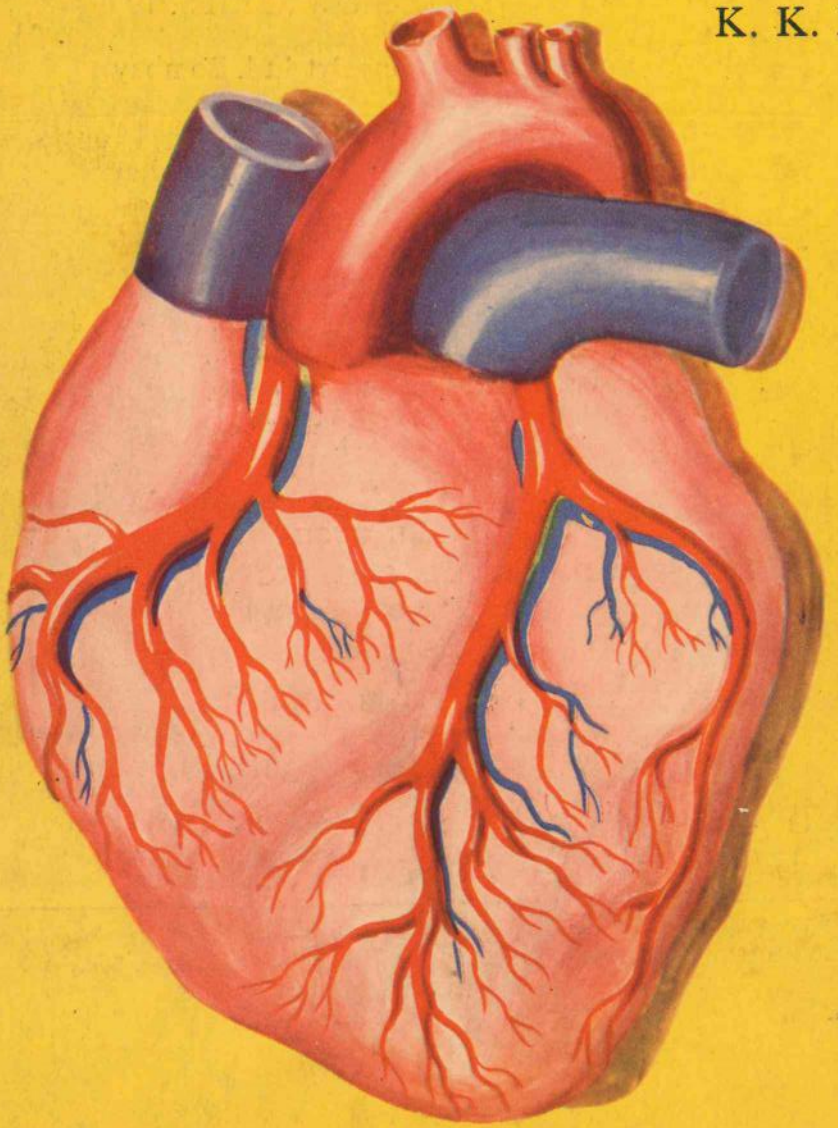
YOUR HEART AND YOU

K. K. DATEY



CITIZENS OF TOMORROW SERIES, 19

YOUR HEART AND YOU

BY

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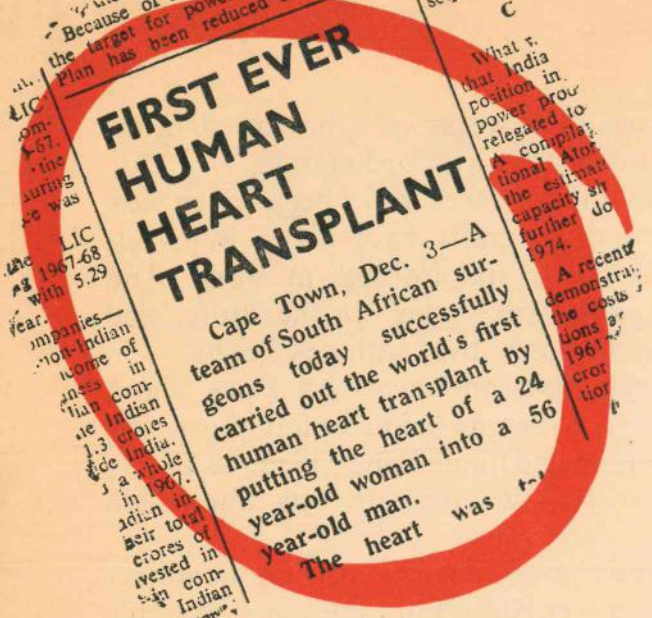


"LUB-DUB ! LUB-DUB!" IS LIFE

On 3 December 1967 a 56-year-old man named Louis Washkansky made history. Although a man, he carried a woman's heart ! The strange thing about it is that he carried a diseased heart for quite some time when the doctors decided to remove it and replace it by another heart. The surgical team waited for a suitable heart to become "available". Then, on the night of 2 December, a woman was brought into the hospital in a dying condition after a car accident. The surgeons worked through the early hours, removed her heart after she died and transplanted it into Mr. Washkansky. But an unexpected difficulty arose. The woman was only 24 years old and her heart was not as large as Mr. Washkansky's. The transplanted heart found itself in the large space occupied by Mr. Washkansky's old heart. It started wobbling from side to side but it kept on beating. After two weeks, there came a picture of Mr. Washkansky, enjoying a breakfast

of porridge and eggs! He lived three weeks on a borrowed heart. Then he died, not because of the heart but of pneumonia.

Since then other patients in other places have been given new hearts, grafted hearts. Some of these grafts have taken well, one patient is still alive after a year and several are back at work. And it looks as if more and more grafts will "take" in the future, and more and more people will be given new lives with new hearts.

Everyone knows he has a heart. Even the cave man knew about it and how essential it was to life. When he painted pictures on the walls of his cave, of the animals he had hunted and killed, he always put the arrow through the heart. He knew that life was impossible when the heart stopped.

That the heart is important has been known to man for countless ages. It has been referred to in a number of fairy tales too. Haven't you heard the story of the great green giant who was so afraid for his life that he kept his heart secured in a parrot? And this parrot was locked up in a seven-vault fortress! Poor giant! He did not realise that one day a Prince Charming would smash all the seven doors, break open the seven vaults and kill the parrot with the giant's heart, all for his beloved princess! And so the giant was slain, for once the heart goes, life also goes — whether it be of a giant or of a man.

