The Medical Termination of Pregnancy Act 1971, which came into force on 1 April, 1972 is another positive step in the broadening of attitudes towards such a vital matter of a woman's right to have or not to have a child. The measure is aimed to give an opportunity to our women to terminate a pregnancy where there are the genuine and compelling reasons.

MEDICAL TERMINATION OF PREGNANCY

PROF. D. P. CHATTOPADHYAYA

TERMINATING pregnancy through abortion has been in practice the world over for centuries, although it is only in the recent past that many countries have initiated measures to give it a legal sanction.

Today, abortion is accepted as a social need in a number of countries, and India is among those who are trying to liberalize the provisions under which it can be resorted to, mainly as a step for emancipation of women.

Custom, religion and law had frowned upon abortion, and it has been under most trying conditions that Indian women could resort to this step. But with the passage of time, transformation of society and tempo of life, social values too have changed, and there is a growing realization of the important role that women can play in all other spheres of life besides that of bearing and rearing children. The Medical Termination of Pregnancy Act, is indeed, another positive step in the broadening of attitudes towards such a vital matter of a woman's right to have or not to have a child. It needs to be emphasized, however, that the Act is not intended to make all abortions legal. It covers only those cases where there are the genuine and compelling reasons.

The measure, is aimed to give an opportunity to millions of our women to take recourse to proper abortion when they have genuine reasons to terminate a pregnancy.

The Act relaxes certain provisions of the Indian Penal Code (Section 312), to make abortion law more liberal thereby embracing a larger group of women who need relief due to certain compelling circumstances.

It is also the intention of the Act to provide at least proper remedy and care to those women who in any case are undergoing abortion, by making it possible for them to get it done under proper medical supervision. Of course, the need of abortion should be genuine in every case.

The Act will enable women to take recourse to abortion on three specific grounds—humanitarian, health and eugenic. Under the humanitarian grounds, abortion could be resorted to in cases where pregnancies might have been caused by criminal sex acts such as rape. Obviously, for most people, children born out of such criminal acts could, if unwanted, cause grave mental injury to the mother. Also children born to these women grow up with a stigma.

Under other provisions of the Act, termination of pregnancy could be possible when it causes grave danger to the physical or mental health of the pregnant women. The pregnancy could be terminated also in cases where a substantial risk exists of the children being born with physical and mental abnormalities.

Opinions may differ on the question whether the provisions of the Act are liberal enough or is it necessary at all to introduce this measure. What is, however, of greater importance is making such laws which take into account the social realities. Some studies have indicated that annually 6.5 million abortions take place in our country. Of these, about 2.5 million are estimated to be natural abortions and nearly four million are of the induced variety. Though the Indian Penal Code provides a drastic penalty for any abortion, yet these millions of women risk their lives often at the hands of quacks, or inexperienced and unscrupulous operators.

A large number of beds in the maternity wards are occupied by women who have been the victims of such operations and whose abortions have gone wrong, leading to serious risk to their health and fertility and often their very lives.

As they do not find legal avenues of relief, these millions of women risk their very life and submit themselves to illegal abortions.

The studies also reveal that, by and large, the women who seek illegal abortions are married women and they are under no other necessity to control pregnancy except to keep the family small.

The Medical Termination of Pregnancy Act provides relief under specified conditions only for those who are forced to seek relief from a pregnancy which, if allowed to run to a full term, would constitute grave injuries to health. Abortions performed outside the confines of the exceptions covered in the provisions of the Act would still fall under the rules of the Indian Penal Code.

There have been protestations that the Act does not go far enough—to protect women against unwanted motherhood; that it does not take into account the right that is being increasingly recognized in other countries for abortion and that, therefore, the Act is much too restrictive and conservative.

.....DIGNITY OF MOTHERHOOD

Neither too restrictive nor too liberal, the Medical Termination of Pregnancy Act came into force in India on 1 April, 1972. Incidentally, this brings us among the 25 and odd nations in the world where different degrees of legislative permissiveness of abortion, as it is called in common parlance, are available.

The new enactment does no more than soften the harshness of those sections of Indian Penal Code which permitted abortion only to save the life of the mother. These sections, in practice, forced the needy women to get induced abortion from quacks in an illegal manner. While the new law saves them from undergoing needless hazards to their lives, it also saves the family and the poor husband from being fleeced by the unscrupulous practitioner, removing at the same time from their minds the taint of sin and the fear of crime.

How pressing the need was can be judged from the fact that one out of every seven pregnant women in India was forced to opt for induced abortion. The number of these unfortunate women was reckoned to be four million per year by the Shantilal Shah Committee which went into the various aspects of the problem.

The Bill was passed by Parliament after a great deal of public discussion. The provisions of the Bill which made abortion on medico-social grounds legal in India elicited a heart warming favourable response from the public as well as from the Press. A Joint Committee of the Parliament had thoroughly examined its provisions, heard a large number of witnesses and made essential modifications in the original draft.

This law, as most legislation is, has been born out of modern social needs and has to be viewed as part of the larger responsibility of the society and the State.

Happily in India, most women seeking induced abortion are married. By freeing them from the clutches of quacks as well as from the out-moded law, the new law will restore dignity of womanhood and motherhood.

—Centre Calling, March 1972

It has to be reiterated here that the legislative permissiveness in this regard varies from country to country. In many countries, abortion is permitted on request or under much more liberal conditions than those obtaining in the Indian Act. Ours is a measure—a step towards protecting the life and health of those women whose situation is such that they would risk their lives in criminal abortions. It does no more than permit the termination of pregnancy on certain specified grounds. Whether this is liberal enough or not is a relative question, relative to society, its tradition and its power. Secondly, just by a piece of legislation, a revolution cannot be brought about. Indeed, this has to be brought about through a change of attitudes towards sex, towards marriage and other related problems of people at large. All these areas are broadly covered by the family planning programme, and it is expected that with passage of time, relaxation of attitudes towards these matters would be speedier.

The liberalization of the terms for medical termination of pregnancy would, it is hoped, give to the women of India a new hope and help them move into the field of economic activity and production with greater confidence and undoubtedly with greater productivity.

It is true that our medical facilities and services need to be geared to take up this new responsibility. There exists a big gap between desire to do things and availability of resources and manpower. Efforts are being made to bridge this gap. Meanwhile, "armed" with the new law, the primary health centres and sub-centres could perform such operations more confidently, making the best use of available facilities.

The new measure is not a family planning device and this has been emphasized time and again. It may be argued that the liberal laws may enable a woman to take recourse to repeated abortions, because a provision exists in the Act that a woman can avail of abortion facilities if the contraceptives fail her. Our answer is that these women (and men, too), who are careful enough to realize the problems of having big families will not think of subjecting themselves to this procedure. A woman who does this kind of thing will be doing it at her own peril. □

MORE HOSPITAL BEDS NEEDED FOR CARE OF ABORTION PATIENTS

Out of the nearly four million women who undergo induced abortion every year in this country, about one-and-a-half million may come forward for abortion during the first year. This would necessitate an addition of at least 20,000 beds in our hospitals for the successful implementation of the Medical Termination of Pregnancy Act.

This view was expressed at a round-table conference on "Implementation of the Medical Termination of Pregnancy Act" held on 12 March, 1972 during the XVI All India Obstetric and Gynaecological Congress in New Delhi.

Professor Naval Kishore (Agra) acted as the moderator. The other speakers were : Professor B.N. Purandare (Bombay), Professor M.K. Krishna Menon (Madras), Professor K.N. Mitra (Calcutta), Professor R.V. Bhatt (Baroda), Dr Bhooshan Rao, Department of Family Planning (New Delhi), Professor S.N. Upadhayay (Patna) and Professor A.D. Engineer (Lucknow).

