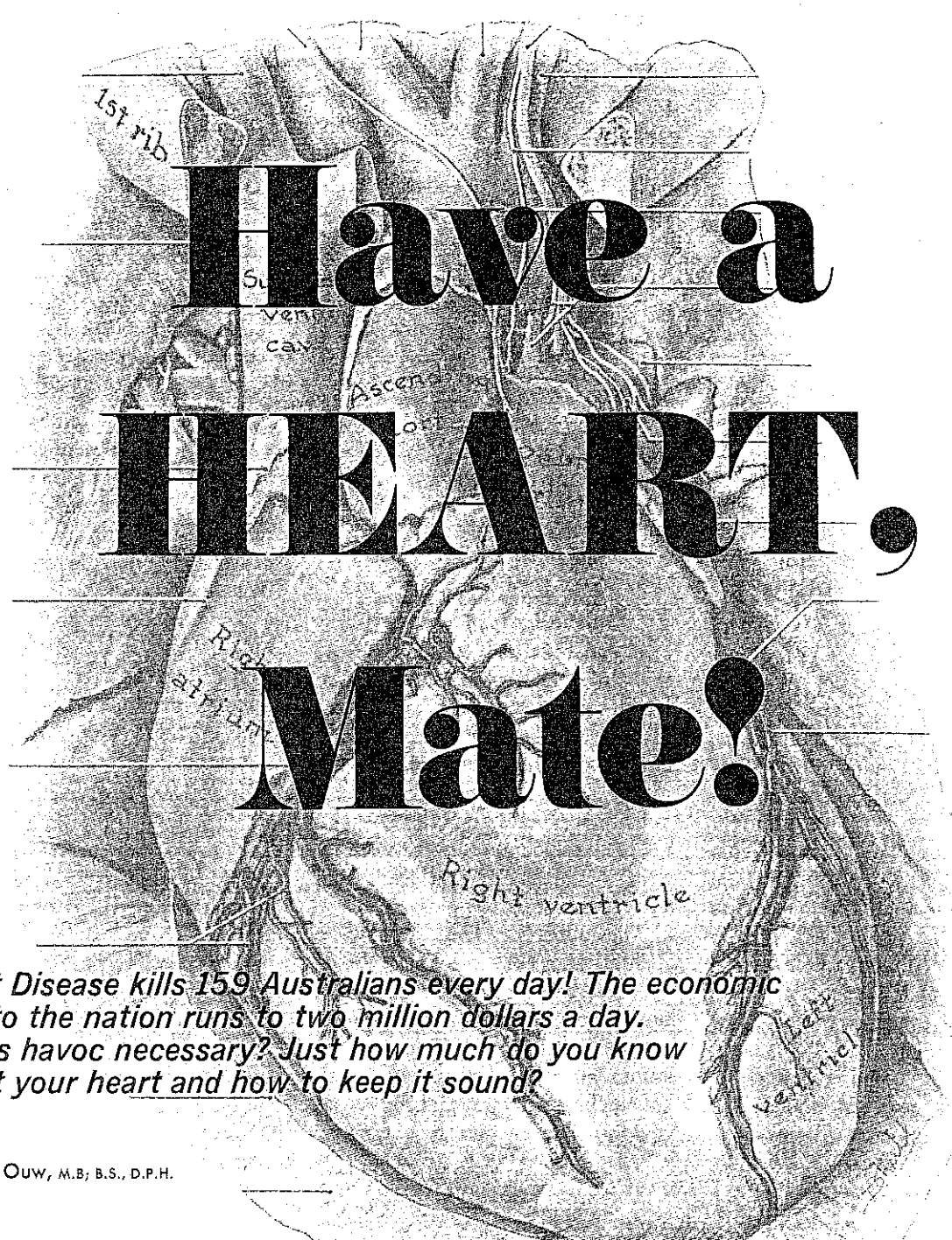


1st rib

Have a

HEART!

Mate!



Heart Disease kills 159 Australians every day! The economic loss to the nation runs to two million dollars a day. Is this havoc necessary? Just how much do you know about your heart and how to keep it sound?

by John Ouw, M.B., B.S., D.P.H.