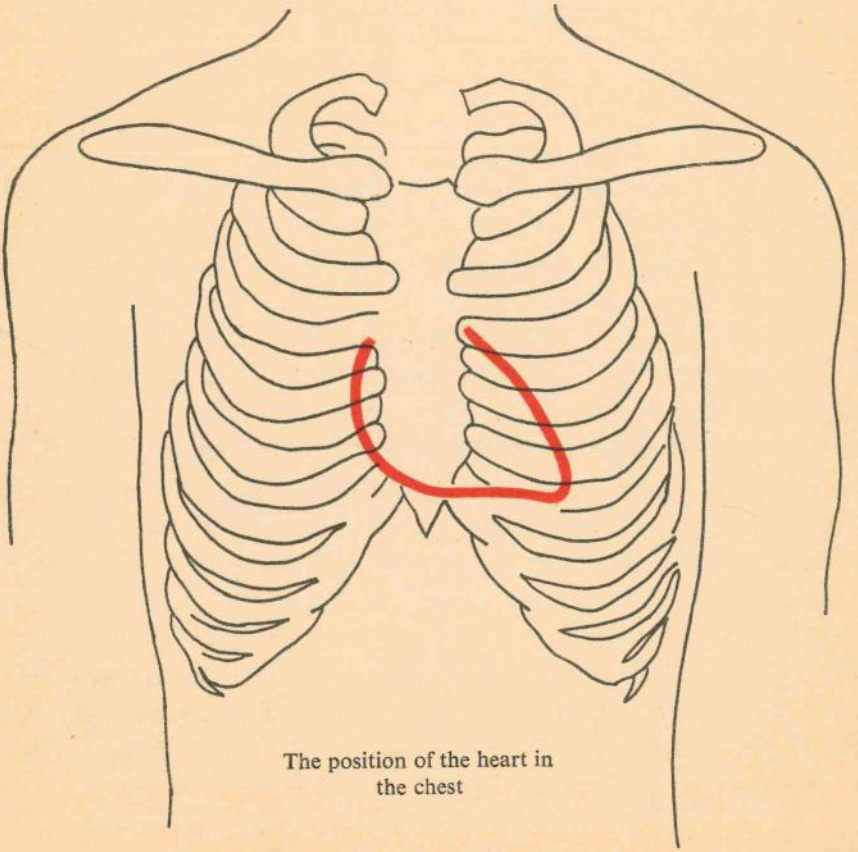
"But I have never seen a human heart!" you will say. It is true that the heart, being inside the body, cannot be seen. Most people think it is "heart-shaped", like the heart in a pack of cards. Actually, in man, its shape is more globular. It is the frog's heart which looks really "heart-shaped".

To the question, "Where is it?", you will of course answer, "In the chest". Yes, it is in the chest, rather in the centre of it, under the breast-bone, and slightly to the left. Its lower end points downwards and to the left.

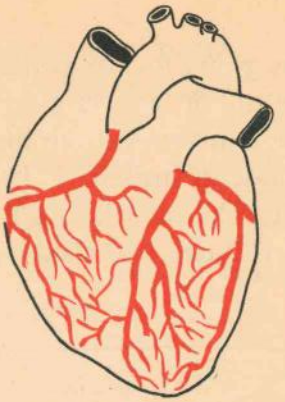
How large do you think the heart is? Have you seen a man's fist

when he is going to box someone? The heart is about that size. It weighs about 250 gm. in a woman, and 300 in a man.

Suppose you were to see the heart. Well, what would you see? The heart is made of muscle. It has a lining on the inside as well as over the outside. The muscle is not like the ordinary muscle of the arm or the leg. It is tough and elastic and it can take a tremendous amount of



The position of the heart in the chest

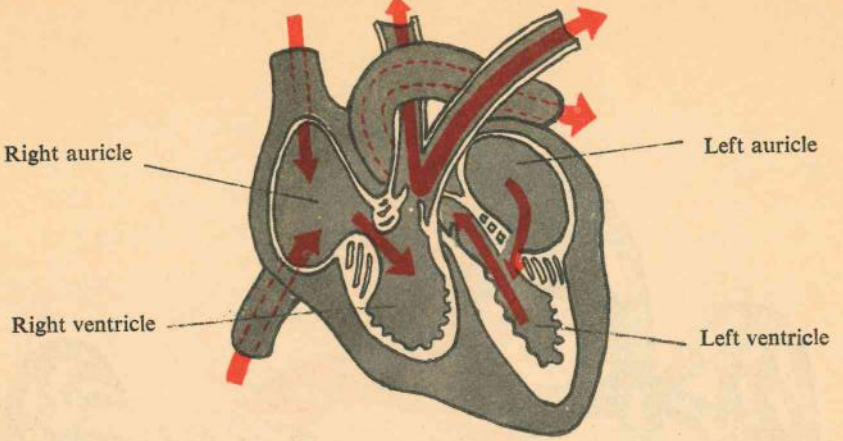


wear and tear. Your arms may become tired with work, your legs may feel exhausted with exercise, but the heart muscle is never tired and never exhausted.

Let us go back to the heart. What do we see when it is open? It has four chambers, two at the top and two at the bottom.

Let us examine the walls of these chambers. The two upper ones have thin walls; the two lower ones have thick walls. The two lower chambers are called the *ventricles*. They have to put in hard work, with every beat of the heart they have to push out blood. The two top chambers, called the *auricles*, have a cushier job. They just receive the blood brought to the heart by the veins and pass it on to the ventricles below. The ventricles have to work harder. No wonder then that they need more muscle in their walls.

Blood flowing through the heart is all one-way traffic. No going backward is ever allowed. There are valves in the heart which act like guards and stop the blood from going back. These valves are between the auricles and the ventricles, as well as between the ventricles and the arteries.



Now, what does the heart actually do? It pumps blood every time it beats. You can feel it if you want to, if you put your hand on your chest, over the left side.

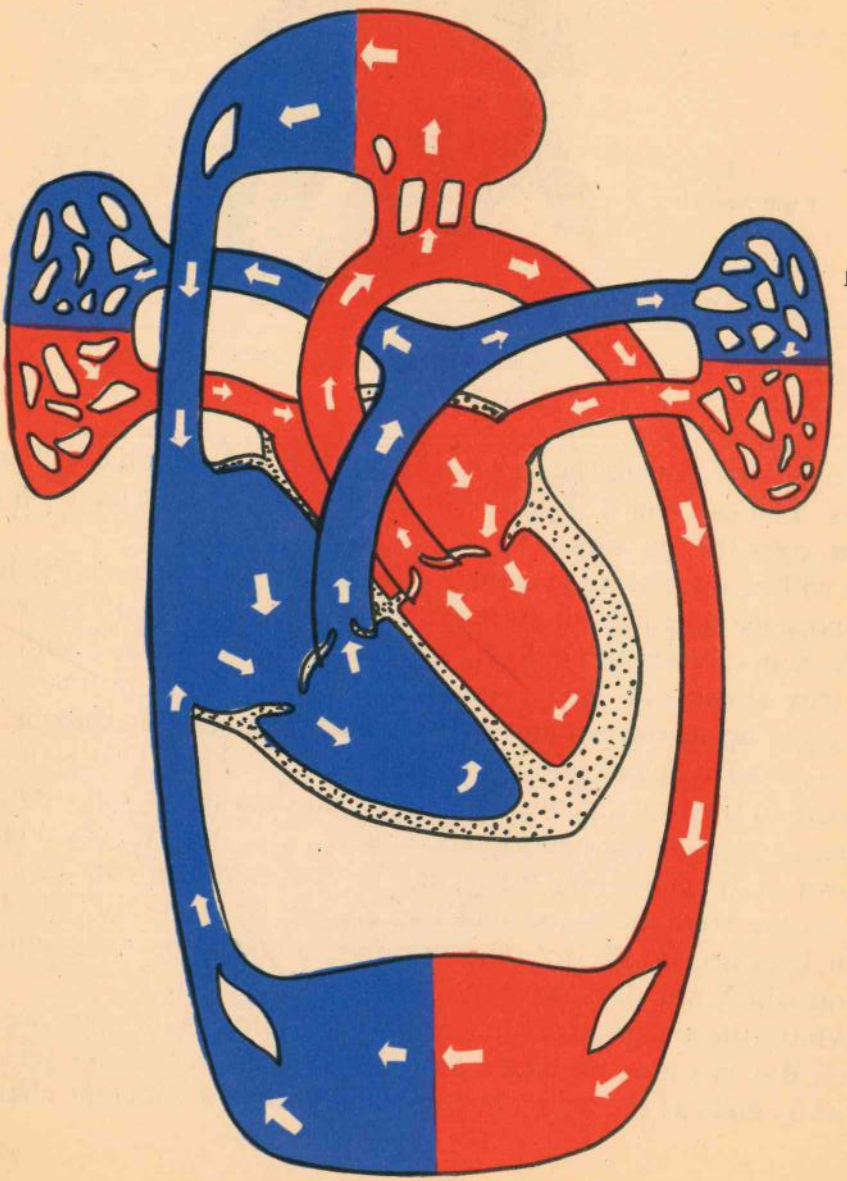
It will be interesting to see how the blood goes through the heart. Suppose we take for our start the point where the blood is brought back from all over the body by the veins. This is *venous blood.* After its trip round the body, this blood looks dark, rather blue. It has given up its oxygen and is now loaded with carbon dioxide.