The panelists were, however, hopeful that the Government would provide the required institutional facilities.

In the initial stages at least, they said, abortion should be performed only in hospitals with the necessary equipment and trained personnel—such as in medical college hospitals, civil hospitals and the bigger private nursing homes. The measure should be introduced in peripheral hospitals and health centres only after the required facilities are established there.

It should be managed and administered along with other family planning methods, in the larger interest of maternal and child health care. The panelists believed that only a close association between the Department of Health and the Department of Family Planning would ensure successful implementation of the new Act.

—Medical Times, March 1972

EXTENDING MEDICAL SERVICES

C. SUBRAMANIAM

"We must eradicate malnutrition, we must control infectious diseases to the extent medical science will allow us to do so, we must improve experimental sanitation and water supply. We have to check the rate of growth of our population so that people can reap the benefits of economic growth with a corresponding improvement in their standards of living and welfare", said Shri C. Subramaniam, Union Minister for Planning, Science and Technology, at the 10th Convocation of the All India Institute of Medical Sciences held at New Delhi on 12 February, 1972 under the Presidentship of Shri Uma Shankar Dikshit, Union Minister for Health and Family Planning.

In the last two decades of planned development we have carried to the rural areas many basic facilities such as agricultural extension, provision of credit, electricity, water supply, roads, primary and secondary education and the like. However, the extension of health facilities to rural areas is a task in which success is still far away. In the preventive aspects of sanitation, immunization and family planning also, rural areas have been covered very thinly.

It is true that designing a national health system on the lines on which it has been attempted in some advanced countries is likely to be beyond the pale of financial and real resources we are likely to have for many years to come.

However, with better organization we can take a rapid stride in providing minimum health facilities to the rural population. The first element in such a strategy should be the emphasis on the prevention of disease which also includes the malady of improvident maternity. In our factories as with our human beings we seem to give more emphasis to new beginnings than to prophylaxis and maintenance. This should first be set right. Secondly, there is much greater scope for the use of para-medical personnel who can undertake initial morbidity surveys, maintain the basic framework of data for periodic check-up, family planning and the follow-up of treatment and attend to very minor illness. Thirdly, our *taluk*, block and district hospitals need to be properly equipped and fully staffed. We must also provide some mobility to the staff in these places so that they can move around within their jurisdictions fairly frequently. We must also provide transportation to more serious cases who can be referred to, and treated at, the block, *taluk* and district hospitals. Fourthly, our strategy should also include a place for those elements in our traditional systems of medicine which have stood the test of modern research and are capable of contributing inexpensive and easily accessible remedies for many ailments.

Problems of Nutrition

With the great expansion that has occurred in recent years in our country in agricultural production, the question of ensuring minimum intakes of nutrients to all sections of the population irrespective of their socio-economic status has become an imperative. There is, in addition, the continuing burden of vast numbers of malnourished people in the country who have to be rehabilitated through supplementary feeding of protective foods in order to pull them out of the dark shadow of malnutrition. Mothers and young children who constitute a substantial proportion of our population are highly vulnerable to the effects of malnutrition. The quality and intensity of effort needed to protect the nutritional health of this vulnerable segment of the population is colossal. The diets habitually consumed by these people provide less than the minimum requirements of nutrients necessary for maintaining health. Environmental infections and infestations accentuate the severity of malnutrition and enhance maternal and infant morbidity and mortality. Concern for maternal and child health is of paramount importance in our health plans and our concept should include nutrition, immunization and fertility control.

Much needs to be done in adapting maternal and child health programmes to the needs and resources of our community. Malnutrition, particularly protein-calorie malnutrition in milder or severe forms affect an estimated 50 to 70 per cent of pre-school age children and contributes substantially to child wastage and childhood diseases. A major problem facing our country is to devise methodologies that will ensure continuous protection of mothers and children even in the most remote corners of the country with special attention being given to the underprivileged segments of the society. Yet another obstacle to progress in this field is the lack of sufficient coordination and integration of effort between various agencies that are involved in medical and health care of the population and those that are involved in other activities of community development. Intensive studies and effective actions are needed to integrate the efforts of these numerous agencies operating in the community for the improvement of health and nutrition. Principles of modern management and systems analysis need to be applied for developing appropriate logistic approaches. Many mistakes have been made in the past by simply looking at isolated aspects of community development and adopting parallel and independent lines of action. It is most important that a total view is taken of community development and human welfare.

Problem of Population

High priority has been given in our plans to the family planning programme. Our knowledge of the fundamental processes involved in the regulation of human reproduction is still quite meagre. There is a global scarcity of knowledge in this field and it is only in the past few years that the seriousness of this problem has been realized and international action initiated. The new knowledge of molecular biology is only beginning to be applied to human medicine. The methods of fertility control that are presently at our disposal, however varied and numerous they might be, are a far cry from the desperate needs of the situation. Everywhere there is increasing attention is being paid to this problem. The bio-medical scientists in India have a distinct lead in this field and that given the necessary encouragement, significant advances can come from our laboratories. There are a number of Indian scientists trained in this field working abroad who could with benefit be induced to return to India for participating in the national effort on research in human reproduction. In an endeavour such as this there can be no sharp line of division between fundamental and applied research. Research in this field is of paramount importance.

As in the case of nutrition so in the field of family planning, it is of the utmost importance, that there should be close integration of efforts at the community level of medical care, family planning and nutritional improvement. The problem is once again one of developing appropriate models for delivering a multi-faceted and comprehensive programme of health service that would include in it not only treatment of the sick but also preventive and promotive aspects, nutritional care, maternal and child care and regulation of fertility.

Need for Self-Reliance

Self-sufficiency is needed not only in trained manpower but also in respect of essential drugs, equipment, reagents and chemicals needed for the practice of medicine and for bio-medical research. The National Committee on Science and Technology is taking steps to accelerate this process of self-sufficiency in all the important sectors that effect national productivity and national health. Medical science

ARTIFICIAL LIMBS FOR JAWANS

The All-India Institute of Medical Sciences (AIIMS) New Delhi was producing 100 artificial limbs every month for *Jawans* disabled in the war, said Shri Uma Shankar Dikshit, Union Minister for Health and Family Planning who is also the President of the Institute. He said that the Institute had also set up an artificial kidney and organ transplant unit and cytogenetics units for modern methods of diagnosis and treatment of genetic disorders.

