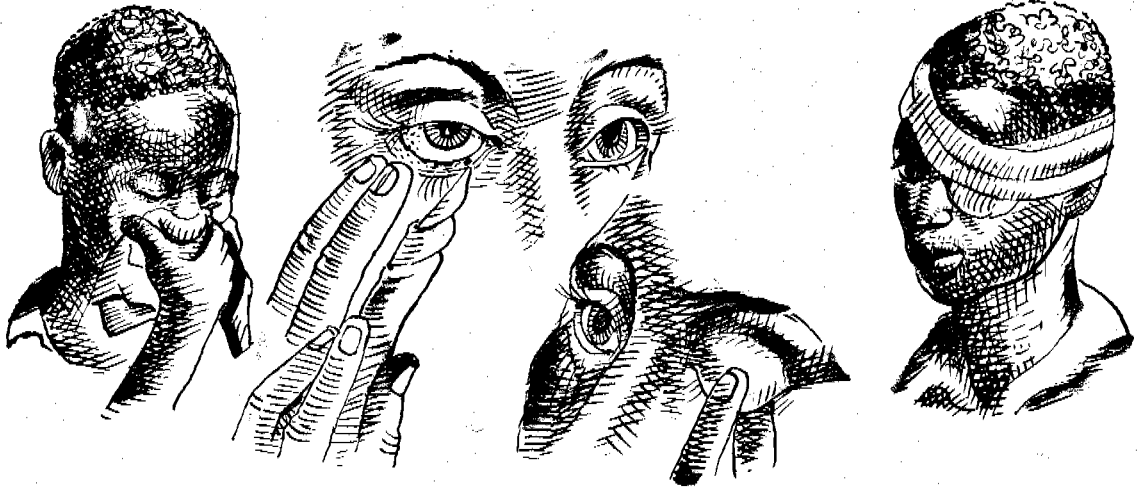
TRACHOMA. This very serious disease can cause blindness. It is quite common in certain parts of East Africa. It is like conjunctivitis and the eyes become very red. Also small white pimples can be seen under the eyelids but only by a doctor. If you think you have this disease you should see the doctor at once.

STYES. Styes are to be found on the eyelids. These are caused by dirt getting into the glands on the edges of the eyelids. The glands pour out the oily fluid on to the skin. A small swelling appears and a yellow coloured fluid collects under the skin. Styes are very painful and after a time burst. The yellow fluid

escapes and the pain stops. A simple way of treating them is by bathing the eye with warm water.

How to take care of your eyes

1. Do not read small print for long periods.
2. Always make sure you have plenty of light when reading.
3. If you cannot read what is written on the blackboard, ask your teacher if you can sit nearer the front.
4. If you get headaches, sore or watering eyes after reading, you should see the doctor.
5. If you think there is *anything* wrong with your eyes you should have them tested by your doctor.



How to remove dust, etc. from the eye

1. Do not rub the eye. You will only push the object farther in.
2. If you blow your nose it will make your eyes water and the speck of dust may be washed out.
3. With clean hands take hold of the lower eyelid and pull it down. You may then be able to see the object in the eye. Remove it by using the corner of a clean handkerchief or piece of cloth.
4. If the object is under the top eyelid, take hold of the top eyelid and pull it down over the bottom one. This may remove the object.
5. If the object is stuck into the eyeball do not try to take it out. Fold a clean piece of soft cloth several times and put it over the eye. Hold it in place by tying a bandage round the head and take the person to a doctor.

THINGS TO DO

1. Hold a magnifying glass or a lens up to the sun so that the light passes through the lens on to a piece of paper. Move the lens forward and backward until the spot of light on the paper becomes as small as possible. The rays of light are now meeting on the paper as the rays of light entering the eye meet on the retina.
2. Try to observe a cat's eyes at night and note the size of the pupils.
3. Examine your friend's eyes. Note the iris, the pupil and the eyelashes.
4. Wave your hand suddenly and quickly in front of your friend's eyes. What does the eyelid do?

QUESTIONS

1. What shape is the eye?
2. What keeps it that shape?
3. What happens to rays of light when they pass through a lens?
4. Why can animals see better in the dark than we can?
5. What causes short sight?
6. What causes long sight?
7. How would you remove a small object from the eye?

4. CARE OF THE EARS

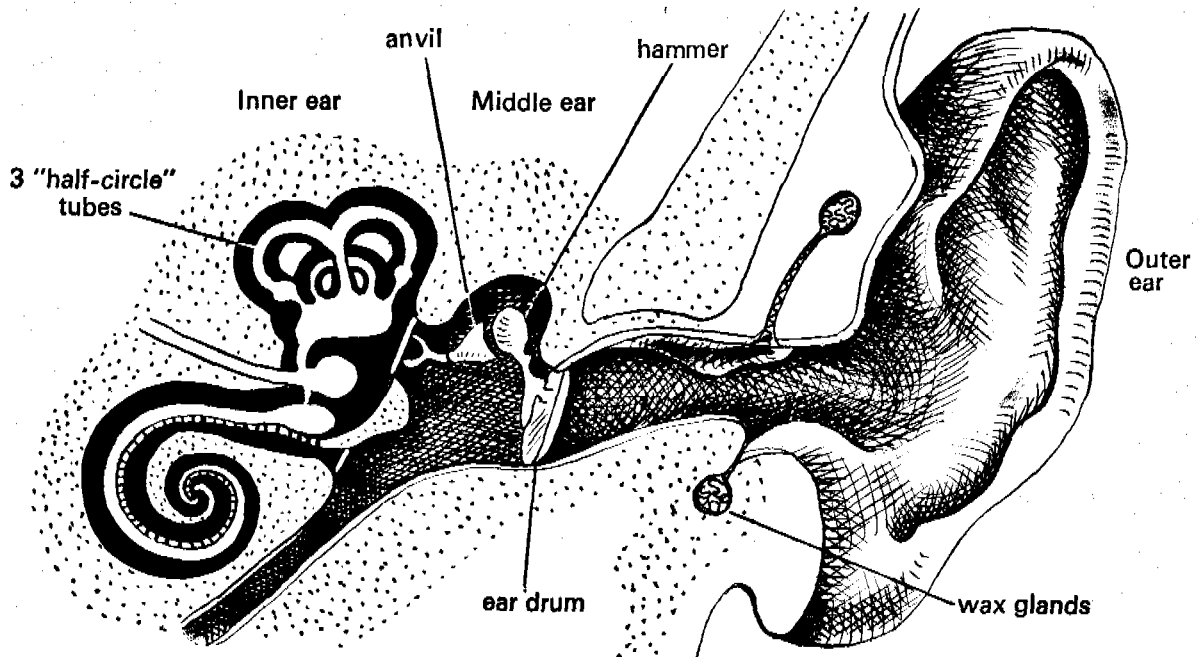
Some animals have a much keener sense of hearing than human beings. This is because they have more dangers to face than we have. Their ears are usually bigger as in the case of the elephant. They can also move them. Being able to move them in the direction of the slightest noise often warns them of approaching danger. Human beings have not to face constant danger as animals do and so we have lost the power to move our ears.

What the ear is made of

The ear is a delicate part of the body. It is made up of three different parts, the *outer ear*, the *middle ear* and the *inner ear*.

The outer ear is the part you can see. This is shaped like a trumpet so that sounds can be directed into the middle and inner parts. In olden times people who could not hear very well used to hold a trumpet to their ears. This helped them to hear better. It really made their own ears bigger and the sound louder.

A short passage leads from the outer ear to the middle ear. At the entrance to this passage are tiny hairs. These hairs do the same kind of work for the ear as the eyelashes do for the eye. They act as a trap for dust, small objects or insects which might get into the ear. The sides of the passage are also covered with wax which also



acts as a further trap for dust and insects.

The end of the passage is blocked by a tough piece of skin called the *ear drum*. This is stretched tightly like the skin covering a drum. Beyond this is the middle ear.

In the middle ear there are three very small bones. The first one touches the ear drum with its other end touching the second one. The other end of the second bone touches the third. The other end of this bone touches another piece of skin. This separates the middle ear from the inner ear. From the middle ear a short tube goes to the back of the nose.

The inner ear is very complicated and is made up of two parts. One part looks like a snail shell and tells you what kinds of sounds you are hearing, that is, whether they are loud or soft, pleasant or unpleasant, high pitched or low pitched.

The other part is made up of three tubes each in the shape of a half circle. This tells you what position your body is in, that is, whether you are standing up, lying down or standing on your head.

How the ear works

Sound travels through the air in waves. If you throw a stone into the middle of a pool, it causes circular waves to spread out. These move until they reach the sides of the pool. These are waves which you can see.

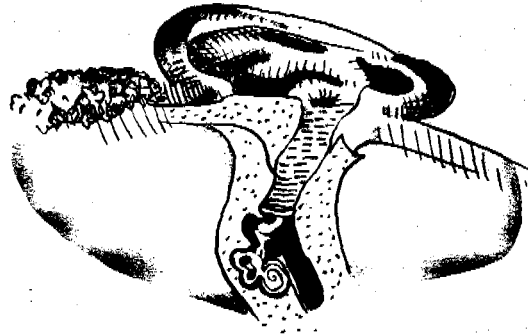
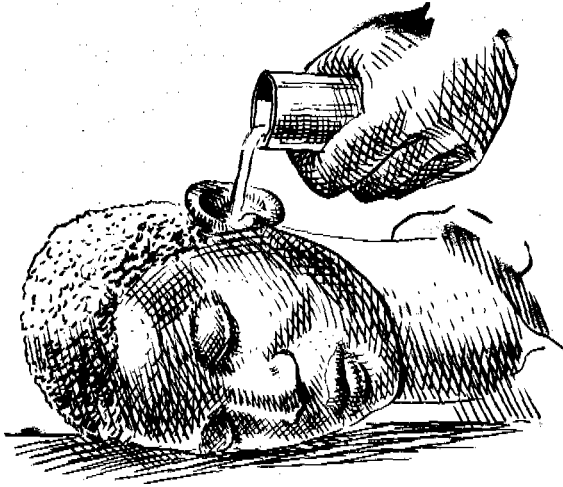
Sound waves are similar to these but you cannot see them. When a sound is made the waves pass through the air very quickly and are directed into your outer ear. They strike the ear drum and make it vibrate. This makes the small bones in the middle ear also vibrate and the sound is passed on to the inner ear. The part of the inner ear like a snail shell then sends a message along a nerve from the ear to the brain, and it is the brain that really tells you what kind of sound you have heard.

How to look after your ears

The ears should be washed every day and thoroughly dried with a clean towel.

Sometimes the wax in the ears collects in large quantities. This





blocks the passage to the middle ear and makes you partly deaf. The wax can easily be removed by a doctor. Never try to poke it out yourself with a match stick or any sharp instrument. It is very easy to poke too far into the passage and injure the eardrum. This might cause permanent deafness.

If you have a bad throat or cold, germs sometimes pass up the short tube between the back of the nose and the middle ear. These germs may cause an abscess to form and the ear will begin to ache. Whenever you get earache you should see a doctor at once. The ear is very close to the brain and if the ear is infected the infection may spread to the brain which can be very serious.

Children sometimes push things into their ears or insects get in. Never try to poke them out yourself. You

will only push them farther in. First try to get the object out by making the child lie on his side. The ear with the object in it should be facing upwards. Pour warm water into the ear and the object may float out. If this does not work take the child to a doctor.

THINGS TO DO

1. Look carefully at your friend's outer ear.
2. Look carefully at any animal's ears. Notice how they move. If a fly settles on your ear how do you get rid of it? How does an animal get rid of a fly on its ear?

QUESTIONS

1. Name the different parts of the ear.
2. Why are animals able to move their ears?
3. What do waves of sound do to the ear?
4. Why is it dangerous to poke sharp pointed things into your ear?
5. How would you remove an object from the ear?

5. CARE OF THE NOSE

How air enters the body

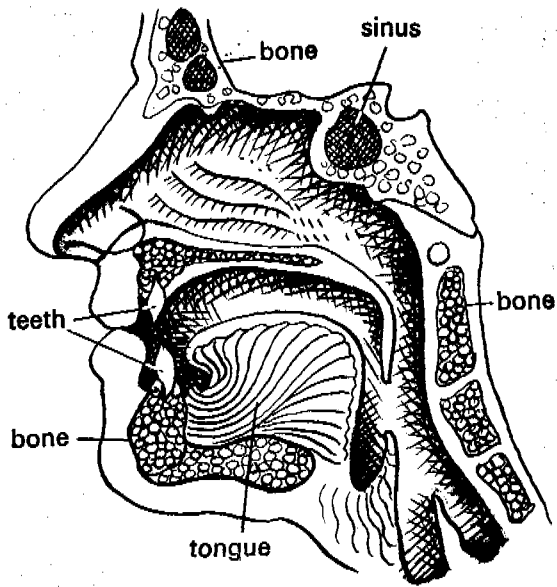
Air enters the body through two different passages. One is the mouth and the other is the nose. When you are sitting or walking about you should breathe through your nose. When you have been running about a lot, as in a game, you are forced to breathe through your mouth. You do this because the body needs more oxygen when you are very active.

Oxygen is a gas found in the air. By breathing through the mouth you can get more oxygen into the body at once than by breathing through the nose.

Why you should breathe through the nose

The nose is made of bone. The bones inside the nose are thin and folded like a piece of rolled up paper. These bones are covered by a substance which is soft and warm. When you breathe in, the air passes over the bones and is warmed before it goes into the *lungs*. At the entrance of the nose are tiny hairs. These act as a trap for dust and germs. When air enters the lungs it has been warmed and cleaned. If you breathe through the mouth there is no trap to stop the germs and dust going into the lungs.





with the first finger and blow down the other passage.