Let us sail in this stream of venous blood. Your first port is the *right auricle* in the heart. You go downstream then to the *right ventricle.* Then, as soon as the heart beats, you are shot out into the highway known as the *pulmonary artery* and this takes you to your next port, the *lungs.* Here the blood soaks up oxygen from the air which has been breathed in. Presto! The colour changes. You were sailing in blood which was dark blue and now it is vivid red.

What's the matter now? It seems we are going back where we came from. But this time we take a new highway, the *pulmonary vein.* This highway ends at the heart, but this time it is at a different chamber,

HOW THE BLOOD GOES ROUND

Head and neck



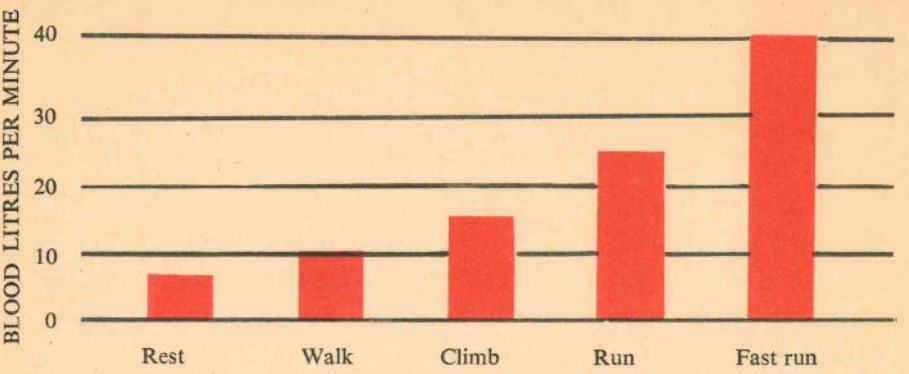
the *left auricle*. From here you slip through into the *left ventricle*. Now you feel 'the boat' rocking with waves of blood. That's because the left ventricle is about to pump out the blood into the largest highway of the body, the artery called the *aorta*. This highway divides and subdivides, the arteries become smaller and smaller, till they reach the farthest corners of the body. Like a good samaritan, the blood gives up its precious cargo of oxygen to each and every part of the body, all along the way.

What about the heart itself? How does it get the oxygen which it itself needs? It gets it from the *coronary arteries*, the first branches of the aorta. These coronary arteries branch again and again and weave a fine network through and through the heart muscle, rather like the delicate branches of a tamarind tree.

All this sounds like a lot of work for the heart, doesn't it? Yes, the heart really does have to work hard. It has to beat faster and work harder when the body needs more oxygen, during exercise, during fever and so on. So you see the heart, though it is a pump, does not work just mechanically; it adjusts itself to the needs of the body.

How hard-working the heart is, you will only realise when you remember that it beats steadily for the whole day, every day, every year. In one day alone it pumps out about 8,000 litres of blood. It is said that the amount of work done by a heart in a lifetime is enough to lift a whole battleship five metres clear of the water!

Does the heart really do all this without any holidays at all? Well, a holiday is really out of the question for the poor heart. If it started taking time off or going on leave, nobody would be alive to tell the tale. But the heart does take rest, in snatches, in between beats. If you listen to the beating of a heart with your ear on someone's chest, you will hear a pause between the beats. In this silent period, the heart is filling up with blood, the heart is "resting". So it goes on and on, beat-rest, beat-rest, beat-rest. If you add all this up, the heart

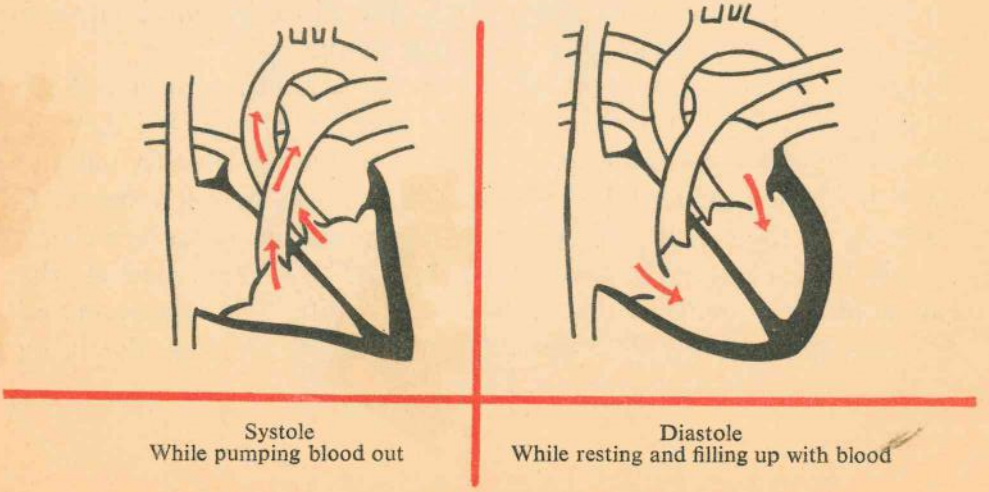


The amount of blood pumped out by your heart depends on what you are doing. The more active you are, the more the heart has to pump out blood.

beats for 8 hours and rests for 16 hours during a whole day.