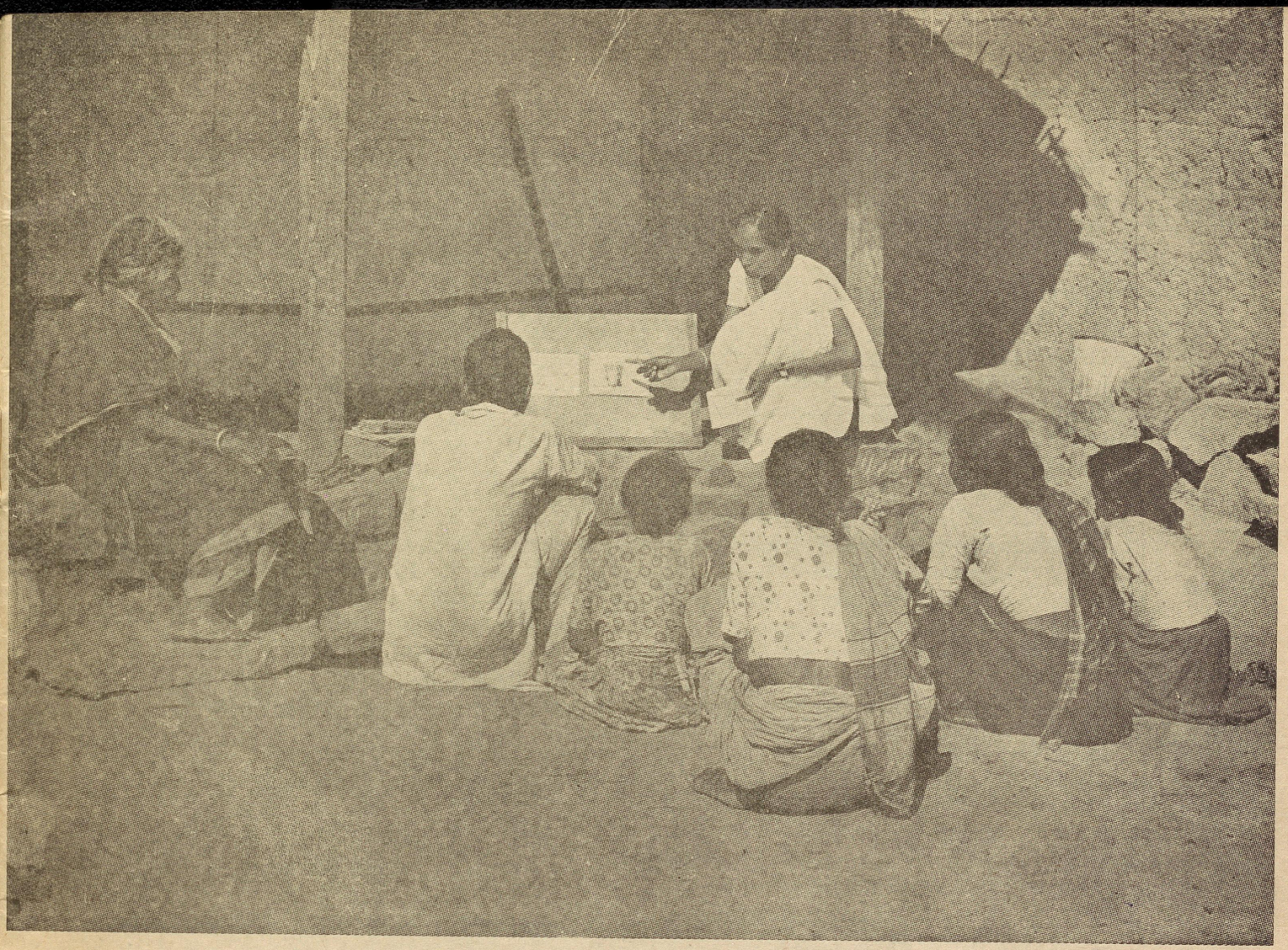
Dr V.Ramalingaswamy, Director, All-India Institute of Medical Sciences, said a centre for bio-medical research, only second of its kind in the world, was being set up at the Institute in collaboration with the World Health Organization. It would offer research and training facilities to the scientists.

The Institute, set up in 1956 to develop pattern of teaching in under-graduate and post-graduate medical education, and to demonstrate high standard to other medical colleges and institutions, has rendered useful service to the country both in the sphere of medical services and in providing specialized doctors. The Institute admits 50 students every year for the MBBS course on the basis of an all-India competition. It also offers 35 different courses leading to post-graduate degrees in various specializations. The AIIMS has since trained 701 post-graduates and 487 medical graduates.

To provide a comprehensive training to under-graduate students in respect of health problems of the community, the Institute has adopted an urban field practice area in Malviya Nagar in New Delhi. A similar rural health service project is also in operation at Ballabhgarh in Haryana.

A number of training courses are also being conducted to meet the shortage of para-medical personnel in the defence services. Sixty-seven students are currently undergoing a training in para-professional courses.

A 750-bed hospital is attached to the Institute. Apart from the general out-patient clinic, the hospital runs a number of specially clinics.



There is much greater scope for the use of para-medical personnel who can undertake initial morbidity surveys, maintain the basic framework of data for periodic check-up, family planning and follow-up of treatment and to attend to minor illnesses.

and medical research are increasingly dependent upon sophisticated technology whether it is in the synthesis of drugs or fabrication of diagnostic and therapeutic instruments or equipment and supplies required for bio-medical research. In all these spheres it is important that medical scientists work side by side with basic scientists in physics, chemistry and engineering and with industry.

Man-Power Utilization

The greatest problem facing us is to determine how best we can deploy our total resources of trained man-power and rapidly evolve technology so as to produce the best results for the largest number of people. Much can be accomplished by securing full application of what is already known. The organization and delivery of health care to the people is the most difficult problem confronting not only our country but also a great many countries of the world, whether developed or developing. A new approach is needed for bringing about a strong and integrated system of medical care based upon the primary health centre and district hospital complex. Institute's experiments on the optimal methods of comprehensive health care of rural communities in the Ballabhgarh area and studies on urban health care in Delhi are of interest in this connection. Results of studies of this nature, wherever found valuable, should be fed promptly into the health care delivery system obtaining in the country. To my mind this is the most important work in the health field that awaits solution in the 1970s. □

HEART is one of the most vital organs in the human body. Malfunction or stoppage of function of this one single organ leads to catastrophic results unmatched by disorder of any other organ.

The diseases of the heart begin right from the conception—this means defect preceding the birth of a child, also called "Congenital heart disease". Next is the adolescent and early young age disease spectrum which is dominated by rheumatic heart disease. This refers to malfunction of valves impeding its function as a "pump". Thirdly, there is a group of diseases with an obscure nature called "Cardiomyopathy". Here the "muscle" of the heart develops defect. Fourthly, there is a heart disease which develops secondary to lung diseases and lastly the coronary heart disease which includes the dreaded "heart attack" or cardiac infarction.

It is true that part of the rise in incidence is due to an increased "awareness" of the condition in the medical profession and the public, resulting in better reporting of the cases. This has resulted in a greater diagnostic frequency as many cases have been recognized to be suffering from this disease which used to be passed over as "dyspepsia", "wind trouble", "muscle inflammation", etc. But it is quite obvious that there has been a real increase in incidence also.

An important aspect to be noted is that more and more cases in the younger age group are being reported.

Some of the risk factors are common to all forms of heart diseases. The risk factors have a direct and indirect effect on the causation of coronary heart disease and also have importance regarding the main-

RISK FACTORS IN HEART DISEASE

DR R.K. CAROLI

Careful avoidance of risk factors and a periodical medical check-up help a person in preventing the occurrence or recurrence of heart disease.

Coronary heart disease is gradually assuming a greater role as a killer disease in our country. It is already taking a heavy toll of life in many developed countries and has also registered an increase in its incidence. According to United States Public Health Service, it appears that in a period of 20 years the incidence of the disease has increased by about 30 times. In India too, available evidence shows that the incidence of this disease has increased from about 13.5 per cent to 40.5 per cent out of the cardiac cases in about 20 years period.

tenance of good health and prevention of recurrence in patients who have suffered from heart disease.

Age Factor

The maximum incidence of coronary heart disease occurs in the age-group 40—50 years. Next in order of incidence is the age-group 50—60 years. This means that persons in this age group are more susceptible to "heart attack".

In women the peak age incidence is about 10 years later than in men. It appears that the female

sex harmones play some protective role in the prevention of thickening and narrowing of the arteries taking blood supply to the heart.