WHO HASN'T heard of the past ravages of Bubonic plague, typhoid and cholera? Yet how many are aware that today the countries of the Western world are plagued by a disease more sinister and far more difficult to control than any of the earlier scourges?

This modern plague is heart disease — especially the main killer, Coronary Heart Disease.

Medical authorities from the World Health Organization (WHO) have warned that unless the causes of Coronary Heart Disease (CHD) are found and eliminated on a wide scale, the world will be subjected to the worst disease epidemic it has ever known.

It has been estimated that *all* heart and blood vessel diseases (CHD being the primary one) cost Australia two

million dollars a day or approximately 730 million dollars a year. This is in man-hours lost to companies and hospital payments made both by individuals and by insurance and health schemes.

Worst Killer-Disease

In the list of the world's *per capita* mortality death-rates due to CHD, Australia rates *fifth!* That is lower

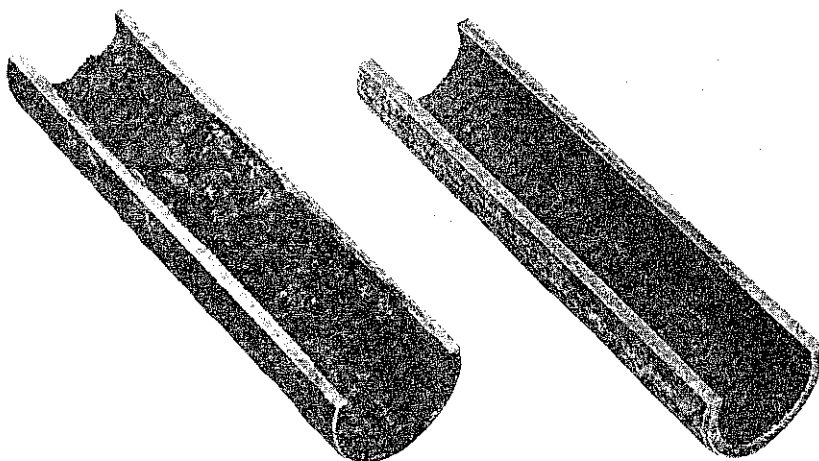


Photo: R. DeVries

HARDENING OF THE ARTERIES (*atherosclerosis*) occurs when the arteries are narrowed by an accumulation of fatty tissue along their inside walls. Just as heavy rust slows down the flow of water through a pipe (above), the thick coating of tissue impedes the natural flow of blood through the arteries. The picture on page 5 shows a series of cross-sections of a coronary artery with exactly this condition.

only than Sweden, the United States, England and Ireland. So CHD is very definitely an Australian problem second to none in its deadly effects upon the nation's citizenry!

Dr. R. Reader, Director of the National Heart Foundation in Canberra, reported that 34,000 Australians died of CHD in 1970. If current trends continue, he forecasts that each year at least 10,000 men and 3,500 women under the age of 60 will suffer heart attacks. Dr. Reader also estimates that about a half a million Australians have some physical or clinical evidence of CHD. That represents one in every 26 Australians—4% of the population! CHD, then, is one of the commonest *chronic* conditions in the country as well as the worst killer-disease.

In fact, it is safe to say that one-third of all Australians will die finally of CHD, and that one in three of those victims will die at less than 65 years of age. There are nine Australians killed each day in road accidents, but, according to the National Heart Foundation, 90 of our citizens die each day from CHD.

We don't have to look overseas for our records and statistics; we have our own very tragic, home-grown variety right here!

Environmental Versus Behavioural Diseases

If Australia had 10,000 cases of typhoid or cholera each year, there would certainly be public uproar, an insistent demand for protection and strict governmental controls. But the nation, it seems, remains complacent and almost uninterested that so many people, including *young* people, are dying or threatened with death from CHD.