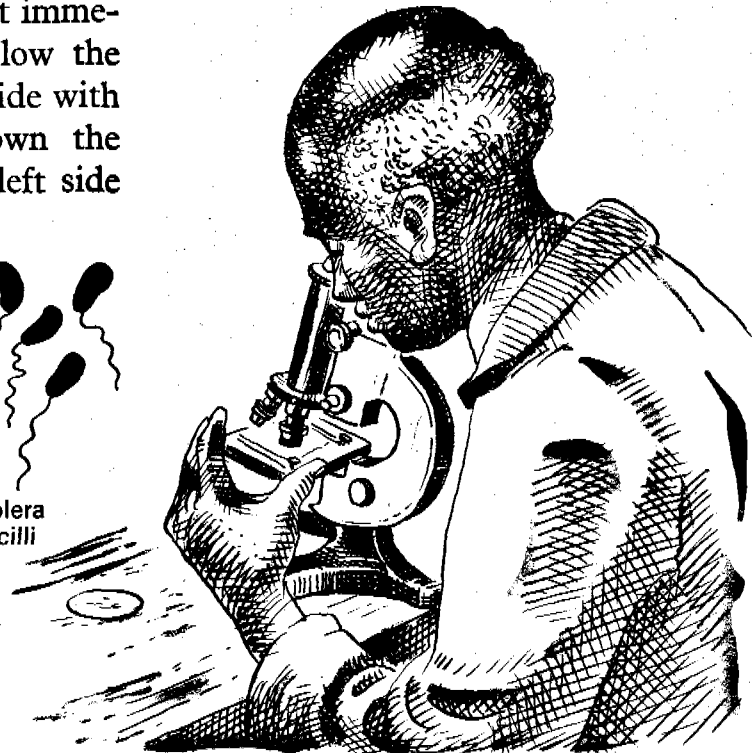
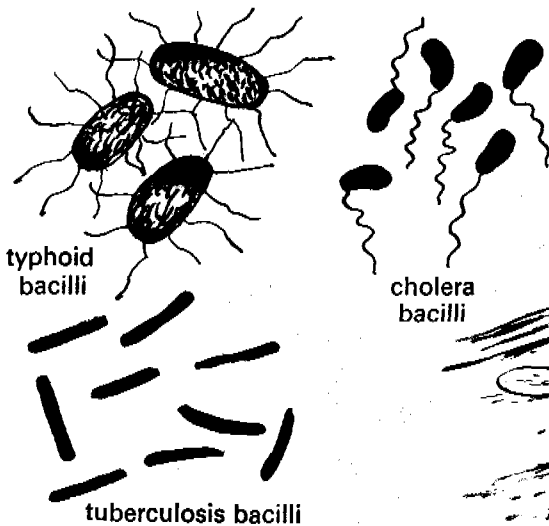
When you have a cold you need to blow your nose more often.

What happens when you cough or sneeze

The air breathed out is warm and full of tiny drops of moisture. If you breathe on a mirror or a piece of glass it will turn dull and you can feel the moisture with your finger. In these tiny drops of moisture are many *germs*. Germs are tiny living things which you cannot see with the naked eye. It is possible, however, to see them through an instrument called a microscope, which is like a very powerful magnifying glass.

How to keep the nose clean

The dirt collected by the hairs has to be got rid of. This is done by blowing the nose using a handkerchief or a clean piece of rag. Soft paper is the best as long as you burn it immediately. The best way to blow the nose is by pressing the right side with the thumb and blowing down the other side. Then press the left side





wrong



right

There are millions of germs in the air, together with dust and dirt. Germs like air of this kind. Most of the time you cannot see the dust in the air. Sometimes in the evening, when the sun is low in the sky, it lights up the dust and you can see it. The air we breathe is full of dust and germs.

When you are talking to someone, the air you breathe out travels about one metre away from you. If you are singing or shouting it goes much farther. The same thing happens when you cough or sneeze. The breath leaves your mouth and nose suddenly and violently.

The germs in your breath will go a long way and others may breathe them in. It is very important when you have a cold or cough that you always put your handkerchief in front of your nose and mouth before you cough or sneeze. You can usually feel a cough

or sneeze coming which gives you time to get your handkerchief ready. Also turn your head away from other people around you. In this way you prevent others from catching your cold, cough or some other more dangerous disease.

The dangers of spitting

Spitting is a very dirty and dangerous habit. The sticky fluid which comes out of your mouth is full of germs. If you swallow it your body will kill many of the germs and it will do you no harm. Some very dangerous diseases are spread to others by spitting. The most dangerous of all is tuberculosis. This disease, which attacks the lungs and can cause death, is spreading and it is one of the biggest dangers to health in Africa. Even when the spit has dried up, the germs of tuberculosis remain alive for a long time.

Sometimes when dirt or an insect blows into your mouth you have to spit to get rid of it. When this happens, spit into your handkerchief and not on the ground.

Your handkerchief

1. If you cannot afford a proper handkerchief a piece of old rag will do but *it must be clean*.
2. You need a clean handkerchief every day. If you have a cold you will need two.
3. The best way of getting your handkerchiefs clean is by boiling them, especially when you have a cold. Boiling kills all the germs.
4. Do not use other children's handkerchiefs or let them use yours.
5. Use your handkerchief only for blowing your nose.

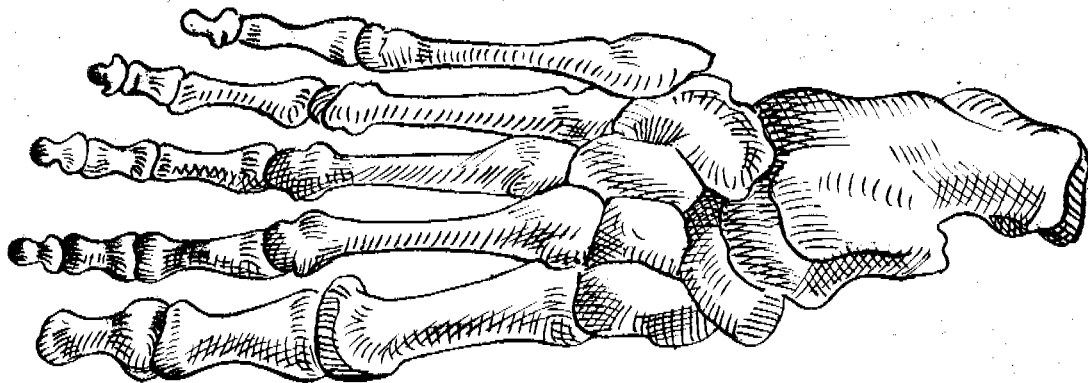
6. When you have blown your nose, put your handkerchief in your pocket at once. Do not leave it lying about or the germs will spread into the air.

THINGS TO DO

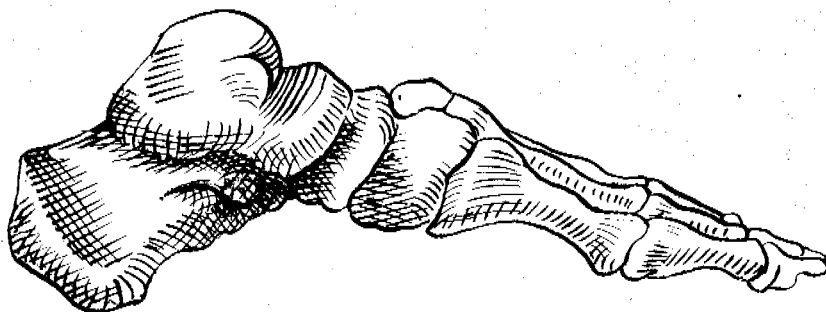
1. Breathe on a mirror or piece of glass. Feel the moisture with your finger.
2. Make yourself some handkerchiefs from an old shirt or dress.
3. Practise using your handkerchief. Pretend you are going to cough or sneeze.

QUESTIONS

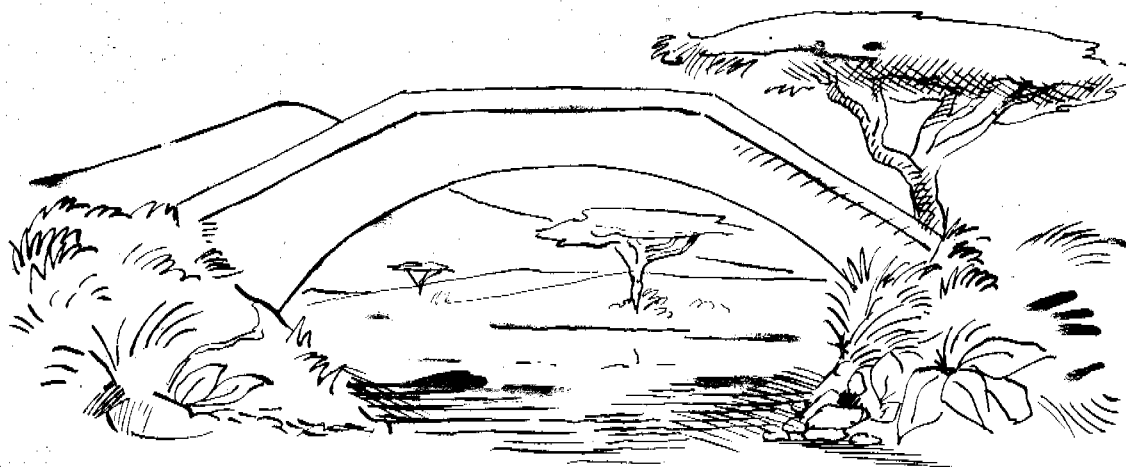
1. Why do you breathe through your mouth when running?
2. What happens to air when it passes through the nose?
3. Describe the best way of blowing your nose.
4. Why is spitting dangerous?
5. What is the best way of washing your handkerchiefs?



bones of foot



long arch of foot



6. OUR FEET

Do you enjoy playing football or netball? In football you must be able to kick the ball skilfully; in netball, to spring high to catch the ball in order to win the game for your team. The feet are a most important part of our body where outdoor games are concerned.

The foot is made up of many small bones. These bones are joined together by *ligaments*. The foot is shaped in a very special way. It is this shape which allows us to spring high and to dribble the ball. Look at the diagram and notice the way the bones are held together. You will see that the bones do not lie flat on the ground. They are raised in the middle and this raised part is called the *long arch*. It is like a bridge crossing a river.

Just as the bridge supports the road or the railway line over it so do the ligaments and muscles together with the bones, support the whole weight of the body when standing or moving.

We must look after our feet if they are to do their job properly. It is better to wear shoes and if they are worn they must fit properly. There should be room for the toes to move. Shoes should not be worn without

socks as there is nothing to soak up the perspiration. The inside of the shoes would become very unpleasant and smelly and the leather would soon rot.

The feet should be washed every night before going to bed. Great care should be taken to dry the feet properly especially between the toes. If this is not done the skin will crack and become very painful.

THINGS TO DO

1. Examine the feet, especially the long arch.
2. See if you can pick up a pencil with your toes.
3. Wet your feet and examine the footprint to see the outline.

QUESTIONS

1. Why is it important to look after your feet?
2. How are the bones of the foot held together?
3. Why is the foot shaped like the arch of a bridge?
4. What must you be sure of when you buy a pair of shoes?
5. Why should you wear socks with shoes?
6. Why should you be careful to dry between the toes after washing the feet?

7. AIR and VENTILATION

The air we breathe in has in it two gases called *oxygen* and *nitrogen*. It also contains a certain amount of water and a great deal of dust. Our body needs oxygen and without it we would die. The air we breathe out contains only a little oxygen as the body has used most of it. It does contain a great amount of another gas called *carbon dioxide*. Plants need carbon dioxide to grow and they breathe it in. They breathe out oxygen which man requires. Man depends upon plants for oxygen which he needs and plants depend on man for the carbon dioxide they require.

The need for fresh air

To keep healthy we need plenty of fresh air. Many years ago people thought that if the amount of oxygen in the air was made less it would be very bad for us. This is not quite true. The higher up in the air you go the less oxygen there is. Pilots of aeroplanes which fly very high have to have extra oxygen but people who climb Kilimanjaro, which is nearly 6000 metres high, do not need extra oxygen. There is a village in the mountains of South America which is 5000 metres above sea level and people live healthy lives there.

If many people were put in a small room with the doors and windows closed there would be a small drop in the amount of oxygen but this would not be dangerous to health. After

some time the people in the room would begin to feel ill. The reason for this is not that the amount of oxygen is getting less. The feeling of illness is caused by the air in the room getting hotter and wetter. Our bodies are warm and they give off heat which warms up the air round about our bodies. Warm air rises and so new colder air takes its place and is then warmed. In this way gradually all the air in the room gets hotter. The air which we breathe out is full of moisture and so gradually the air in the room gets wetter. If the room has smooth, hard walls the moisture in the air will collect in drops on the wall. As all the doors and windows are closed the air in the room is still. There is nothing to make it move. This also helps to make you feel ill. The feeling of illness then is caused by three things :

1. the air getting hotter from the heat of our bodies ;
2. the air getting wetter from moisture breathed out ;
3. the stillness of the air.

What happens if we do not have enough fresh air

If several people went into a room with the door and windows closed they would feel all right for a short time. After a while their bodies would get hot and they would start to sweat. Then they would get a headache. They would feel tired and

weak. If they stayed in long enough they would want to sit down and would easily fall asleep.

If the doors and windows were opened, the first thing they would feel would be the air moving. Air would blow in from outside and the air in the room would become cooler. This is called *ventilation*. In a short time the people in the room would feel very much better.

Ventilation

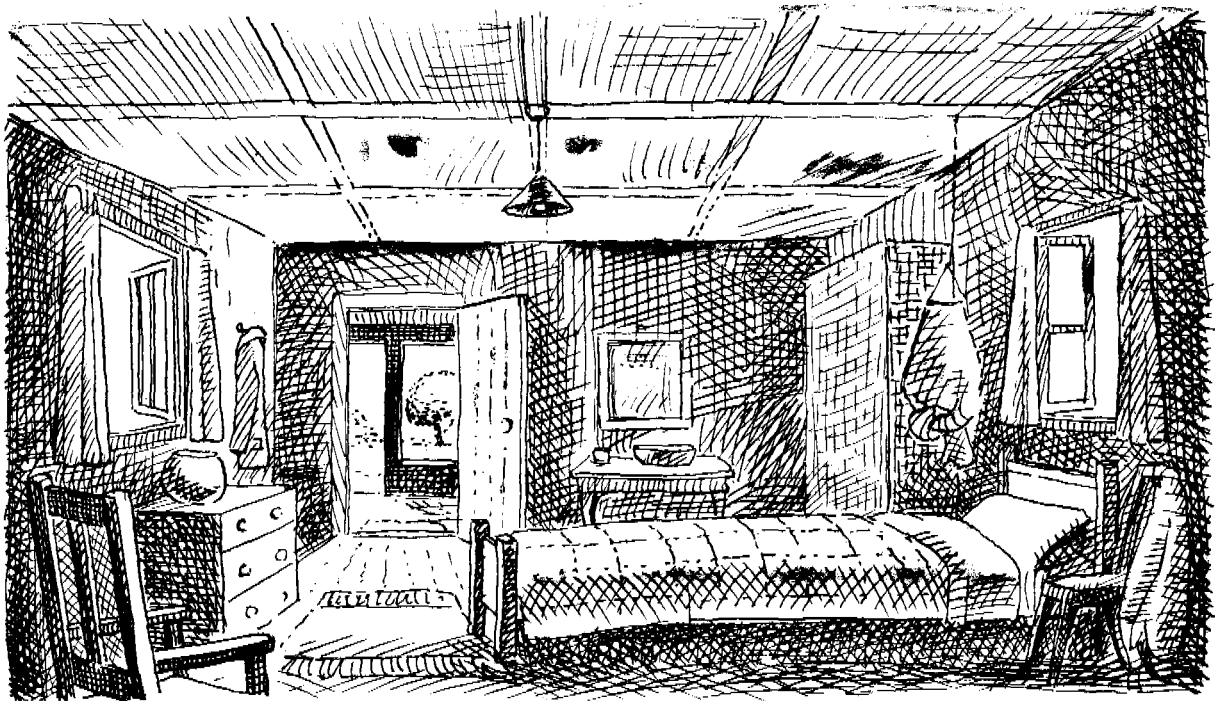
This means making sure that the air in a room is kept cool, dry and moving. It is very necessary to have good ventilation to keep healthy. The most common way to get good ventilation is to have windows which can be opened on opposite walls of a room. The air blows in at one window and goes

across the room out of the other window. In this way the hot, moist air is blown out and you have a constant supply of fresh, cool, dry air.