It has been mentioned earlier that now-a-days cases are also often seen in the age-group of 20—40 years. Even the younger age group is not exempt from the coronary heart disease.

Sex

Men are more susceptible to the disease especially in the younger age group. The ratio of male to female cases has been found to be varying from 6 : 1 to 8 : 1.

Heredity

Paul D. White of the U.S.A. has reported that out of 100 young patients of coronary heart disease 37 per cent had a history of their fathers dying of coronary thrombosis. We found positive family history in 27.8 per cent of our cases. It is obvious that if there is a person whose parents or near blood relations had coronary heart disease, he has to be very careful about himself.

Body Build

The obese and the muscular-stocky type of persons show a tendency to coronary heart disease. In some reports the role of body build has not been found much but in our observations one thing was clear that out of the patients of "heart attack" the lean and thin showed a tendency to quicker and better recovery and a lower incidence of recurrence. Thus in any case, it appears advantageous to avoid being overweight—whether the weight is due to fat or a heavier muscle structure.

Diet

In addition to its indirect role in obesity due to overeating, the qualitative aspect of diet plays a direct role. Diets which are rich ,in saturated fats like *ghee*, butter and hydrogenated oils tend to raise the blood cholesterol and upset the delicate balance of some other chemicals in the blood. This results in narrowing down of arteries of the heart and also helps in clotting of the blood in them resulting in "heart attack". Moderation in fats and a general avoidance of excessive intake of calories is advised.

DO YOU KNOW THAT YOUR HEART....

.... is the toughest, strongest muscle in your entire body ?

.... is more efficient than any man-made machine ?

.... has its own complete maintenance and repair system ?

.... has a reservoir of power specifically intended for strenuous exertion ?

.... pumps every drop of your blood to body tissues and back once every minute ?

.... produces enough energy in its lifetime and is as strong as an automobile engine that could run constantly for 70 years without overhauling ?

Physical Activity

The incidence of this disease is found to be higher in people with sedentary occupations and less in people who undergo more physical activities. This factor appears to play a part in the recent increase in the disease in our country. There is a big increase in people in sedentary jobs, and the modern modes of transport have eliminated walking to a great extent.

Smoking

This has long remained a controversial matter as to what extent smoking predisposes to heart attacks. Recent reports however, from abroad and our own observations indicate that there does exist a correlation between smoking habit and heart disease. It is often seen that smoking increases the severity of angina pectoris—a condition which usually precedes heart attack. The only point worth considering at this stage is the alleviation of mental stress by smoking. Some smokers become very tense when they give up smoking. In such cases allowance of upto 5 cigarettes a day may not be too much.

Mental Stress

Prolonged mental stress borne out of frustration, anxiety, insecurity or any other stressful situation has a strong role to play in precipitating an acute heart attack or causing its recurrence. This factor,

in addition to having a direct effect on coronary arteries also tends to alter the composition of certain substances in the blood and thus predisposes to thrombosis. Interviews with our educated patients revealed that a large percentage of them had faced a severe stressful situation in the period immediately preceding the attack. Many patients were of an ambitious nature and had always aimed high and tended to struggle for it even against heavy odds.

Environmental Temperature

Exposure to extremes of climate especially to severe cold tend to increase chances of getting an attack or a recurrence in patients who have recovered from it.

High Altitude

An altitude above 6000 feet has been found to predispose to coronary heart disease or to its recurrence.

Diabetes and High Blood Pressure

Persons suffering from these two diseases singly or together are definitely prone to coronary heart disease. In diabetes, the arteries supplying blood to the heart get narrowed as a part of general arterial narrowing while in high blood pressure there is an increased pumping load on the heart.

Excess in Physical Exertion

Though the sedentary people have a greater tendency to get coronary heart disease, excessive physical exertion has been known to often precipitate an acute attack or to cause recurrence of a fresh attack in a recovered patient. Many cases state that they got the attack after a severe exertion, for example, climbing uphill or pushing a car or lifting some heavy weight. This predisposition is more after a heavy meal. Hence, we make it a point to advice our patients to rest after meals for about an hour and also to avoid a heavy meal.

Regular physical activity is considered an important factor in reducing the risk of heart attack. Coronary heart disease is much less common in the physically active. Apart from reducing the long-range risk of heart attack, regular exercises bring immediate benefit by improving blood circulation in the body.

Some other conditions like gout and gall bladder disease also tend to predispose to coronary heart disease.

While there is no way of completely preventing the occurrence or recurrence of a heart attack, yet a knowledge of the risk factors mentioned above can play a great role as a help in the prevention of this disease. Same factors can be responsible for deterioration in health of patients with other types of heart disease. It will not be out of place to add that with a careful avoidance of the factors mentioned above and a periodic medical check-up and advice a patient of heart disease can lead a useful and productive life and can expect a fairly good span of active life. □

HEART DISEASE IS AN EPIDEMIC

"The arterial disease which causes heart attack and many strokes is the epidemic of our time. It is the single biggest killer in this country (U.S.A.). How many of us realize that it kills ten times more Americans than does the automobile ?

"The sum of just one year's deaths from all of the heart and blood vessel diseases—including coronary artery disease, hypertensive heart disease, rheumatic heart disease and inborn heart defects—exceed a million. This is much greater than the total number of Americans killed in all America's wars from 1776 to the present day. And these heart and blood vessel diseases cripple more Americans each year than any other disease.

"Like all epidemics, this arterial disease afflicts every kind of people. No one is immune, regardless of race, sex, position or economic status, or whether he is an executive, a worker, a housewife, an athlete or a spectator. All are vulnerable."

—Dr Paul Dudley White

Recent investigations may shed some light on the relationship of cardiovascular diseases to technological advancement. One field of investigation concerns the so-called "trace elements", that is to say, minerals present in very small quantities in the body tissues.

MINERALS IN THE BODY AND YOUR HEART

DR R. MASIRONI

CARDIOVASCULAR diseases, rare at the turn of the century, are now the leading cause of death in the highly industrialized countries, where they account for roughly 50 per cent of all deaths. Death rate from coronary heart disease (CHD), in particular, has been steadily increasing over the past few decades. However, in population groups relatively unexposed to industrial civilization, this disease is practically non-existent. The developing countries occupy an intermediate position, but cardiovascular mortality rates are increasing there too.

Attempts to explain these geographical differences and alarming trends on the basis of dietary habits, blood fat levels, diminishing physical activity, genetic factors, smoking, psycho-social stress and other causes have not yet yielded consistent results. While the cause and pathogenesis of CHD are still not completely known, we know that a number of predisposing factors play a role.

Death rates from CHD are correlated with indices of living standards and technological development, in other words the "better" the living the more deaths there are from heart disease.

Recent investigations may shed some light on the relationship of cardiovascular diseases to technological advancement. One field of investigation concerns the so-called "trace elements", that is to say, minerals present in very small quantities in the body tissues. If any of these minerals exert an action on the heart and blood circulation, as they do on many other functions of the body, then it would be logical to expect that any disruption of their natural balance by industrial or other artificial manipulations of the environment would also have adverse effects.