Let's go back to our sailing trip from the heart. We go on a stream of bright red blood through the highways and byways of the arteries to the head and neck, the arms and chest, the abdomen and legs. All

HOW THE HEART WORKS



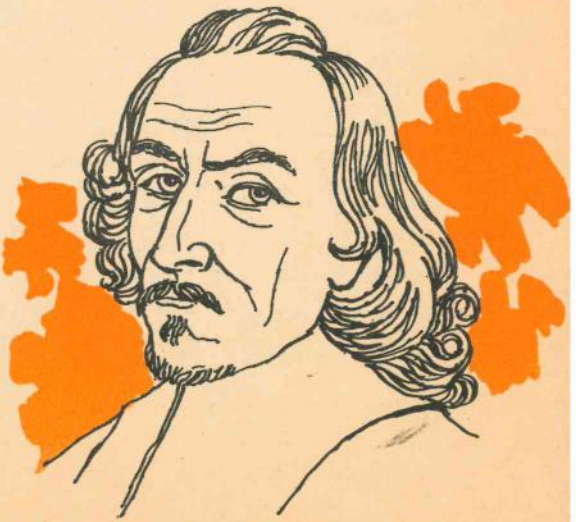
Systole
While pumping blood out

Diastole
While resting and filling up with blood

along the way, the blood gives away its oxygen and picks up the waste products and carbon dioxide. We return on a river of dark, blue blood through the veins to the heart.

Do you know who first discovered the course of the blood? It was William Harvey, a doctor, and he did it in 1628. The blood goes out from the heart to the lungs and back again to the heart; from the heart to the body and back again to the heart. In other words, it circulates. That is why the flow of blood around the body is like the flow of a mighty river. It brings oxygen to the body just as the river brings life to the people living on its banks. The blood carries away carbon dioxide and other waste products from the body, even as a river washes away the dirt and sorrow from the people. There is one big difference, though, between them. The river flows because it goes down a slope in the land, the blood because of the pump of the body, the beating heart.

William Harvey
(1578-1657)



William Harvey was a physician, a favourite of Charles I of England. William had seen blood being pumped out "by the beat of the ventricles" to the lungs and to the whole body and returning to the heart via veins. From this he concluded "that blood moves round in a 'circle' continuously."

ALAS! THEY ARE BORN THAT WAY

She is really blue and gets out of breath easily, so she has to squat like this. Her fingers and toes are like drum sticks—clubbed!

CONGENITAL HEART DISEASE

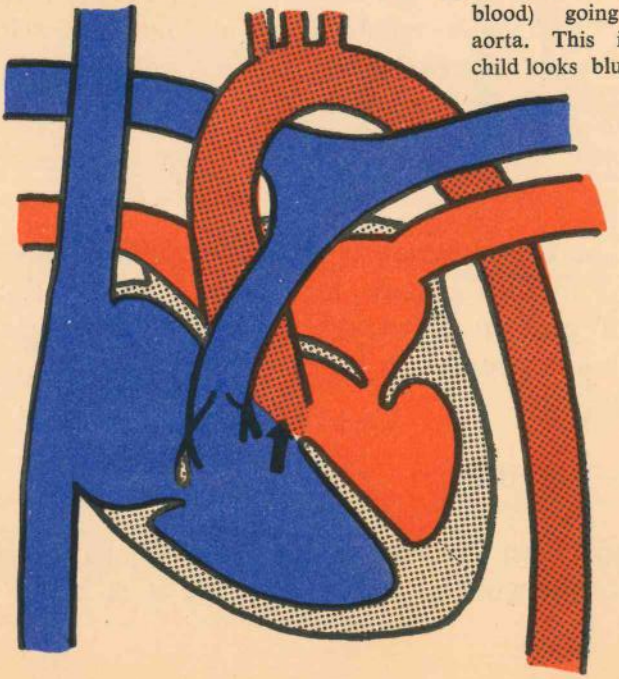
I WONDER if you have ever come across toddlers who, while indulging in normal activities, suddenly become breathless—in fact, so breathless that they have to stop running or playing. They just sit down; generally squatting on their haunches. When we say they are breathless, what do we mean? Actually there is shortness of breath because there is general lack of oxygen.

This lack of oxygen for the tissues interferes with normal growth and such children are often small and stunted.

Do you know why these children do not get a sufficient supply of oxygen? Well, to understand this, let's go back and revise what we learnt earlier. In the last chapter, when we talked about the course of the blood from the heart through the body and back to the heart, we saw that the returning venous blood was blue and that it had to

be sent to the purifying plant—the lungs. But what if something goes wrong and if some of the venous blood is shunted from the right side of the heart to the left and finally to the arteries, without passing through the lungs? The obvious answer is that the blood cannot become bright red and remains partly blue. The blue colour is due to insufficient oxygen (reduced hemoglobin) in the blood in the arteries. No wonder the appearance of these unfortunate breathless babies, who have this defect in the heart, has been called "blue" and the babies themselves are aptly known as "Blue Babies".

However, there are others who are not blue, although they too have a defect in the heart. In some, the blood is short circuited from



A heart with a defect. Arrow shows unoxygenated venous blood (blue blood) going into the aorta. This is why the child looks blue.

the left side to the right side of the heart due to an abnormal opening. Though they are not blue, they too run into various difficulties.

They Are Born That Way

What a pity! These babies are born that way. Since the disease is present at birth it is called *congenital* heart disease. These defects in the heart are known to occur in babies born to mothers who have had German measles during their pregnancy. Unfortunately, the story does not end there. Certain drugs taken by the mother and exposure to irradiation have also been found to produce deformities in the baby while it is in the mother's womb.

But you will ask, "Can nothing be done about it?"

Knowledge of the fact that German measles in pregnant mothers may cause this disease suggests a remedy. This is where vaccination against German measles would be useful. The mother should be protected against other causes (enumerated above) particularly during the first three months of pregnancy.

The Way Out

What can be done? When a defect is present, only a surgeon can correct it. If there is a shunt, it must be stopped. Blood must go to the lungs to pick up the oxygen which the baby must have.

How can you operate on the heart? How can you repair it while it is beating?

The Heart-Lung Machine

This is where man has been rather clever. He has built up a machine to take over the work of the heart while it is being repaired. This

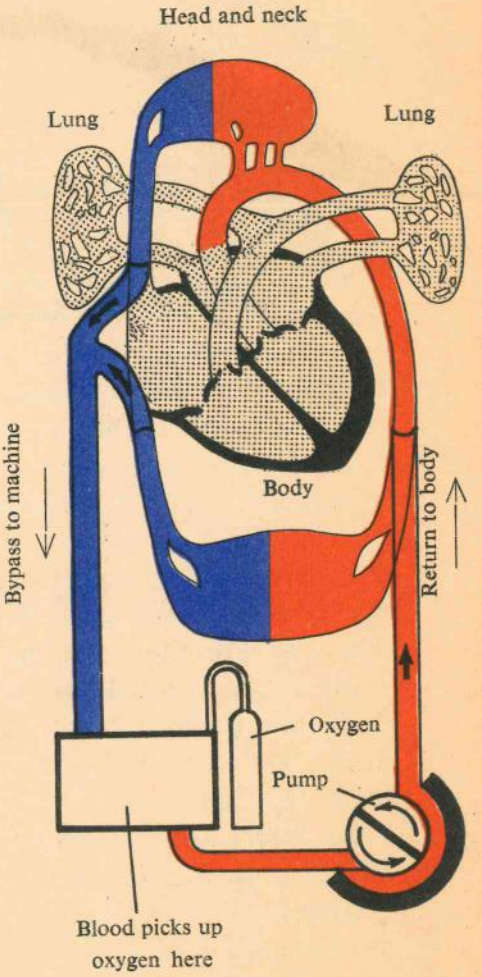
heart-lung machine does look complicated but it is actually quite simple. The blood from the veins is taken into the machine, exposed to oxygen and returned to the arteries.