The answer is, of course, that while it is relatively easy to control typhoid or cholera by improving sanitation and the environment, it is difficult to control CHD. Why? Because the means of preventing it clash with human behaviour and culture. A case in point: Can any human government ban the production and sale of cigarettes, never mind the use of them, without strong reactions from a smoking public? Yet, cigarette-smoking is among the "high risk factors" related to CHD. That fact is no secret to the general public! But a political party with a tobacco prohibition policy wouldn't have a hope in an election.

As a matter of fact, we *have* found factors that can minimise the incidence of CHD. We *do know* how to cut down the number of cases drastically

—but the kind of self-control this kind of life demands has so far proved too challenging for the average person.

Anatomy of Heart Disease

There are a number of *risk factors* that medical men have discovered and that they urge us to avoid. Three of them—high blood pressure, high blood cholesterol, and cigarette-smoking—are vitally important factors, and the presence of any one of them in a person's life-style will increase the risk of CHD to an above-average level. When two of these factors are present, the risk is increased to double the average. If all three are a part of a person's pattern of living, the risk of CHD is increased by at least six-fold!

The important secondary risk factors are physical inactivity, excess weight and a Type A (impatient, volatile) personality. Any combination of these risk factors can be dangerous.

If we want to discuss these factors impartially—and admittedly that is hard to do with so much at stake—but to be objective, we must understand the basic "anatomy" of heart disease.

Let's do that by looking at a typical case-history.

Mrs. K.G. rang my home one evening sounding very concerned.

"Doctor," she asked, "can you please come right away? My husband is having a lot of chest pain, and I'm worried that it may be a heart attack!" I jumped into my car and drove over to their home immediately.

Mr. K.G. was a very ambitious, hard-working businessman at the prime of his life and career. At 40, he had arrived. He owned a luxurious home in a fashionable suburb and drove an expensive car. He was what most people would call a success in life.

When I arrived at his bedside, he was in severe pain. An examination quickly confirmed his wife's suspi-

cions that he had suffered a heart attack. He was immediately taken to hospital, but in spite of treatment and nursing care, he died a few hours later. His grief-stricken wife told me that they had planned to take a cruise and that he was overdue for holidays.

Unfortunately this is the all-too-common outcome of CHD, but if you have a morbid curiosity, let us probe this case further. Let us go into the mortuary with the pathologist to examine the body. He can show you Mr. K.G.'s lungs—blackened by the incessant smoke of thousands of cigarettes—then thickened arteries and the blood clot that had lodged in a branch of the coronary artery, most certainly the clot that had killed him.

Crowning the Heart

The branch where the clot had lodged was a part of a coronary artery system. Two such arteries and their many tributaries "crown" the heart (*coronary* means *crown* in Latin). These two arteries and their branches are subject to a condition called *atherosclerosis* (hardening of the arteries). This occurs when these "tubes" are narrowed by an accumulation of fatty tissue along the inside walls of the arteries. This thickening and narrowing of the walls quite naturally slows down the flow of blood just as thick rust on the inside of a pipe slows down the flow of water.

The causes of this condition are well known, but are not generally understood.

When the build-up becomes more or less severe, the heart has to beat faster to pump the blood through the arteries when the victim exerts himself. When the artery or its tributary is badly narrowed and an inadequate blood supply results, the victim will suffer from chest pain which is called *Angina Pectoris* (Greek and Latin: to throttle the chest). The pain will usually disappear when the victim is at rest.

If, on the other hand, the disease

is more advanced, a clot may form in this "rusty" artery and block the flow of blood altogether. If a small branch of a coronary artery that supplies blood to an area of heart muscle is blocked in this way, the resulting condition is called *Myocardial Infarction* (the death of heart tissue). The victim—like Mr. K.G.—will invariably suffer from severe chest pain and then have a heart attack. When the main artery is completely blocked, sudden death will occur.

Risk Factors

Let's take a closer look at the major risk factors that affect the increase of CHD.

Although the incidence of the disease in western countries such as Australia and America has been on the increase generally in the last sixty years, the changes that occurred during the wars were quite unexpected.