What is a trace element ? In the earth crust, ocean, air, *i.e.*, in all our geochemical environment there are more than 90 elements. Only 11 of these occur in the human body in substantial amounts—oxygen, carbon, hydrogen, nitrogen, calcium, phosphorus, potassium, sulphur, sodium, chlorine, magnesium—and are, therefore, called "bulk" or "major" elements. Their biological actions are known. Many others occur only in very minute amounts (less than 0.1 per cent of body weight) and are, therefore, called "trace" elements. Seven or eight of these—cobalt copper, iodine, iron, manganese, molybdenum, zinc and, possibly, selenium—are essential to human life since they are involved with growth, respiration, thyroid function and other physiological functions. For other elements, the biological usefulness is not yet known, and several may be considered merely as contaminants. It is possible that some of the trace

elements indeed play important roles also in the function of heart and the circulation of the blood. Some of them might, for example, control the contractility of the heart cells, be essential for the elasticity of the vessel walls, blood pressure regulatory centres, metabolism of fats and sugars, etc. On the other hand, it is also possible that the contaminants may act as poisons, *i.e.*, they may interfere with the beneficial elements or may alter the proper functioning of organs.

Adjustment to Environment

Man, after many thousands of years, has become adjusted to natural environment and universal balance. This relationship to the environment starts from the rocks, which are the primary source of minerals. The minerals enter from the rock into the soil, the water, into plants, animals and man. The natural balance of a few decades ago has now perhaps somewhere been disrupted by man himself. In the technologically advanced, coronary-prone countries, man-made alterations of the environment through industrial pollution of soil, water and air, through various agricultural practices, such as irrigation and use of fertilizers, through the use of food additives and food processing, through water treatment, such as softening and distribution of water in metal or plastic pipes for domestic use—may have brought about changes in the natural mineral balance and, consequently, subtle, detrimental effects on cardiovascular function. These are only hypotheses, but there is some evidence that this may well be true.

The whole story started in 1957 when a Japanese investigator observed that areas in Japan where the river water was more acid were more subject to apoplexy than the areas where the water was less acid.

Following this observation, studies in the United States showed that the states that were served by soft water (low in calcium and magnesium salts) had higher mortality rates from cardiovascular diseases than the states served by hard water. Other studies showed the same relationship in the United Kingdom, Finland, Canada, Sweden, and, to a lesser extent, in the Netherlands and Ireland. Areas where the water—not only the tap water at home, but also in the wells, reservoirs, and the rivers—was softer, always had a higher incidence and mortality from one or another type of cardiovascular disease. Other diseases and other causes of death did not show such a relationship.

If this relationship were observed only in one country, it might have been only a casual statistical association, not related as cause and effect. However, since it was found in several countries, it is more than a matter of chance. Something in the water, or associated with it, must influence the cardiovascular function.

Another preliminary report adds further evidence to this hypothesis: several areas in England and Wales were studied because the quality of their water supplies had been changed several years ago, *i.e.*, in some towns the water had been softened, while in some others it had been hardened. The towns where water was softened experienced an unfavourable trend in cardiovascular disease death rate, while towns where water had become harder experienced a favourable trend.

The reasons for this apparently beneficial effect of hard water or, conversely, harmful effect of soft water, is not yet known. However, the issue is obviously important, in fact it is so emotionally charged that public health officials in some countries have considered the possibility of halting water softening procedures while waiting for further proof of possible harmful effects of soft water.

Excessive hard water brings about undesirable effects such as scaling of pipes, boilers and radiators. More soap is required for laundering with hard water than with soft water. For these practical reasons, very hard water is softened to make it more suitable for industrial and domestic use. Mainly because of the cost, water softening is practised almost exclusively in the highly industrialized countries. Softening procedures remove most of the calcium and magnesium salts and, most likely, other minerals as well. It is not known, however, whether a life-long use of soft water for drinking may entail any harmful health effects. Excessively soft water is corrosive. It may remove harmful elements, such as cadmium and lead from the pipes. These elements then become part of the drinking water supply.

Some investigators have suggested that cadmium may cause hypertension, and indeed it was reported that the cadmium concentration in kidneys from various population groups suggests a rough parallel with geographic differences in hypertension. Some countries evidence a growing concern about increasing pollution by cadmium as a result of industrial activities.

An alternative explanation is that soft water may not contain the apparently beneficial minerals present in hard water.

Before getting too emotional about this "water factor", a word of caution is essential. The amount of water that we drink as such, at least under usual urban conditions in many affluent societies, is rather limited. Most of our fluid balance is covered by various other drinks such as milk, wine, beer, mineral waters, soft drinks, fruit juices, coffee and tea, and also by the water contained in vegetables, fruits and other foods. Much water is used for cooking, and minerals may thus be either deposited on, or extracted from, the food being cooked. In all these drinks and foods, the amount of minerals is very different from that in the tap or well water, and they are really more important sources of minerals than the water we drink.

Therefore, there should be no apparent reason why drinking water should play a major role in cardiovascular functions, *i.e.* beneficial if hard and harmful if soft. Yet the investigations mentioned above suggest the existence of such a trend.

Moreover, the relationship of water softness to cardiovascular death rates has been found not only for the drinking water, but also for the raw river water not normally drunk. This indicates that a broader factor not only linked to water but also to the general environment, *i.e.*, the rocks and soils through which water passes, may come into play.

Geological Factors

This brings us to another problem : the influence of the geological factors. The primary source of all minerals is rock. The mineral composition of the rocks will influence, through complex relationships, the chemical composition of the water and of the top soil layer and, eventually that of the plants growing on these soils and of the animals feeding on these plants. A mineral deficiency or abundance in the geological environment could, possibly, bring about a deficiency or an abnormal uptake of certain minerals by man. This is still a tentative hypothesis, but some evidence of an ill-effect of certain geochemical environments on human health is already available. The incidence of several diseases has been reported to be associated with occurrence of certain rock types which are deficient in one or another element. The relationship of dental caries to the presence of certain rock or soil types has been studied intensively. Preliminary observations in the USA suggest that death rates from cardiovascular diseases are higher in areas where the soils are generally poor in trace elements, while they are lower in areas underlain by certain rocks which, through weathering, continuously contribute a good supply of trace elements to the soil. Other preliminary observations indicate that several countries with high cardiovascular death rates are often underlain by rocks of older geologic age, and indeed older rocks tend to produce soft water because they consist largely of relatively in soluble minerals and the soil which covers them may contain few minerals.

Thus, it seems, that both under the viewpoint of rock and soil type and of water quality, a certain relationship exists between higher cardiovascular death rates and deficiency in trace elements.

Another piece of circumstantial evidence that deficiency of certain elements may be associated with higher cardiovascular death rates concerns chromium in the food and in tissues. Chromium seems to play a beneficial role in fat metabolism and against atherosclerosis. North American populations, which are highly prone to atherosclerosis and coronary diseases, reportedly lose chromium from their tissues with age. Eventually the chromium may be virtually depleted. People from parts of Africa and Asia, areas where incidence of these cardiovascular diseases is far lower, have high tissue chromium concentration throughout life. The typical North American diet lacks chromium. Food such as refined sugar and flour, consumed in the affluent, coronary-prone countries, may lack chromium. The non-refined food and raw sugar, such as consumed in the less prosperous, but also less coronary-prone countries, usually contain a good amount of this element. Thus,

(*Contd. on page 148*)

Heart Disease In the Indian Systems of Medicine

Dr Rustom J. Vakil

The methods of examination, employed by the ancients in the elicitation of physical abnormalities and signs are comparable to those employed in the modern medical schools.

As Rawlinson so rightly maintains "India suffers today in the estimation of the world, more through the world's ignorance of her achievements than in the absence or insignificance of these achievements....." Not only were the Indians the first to practise scientific healing, being well advanced in their art by the third millennium B.C., but they managed to keep "pace with the most enlightened nations of the world", attaining "as thorough a proficiency in medicine and surgery as any people whose requirements are recorded".