But the machine depends on several gadgets. One acts like a pump; another prevents blood from frothing, while the third stops bubbles from entering the arteries.

Nature Shows The Way

Overleaf you see a picture of a bear fast asleep under the snow. Do you know that the bear is called a *hibernating animal*? Some animals with the coming of winter seek out a den which is usually an opening among rocks or a hole on a hillside or under the roots of a fallen tree. They make themselves comfortable in this den and go into what is known as winter's sleep or *hibernation*. During this period their circulation slows down, and the only nourishment they can get is from the fat that covers their body. Here in the den they stay until spring.

During winter, even frogs, turtles and woodchucks dig far into the mud



HEART-LUNG MACHINE

to sleep away the cold months in a state of half life. Chipmunks and moles are other animals who also live in burrows. Sometimes, these burrows are about ten feet long, and at the end they widen into a snug chamber lined with grass. A woodchuck curls himself up in a ball, sound asleep. Not a sign of life can be seen even when you move him. The heart beats may slow down to as low as fifteen a minute instead of the usual hundred.

So hibernation is one of nature's most effective ways of caring for her own during the cold of winter when food is scarce. When hibernation is complete, digestion ceases and the animal lives by absorbing fat that is stored up in the body. The largest group of hibernating animals are the bats which sleep through the winter in caves and hollow trees.

All this talk of hibernation has arisen because doctors have begun to apply this wonder of nature. They have evolved a technique based on this principle to help them in operating on the heart. They use a big word for this, *hypothermia*, which means body cooling. It really means cooling of the body during the operation. During the operation, they deliberately lower the patient's temperature so that the tissues can survive the relative lack of oxygen for a longer period.

Replacement Surgery

I am sure you have heard of the human eye being donated these days. It is possible to replace certain damaged parts of the eye by those donated. The same is true about certain parts of the heart and, now, even of the whole heart itself. It is possible to replace parts of the heart (valves, blood vessels, etc.) with synthetic material or tissue from human donors. Even replacement of the heart with an artificial heart has been attempted and will almost certainly become a reality in the not too distant future.

RHEUMATIC PAINS ARE DANGEROUS TOO

YOU HAVE often heard people say, "I am aching all over today. It is my rheumatism again." But this is not real rheumatic fever, nor what the doctors mean by rheumatic heart disease. For doctors, it is something quite different from having a few aches and pains on a chilly day. May be the following story will show you what they mean.

Six-year old Vimla came home from school one evening complaining of a sore throat. She had been waiting for the school bus that morning for a long time, the bus was late and the rain was pouring. She had been soaked to the skin and she had remained wet all day because she could not change her clothes at school. The sore throat felt better with salt-and-hot-water gargles and she continued to go to school as usual. But a couple of weeks later, she woke up one morning feeling hot and feverish and stiff all over, especially in the joints. Her right knee was actually swollen and she had to remain in bed. The doctor came and told her she would have to stay in bed for a few weeks. The right knee seemed to improve, but other joints kept on becoming swollen and painful one after another. She recovered and could go back to school. But about a year later, she again caught a chill, and the same things happened again, the sore throat and then the fever and the pains in the joints. This time the doctor said her heart was affected.

RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

After that everyone was very careful every time Vimla caught a chill. But the damage had already been done to her heart. She grew up, she got married. But when she was expecting her first baby, the

real trouble started. She could work less and less, as she became more and more out of breath. The strain was beginning to tell on her heart; her heart had been badly hurt by the rheumatic fever that she had had as a child.

So you see, a simple thing like a sore throat can ruin your life!

Rheumatic Fever Licks the Joints but Bites the Heart

Now, how do we know that it was really the rheumatic fever that damaged Vimla's heart? In rheumatic fever, the whole heart gets inflamed, the muscle, the inside and the outside lining of the heart, and especially the valves. The sick valves do not, cannot, function properly—they become scarred and rigid. Blood cannot flow past them easily, or it may even leak backwards through them. Either way, it collects behind the valves and strains the heart.

Can Rheumatic Fever Be Prevented ?

From little Vimla's story, it is obvious that rheumatic fever should be prevented. But how? Everyone has a sore throat and fever some time or another. But everyone does not have rheumatic fever. How can you tell who will have it?

That is just the trouble, you cannot tell without special tests. That is why it is so important to take care of a sore throat, of every sore throat, specially in children. Going to bed, sending for the doctor and doing what he says for the sore throat is the correct thing to do. You need not feel guilty about doing it, you need not think it is all a lot of fuss over nothing.

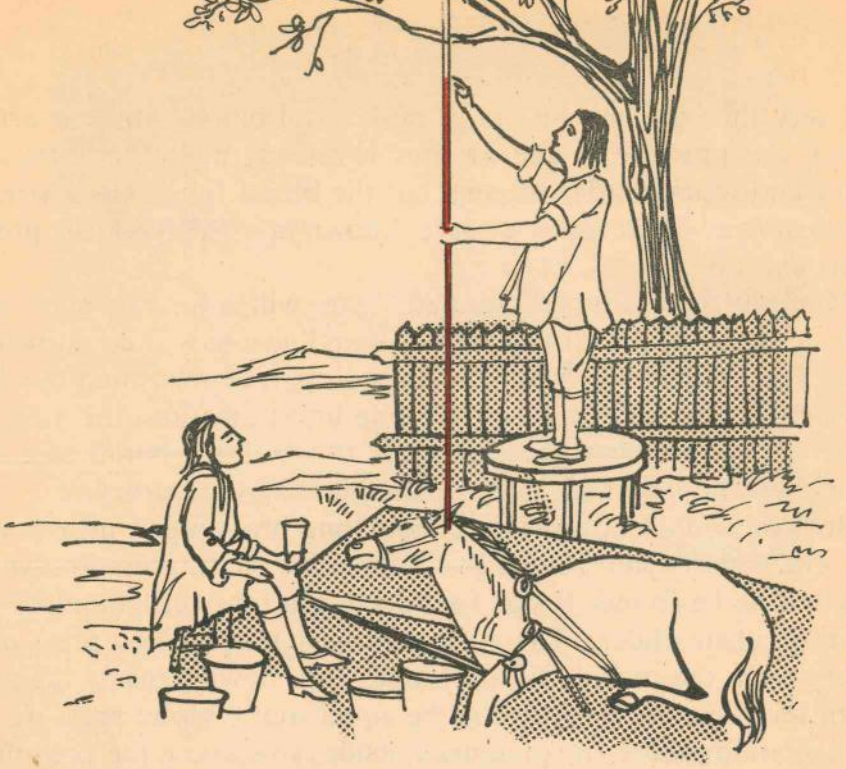
Those who have had rheumatic fever once and those who have had rheumatic fever in their family should be more than ever care-

ful. They will need penicillin or sulphonamides prophylactically, for a very long time, just to keep trouble away.

Can the Heart Be Helped?