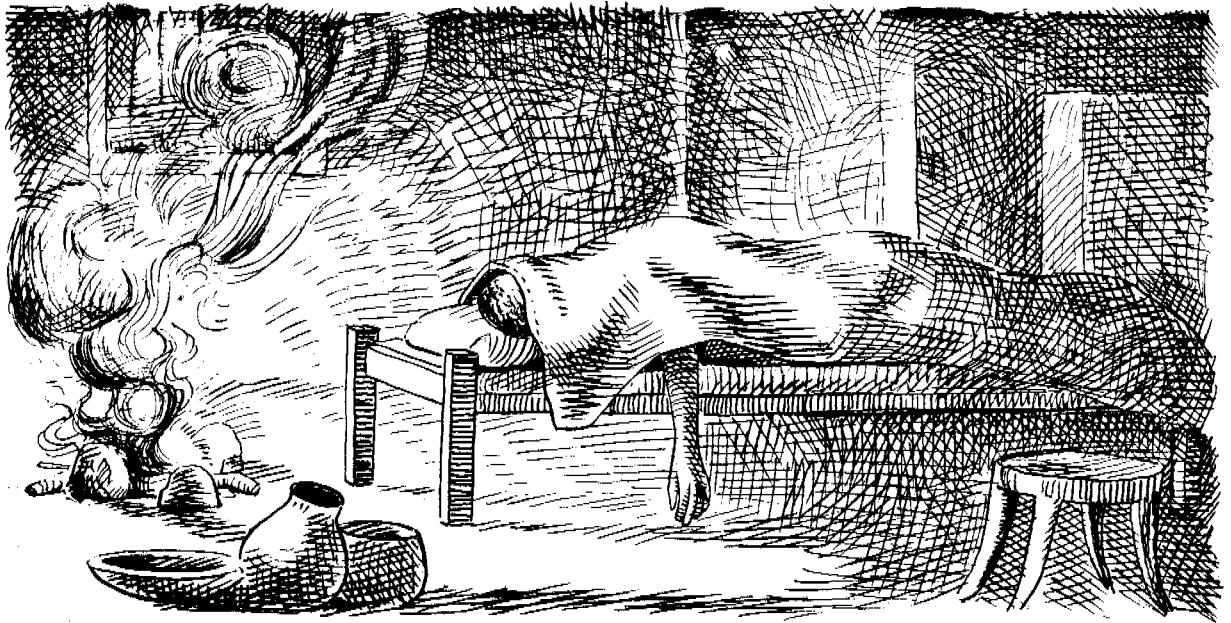
It is not enough to have your windows open in the day time but it is just as important to have them open at night. If you sleep with the windows closed you will wake up in the morning feeling tired and ill. If you sleep with them open you will wake up feeling well and full of energy.

The effects of bad ventilation

If you live for a long time in a badly ventilated house your health may suffer permanently. The warm, moist air of a badly ventilated house is an ideal place for passing on harmful germs, because you are breathing in air which someone else has breathed



Well ventilated room



out. If someone in the room is suffering from a certain disease he will be breathing out the germs of that disease. You may only get diseases such as the ordinary cold, measles, whooping cough, diphtheria or chicken pox. You may also get very serious diseases which can cause death such as tuberculosis which attacks the lungs.

The danger of sleeping in a room with a fire

In cold weather people often go to sleep with a fire burning in the room to give extra warmth. This is not healthy because the fire needs oxygen to burn. If the fuel used on the fire is charcoal, you must be very careful because it gives off a dangerous gas. This may cause death, especially if the door and windows are closed and no fresh air can get in.

Every year there are deaths caused in this way.

Sleep

Sleeping in a well ventilated room is very good for health. During sleep the body is rested and repaired. Many people pull the blankets right over their heads when they sleep. This is a bad habit as you are not breathing fresh air. Always sleep with your head clear of the blankets so that you are breathing fresh air.

THINGS TO DO

1. Breathe on a mirror and feel the moisture with your finger.
2. See that the windows of your house can be opened.

QUESTIONS

1. In what way do plants and man depend on each other?
2. What do we mean by the word "ventilation"?
3. What three things make you feel ill if your house is not well ventilated?
4. Why is it dangerous to sleep in a room with a fire?

8. FOOD

A motor car will not go without petrol. A fire will not stay alight without fuel. In the same way our bodies require food to keep them working. Food gives us energy and keeps us warm. The important things in food are :

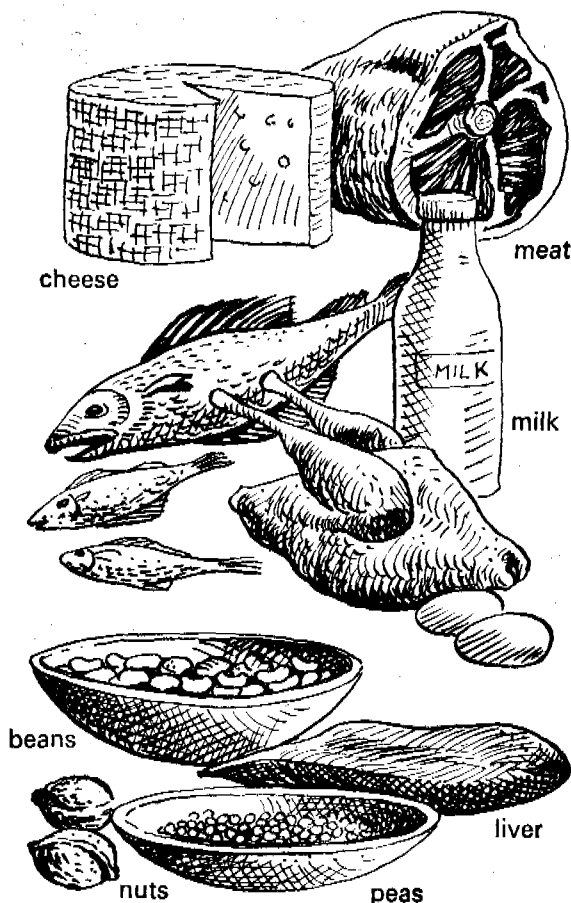
SUGAR AND STARCH. These are called *carbohydrates*. They give us energy and keep us warm. Maize, rice, posho, cassava, yams, millet and wheat are some examples.



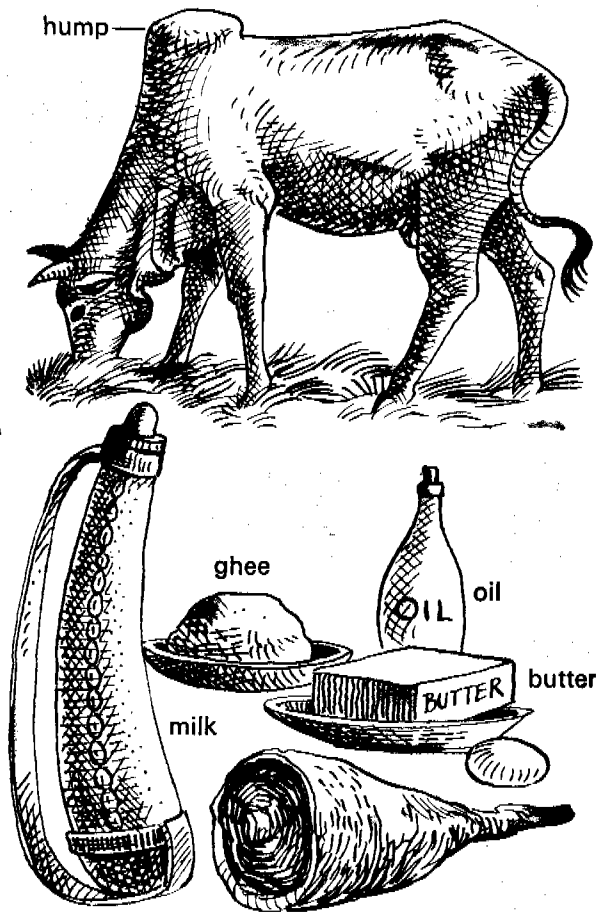
Carbohydrates

PROTEINS. These are found in milk, meat, beans, cheese and the white of eggs. Proteins are the body builders. They make the flesh and bone of the body.

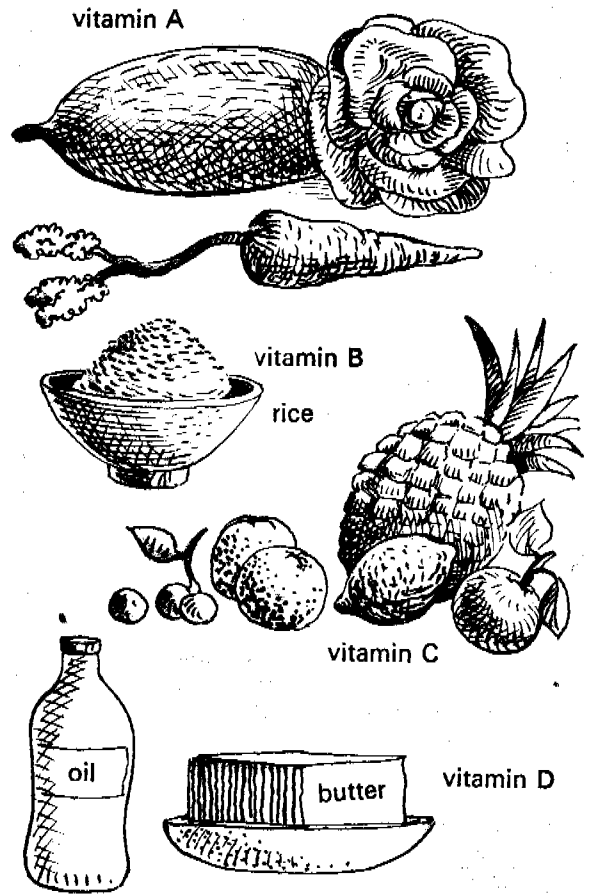
FATS AND OILS. These warm our body. They are also stored under the skin for use when food is scarce as, for example, in the hump of the cow or camel. They are found in milk, ghee, beef and mutton fat.



Proteins



Fats and Oils



Vitamins

VITAMINS. Vitamins in food are necessary if we are to get the things we need for health. If we lack vitamins we can suffer from certain diseases.

Vitamin A helps us to grow and is found in green vegetables.

In wheat and rice there is Vitamin B which prevents beri-beri and the more serious disease pellagra.

Lack of fresh fruit containing Vitamin C causes a skin disease. Sailors in olden days suffered from this disease called scurvy. When they were given lime juice they got better.

Vitamin D which is in butter and oil prevents the disease rickets, in which the bones become soft and do not support the body properly. This is not a problem in Africa because the body gets plenty of Vitamin D from the sun. Only small amounts of vitamins are required to keep us healthy.

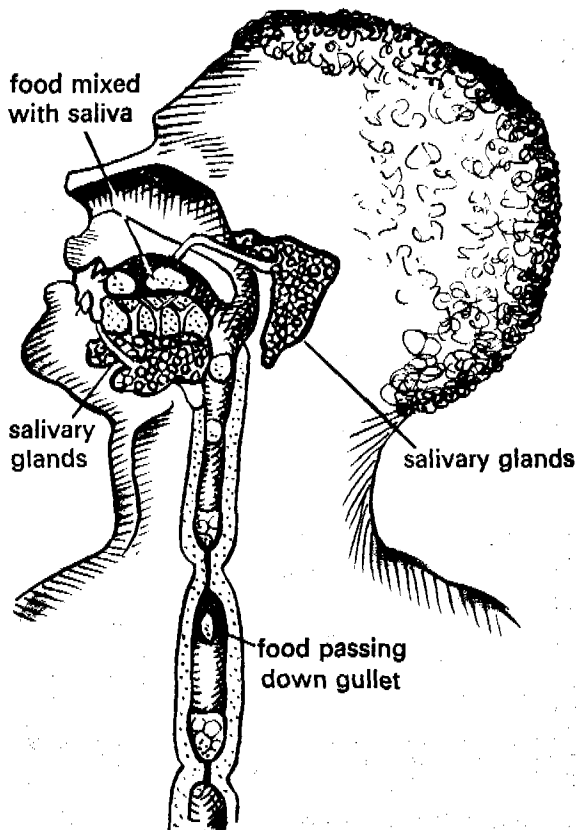
THINGS TO DO

1. Draw some fruit and vegetables you like to eat.
2. Write a list of food you like best. Say whether each is a body-building food or a giver of heat and energy or both.

What happens to the food we eat

The food is taken into the mouth where it is chewed. We must have healthy teeth to chew properly. The teeth break the food into small pieces so that it can be swallowed. There is a liquid like water in the mouth called *saliva*. Its job is to make the food soft and moist. Saliva has another job. It changes the starch in our food into sugar.

When the food is soft and pulpy it is ready to be swallowed. It passes from the mouth into the *gullet*. This is a tube about 23 centimetres long. The food does not drop down the gullet into the stomach.



It goes down slowly being pushed by the walls of the gullet. Look at the diagram and you will see how this works.