German doctors noticed a decline in heart disease at the end of World War I. In Norway, the incidence of CHD decreased during the German occupation during World War II when food was strictly rationed, tobacco consumption dropped, and a shortage of petrol made travelling almost impossible.

The absence of sugar in the diets of these people is significant since it

may be a factor of some importance in the incidence of CHD.

From these and other records, doctors have concluded that there is some relationship between the decline of CHD and diet, smoking and activity.

High blood pressure is another factor involved in CHD. When the heart beats, it forces the blood out through various arteries to the organs in the body. The pressure *during* a heart-beat is called *systolic*, and in between beats when the heart is momentarily resting, the blood pressure is called *diastolic*. Both pressures must be measured, and the result is written, for example, 120/80, which simply means that the *systolic* pressure registers 120 mm. on a mercury gauge and the *diastolic* pressure 80 mm.

The smaller arteries are under the influence of the nervous system. When for any reason they are constricted, the heart has to work harder—it has to exert more pressure to pump the blood. Under these circumstances the blood pressure may increase beyond its normal range, say above 140 mm. for systolic and 90 mm. for diastolic. If this situation continues, the heart will grow larger, and eventually it will fail. This condition is called Congestive Cardiac Failure. It might be that a kidney will

DEATH IN AUSTRALIA

55%
HEART/BLOOD-
VESSEL DISEASE

16.5%
CANCER

3.5%
ROAD
ACCIDENTS

SOURCE: Commonwealth Bureau of
Census and Statistics, 1971.

fail as well, or perhaps the arteries in the brain will burst under the pressure, and the victim will suffer a stroke.

In an American study it was discovered that people in the 40-59 years age bracket who had high blood pressure were much more prone to CHD than people of the same age whose blood pressure was normal. The increase was 2.6-fold for men and 6-fold for women!

It has also been shown that people who have high blood pressure do not recuperate as easily after a heart attack as people who have normal blood pressure.

Although more evidence is needed to prove conclusively that lowering elevated blood pressure will reduce the frequency of CHD, it is agreed that with satisfactory treatment, the complications of high blood pressure (heart failure, kidney failure) can be minimised.

High blood pressure is difficult to recognize without a medical check. A headache or giddiness or palpitation *may* not be an indication of high blood pressure, but they should be checked. During a medical examination, it is often possible to determine, if high blood pressure is present, if it is caused by an organic problem. Often relaxation and weight-reduction can lower blood pressure to normal.

What is Cholesterol?

Cholesterol is only one of the complicated elements that make up the complex mixture that is blood. It performs many important functions and is also an essential component of the body hormones, including sex hormones. Egg yolks and animal fat contain a lot of cholesterol. Some blood cholesterol is formed in the liver.

Generally speaking, blood cholesterol levels are low among peoples of the developing nations and higher among the populations of the affluent nations. At the same time, the inci-

dence of CHD is lower in developing nations than in the western countries.

In an American study, it was revealed that (other factors being equal) men aged 35-44 who had blood cholesterol levels greater than 265 mgms per 100 mls of blood had 5½ times the risk of developing CHD as men of the same age whose blood cholesterol levels were below 220 mgms per 100 mls of blood. Since we eat cholesterol along with our food, it's logical to ask if diet is of particular importance in causing this higher rate of CHD.

Interestingly enough the Japanese who live in Japan have a lower incidence of CHD than the Japanese who live in America where the diet is completely different. The Japanese Americans suffer the same incidence of CHD as the rest of the population. On the other hand, the incidence of CHD among the Japanese living in Hawaii is approximately half that of their relatives living in Japan.

Also recently Professor J. B. Polya and Dr. R. S. Parsons of the Chemistry Department of the University of Tasmania have isolated a component of fat in the blood which acts as a clotting agent in heart-attack victims. This component (free Ceramide), which is produced in large amounts by the body in times of stress, acts as a coagulant. It is an important factor in heart attacks. Dr. Parsons maintains that "... the isolation of the fat discovered at the University ruled out cholesterol as a major cause of heart disease."