It certainly should be helped, but whether it can or cannot be done is another question. Today there is hope even for those whose valves have been badly damaged. Operations have been devised to widen narrow valves. If they are too far gone, they may even be taken out altogether and replaced, since artificial valves are available in all sizes to suit all hearts. Even real ones have been used.

But valve surgery must be done in time, or it may be too late to save the heart, and the strain may prove too much for the heart to bear.



PRESSURES IN THE PIPE LINE—HIGH BLOOD PRESSURE

YOU HAVE perhaps heard the phrase "Water pressure in the pipe". By that is meant the pressure which water exerts against the inside of the pipe through which it flows. Will you be surprised if I tell you that blood also presses against the inside of the "pipes" through which it flows? Only the "pipes" in this case are the arteries. This is *blood pressure*, and when it is above normal, it is called *hypertension—hyper* in Greek meaning 'over'.

Every time the heart beats, it pushes out blood into the arteries. When the pressure in the arteries is already high, the heart has to work that much harder to push out the blood. This puts a strain on the heart and leads to the disease known as "high blood pressure heart disease".

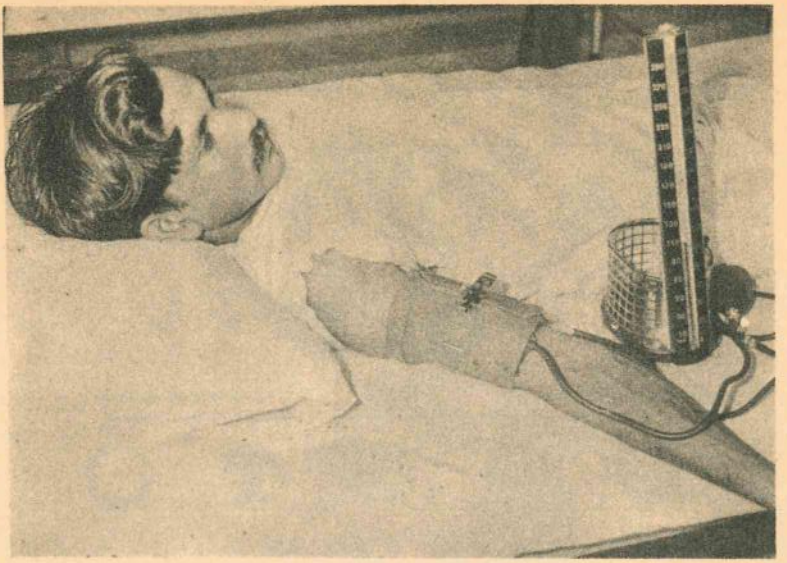
"Can this pressure be measured?" you will ask. For ages, many had wanted to do just this, but no one knew how it could be done. Then in 1733 Stephen Hales, an English parson measured the blood pressure of a mare. He inserted a long brass tube into the artery of a mare's leg. He measured the height to which the blood rose in the tube. This, he reasoned, must be the mare's blood pressure.

But you could not possibly plunge long brass pipes into a man's leg every time you wanted to measure his blood pressure. Another way had to be found. It was found, but not for over a hundred years after Stephen Hales. The idea was very simple. You press on the artery from the outside till the blood stops flowing inside the artery. Then the pressure outside must be equal to the blood pressure. And if you can measure the pressure outside, you know the pressure inside, i.e. you know the blood pressure.

Measuring the Blood Pressure

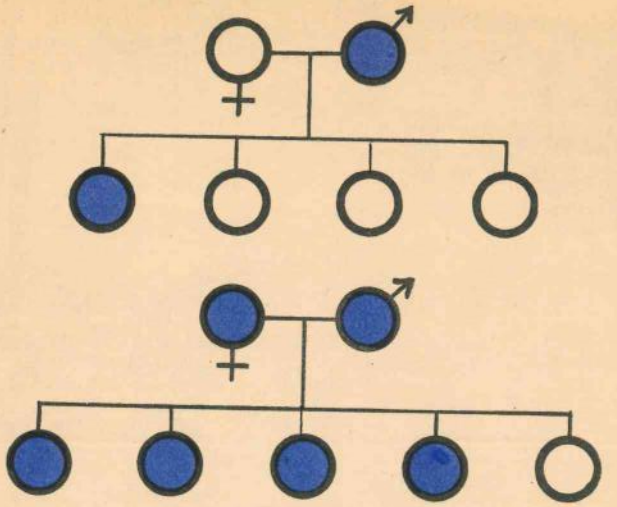
Suppose you were the doctor measuring the blood pressure of a patient. What would you do? The blood pressure instrument consists of: (1) A pressure manometer, (2) a compression cuff consisting of a rubber bag which can be inflated with air, enclosed within an elastic cloth, and (3) a rubber hand pump with control valve to inflate the rubber bag. This is how the instrument is used:

(1) Wrap the cuff around the upper arm and blow up the bag with air. This compresses the big artery in the arm.



(2) Listen with your stethoscope over the artery below the cuff, at the elbow. The squeeze over the artery will make the pulse disappear below.
(3) Let out the air slowly from the rubber bag. This will release the compression of the artery. At one point the pulse will return and you will hear it. This is known as the *systolic pressure*. The pressure inside the artery is equal to the pressure outside it. The pressure outside is the pressure of the air in the rubber bag.
(4) Read off this pressure on the manometer scale, which communicates with the rubber bag.
(5) Let out more air from the rubber bag. Go on listening over the artery. The pulse sounds will change. At one point they disappear. This point is known as the *diastolic pressure*.
(6) Only one thing remains: Write down the blood pressure.

Suppose that you have found a figure of 140 for the systolic and 90 for the diastolic, you will say that the blood pressure of your patient is 140/90 millimetres of mercury, or 140/90 mm. Hg for short.



How high blood pressure is inherited. Arrows indicate males and crosses females. White circles indicate individuals with normal blood pressure; blue circles indicate individuals with high blood pressure.

Actually, 140/90 mm. Hg is on the high side of normal for a grown-up. It is usually about 120/80 mm. Hg. In children it is still lower, a newborn babe has a pressure of only about 80/40 mm. Hg.

Types of High Blood Pressure

Broadly speaking, there are two types of high blood pressure:

(1) Those which run a slow course, for which no obvious cause can be found, and which are called *benign* or *essential.*
(2) Those which are the result of some other disease and which are, therefore, called *secondary*. For these there is good hope of cure if the cause can be removed.

In either of these types, the blood pressure may soar to very high levels. It is then called *malignant* pressure.

What Causes These Different Types of High Blood Pressure

(*a*) In the benign type, the exact cause is not known, but many things have been blamed.

The age at which these start is between 45 and 60. As age increases, the pressure also increases.

Of the sexes, women have it slightly more often than men. But women, on the whole, can stand a high pressure better than men.

Heredity plays a big part. A high blood pressure does run in families. If one parent has it, about 25% of the children also have it. But if both parents have it, about 80% of the children will get it.

Some races like the Filipinos, Chinese, Puerto Ricans and Negroes (but in Africa only) are blessed with an immunity to a high blood pressure. Not so the Negroes of America, who get high blood pressures as often if not oftener than the other Americans with whom they live.