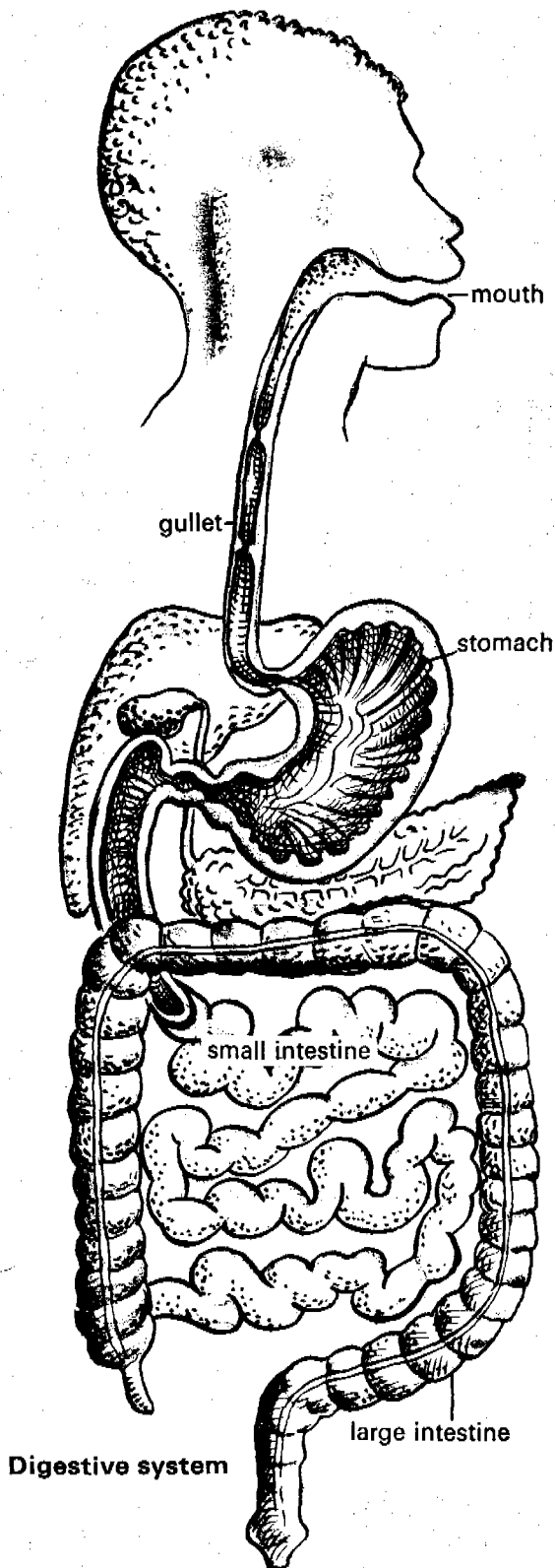
After the food passes slowly down the gullet it enters the stomach. The stomach is a bag made of muscle. The food is squeezed about by the movement of the stomach. There are juices in the walls of the stomach called gastric juices. They come from tiny tubes on the inside wall of the stomach. These juices act upon the proteins in our food.

So, you see, saliva acts upon the starch and the gastric juices upon the proteins. These changes enable the food to be used in our bodies.

The food you have eaten now looks like milk. The juices and the squeezing have made it like this. After a few hours your stomach should be empty. There is a small "door" which opens into the *small intestine*. This "door" allows a little liquid to pass through. It opens and shuts till all the food has left the stomach.

The small intestine is a long tube. It twists and turns like a long thin snake. There are more juices there which complete the changing of food. These juices are finishing off the work of the saliva and gastric juices. They are called intestinal juices.

The food is now a thin liquid. It is ready to be taken into the blood stream. The inside walls of the small intestine are not smooth. They have



tiny hair-like structures on them. Very close to these are small *capillaries*. The digested food is sucked into these *villi*, as they are called. It then passes through the very thin walls of the capillaries. Once in the blood stream it is carried to all parts of the body.

After a fire has burned out there are ashes left. These are thrown away. In the same way the body throws out waste. The *large intestine* is responsible for this. It is shorter than the small intestine but broader. The liquid which has not been absorbed by the small intestine is absorbed by the large. The dry mass of waste is then pushed on until it reaches the end of the large intestine. It is then expelled from the body as waste. The waste liquid is dealt with by the kidneys.

THINGS TO DO

1. Examine the diagram and see where your food goes. Copy the diagram into your notebooks.
2. Write down what happens to a dinner of stewed meat and maize (meat is protein ; maize is starch).

QUESTIONS

1. Name five foods which are carbohydrates.
2. Name four foods which are proteins.
3. Name three foods which are fats.
4. What do carbohydrates, proteins and fats do to the body ?
5. Why are vitamins important ?
6. What happens to food in the mouth ?
7. What happens to food in the stomach ?
8. How does food get into the blood-stream ?

9. THE FRAMEWORK OF OUR BODY

Have you ever watched anyone building a house? The house must be strong and well built so that it will not fall down when fierce winds blow. The materials for building must be chosen carefully.

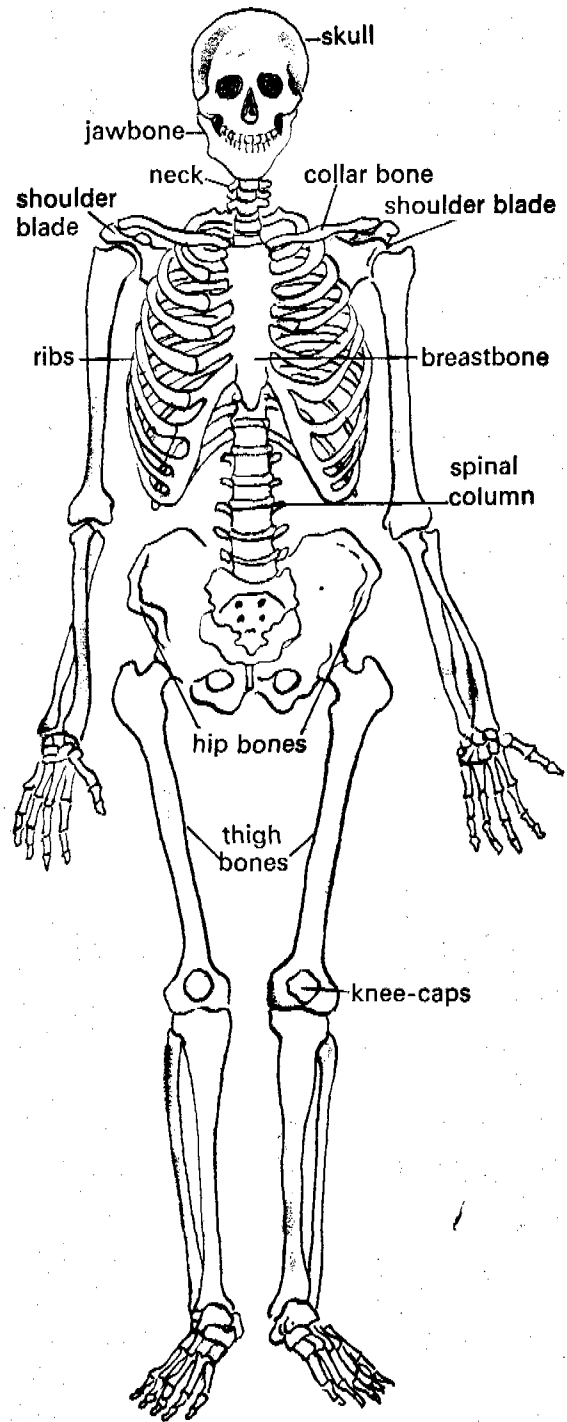
The man will choose strong, straight poles of bamboo or wood to make the framework. He will then plaster mud to form the walls. He will also be very careful to choose good poles for the roof, so that the thatch will not blow away when there is a storm.

He will remember that the house has to protect his family and his possessions and build his house accordingly. In the same way, the *skeleton* or framework of our body protects the important organs inside.

The framework is the hard part of the body to which all the soft flesh is attached. It is also the part which gives the body its shape. If the builder wants a round house he makes his framework circular ; if he wants a square house he makes his framework square thus giving it shape.

Let us now consider the uses of the skeleton, looking at the diagram as we go along.

1. The skeleton gives us our shape.
2. The skeleton gives us stability ; that means we can stand upright without falling over.



Human skeleton

3. The skeleton protects the vital organs inside, that is, the things we must have to keep alive.
4. The skeleton, working with our muscles, enables us to move from one position to another.

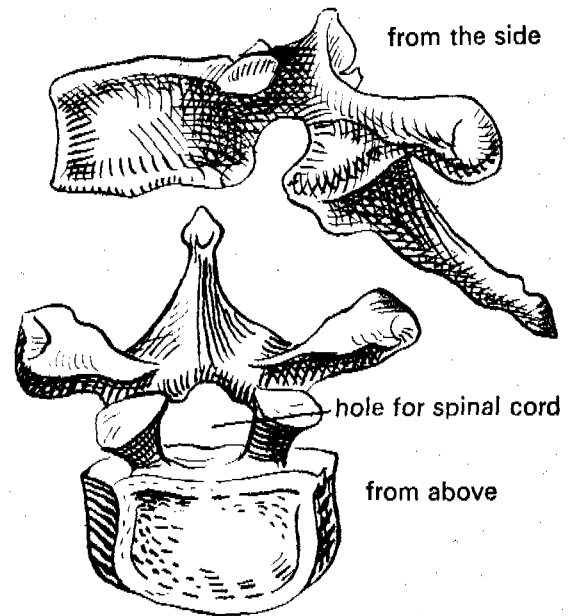
Let us now look more carefully at the many parts of the skeleton, starting from the top.

The bony framework of our head is called the *skull*. It is not one bone but is made up of several bones joined very closely together. They are joined like this so that they make a very strong box to protect our brain. If you had a large amount of money you would not keep it in a basket. You would keep it in a strong box to prevent it from being stolen. You would protect your money. The skull is just like that. The brain is soft and needs to be protected from injury. The skull has holes in it, though—two for the eyes in front, one for the nose and two smaller ones for the ears at the side.

Attached to the skull is the jaw bone which enables us to open and shut our mouths. This is very necessary for eating and also for talking.

The skull sits securely on top of our *spinal column*. That is the long row of bones running down the centre of the back. These bones allow us to move in many directions. They also have another very important job to do. They each have a hole in the middle

and through this hole passes the *spinal cord*. This cord is a group of nerves taking messages to and from the brain. These messages tell our muscles what to do.

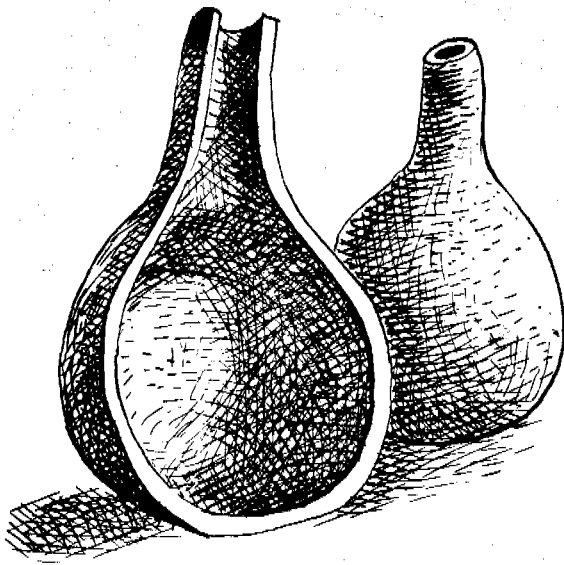


Bone of the spine

There are seven bones at the top of the spinal column and they are the bones of the neck. Number 7 is the one you can feel as it sticks out farther than the others.

Below that we have twelve bones and the ribs are attached to them at the back. Along with the breastbone at the front the ribs form a cage which protects the heart and lungs just like a boma for cattle.

The bones at the bottom of the column are bigger and stronger than the others. They have to support the top part of the column, the chest, the neck and the head.



Gourd cut in half

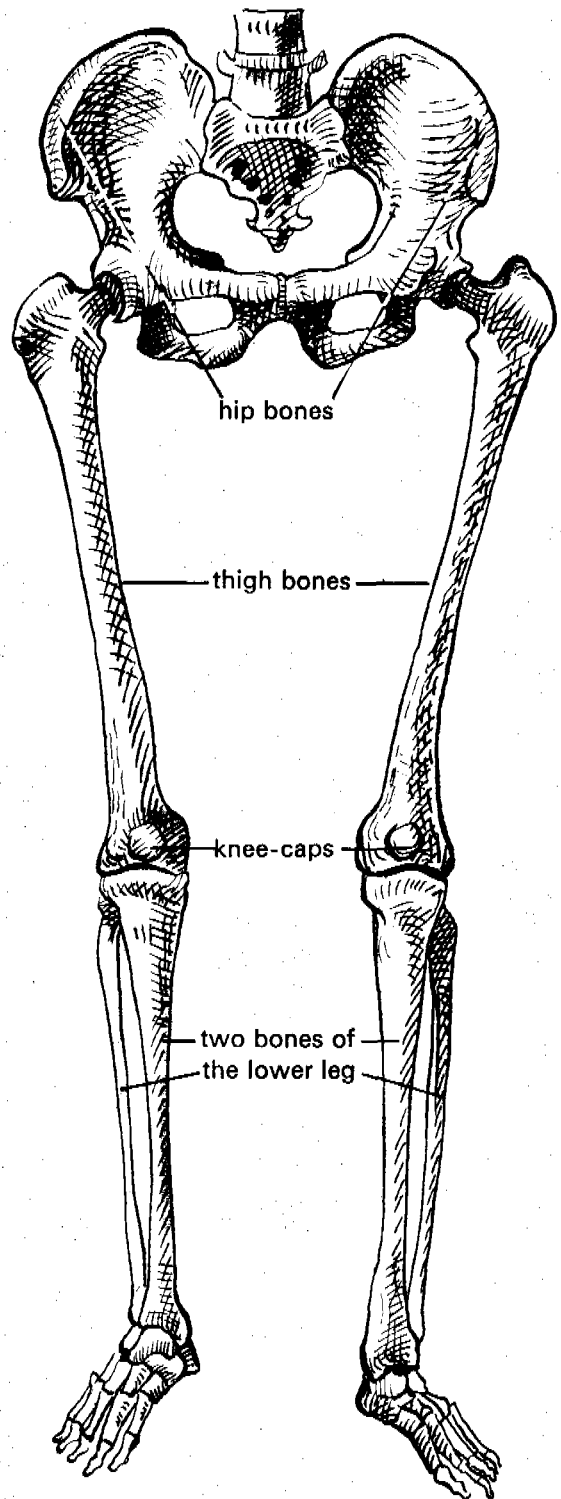
At the very foot of the column the bones join together to form a flat bone. It is like a triangle upside down and attached to this are the hip bones. The hip bones and the flat bone form a shape rather like a gourd cut in half.

This is again for protection as it keeps the organs inside free from injury.

Joined to the hip bones we have the long bones of the upper leg called the thigh bones. These bones have round heads which fit deeply into the hole or socket of the hip bone.

If you examine the diagram you will see a small bone at the knee. This protects the knee joint if you fall at football or netball.

The lower part of the leg has two bones, one thick and one thin. The thin one is on the outside, the lower end of which you see at your ankle.



At the bottom of the leg is the foot. You can see how many bones of different shapes and sizes there are. They form a strong bridge which supports the whole weight of the body.