The problem is posed, of course: how do we evaluate such conflicting findings? One solution, and certainly the most obvious, is that more research is necessary into both the effect of cholesterol and the claims made by the University of Tasmania scientists.

Pending further study of the new discovery, a New Zealand report on CHD, commenting on the question of diet and cholesterol, made these

recommendations to the people of New Zealand:

A general reduction in total calorie intake and moderate restriction of saturated fat (animal fat especially) and cholesterol intake (egg yolks and internal organs of animals) . . . These are prudent rather than proven measures and logically should be introduced as habits in childhood rather than as modifications of diet later in life.

A doctor can estimate whether or not the blood cholesterol level is normal and if one needs a low cholesterol diet. For the time being — until further research is carried out — doctors must continue to assume the validity of the work that has already been done and which points out the serious implications of high cholesterol levels on CHD.

Cigarette-Smoking and CHD

The increased health hazards that result from cigarette-smoking are well documented. This has led the Australian Government to legislate that a warning be broadcast at the end of every cigarette advertisement on radio and television.

The mortality rate from CHD among smokers is double the rate among non-smokers! That is a demonstrable scientific fact.

In one American study of men between the ages of 30 and 60—all men who smoked 20 cigarettes a day—it was discovered that the CHD mortality ratio is three to one against smokers.

The risk of death from CHD is higher among young cigarette-smokers than among the older group, but the risk ratio seems to be lowest among women, presumably because women who smoke frequently do not inhale. The New Zealand report stated that it takes five years for a man who has stopped smoking to bring down his risk of *Myocardial Infarction* to the level of the man who never smoked.

Continued research only accen-

tuates the role that cigarette-smoking plays in the incidence of CHD. Public Health officers are very conscious of the importance of any decline in the smoking habit. Preventative measures will pay good health dividends to the public. As more and more young people take up the habit, the need to implement measures to discourage people from smoking becomes urgent.

This educational responsibility is not only the charge of doctors, but also the job of government officials, teachers, parents and the church. Those genuinely interested in the health of the Australian people will make every possible effort to eliminate this habit which can have such serious consequences for people who are predisposed to CHD. (For practical help in breaking the smoking habit, write for our free booklet, *You Can Quit Smoking*.)

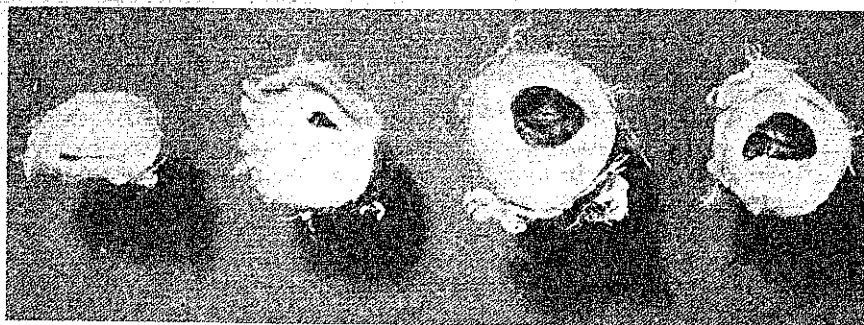
Physical Activity

Australians seem to be generally aware that regular physical activity produces a sense of good health and well-being. It also lessens the risk of CHD.

In a country of sports enthusiasts, there are two major pitfalls that people tend to fall into. One is the all-too-frequent preference to watch games rather than participate in them. Spectators seldom tone up their muscle or improve circulation to any appreciable degree while cheering on a team.

The second pitfall can be downright dangerous: too many Australians participate in an active sport *violently* for one hour every week or two! Their hearts are simply not prepared for the *sudden* and unexpected increase in activity. The demands made on the heart's muscles to produce enough pressure to pump the blood through the arteries can be fatal! A regular programme of physical activity suitable to the individual's age and physical condition is the obvious answer.

“When the main artery is completely blocked, sudden death will occur.”



This photo shows a cross-section of coronary artery narrowed by fatty-like substances (whitish area) that have built up in an irregular pattern. A blood clot (dark area), deposited in the artery, completely blocked the opening and caused the patient's heart attack.