The origin of the art of healing, like most other matters chronological in India, is steeped in obscurity. The term Ayurveda, applied to the science of healing or of medicine in ancient India, is derived from the two words *ayuh* and *veda*, meaning "life" and "knowledge", respectively.

According to legend, Ayurveda was originally made up of 1,000 chapters and 100,000 *slokas* but in view of the short life-span and limited mental capacity of the human being was later trimmed down to mere eight chapters.

The science of healing represents the collective efforts and experiences extending over thousands of years, of a vast number of workers and observers. Of these, only a few are destined to play vital or pivoted roles in the growth of their science. The greatness of ancient Indian medicine stems from the monumental treatises of but a handful of such individuals. The names of Atreya, Charaka and Susruta stand out among the many who have ventured to probe the secrets of the Universe by trying to understand the problems of health and disease

Chronologically, several main periods or epochs of ancient Indian medicine are recognizable, *viz.*, (1) the earliest or *pre-historic phase* (up to 2500 B.C. including the paleolithic and neolithic ages), (2) the *pre-vedic phase* or the period of the Indus valley civilization or Harappa culture (from about 2500 B.C. to 1500 B.C.), (3) the *vedic period* (1500 to 800 B.C.),(5) the *creative period*, the period of "rational medicine" or the Buddhistic period (600 B.C. to 200 A.D.), and (6) the period of decadence or the post-Buddhistic period (after 200 A.D.).

The creative period (600 B.C. to 200 A.D.) of Indian medicine is the period of medical schools and scientific teaching in India. During these glorious years of medical history, one witnesses the publication of various monographs and text-books of medicine and surgery, the establishment and growth of famous teaching centres in Taxila and Benares, and a shift of emphasis in medical thinking from the supernatural and magical to the scientific and rational. During this period medical literature began with the so called *tantras* (or texts) and the *kalpas* (or monographs on special subjects). The greatness of Indian medicine depends mainly on the monumental *samhitas* of Susruta and Charaka, two of the greatest and most systematic teachers of surgery and medicine (*Kayachikitsa*) of ancient times.

The science of medicine owes much to the brilliant philosopher-physician Charaka, a court-physician, who, besides revising and rearranging the monumental medical treatise of *Agnivesa* added considerable information to his own regarding a variety of subjects, including clinical descriptions of various

diseases, their causes, diagnosis, prognosis and treatment, and discussed the importance of diet, cleanliness, fumigation, hospital-planning and bowel washes. A man of high intellect and well-versed in philosophy and astronomy, besides being the greatest physician of the day, Charaka wrote extensively on subjects of medical interest. His treatise or *samhita* is not only regarded as one of the most authoritative texts on ancient medical subjects, but has been translated into a number of languages, including English, Arabic and Chinese. Charaka classified the Science of Healing (*Astanga-Ayurveda*) into eight sections. He was able to provide lucid descriptions of over twenty five varieties of fevers, several types of abdominal swellings, jaundice, urinary infections, intestinal worms, diseases of the ears, eyes, nose, mouth and throat, of mental diseases, diabetes, leprosy, pulmonary tuberculosis, heart disease, dropsy, smallpox and a number of other ailments. Certain symptoms, such as headache, giddiness, cough, loss of appetite and hoarseness of voice were regarded by him as indicative of a bad outlook of prognosis.

There are several references in ancient Indian medical literature to the heart (or *dhara*) and to certain channels or ducts (described as *siras*, *dhamanis* and *snavas*), probably synonymous with our present day arteries, veins and nerves. In the Atharvaveda and in Upanishad literature, the human heart is picturesquely compared to a "lotus flower" or "house" and variously described as having "nine gates", "ten holes" or "one hundred and one" vessels. The "lotus-like" *dhara* or heart is said to "expand in many directions" in the Subhala Upanishad.

Whilst Charaka sheds little or no further light on the subject of the heart, he does allude to large numbers of ducts or canals (200 *dhamanis* and 700 *siras*), within the human body. Susruta was the father of Indian Surgery. His knowledge of the cardiovascular system, although of a much higher order, is seemingly inaccurate from the standpoint of modern anatomy. To him, the heart which is shaped like a "lotus-bud" with its point directed downwards gives rise to the *rasa* which flows along 24 large channels (*dhamanis*) to various parts of the body. Of these, 10 proceed upwards, 10 downwards and four sideways. Other channels or ducts, referred to by him in his anatomical writings, are the *siras* (of which there are 700) and the *srotas* (22 or such). Despite considerable exchange of views, there is no unanimity of opinion today as to what the ancients meant precisely by the terms *dhamanis*, *siras* and *srotas*. The terms *dhamanis* and *siras*, as used by the ancients, refer to large or thick-walled and small or thin-walled vessels respectively (probably the arteries and veins of today).

In the Charaka-samhita, an entire section, referred to as the *Vamana Sthana*, deals more or less exclusively with the problems of diagnosis. Its exhaustive and intricate consideration of diagnostic problems, rivals for clarity and attention to detail, any ancient treatise on diagnosis written in any part of the world (including Greece). According to this great physician-philosopher of ancient India, who regards correct diagnosis as an essential preliminary to successul treatment, a "physician of knowledge who fails to enter the inner body of the patient with the lamp of knowledge and understanding, can never treat diseases". The methods of examination, employed by the ancients in the elicitation of physical abnormalities and signs, are comparable to those employed today in modern medical schools. Diagnosis depended upon a proper examination of the patient and included our present-day methods of inspection-palpation and direct auscultation.

Those who look with contempt at the past should recall the words of Prof. Adams that our ancestors "have more cause to look down with contempt upon us, their posterity" than we "their posterity, to look back with scorn upon them because we have now made some little advances beyond their limits". Considering that our distant ancestors, having no previous studies or instruments of diagnosis to help them, had to depend entirely on their own powers of observation, intuition and experimentation in their quest for scientific and medical knowledge, one cannot but marvel at their pioneer efforts in various directions. It is individuals of the stature of Susruta and Charaka, "giants amongst dwarfs", who have not only kept the torch of knowledge burning bright through years of ignorance and inactivity but have tried to release scientific medicine from the stifling bonds of bigotry, magic and superstition. (*Excerpts from a paper by Dr Rustom J. Vakil.*)

AFTER A HEART ATTACK

SOME QUESTIONS AND REASSURING ANSWERS

THERE can be no doubt that a person who has survived a heart attack must have had a frightening experience. Even when he is being treated and getting better he may be beset with fear and anxiety despite assurances by his physician that he will be all right. This is nothing unusual since it is the most common corollary to coronary thrombosis.

As the patient begins to understand his illness and the process of healing the optimistic feeling that everything will be all right must gain ascendency over pessimism. When he begins to increase his activities under medical advice without discomfort and hears and knows that a great number of people have returned to their former jobs after heart attack, he should be feeling confident about his ability to return soon to his usual way of life and enjoyment. For this to happen speedily lurking fears and anxieties should be brought out into the open so that they may be removed.

The physician treating the patient is the best person to answer all questions. However, questions may often occur to the patient when the doctor is not there. Or else questions may be forgotten when the physician is present and there may be questions for which the patient and his family may be hesitant to seek answers.

Some of the questions that often trouble patients and answers to them are given below :

Q. I was not doing anything unusual —Why should I have had a heart attack then ?

A. It is not at all unusual for heart attacks to occur during rest or inactivity. Although it happens suddenly and without any warning, a heart attack is the outcome of a slow process extending over several years of the disease called atherosclerosis in the coronary arteries which supply blood to the heart muscle.