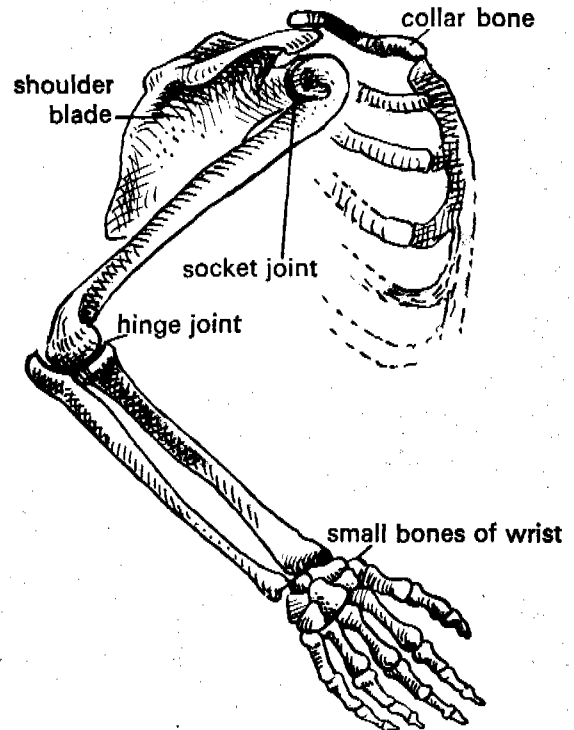
Now let us look at the arms. From the diagram you will see how similar to the legs they really are. One long bone of the upper arm has a round head which fits loosely into the socket of the shoulder blade. It also joins lightly the end of the collar bone. This rather loose joint allows us to swing our arms in any direction. The lower part of the arm has two bones. The lower end of the "outside" one shows as the knob just above your wrist. There are several small bones which form your wrist. Then there are the bones of your hand.

You have now examined the framework of the body. You have seen how the various parts protect us. How are they joined together so that we may move?

You remember the house at the beginning of the chapter? The framework was strong because good poles had been chosen. These poles were tied together with strong rope and nails were used to keep the walls and roof firmly joined. The bones of the body are joined with strong cords just like the house. These cords are called *ligaments*. These ligaments are fixed round the end of one bone and joined firmly to the end of the next. In some places the ligaments are not

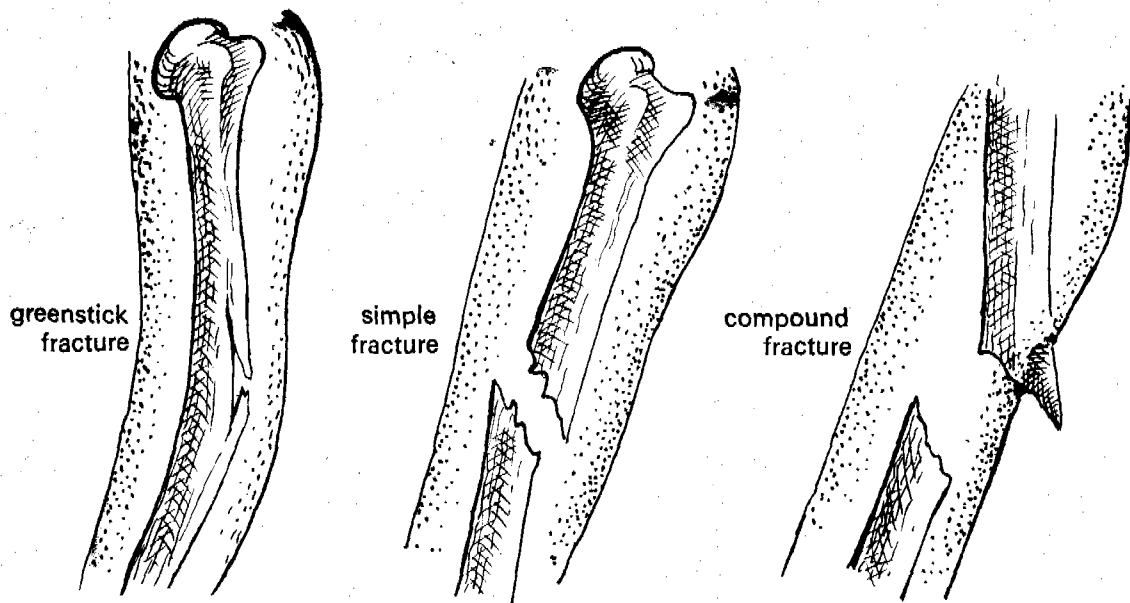
joined so tightly as in others. These joints can move more freely, e.g., the arm can move more freely than the leg.

The ends of the bones are smooth and shiny. There is a special liquid which keeps the joints oiled, and working smoothly.



THINGS TO DO

1. Take a partner, and with fingers pressing lightly on your partner's spinal column, feel the bones.
2. Ask your partner to twist about in all directions so that you can feel the bones moving.
3. See how many of your own bones you can feel. Look for them on the diagram of the skeleton.
4. Make a model of the framework of a house. Show the joints tied with string.



Different types of fracture

First Aid - Injuries to the Bones

FRACTURES

A fracture is a breaking of the bone and may be

greenstick—partially broken similar to live twig (only happens to children);

simple—little injury to surrounding tissues;

compound—an open wound with the bone sometimes sticking out.

SIGNS

Swelling and discoloration.

Limb held in an unnatural position.

Tenderness.

SYMPTOMS

Pain and the injured part cannot move naturally.

WHAT TO DO

1. Treat the fracture on the spot. Moving the injured person might be dangerous.

2. Steady and support the injured part and comfort the casualty.

3. Prevent movement of fractured bone by securing the injured part to a sound part of the body. The arm could be tied to the body, for example.

4. Take the injured person, very carefully, to the nearest hospital or health centre.

QUESTIONS

1. What does the framework of the body do?
2. Why is the skull hard and made of bone?
3. What is the spinal column like?
4. In what ways are the arms and legs like each other?
5. How are the bones joined together?
6. What makes the joints move easily?

10. MALARIA

Malaria is a sickness which is found in many parts of the world. It is common in many parts of Africa. A great deal of work has been done by doctors and scientists to prevent it. You can all avoid getting malaria by taking a few simple precautions.

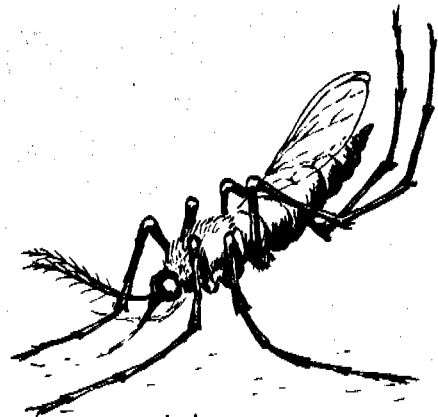
Many African children today die of malaria. The disease keeps many people away from work and it also costs the Government a great deal of money to pay doctors and nurses to make them better. This money could be used to make life better for all of us. It could be used to build more schools, better roads, more houses, or to pay doctors to find out more about other diseases. Malaria is carried by the mosquito which is a flying insect.

The mosquito

The name *malaria* means "bad air" because years ago people thought that it was caused by the bad air which often comes from a swamp. Today we know that mosquitoes live and breed in swampy places or anywhere where there is still water. There are several kinds of mosquitoes but not all of them cause malaria. The one which causes malaria can be

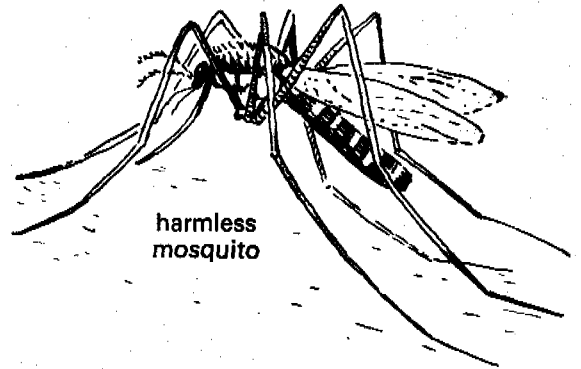
recognised in several ways. The easiest way of recognising the mosquito which spreads malaria is by its shape when it rests on a wall.

The body sticks straight out.



malaria
mosquito

The more common mosquito has a bent body and looks like this.



harmless
mosquito



The common mosquito makes a buzzing noise but the harmful one makes hardly any noise.

How malaria is spread

The harmful mosquito bites a person who has got malaria and sucks a little of his blood. The tiny parasites which cause malaria are in this blood. The mosquito then bites a person who has not got malaria and the parasites get into his blood. Some days later this person will develop malaria.

Malaria

A person who has malaria feels cold and his body shakes for an hour or so. Then he feels hot and breathes very

quickly. This is called a fever. His head, legs and arms all ache. After some time the sick person begins to sweat and he feels a little better. After one or two days the fever returns and this may go on for several days until the fever finally goes away altogether.

How to avoid getting malaria

1. **KILL ALL MOSQUITOES.** This is best done by having your house sprayed with liquid D.D.T. by men of the Health Department. This will keep the house free of mosquitoes for quite a long time.
2. **PREVENT THEM FROM BREEDING.** Mosquitoes lay their eggs in water. This does not only mean large areas of water like lakes and swamps but



small pools of water as well. They will breed in an old tin which is left lying around and collects rain water. They will breed in a tree trunk or an old car tyre. They breed in tiny pools of water caused by uneven ground. If everybody cleared the ground round his house of old tins, tyres, and so on, and filled in all the holes in the ground

it would make it difficult for the mosquito to breed.

Mosquitoes also live on the juice of plants and like to spend the daytime in long grass. If the grass round the house is kept short this also drives away mosquitoes.

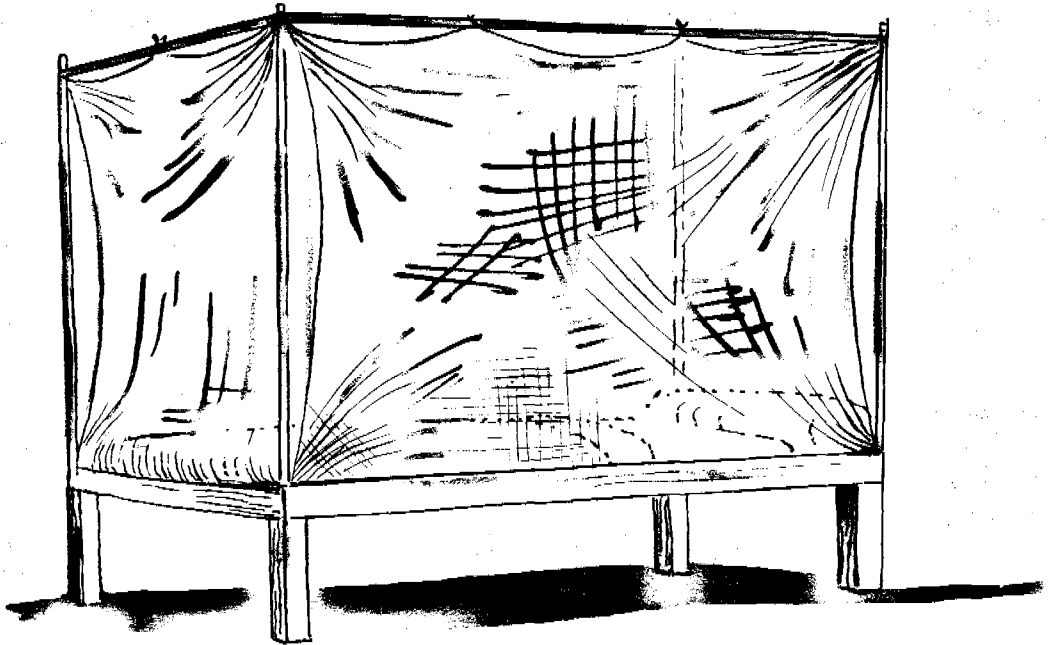
Large areas of water can also be sprayed with oil as this prevents the eggs of the mosquito from hatching.





A cheaper method is to throw cubes of plaster of Paris with D.D.T. mixed in them into the water. The plaster dissolves and releases the D.D.T. which kills the eggs of the mosquito.

3. **SLEEP UNDER A MOSQUITO NET.** If you sleep under a mosquito net it will protect you from being bitten. The net is useless if it has big holes or tears in it. It must also be tucked under the mattress properly so that the sides of the net are straight. A net which sags is dangerous because while you are asleep you may touch the sides and the mosquito can then bite you through the net. Always make sure that there are no mosquitoes inside the net before you go to sleep. It



is best to put the net down over your bed before sunset.

4. Malaria can be avoided by taking medicine in the form of tablets. Paludrine is one of these and should be taken every day. Another is Daraprin which need be taken only once a week. There are others but these are the best known.
5. If you normally live in an area free of malaria but you are going to visit a malarious area, start taking your medicine about ten days before you go. Also take it for three weeks after you get back home. This is important because you may be bitten on the last day of your visit and malaria does not develop until after ten days. If you stopped taking your medicine as soon as you left the malarious area malaria might develop.

THINGS TO DO

1. Catch a few mosquitoes and examine them. Try to say which type they are.
2. Look carefully at mosquitoes at rest on a wall and try to say which type they are.
3. Go round your house and pick up all rubbish which might hold water.
4. Fill in any holes you can find near your house.
5. Keep the grass round your house cut short.
6. See that your mosquito net is in good condition.

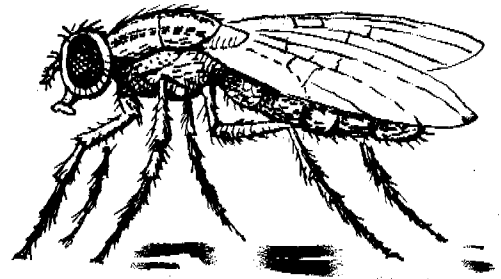
QUESTIONS

1. What kind of mosquito causes malaria?
2. Describe how you would feel if you got malaria.
3. How can you stop mosquitoes breeding?
4. How can the Health Officers stop mosquitoes breeding?
5. How is malaria spread from one person to another?
6. What should you do if you are going to visit a malarious area?

11. PESTS WHICH BRING SICKNESS

The House Fly

The house fly is the filthiest of all pests. Flies love dirty places. The female lays about 450 eggs in her lifetime. She lays them on refuse and excreta. These eggs then hatch out and the baby flies feed on this filth. When fully grown the fly adds to its diet. It likes human food as well as filth. They carry germs on their legs and land on food left uncovered. These germs come off on the food which humans will eat. The other dirty habit flies have is that before taking another meal they vomit the previous one on whatever they wish to eat. This vomit moistens the new



house fly

food. There are many germs in this vomit. They also excrete on the food which will be eaten by humans. Disease is spread very quickly by these pests.



To prevent the carrying of illness by flies the following rules should be obeyed :

1. No food should be left uncovered.
2. Latrines should be deep. Flies do not like darkness and will not breed there.
3. Houses and compounds should be kept clean.
4. Manure and rubbish should be kept in a proper compost heap.
5. If house fly eggs or larvae are found they must be destroyed.

The larvae are fat and white looking. They crawl like a caterpillar.