One of the most frequently cited studies in the area of occupational activity was done in London in 1953 among bus drivers and conductors. The study revealed that the bus drivers had a CHD incidence about 1.4 times higher than the conductors whose job called for greater activity. But it has been pointed out by critics of the survey that the heavier recruits tend to prefer driving the bus rather than moving about as much as a conductor must. Nevertheless, the sluggishness of the heavier sort is further indication that inactivity and obesity can be a deadly duo.

In America, studies among the Washington D.C. postmen and clerks as compared to farmers and managers on the farms in the southern State of Georgia have confirmed the London observations that the more active postmen and farmers are less prone to CHD than the much less active clerks and farm managers.

A study of Israelis living in Kibbutzim proved that the incidence of *Myocardial Infarction* is lower among the members who are physically active even though they live in the same environment and have the same diet as their less active fellow-workers.

Another interesting study was made in East Finland as part of the Seven Countries Study (1970). The

report mentioned the excessively high mortality rate from CHD among men in the area despite the fact that physical activity was the rule. It was noticed, however, that these men had a high mean-blood-cholesterol which seemed to override the activity factor! So it is possible that the advantages of one factor do not always compensate for the other.

Many authorities share the view that, as one put it, “physical activity protects against having a fatal outcome to a clinical event of coronary heart disease.” He is convinced that regular exercise improves, “the condition of the heart muscle and also improves the circulation in the coronary arteries’ tributaries.”

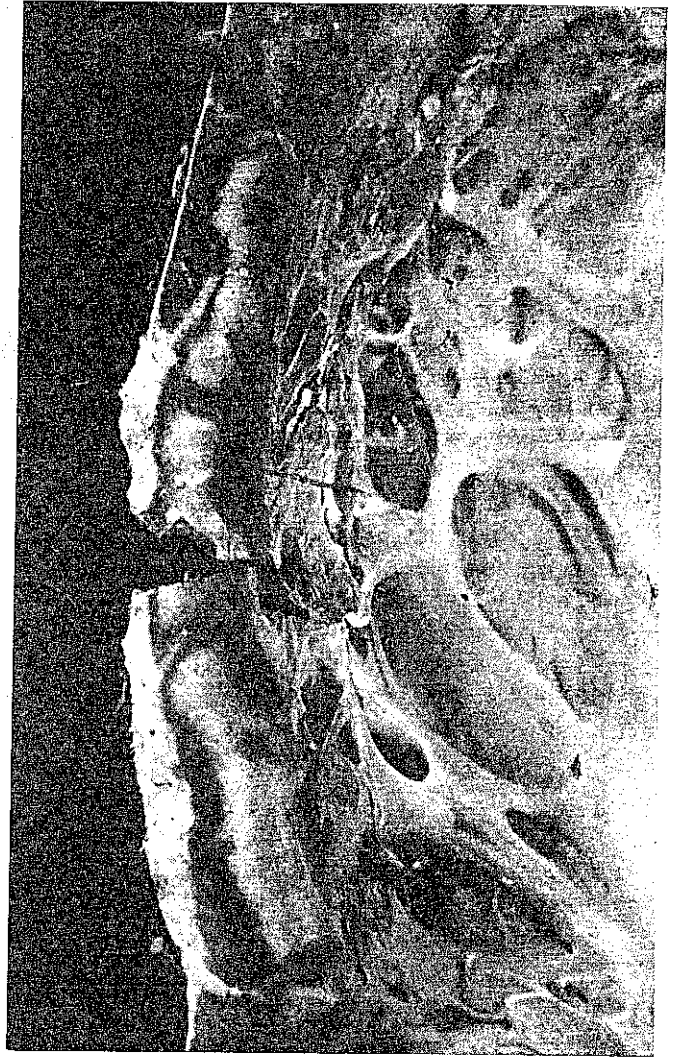
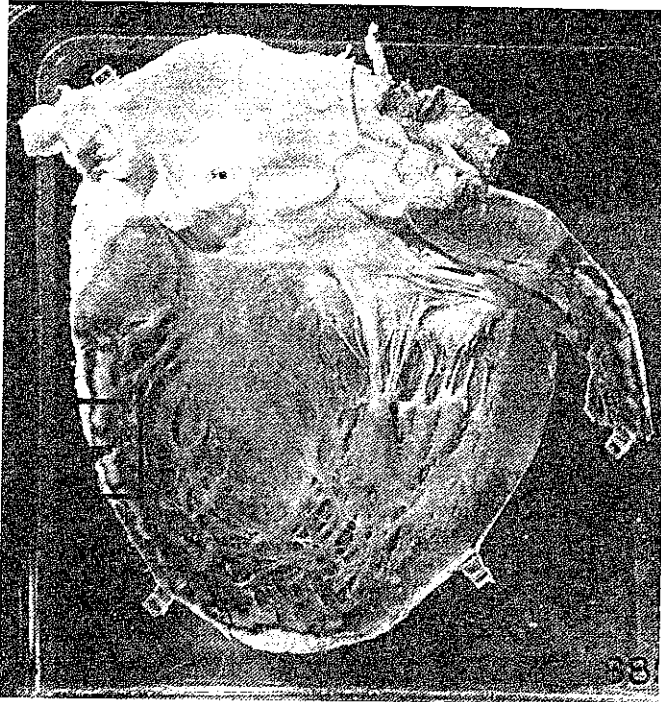
As we have already said, regular exercise — perhaps three times a week for a half hour depending on the individual — helps in weight control and reduces cholesterol and other fatty substances.