Environment too matters a great deal. Stresses and strains of life, nervous tensions, all tend to shoot up the pressure. They say that people who can accept the ups and downs of life without fretting about them generally have lower pressures. They have what is called an 'oriental philosophy' about life.

Food may seem a strange thing in this list, but doctors have found that people who eat more salt are more likely to have higher pressures. Take the Japanese for instance. They eat enormous quantities of salt, in fact they say that the Japanese always buy their salt

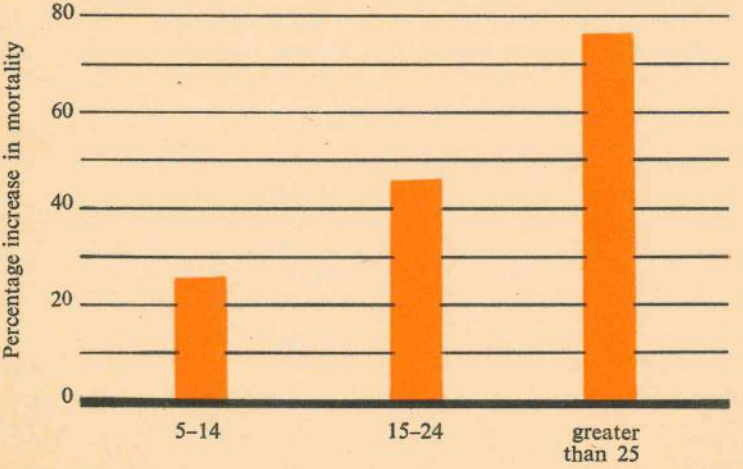
by the barrelful! And generally they have more cases of high blood pressure than others.

Being overweight makes a high pressure even worse!

(*b*) High blood pressure secondary to some other disease can often be controlled. Sometimes it is due to a diseased kidney. What actually happens is this. When the blood supply to the kidney is cut down, certain chemical substances are formed by the kidney. These, on entering the blood, raise the blood pressure.

OBESITY AND LONGEVITY

The more you are overweight, the greater are your chances of dying early. Figures do not lie!



That is generally beyond our reach at present, except where one can find a cause and remove it. But most types, particularly the benign ones, can be kept in check with drugs and other measures. But they remain in check only so long as the treatment is taken and therefore treatment must be continued.

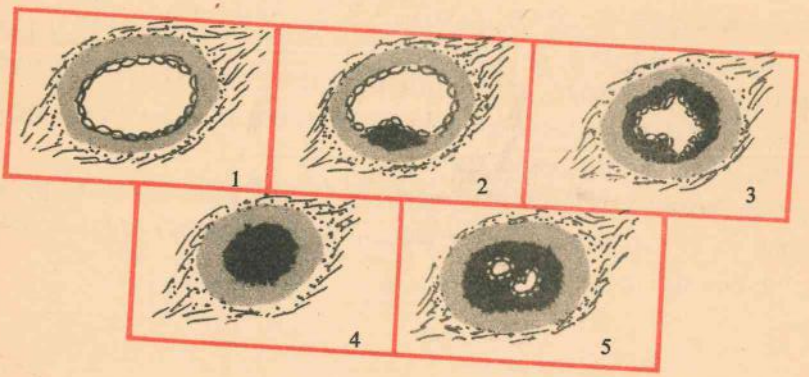
Cutting down on salt, cutting down the weight and cutting down all worries, are just as much a part of the treatment.

Sometimes an operation is the answer. Taking away a bad kidney may be all that is needed. But what if both kidneys are bad? There is hope there too, for surgeons today are trying to transplant healthy kidneys into those who need them.

Whatever you do, adequate control of blood pressure is imperative as otherwise it reduces life expectancy, as it wrecks the heart, the brain, the kidneys and the eyes.

GRADUAL DEVELOPMENT OF ATHEROSCLEROSIS IN CORONARY ARTERY

1. Normal artery. 2. Deposits under the inner lining. 3. Channel narrowed. 4. Channel blocked by blood clot—leads to heart attack. 5. Recanalisation.