THINGS TO DO

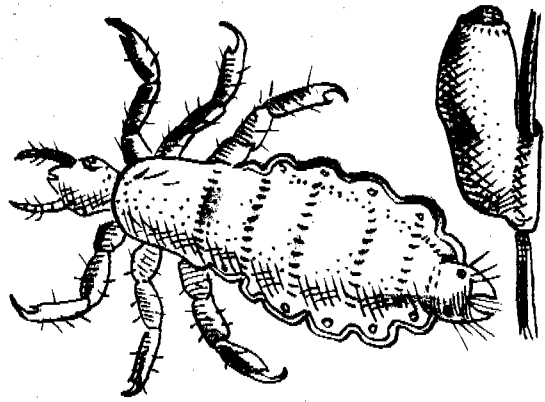
1. Draw a house fly on a pile of rubbish.
2. Draw a clean compound.

Lice

Lice are soft, grey insects. There are two kinds of louse. One loves living in dirty hair, the other on dirty bodies. The female louse lays about 200 eggs during her lifetime. She is very clever about this and carefully sticks the tiny egg on to a hair. This white sticky substance acts like glue and the nits, the name given to the eggs, are very difficult to remove.

If a person becomes infested with lice the head should be washed with a special shampoo which kills the lice.

To prevent becoming infested with



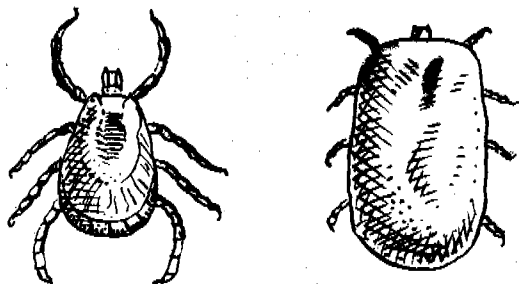
louse and nit

these dirty insects never allow anyone else to use your comb, and wash your hair regularly.

Ticks

Ticks are very common in East Africa. A person can get typhus fever from a tick bite. Usually ticks bite people who are living in the bush or hunting. Ticks normally live on dogs and cattle.

Ticks are flat grey insects. They are very tiny but when they attach themselves to a person they suck blood and become quite swollen.



tick before and after sucking blood

Bugs

Bugs normally infest dirty houses. They live in the cracks in walls and wooden furniture. They are particularly fond of the wooden parts of beds. They give a fierce bite which can be quite painful.

To prevent bugs a house should be kept clean and plenty of sunshine allowed in to keep it light.

bug



The best way to prevent pests which carry disease is to keep the house and compound well swept and to burn all rubbish.

THINGS TO DO

1. Catch a fly and look at it through a magnifying glass. What do you see on its legs?
2. Help to keep the area round your house clean.
3. Keep yourself clean.

QUESTIONS

1. Why are flies dangerous?
2. Where do they lay their eggs?
3. Describe two ways in which they spread germs to man.
4. Where does the louse lay its eggs?
5. Where do bugs live?
6. What dangerous disease can rats cause?

Rats and Mice

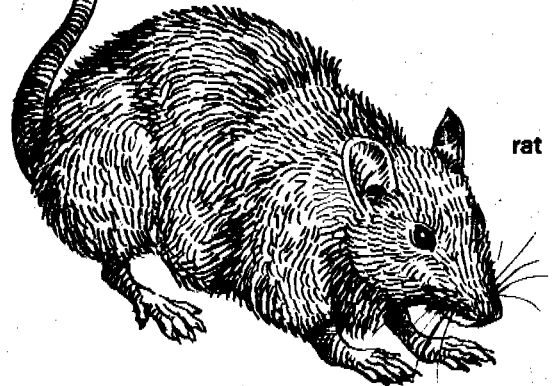
Like bugs, rats and mice love dirty places. They infest food stores and often bite people while they sleep. Food stores should be kept clean and wire netting put round them to keep rats away. Holes in the walls of houses should be filled up.

Most important of all, the house and compound must be clean. Refuse lying around is just what rats and mice are looking for. Rats are doubly dangerous as they have rat fleas. If bitten by a flea from an infected rat a person can become ill with plague. Plague spreads from person to person very quickly.

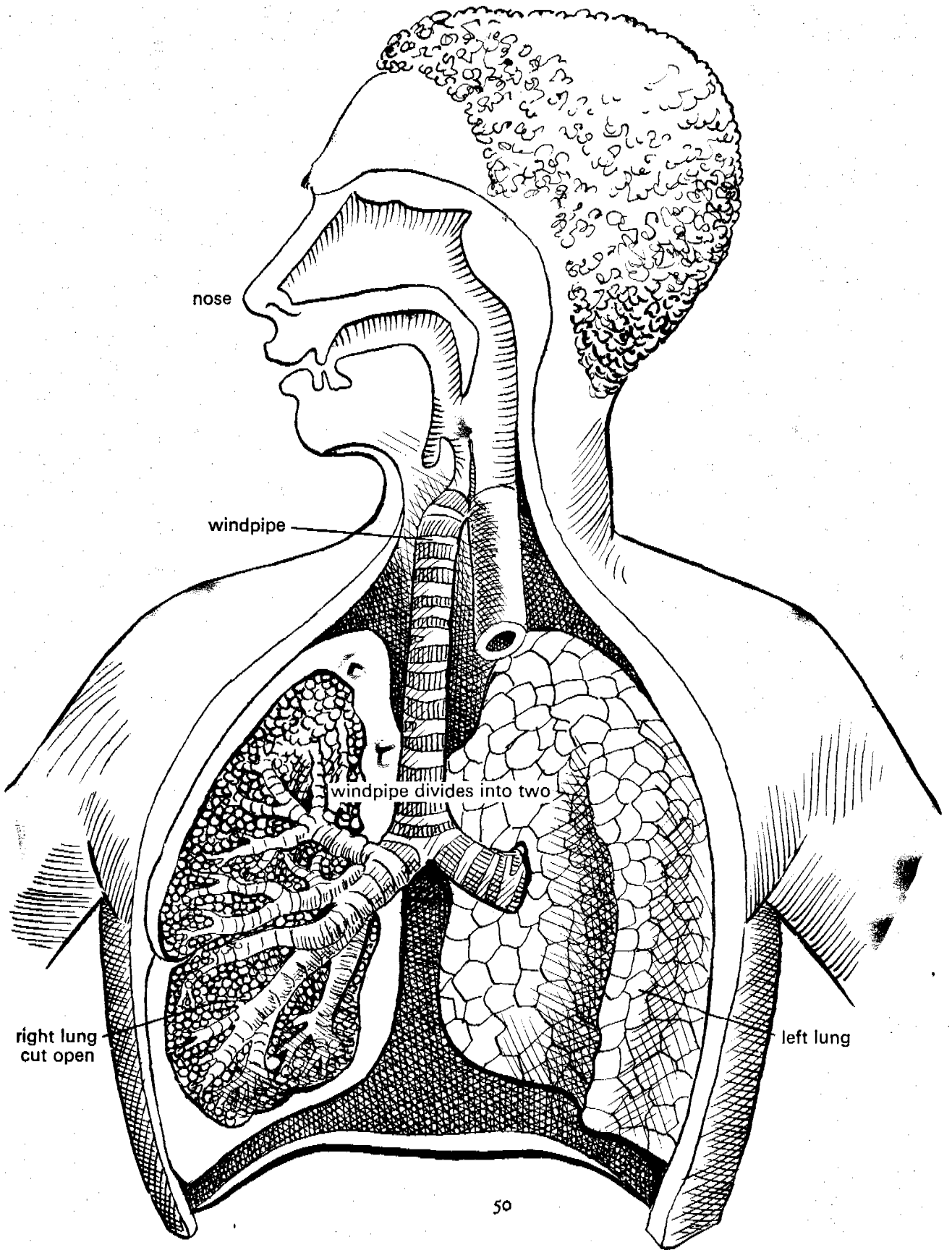
mouse



rat







nose

windpipe

windpipe divides into two

right lung
cut open

left lung

12. HOW WE BREATHE

Breathing is the process of taking air into the body and also getting rid of air from the body. The air you breathe in contains the gas called *oxygen* and the air we breathe out contains *carbon dioxide*. The body needs oxygen.

The Breathing System

Air enters the body through either the mouth or the nose. It is best to breathe in through the nose. As you have learned, the nose contains hairs which trap dust which is in the air. The air is also warmed by the soft warm covering of the bone inside the nose. Having passed through the nose the air goes down the *windpipe*. The windpipe divides into two pipes which lead to the *lungs*. There are two lungs and these are in the chest on either side of the heart. They are really bags which contain air. Inside each lung are many very small bags. The lungs are delicate organs and are protected by the ribs. The ribs form a strong cage round the lungs so that they cannot easily be damaged.

How oxygen gets into the blood stream

Oxygen in the air you breathe in goes to all parts of the body and it is carried by the blood stream. The

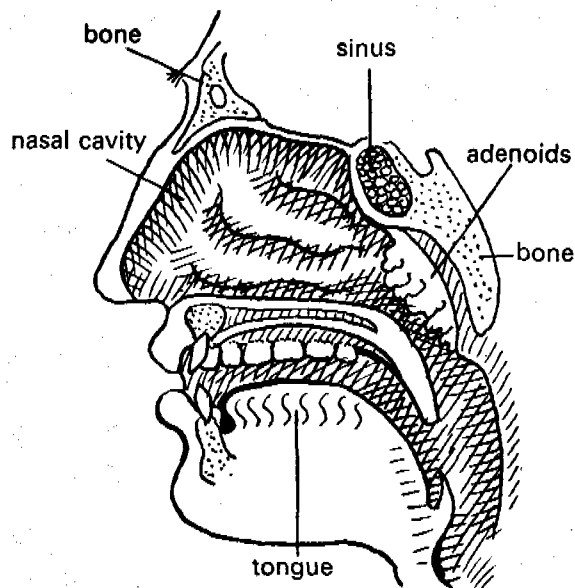
oxygen therefore has to get from the lungs into the blood. Each small air bag inside the lung has tiny blood vessels. The gas turns to liquid and passes through the thin wall of the air bag into the blood and is carried away. When we breathe out, we get rid of the waste gas carbon dioxide. The carbon dioxide is brought to the lungs by the blood stream and passes through the thin walls of the air bag in the same way as oxygen passes from the air bag to the blood. It is then breathed out.

Why it is better to breathe through the nose

As you know, if you breathe through your nose the air is warm and filtered. If you breathe through your mouth, this does not happen and so you are breathing dust into your lungs. You can train yourself to breathe through your nose. It eventually becomes a habit and you do not have to think about it. You will still breathe through your nose even when asleep.

At the back of the nose is a mass of soft substance called the *adenoids*. If the adenoids become diseased, they grow bigger and bigger and block the nose. This makes you breathe through the mouth. This gives you a rather silly appearance as you always have

your mouth open. In order to clear the passage to allow you to breathe through your nose again the adenoids have to be removed by an operation.



There are times when you have to breathe through your mouth. When you do violent exercise the body needs a bigger supply of oxygen. You cannot get enough oxygen into the lungs through the nose and so you have to increase the supply by breathing through your mouth as well

How quickly do you breathe

When you are sitting quietly you breathe in and out about eighteen times in one minute. When you are running about as in a game the rate of breathing increases very much. Other things can also cause you to breathe more quickly. If you have a fever such as malaria your breathing will be faster, even though you may be lying in bed.

THINGS TO DO

1. Put your hands on your ribs and feel how they move as you breathe.
2. Count how often you breathe in a minute while sitting still.
3. Count how often you breathe in a minute after playing a game.
4. Train yourself to breathe through your nose whenever possible.

QUESTIONS

1. What is breathing?
2. Give three reasons why it is better to breathe through the nose than the mouth.
3. How does oxygen get into the blood stream?
4. What are the lungs made up of?
5. How does the body get rid of carbon dioxide?

13. THE KIDNEYS AND SKIN

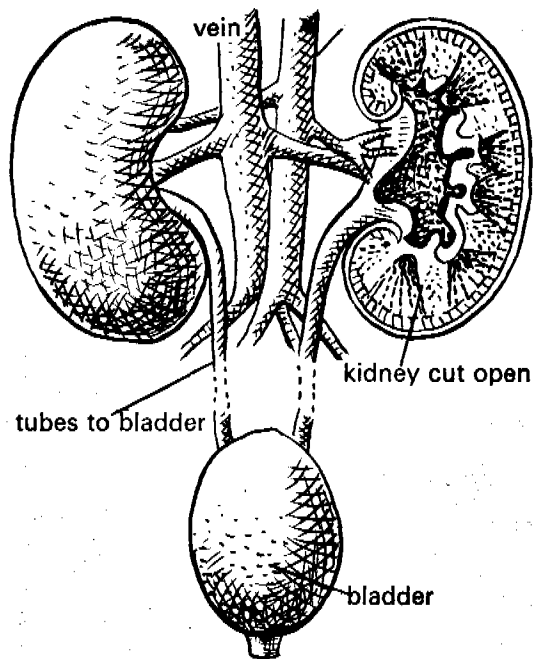
The kidneys and the skin are partners. They work together to rid our body of waste liquid.

In every household there is dirty water which must be got rid of. Water after cooking and water after washing must be thrown away. In a modern house there are drains to carry away this dirty water. It is carried to septic tanks or sewage pits where it can be cleaned or filtered.

The body has its own drainage system which collects the waste liquid and carries it to the outside.

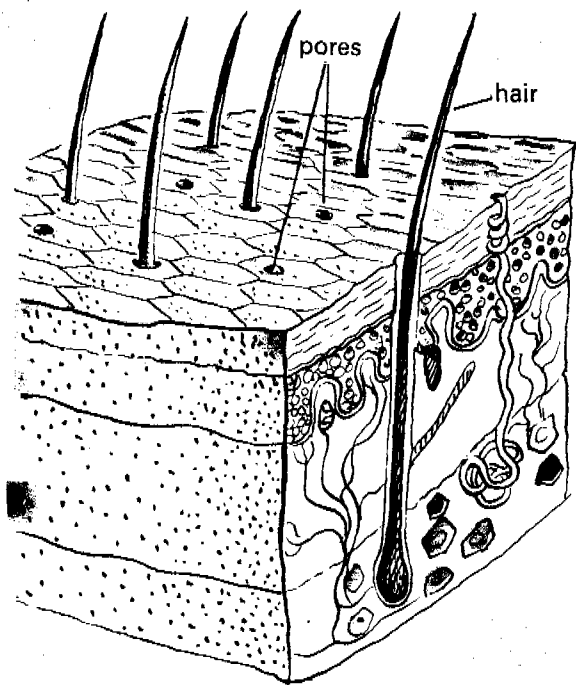
The two kidneys are situated on either side of the spinal column. They lie in the hollow of the back. They are shaped like a bean, about 10 centimetres long. The outer part of the kidney is reddish brown in colour, while the inside is paler. Both parts are composed of many coiled tubes. The work of the kidneys is to filter off the liquid entering them and to separate the urine, or waste, from the liquid.

There is a tube running from the dented part of each kidney. Down this tube passes the urine and it pours into the bladder. The bladder is like a small bag and, as the urine enters it, it fills up. When the bladder becomes full the desire is felt to empty it.