The Problem of Obesity

How do we measure obesity?

Weight that is assumed to be excess does not necessarily mean that the person is obese. Much depends on the size of the individual's frame or his muscularity. Weight also varies with age and height and is a very individual problem.

“Their hearts are simply not prepared for sudden and unexpected activity.”



The photo above left is of a human heart cut open to show a patch of dead tissue on the heart wall (boxed area). This condition is known as *Myocardial Infarction*. The presence of this dead tissue may disturb the regular heart contraction rhythm

and, in some cases, this weakened area may rupture and cause instantaneous death. The photo above right shows this area in more detail. Photos: Courtesy of the Department of Pathology, University of Sydney.

To overcome these difficulties in defining obesity, scientists have invented an ingenious device known as a *calliper*. It measures obesity. A roll of skin with underlying fat is measured in a specified area to determine the person's degree of obesity in m.m. But for practical purposes, people who weigh 20% more than their ideal weight can be regarded as obese for clinical purposes (Data for ideal weight are based on international figures for best survival from the Society of Actuaries of the U.S.A.).

Using this system, researchers determined that patients with symptoms of CHD are generally fatter than

people who are not bothered by the symptoms.

Again, the evidence varies. In the report on the high mortality rate from CHD found in East Finland, obesity is not cited as a characteristic of the people. In such countries as Italy and Yugoslavia which have low CHD mortality rates, obesity seems to be the rule.

The exact mechanism that governs the effect of obesity on CHD mortality is not known. Perhaps it is related to the association of obesity to hypertension and diabetes—both of which are potent CHD risk factors. So while doctors do not believe that ideal

weight necessarily reduces the incidence of CHD, they do know that obesity is closely related to high blood pressure and diabetes, and they recommend that patients bring their weight down to normal.

And it must not be forgotten that the average life expectancy is shortened for obese people.

Emotional Stress and CHD

It is difficult to give a definition of stress.

It has been defined by the author of the New Zealand report on CHD as being synonymous with the force and pressure that is exercised upon

an individual. But it is still difficult to measure stress in these terms, for there is no satisfactory way to estimate the reaction of a person to stress.

Despite these drawbacks, there is a widely held belief, especially among laymen, that the increase of CHD in the Western world can be attributed at least in part to emotional stresses—although there is no medically conclusive evidence that this is true. In fact, one study indicates that the incidence of CHD among executives is lower than among non-executives!

Whether it is the stress *per se* that is important or the ability of the individual to handle stress is the matter that is really up for discussion.