In consequence of the development of atherosclerosis, the coronary arteries which are small channels for the passage of blood become rough instead of being smooth as well as narrow by deposit of fatty cholesterol and other substances. When a blood clot forms in the narrowed artery there will be blockage of blood flow to the heart muscle served by this artery. That is what a heart attack is. Doctors call it 'coronary thrombosis' or 'coronary occlusion'. The injury produced in the heart muscle on account of the decreased blood supply is called 'Myocardial infarction'.

Q. Why did I not have any warnings ?

A. A feature of atherosclerosis is that it can go on for many years without the appearance of any symptoms. This is due largely to the fact of the built-in repair system in the heart in consequence of which the small blood vessels near to the blocked coronary arteries become wider to carry blood. Small new channels of blood supply may also form. This development is called 'collateral circulation'. This is the reason why many persons who have atherosclerosis do not get heart attack. Once a heart attack occurs, an increase in collateral circulation helps the heart to mend itself.

Q. How was my heart injured ? How will this affect the way my heart works ?

A. When there is a heart attack there is acute injury to a part of the heart muscle on account of the cutting off of oxygen-carrying blood. As the heart is a very tough organ it goes on working despite the injury. For a while the heart is weak and therefore cannot pump the full quantity of blood. To enable the heart to mend itself complete rest is prescribed by the doctor for a few weeks after a heart attack. This may be compared to the placing of a broken limb in a cast and keeping it there till the bone unites firmly.

As the affected part heals, a tough scar forms and collateral circulation develops to nourish the tissue around the scar. This takes some time even after the patient begins to feel quite well. How long will depend on the extent of the injury to the heart and the individual rate of healing. However, the healing is generally complete from four to six weeks.

Q. What are the chances of leading a normal life again ?

A. After the period of convalescence is over most patients are able to go back to the life when they left off with very slight and none too difficult modifications. When the injury to the heart has completely healed, the scar is not large enough to interfere with its pumping operation. It should be reassuring to know that most patients survive their first attack and most recover fully to enjoy many years of productive activity.

Q. Will I be able to go back to my old job, or will it be too hard for me ?

A. This is a question which only the physician can answer, if necessary, after consulting the medical officer incharge of the place of employment. The decision will naturally be based on the extent of damage to the heart and upon the demands of the job.

Q. Suppose the doctor decides I can't do the work I did before—what then ?

A. It is only after doing work evaluation of the patient after recovery from heart attack and taking into consideration the demands of the job that the doctor will make the decision. If in the initial stage it is not possible to return to the old job the patient can be rehabilitated through a series of graded exercises to do more and more work. If it is not at all possible to return to the old job the physician will suggest the kind of job to which he can put his hand to, taking into consideration his capacity for work.

Q. Even if I go back to work will I need to rest most of the time when I am not working ?

A. Reasonable rest is necessary, of course. However, recreations, exercise and social life are as good for a person who has had a heart attack as for everybody else. In most cases doctors advise even more regular exercise than a patient may have been doing before his heart attack.

A restful sleep at night and sometimes a nap or rest during the day is beneficial too. The physician will make recommendations to fit the individual and the patient himself will learn to rest before he becomes too tired. Most patients find they have enough energy for both work and leisure time activities.

Q. What kind of exercise can I take ?

A. The majority of the patients who recover from heart attack are able to go for walks, play golf, fish, swim and engage in similar activities without trouble. Doctors believe that exercise is beneficial provided it does not produce pain, shortness of breath, or other symptoms.

Q. I have lost some weight since I have been ill. The doctor says that it is good. Does that mean I have to stay on a reducing diet ?

A. Doctors are agreed that it is important for persons who have heart disease to keep their weight at, or a little below, normal. You may have to eat less than formerly in order to keep your weight where it should be. It is, however, important that the diet

should be well-balanced with good amount of protein, vitamins and minerals and enough energy food to fit the activities. Heavy eaters should learn to cultivate new eating habits to keep their weight down and still get the food they need. Heavy meals make heavy demands on the heart. Several heart patients find it better to have several light meals a day instead of the usual three meals about equal in amount in order to avoid eating big meals.

Q. Should I stop smoking ?

A. Cigarette smoking is a health hazard for every person and more so to heart patients.

Q. What is a fat controlled diet ? Why is it recommended for some heart patients ?

A. Fat-controlled diet is one which regulates the amount and type of fat you eat. If the doctor prescribes such a diet for you, the food you will eat daily will contain less fat; and of the fat more will come from vegetable oils (polyunsaturated fats) and less from meat and dairy products (saturated fats).

The purpose of fat-controlled diet is to reduce the amount of cholesterol and other fatty substances in the blood. A reduced level of cholesterol tends to retard the progress of atherosclerosis. The doctor may find it desirable to check from time to time the level of cholesterol in the blood to see whether the fat-controlled diet is producing the desired effect and if other investigations need to be made, or drugs prescribed.

Q. What about alcohol and coffee ?

A. Since alcohol has a tendency to produce relaxation, moderate quantities of it are sometimes permitted by doctors to some patients. It must be remembered that not all heart patients can tolerate alcohol beverages and alcohol adds to the calories. Patients who are used to drinking large quantities of coffee would do well to restrict coffee consumption to one or two cups a day.

Q. Is sexual activity likely to be harmful for a person who has had a heart attack ?

A. The pattern of marital relations that existed before a heart attack is usually possible after convalescence. This question frequently worries patients and it would be wise to discuss it with their doctors.

Q. I have heard about medicines that keep blood from clotting. Why did not my doctor give me some ?

A. No two heart attacks are alike. Each is different from the other. In some cases anti-coagulants may be beneficial. In others this treatment may not be necessary and in some can be definitely harmful. It is the physician who has to decide whether to prescribe anti-coagulants or not.

Q. It is said that if you have had one attack, you are bound to have another. Is this true ?

A. Not necessarily. No one can be sure whether a person will or will not have a second heart attack. However, by sticking to the physician's recommendations about weight, diet, work, medicine, exercise and rest, heart patients have a better chance of living comfortably without further attacks. More and more knowledge is being acquired through research and the outlook for patients who have had heart attack is much better now than it was a few years ago.

—Courtesy : Ail India Heart Foundation

Heart Transplantation

THE Council for International Organizations of Medical Sciences (CIOMS), a federation of non-governmental organizations dedicated to the progress of the medical sciences, was established in 1949 under the joint auspices of WHO and UNESCO, and during the past 20 years has received the continuous support of WHO. A feature of its activities is the convening of Round Table Conferences on important issues in modern medicine. One such conference, on heart transplantation, was held in June 1968, and a report of the proceedings has been released. The Conference was organized with the assistance of UNESCO and WHO.

The conference reviewed the situation with regard to heart transplantation, the immunological, clinical, and ethical problems involved, the choice of the donor, and the definition of death. At the end of the Conference a statement summarizing the views of the participants was adopted.

STATEMENT

At the present time heart transplantation is a palliative operation, of an exceptional character, the results of which are still uncertain.

Such an operation can only be envisaged in hospitals having at their disposal specialists directly concerned with cardiological, immunological and neurological problems and heart surgeons working in close co-operation.

At present, heart transplantation can only be considered in the case of patients with heart disease rapidly progressing towards a fatal outcome and for whom medical or other surgical treatment offers no possibility of improvement.

The choice of the donor should be guided by the following three considerations :

1. Excellent condition of the donor's heart at the time of the transplantation.
2. Immunological studies of compatibility between donor and recipient.
3. Complete and irreversible cessation of cerebral function.