The skin also gets rid of waste water. This waste is called sweat or perspiration. In the skin, as you have already learned, there are tiny tubes called sweat glands which collect the waste liquid from the blood vessels. It is then passed up the tube to the outside. The tiny hole out of which the sweat comes is called a *pore*.

There are millions of pores all over the skin, the largest being in the armpit, and the greatest number being in the palms of the hands. After a strenuous game the body sweats much more than if one is just sitting in the classroom.



Piece of skin

In the skin there are also oil glands. These produce oil which keeps our skin soft. The oil comes out of the body alongside each hair.

In hot countries the blood vessels get wider and so more sweat is brought to the surface. As this sweat evaporates the body is cooled. More waste is got rid of by sweating, therefore the kidneys do not collect so much. Water should be taken between meals so that

the kidneys are kept in good working order.

In cooler climates the blood vessels just under the skin get narrower. Less sweat is given off and so the kidneys produce more urine.

It is very important that the skin be kept very clean. If not, the pores become blocked and the sweat glands cannot do their work properly.

THINGS TO DO

1. Examine the skin on the palms of the hands. What difference can you see from the skin on your arm?
2. Draw a diagram of the kidneys and bladder.
3. Get a sheep's kidney, cut it in half and examine it. Try to identify the parts.

QUESTIONS

1. Where are the kidneys situated in the body?
2. What are the kidneys like?
3. What do the kidneys do?
4. Describe how the body gets rid of waste water other than through the kidneys.
5. Why do we in hot countries get rid of more waste water through the skin than through the kidneys?

14. BLOOD AND WHAT IT DOES

To get petrol we need ships to bring it to the seaport. To get petrol up-country we need oil tankers and roads or railways. To move produce from one place to another some form of transport is required.

The cells of the body require food and oxygen to keep them alive. There must be some way of transporting this food and oxygen. How then is this done?

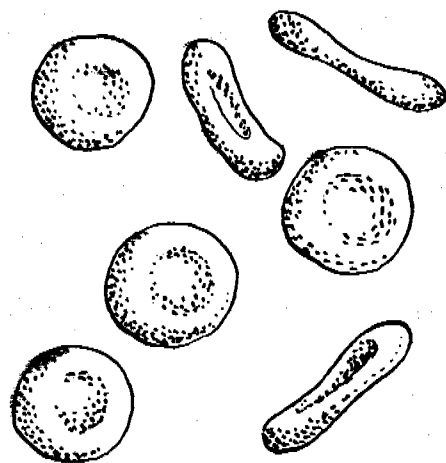
There is a system of tubes or pipes going to all parts of our body. These tubes are called blood vessels. Inside these blood vessels the blood travels round giving food and oxygen to all the living cells. Just as there is a central station for trains to depart from there is a central pumping house which sends the blood on its journey. This pumping house is the heart. The heart, the blood vessels and the blood itself make up the circulatory system of the body.

Let us consider the blood first. It is a liquid carrying in it millions of tiny cells. The liquid part is called plasma. There are two kinds of cells floating in it, red blood cells and white blood cells. Both are very important but they do very different jobs.

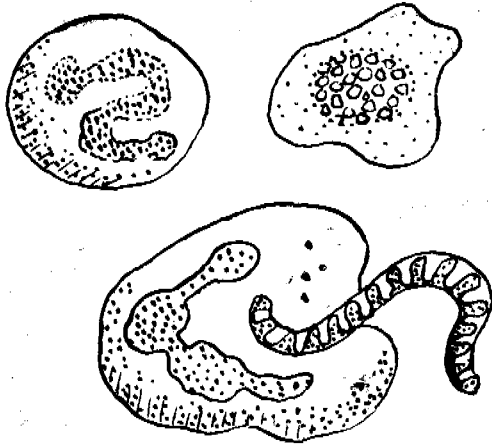
Red blood cells are like small discs which are thinner in the centre than round the edges. They are so small

they cannot be seen except through a microscope. They give the blood its red colour. You can see the colour of your blood if you cut yourself, and begin to bleed. When the blood leaves the body it becomes thicker and clots and the bleeding then stops. If this did not happen you would bleed to death. The red blood cells carry the oxygen round the body. As they give off oxygen they absorb carbon dioxide which the body wants to get rid of.

If you prick your finger and draw one drop of blood there will be about 5,000,000 red cells in it. You can imagine how many millions there are altogether when you know that there are about 4.5 litres of blood in the body.



red blood cells



white blood cells

The white blood cells are not as numerous as the red. There are about 8,000 in a drop of blood. They are the soldiers of our body and protect us against an invasion of germs. They have a very peculiar way of doing their job. They can come through

the very thin walls of the small blood vessels and fight the disease-carrying germs. They do this in the following way.

The white cell comes to a germ and spreads itself around it until the germ is taken inside the cell and killed. Look at the diagram and see how this is done.

In all battles there are dead on both sides. The scab which forms over a cut is made up of dead cells and dead germs.

QUESTIONS

1. How is blood carried to all parts of the body?
2. What does the blood carry in it?
3. What is blood made of?
4. What are the red blood cells like and what do they do?
5. What do the white cells do?

15. THE HEART

The heart is made of muscle and is the strongest muscle in the body. It can therefore contract and get smaller or expand and become larger. The contraction and expansion cause the beating of the heart.

The heart is situated towards the left side of the chest between the two lungs. Put your hand on your heart now and feel it beating. The heart is divided into two, a right side and a left side. This division is lengthways. Each side is then divided into two. An upper and a lower half. The upper sections are called *auricles* and the lower sections *ventricles*. On the right side, therefore, we have a right auricle

and a right ventricle; on the left, a left auricle and left ventricle.

The two ventricles have thick walls made of muscle. From the ventricles the blood is pumped out of the heart. The walls of the auricles are thinner because all they have to do is pump the blood to the ventricle below.

The journey of the blood round the body

Let us now follow the blood as it travels round the body. We will begin with the blood in the left ventricle.

Here the blood is bright red and full of oxygen. The heart beat consists

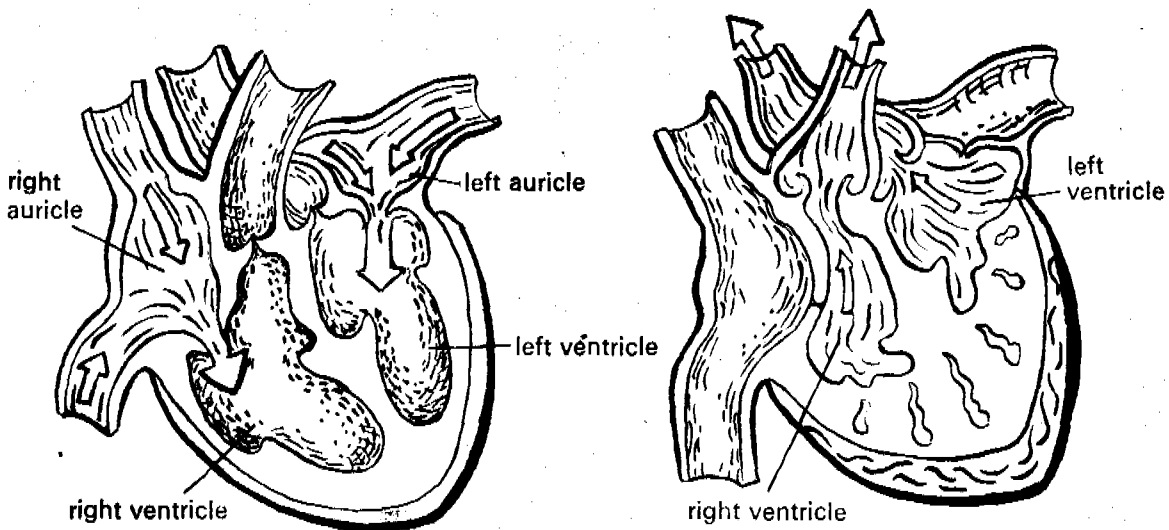


Diagram of heart

of two movements. In the first movement the auricles contract. In the second the ventricles contract. The blood in the left ventricle is squeezed and forced out. It leaves the heart through the largest artery in the body.

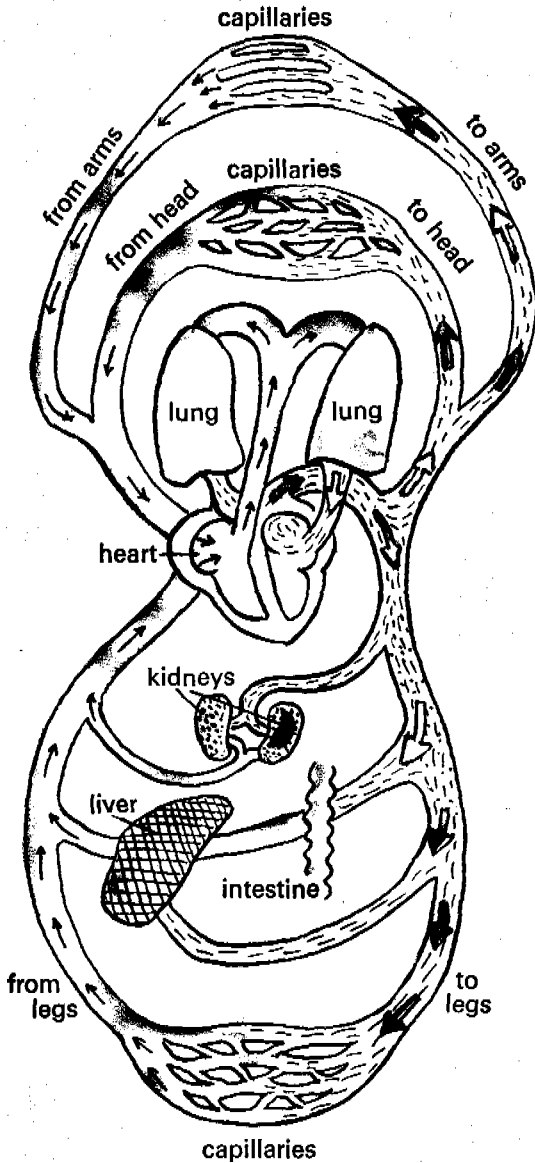


Diagram of circulation of blood

This is the *aorta*. From the aorta it passes into smaller blood vessels called *arteries*. These go to all parts of the body carrying oxygen. Farther from the heart the arteries get smaller and smaller. They change their name when they are very small. They are now called *capillaries*. Here the blood loses its bright red colour. The oxygen has been given off to feed the cells.

Farther along, the capillaries begin to join together again. They become larger and are now called *veins*. The blood is now dark purplish red. The veins join up with each other as they come close to the heart. They are now very big.

Two large veins pour all the dark blood into the right auricle. This is the room at the top right-hand side. The first part of the heart beat contracts the auricles. The "door" between the right auricle and the right ventricle opens. This "door" is called a valve. The blood pours down into the right ventricle. This ventricle is squeezed and, as the valve opens in one direction only, the blood cannot go back. It must escape another way. This time it is forced out into a large blood vessel. This vessel divides into two. One part going to the right lung and the other to the left lung. In the lungs fresh oxygen is absorbed by the blood cells. The blood now becomes bright red. This bright red blood is carried back to the heart. It goes into the top left

room, the left auricle. Then the auricle is squeezed and the valve between it and the ventricle opens. The blood then pours down into the left ventricle. It is then ready to begin its journey all over again.

On the first part of the beat the auricles are squeezed. At the same time as the bright red blood is pouring into the left auricle, old used blood is pouring into the right auricle. On the second part of the heart beat the ventricles contract. At the same moment as fresh blood is being forced out of the aorta, old blood is being pumped to the lungs.

THINGS TO DO

1. Find the pulse beat at the wrist. Put your fingers on it, not your thumb. Count how many times it beats in a minute.
2. Draw a diagram showing how the blood travels round the body.
3. With a partner bandage an imaginary cut on the palm of the hand.

First Aid

A wound is a break in the skin which allows germs to enter.

WHAT TO DO

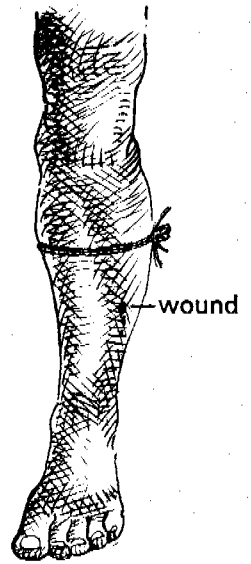
1. Make the casualty sit down.
2. Wash your hands.
3. Collect all dressings and place them on a clean towel or handkerchief.
4. Clean around and away from wound with soap and water. Remove surface dirt but do not dig deeply.
5. Cover with a clean dry cloth and bandage firmly. Be sure the bandage is not too tight.

QUESTIONS

1. What is the heart made of?
2. Where is the heart in the body?
3. What protects it?
4. What are the names of the different blood vessels?
5. What colour is the blood? Why is it two different colours?
6. Describe how the heart works.
7. Describe how you would give First Aid to a person.

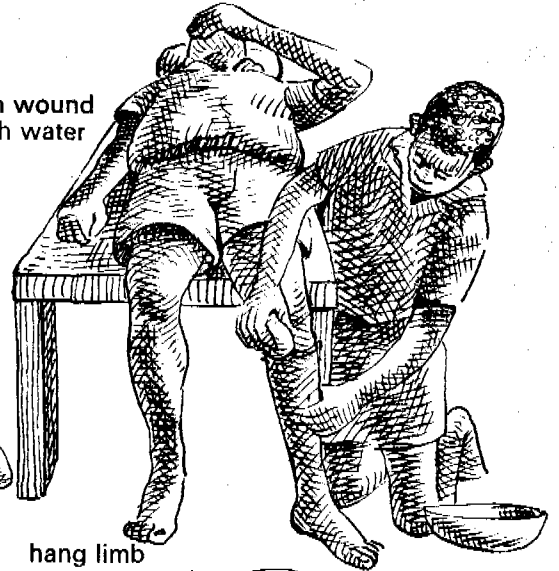


kill snake if possible

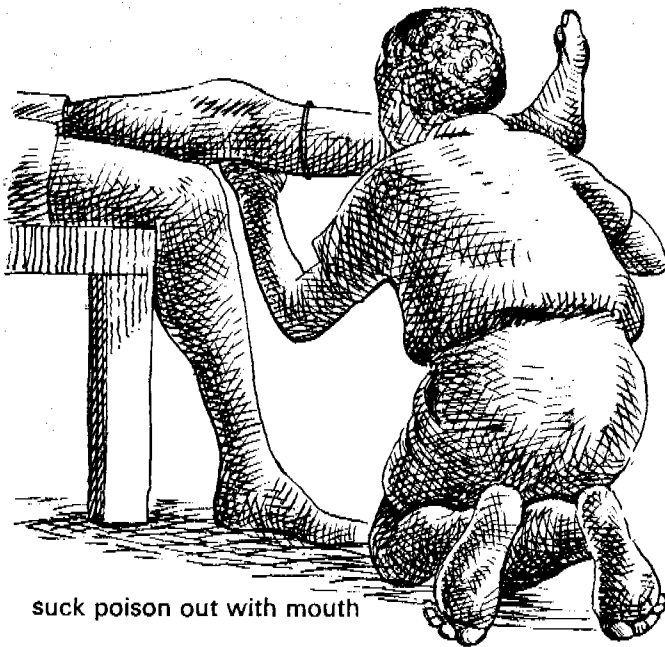


tie wound on heart side

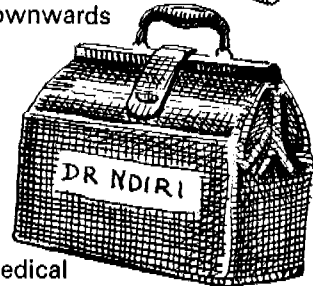
wash wound
with water



hang limb
downwards



suck poison out with mouth



get medical
assistance as soon as possible

First aid for snake bite

16. SNAKE BITE

Snakes are not all poisonous. Many, however, are poisonous and their bite is dangerous. Snake bite is greatly feared and as a result the casualty must also be treated for shock.