As a doctor, I am inclined to feel that it is the capacity—or lack of it—of the individual to manage the stresses of his particular life that is important rather than the nature of the stress itself. Of course, the ability to handle stress depends largely on experience, social and educational background and childhood training. Inheritance is also a vital factor, of course. In short, it is the total personality that is involved.

Attempts have been made to categorize personality types and to catalogue their relationship to *Myocardial Infarction*. Friedman and Rosenman, two American scientists, have defined two main personality groups—Type A and Type B. The Type A person is characterized by a driving, ambitious, competitive personality and displays restlessness and impatience. A Type B person is just the opposite: he is placid, easy-going and unmotivated by strong inner drives. He is not generally ambitious. The two types also differed in other respects—the blood cholesterol and blood pressure of the Type A people were higher than those of the Type B group studied. Type A people also tended to smoke more cigarettes. Friedman and Rosenman found that Type A people have a higher incidence of CHD.

Psychological testing has also

identified a phenomenon that has been called “coronary-prone behaviour patterns.” Most laymen could identify the person with such a problem without any medical assistance. And most could prescribe the needed change: slow down, work at finding contentment. It sounds like a very superficial answer, *too* simple, *too* basic. But *that's it*, no matter how it is dressed up in psychological terminology or how many popular books on psychology are written on the subject. Just slow down and learn to be content.

The Bible and CHD

Even the Bible discusses the risk factors we have been talking about. And much more specifically than you would think!

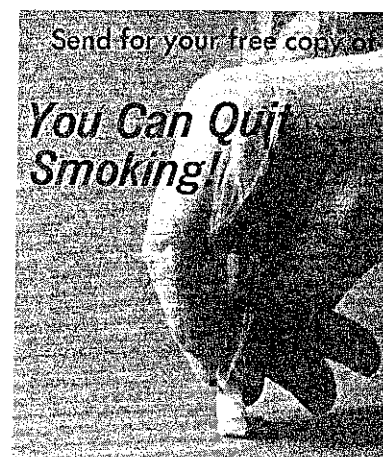
The Bible deals plainly with the problem of obesity. In Proverbs 23:20-21, gluttony and overeating are thoroughly condemned! And talking about fat and cholesterol as much as we have been, we should be pleasantly surprised to find a direct command of God, “. . . Ye shall eat no manner of fat, of ox, or of sheep or of goat” (Leviticus 7:23).

Of course the Bible condemns anything which may defile or harm the body—and that, medical evidence reiterates, certainly includes smoking! In I Timothy 4:8, correctly translated, the Apostle Paul says that physical exercise profits—does us good—“for a little while”—meaning in this life.

Jesus Christ and His disciples trudged many long miles over the terrain of Palestine, climbing mountains and working on fishing boats. They were not a sluggish, lazy group of young men, but rather an active, vigorous, physically and mentally healthy and alert team.

We find that Christ was always exhorting His followers—and us—to love each other. He even commanded us to love our enemies. He advised us to be peaceful and content.

As it is put in the book of Pro-



verbs, “Better is a dinner of herbs where love is, than a stalled ox and hatred therewith” (15:17), and “A merry heart doeth good *like* a medicine: but a broken spirit drieth the bones” (17:22). In fact, the Old and New Testaments are full of tension-reducing formulas.

You and Your Heart

When the first heart transplant was done with a certain amount of success about five years ago, people thought that a new kind of medical salvation was at hand.

Artificial hearts also have their problems. A power supply seems to be the major problem in keeping them in operation. And the complicated factors involving damaged kidneys and lungs and even brains are making many people wonder just how far medical science should go in replacing vital organs.

But is there really any point in putting a new engine in a car already half way to the junk-yard? Would caution and prevention do the job better?

We must go back to the primary prevention of CHD. We must avoid the risk-factors; we must exert the necessary self-control to protect ourselves from the Apocalyptic horseman that carries this new, modern epidemic. The question is whether we are wise enough, whether we have enough strength of character to follow the simple, basic lessons in self-preservation. □