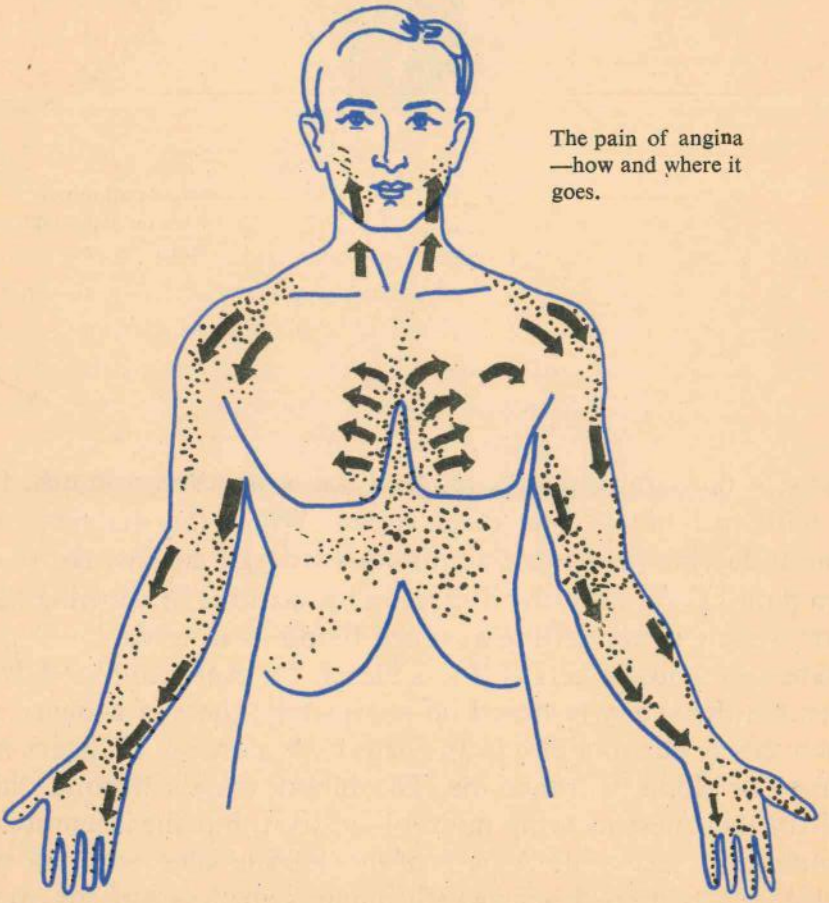


PAIN IN THE HEART AND HEART ATTACK

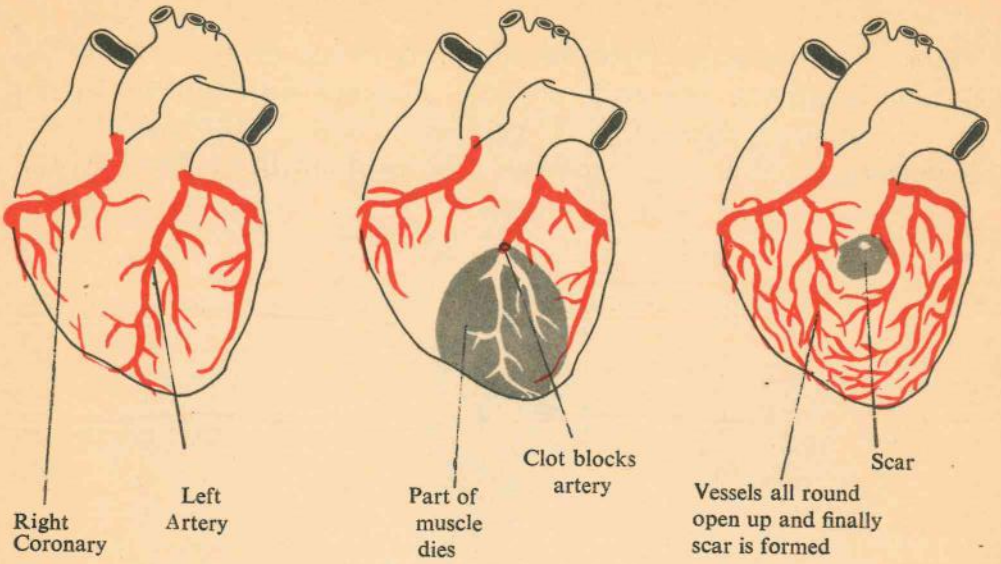
WHAT ATTACKS the heart? Or rather what happens to the heart during an "attack"?

The heart muscle gets the blood it needs through two arteries (called the *coronary arteries*). When these become narrowed down by disease, less blood reaches the heart muscle. The heart cannot get all the blood it needs, especially when it has to work more, as after exertion or an emotional upheaval. The poor heart cries out for blood.

There is a pain in the chest, in the centre of the breast bone, and this pain is *angina*. The pain may also go down the left arm, right arm or both arms through to the back or up into the throat. And it is agonising while it lasts, it feels as if you are going to die. Fortu-



The pain of angina —how and where it goes.



nately, it does not last very long, at the most a few minutes. It eases off with rest but it may come again. When this happens several times a day life becomes a continuous struggle against the pain. But even pain has its uses, for it serves as a warning; a warning that the heart muscle is not getting as much blood as it needs.

When the muscle gets still less blood, or even no blood at all, as when the the artery is closed off completely, there is a heart attack. Often this is due to a clot in the artery. A portion of heart muscle, starved of blood, will then die. The blood vessels around this part will try their best to bring more blood to it, but the attempt is never completely successful. A part of the muscle dies and, in time, is replaced by a scar—a scar which remains on the heart for ever.

A Case of Heart Attack

Here a typical case of heart attack is presented. Mr. Wilson, a successful (but always very worried) businessman, of about 50, lived well, ate well and, as expected, put on weight too well! He would come home after the day's work, collapse in an easy chair with the newspaper and switch on the radio. He disliked exercise of any sort and even got someone else to tie his shoelaces for him whenever he could. His blood pressure was on the high side, but he could not be bothered to take any treatment for it. His father and grandfather had both died of a heart attack, but Mr. Wilson had not taken the warning, though once or twice he himself had had the warning pains of angina.

One evening, after a particularly large dinner party, where he had eaten far more than could possibly have been good for him, he went to bed at about midnight. But at two in the morning he woke up with a dreadful pain in his chest (a tight constricting feeling in the centre of the breast bone). It was something like the pains he had had in his chest before, but this time it was much, much worse. He rolled in his bed with agony, perspired a lot and vomited twice. The doctor was immediately called. His verdict was "heart attack".

Eventually, after a lot of treatment and a long time in bed (almost two months), Mr. Wilson recovered. But for ever afterwards he was told he would have to take better care of his heart and blood pressure. He had been warned. . . . .

How You Can Avoid a Heart Attack

First of all you have to know what leads to one.

Too much weight, too much worry, too much eating and smoking

and too little exercise, all these pave the way to a heart attack. So does diabetes and too much cholesterol in the blood. When others in the family have also had heart attacks, the ball is set rolling. A high blood pressure makes it roll faster.

Usually there is a warning, the warning pain called angina. But if there is no warning, or if the warning is ignored, the heart attack becomes grim reality.

Heart Failure

The heart is the "mystery man" of the body. It has baffled man for ages; it still baffles us. Always working, never on a holiday, how does it do it?

Even when it fails, it does not always mean the end of the "mystery man". For it does recover even after failure. Failure, when it comes, may be severe, dramatic. But recovery is also dramatic!

Why Does The Heart Fail?

When the camel has to carry more than it can bear, we talk of the "last straw that broke the camel's back". This is true of the heart too. When it can no longer cope with the load of work, it goes into failure. This is seen when the heart has to push blood out into the arteries against high pressure. It is also found when heart muscle itself is diseased, damaged or even scarred, as perhaps after an infection or a heart attack. Sometimes, the heart beats much faster than it usually does, this means it has to work harder than usual. When any of these happen too often or too long, the heart fails.

Finally, there are causes outside the heart that cause disaster. Lack

of blood (anaemia) or lack of vitamin B, etc. are also sometimes responsible for heart failure.

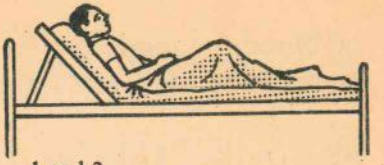
How Do You Know the Heart Has Failed?

Heart failure usually warns before it strikes. Being out of breath is the first signal. Initially it may be noticed only after severe exertion. As the condition deteriorates it may manifest itself after doing some ordinary routine things, like washing or dressing. But it may become so severe that the patient cannot even lie flat in bed at night. He just sits up all the time and gasps for breath. As the pump fails, the blood flow becomes sluggish. The body is starved for oxygen and tries to get more by breathing faster.

Another symptom is swelling of the body at the end of the day. The swelling starts in those parts of the body which are usually furthest below the heart, the legs for instance. As the heart fails, its pumping action also fails. Fluid collects in the lowest parts. Gravity asserts itself. With progress of the disease the swelling is seen on the thighs, abdomen and then the rest of the body.

Yet another feature is increase in weight. The patient does not pass as much urine as he used to or ought to. The circulation is sluggish, the kidneys are not working as they should. Water is retained and the weight goes up.

What are the Rules for Recovery After Failure?



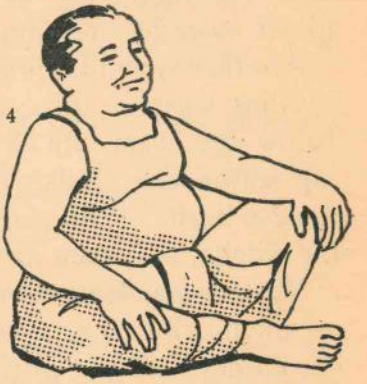
1 and 2

(1) Complete rest in bed is just what the heart needs to recover.

(2) Complete rest does not mean lying flat, in fact it is better for the patient to sit up in bed. He is more comfortable, as in this position the heart finds its work easier.

3

(3) Avoid salt, in failure and if necessary after it. Salt is the thing which holds water in the body. Cut out salt, or help the body get rid of it with drugs, and the water passes out of the body.



4

(4) Bring the weight down, specially if it is above normal. The less weight you have, the easier is the work of the heart.

5

(5) Besides all these DOs and DON'Ts your doctor will, of course, prescribe the medicine you need.

The heart *can* recover, even after failure.

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