First Aid for Snake Bite

1. Kill the snake if possible. Handle it only by the tail. Give it to the doctor when you get to one.
2. As quickly as possible the limb should be tied on the heart side of the wound. The tie can be made with anything handy, for example, a piece of string, a piece of material torn from a shirt or dress, a shoe lace, and so on. This tie should be

tight enough to stop the flow of blood in the veins but not tight enough to stop the flow of blood in the arteries. This helps to stop the poison getting into the circulation and being carried to the heart. To test if the arterial blood is still flowing a pulse beat should be felt at the ankle or wrist.

3. Wash the wound with water without rubbing.
4. Hang the limb downwards.
5. Release the tight bandage every 15 minutes.
6. Keep the casualty at rest and see that he is warm.
7. Give hot coffee or tea and aspirin if available.
8. Try to get medical assistance as soon as possible.



Black mamba

THINGS TO DO

1. Practise treating a person for snake bite.
2. Make a list of the snakes found in your district and note which ones are poisonous.

QUESTIONS

1. Why should the patient be kept still ?
2. Why should the patient be kept warm ?
3. Where would you make a tie to stop the flow of blood ?
4. What can you do to help get rid of the poison ?

17. WATER

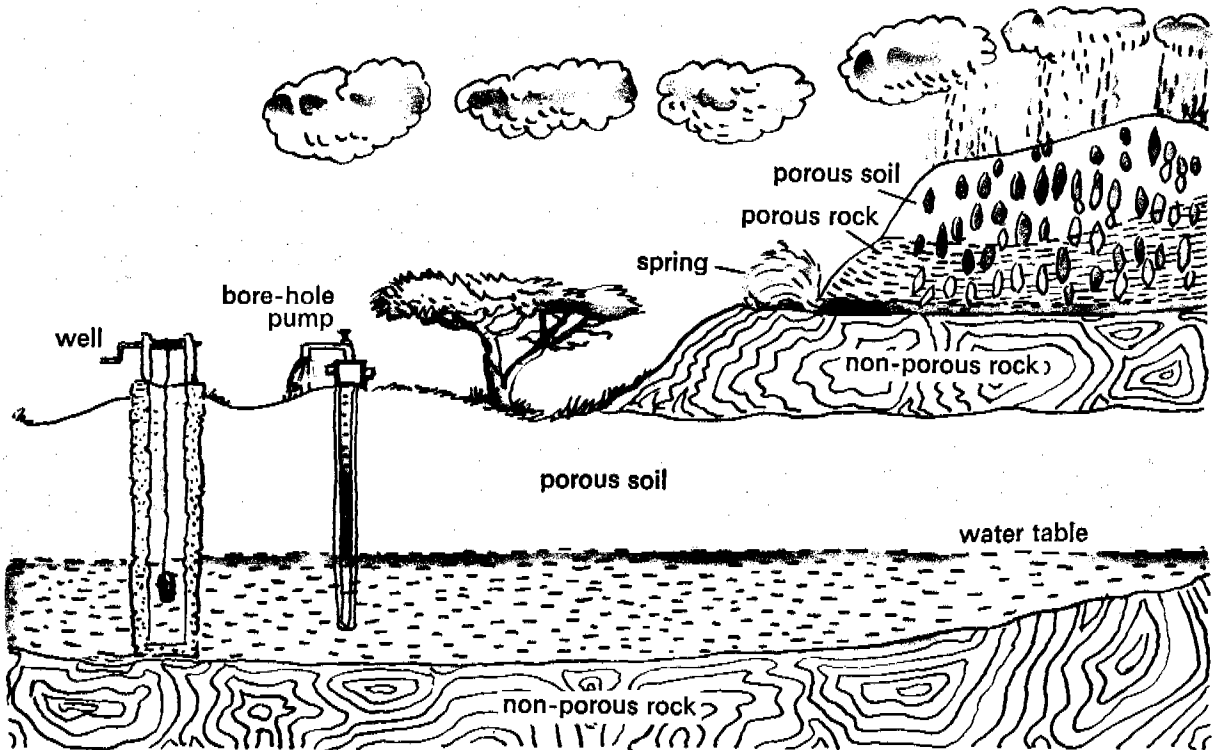
What a wonderful liquid water is. It quenches our thirst. It washes us when dirty. It makes up about three-quarters of our body. It is necessary for removing waste. Without water we should have no meals. Most food is cooked in water.

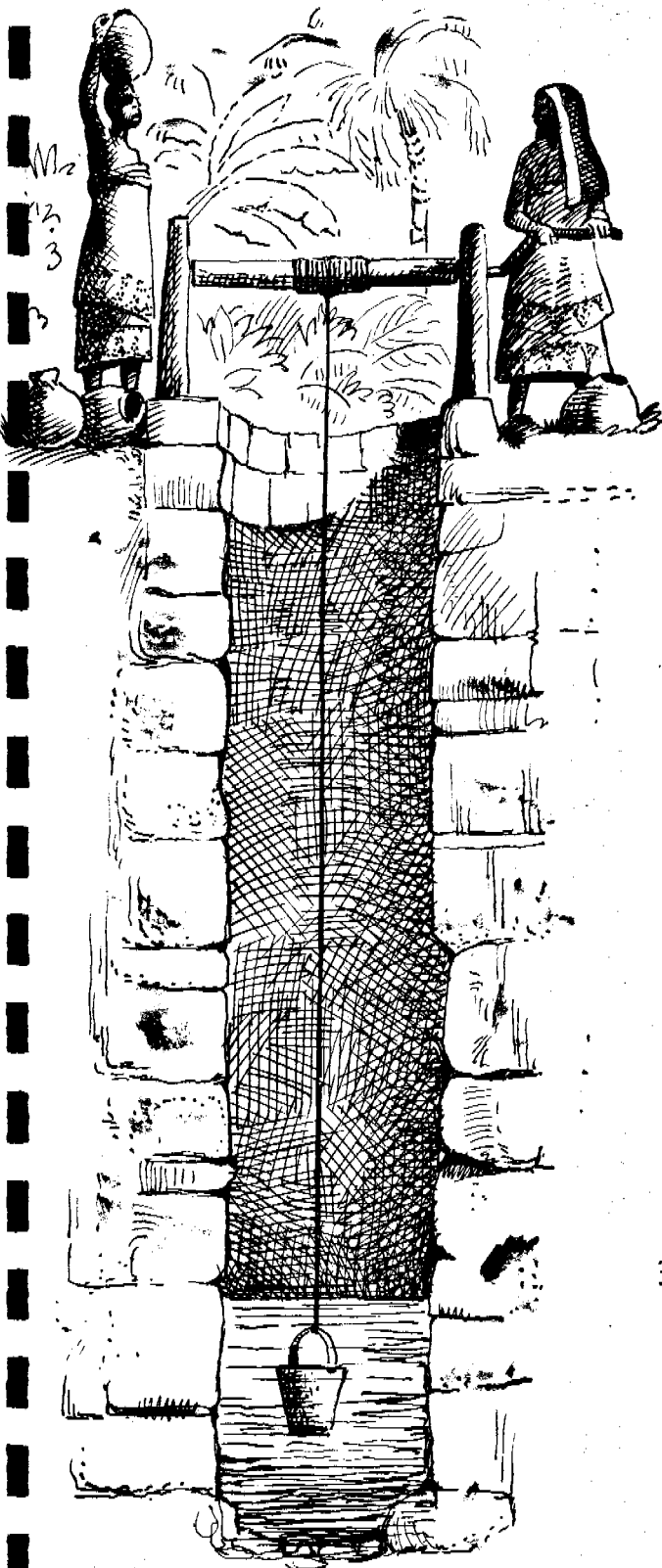
Rain is the source of all our water. You know how difficult everything becomes when there is a drought. Rain water is pure. It is only after it falls that it picks up impurities. Rain water is collected in tanks by means of gutters and pipes leading from the roof.

Sources of Water

I. SPRINGS. Spring water is usually very pure. The deeper the spring the purer the water. Springs are made by water sinking into the soil.

When the rain water reaches the hard layer under the ground it cannot go through. It travels along this layer till it reaches the surface, usually the side of a hill. It then forms a surface spring. A hole can be bored through this hard layer. A pipe is then put in and the water is then pumped out. This is called a bore hole.



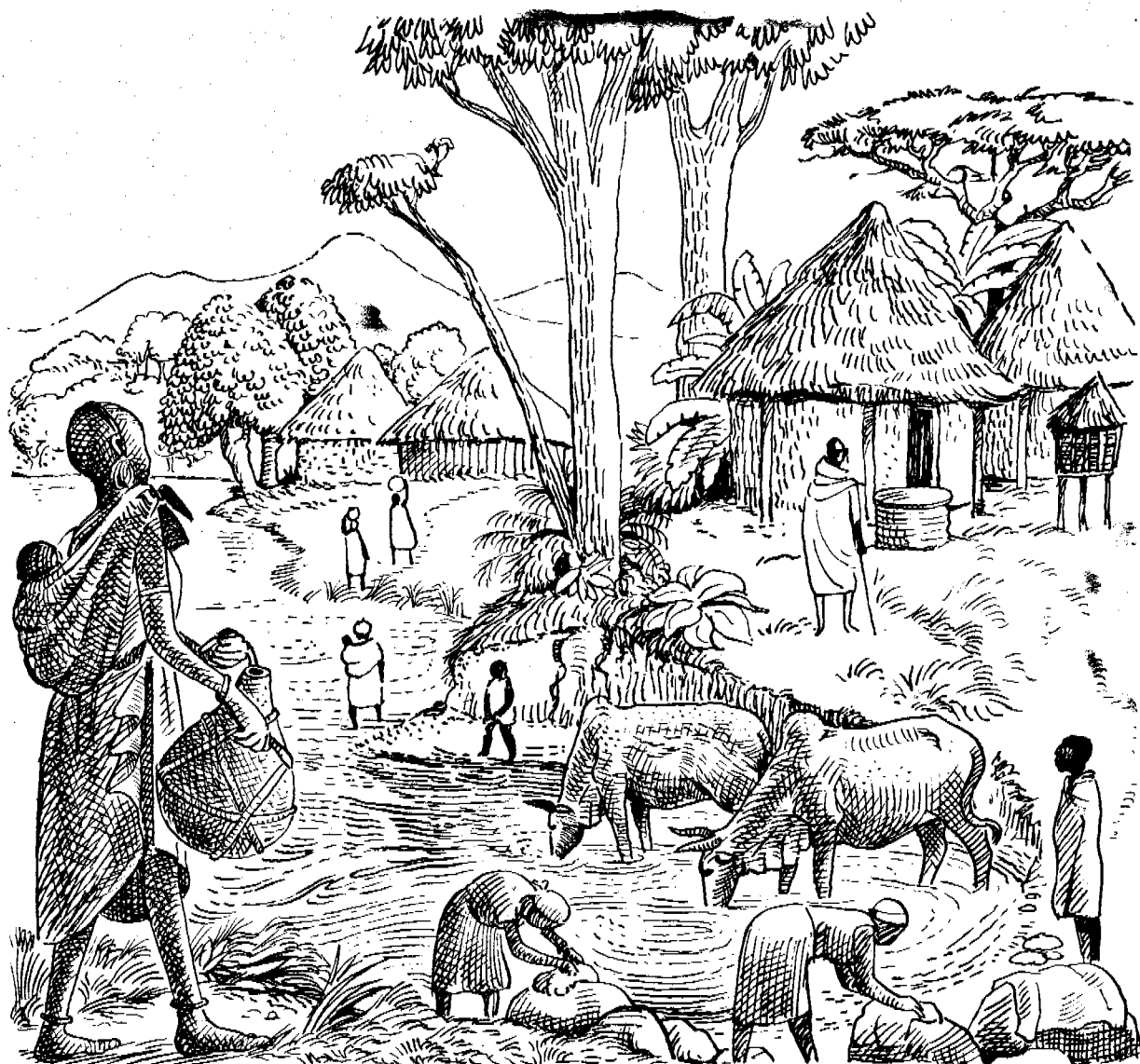


Depending on the type of soil through which it has passed the water is either "hard" or "soft". If the soil is chalky the water will be "hard". If the soil is gravel the water will be "soft". Soft water mixes with soap easily and makes a lot of lather. Hard water does not.

2. **WELLS.** Wells are a common source of water. If the well is shallow great care must be taken. The ground near the well must be kept clean. Refuse and dirt may find their way into the well. There must be no latrine nearer than 150 metres from the well. The filth would otherwise soak into the soil and be carried to the well. There should be a wall round the well to prevent animals from using it and children from falling in.

A deep well, fitted with a pump, is the best kind. The water will be pure as it has travelled a long way underground. A brick wall should be built to the depth of the porous layer of soil. If there is no pump the buckets used should be clean. Dirt will otherwise enter the well and foul the water.

3. **RIVERS AND STREAMS.** These are the most common sources of water. If they are far from villages they should be fairly safe. If close to a village the water will be fouled by sewage from the houses. Water from rivers need only be boiled for drinking. If water is boiled for twenty



minutes most of the germs in it will be killed.

If water is stored near the house it should be kept clean. A large tank with a lid is necessary. The lid prevents dirt from settling on the surface. It also prevents mosquitoes from breeding. Tanks must be emptied and cleaned at frequent intervals.

THINGS TO DO

1. Draw a diagram of a good well.
2. Draw a plan of a village showing the position of the well.

QUESTIONS

1. Why is water a wonderful liquid ?
2. Why is "soft" water better than "hard" water ?
3. Which is the best kind of well ?
4. Look at the picture and say how river water becomes dirty.