The criteria for cessation of cerebral function are as follows:

(*a*) Loss of all response to the environment.
(*b*) Complete abolition of reflexes and loss of muscle tone.
(*c*) Cessation of spontaneous respiration.
(*d*) Abrupt fall in arterial blood pressure once it is not artificially maintained.
(*e*) An absolutely linear electro-encephalographic tracing (even with stimulation of the brain) recorded under well-defined technical conditions.

These criteria are not valid for young children or for subjects in hypothermic states or with acute toxic conditions.

At the present stage of development of heart transplantation, two independent teams should take part. One should be responsible for deciding whether all medical or other treatment has become useless because cerebral function has totally and irreversibly ceased, the other should be responsible for all aspects of the transplantation itself.

There is evidence that a favourable histocompatibility matching improves the prognosis of kidney grafts. No data are yet available as regards heart transplantation, but a *priori* there is no reason to believe that the situation will not be the same, whatever organ is grafted.

For future transplants it is strongly recommended that the tissue groups of prospective recipients be determined beforehand and that the most favourable donor-recipient combination be selected from as large a pool of potential recipients as possible. Central computer facilities in the United States of America and Europe have already shown their value for the selection of the most suitable recipient for a given donor organ in rental transplantation and similar facilities should be establised for cardiac transplants. It appears likely that, in this way, it would be easier to achieve adequate immuno-suppression at less risk to the patient with a view to improving the long-term prognosis.

The group laid stress on the importance of experimental investigations on higher mammals for the improvement and extension of our knowledge of graft rejection processes and of means of preventing the phenomenon.

Since human heart transplantation is not yet an established procedure, data should be sought on each transplantation with a view to evaluating the significance of histocompatibility matching for the prognosis of heart transplants. Teams performing transplantations are urged to conserve at least the splean, and if possible, other organs for future studies of tissue antigens. The organs should be obtained from the donor at the time of the operation and from the recipient after his death. An international registry of such material should be establised.

The following statement by the National Academy of Sciences of the United States of America is endorsed:

"The surgical team should have had extensive laboratory experience in cardiac transplantation, and should have demonstrated not only technical competence but a thorough understanding of the biological processes that threaten functional survival of the transplant, *i.e.* rejection and its control. Investigators skilled in immunology, including tissue typing and the management of immuno-suppressive procedures, should be readily available as collaborators in the transplantation effort."

—*WHO Chronicle*, March 1970

Minerals in the Body and Your Heart—(*Contd. from page 141*)

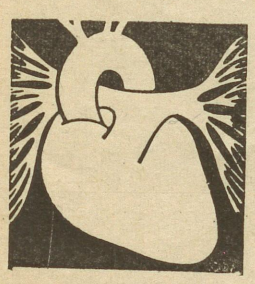
indirectly, there is some evidence that lack of chromium may be harmful to cardiovascular health.

All these bits and pieces of evidence point to a relationship between geochemical environment (be it rocks, soil or water) and cardiovascular diseases through trace element imbalance, such as brought about either by natural causes, or by industrial activities or by dietary habits. These are all important problems. They deserve deeper investigations on a multi-disciplinary, international scale, and WHO is already carrying out work in this direction.

Rewarding results may be obtained from the study of so-called "primitive" population groups, who still live in close contact with their natural environment. These groups are free from industrial pollution and the other by-products of our technological civilization, eat food grown locally, and drink water as they find it in nature. Research here is rather urgent for, as technology spreads and the world becomes more and more urbanized, the relationship of these "primitive" groups to their natural environment will shortly change. Indeed it is already changing as these groups become exposed to "western" civilization.

Better knowledge on how environmental factors affect human health will certainly increase understanding of the natural history of cardiovascular diseases. It will also tell us why incidence of these diseases differs from country to country, from civilization to civilization, and why it is increasing. It might lead to possible intervention by health authorities through beneficial alterations of the trace element environment and of dietary habits. Examples of intervention of this type are fluoridation of water, addition of iodine to table salt and addition of vitamins to certain foods. Obviously, it is still premature to advocate or even envisage such actions in the field of cardiovascular diseases, but the possibility of action in this sense in the future cannot be ruled out.

—*Courtesy : WHO*



HEART CREATED BY HUMAN INTELLIGENCE

It looks like a real heart—both in shape and in size. Two auricles of the heart, two pumping chambers which replace the right and left ventricles, two artificial vessels—they are connected with the aorta and the pulmonary artery. The heart weighs about 200 grams and fits readily into the natural pericardium inside the thorax. The heart has already been tested experimentally on animals and now it is ready for the first attempt at using it in the clinic. The artificial heart operates according to the same laws that underlie the operation of a natural one. Already now it can replace for several days the heart of an animal that has just died and recover it to life.

We have worked on the creation of an artificial heart capable of supporting the vital activity of the human organism for many long years. In this sphere we have scored certain successes, but there also are outstanding problems which specialists in the various spheres of knowledge are deeply deliberating on.

The heart of a healthy person performs about 40 million cycles a year. It is but natural that for creating an artificial heart capable of functioning in the organism for decades we must have, first and foremost, high-strength materials capable of coping with such stresses without changing their initial properties. Despite the great successes of modern chemistry, there are no such materials yet.

Complex Problem of Materials

There is another problem connected with materials. It is a no less complex one. The point is that when the blood flow contacts any of the now known synthetic materials, blood clots—thrombs—form on its surface sooner or later. These thrombs detach themselves and are carried to vitally important organs, which is fraught with lethal complications. Or, these thrombs may form in such great quantities that they will simply fill up the whole void of the pump that delivers blood, *i.e.*, of the artificial heart itself.

We are looking for various ways and means to overcome thromb formation in the artificial heart cavity. The first way is to develop heparine—containing or heparinoid coatings (heparine is known to prevent blood coagulation). We are testing such coatings already.

Another way of averting thromb formation is the application of so-called autobiological coatings; materials capable of arresting a certain amount of formed elements and proteins of the blood, are applied on to the surface of the artificial heart. This produces a fine film which screens, as it were, the surface of the synthetic material from the blood flow. We call it the pseudo-endothelium, in distinction from natural endothelium which coats the whole surface of the heart and vessels. It prevents thromb formation in healthy man. The creation of a control system is an issue of paramount importance to solving the artificial heart problems.

The heart working in a healthy organism has to meet various requirements all the time. For instance, when a person is asleep, the requirement in blood flow is much smaller than when he is

running a long distance. And the heart responds precisely to the constantly changing requirements of the organism. We are sorry to say that we are still unable to create an automatic artificial heart control system capable of reacting just as precisely to changes in the organism's blood flow requirements. Now we are conducting extensive joint research with the Institute of Control Problems and other research institutions : evolving algorithms for the automatic control of an artificial heart. It looks as if the problem will be solved in the nearest future.

Power Supply

Another problem is the power supply sources that would fit fully into the organism. When we speak of an artificial heart functioning for a few days, the problem is solved rather simply—the appliance may be joined to external sources. But it is quite different if we want to create a heart to operate for a number of years. Here we, naturally, need miniature power sources. Some researchers assume that these might be isotope elements, particularly plutonium-238. We think that there are better prospects in using the energy which is emitted in the organism in the course of various biological processes. It may, probably, be used for supplying the artificial heart with power.

So, the ultimate solution of the problem of an artificial heart capable of functioning in the course of many years depends on the creation of anti-thrombogenous materials, automatic controls and miniature power supply sources. We are working now on all these problems, hoping and believing that a sturdy and durable artificial heart will soon become a reality.

—Soviet Feature

Sixth International Congress on Medical Records

The Sixth International Congress on Medical Records will be held in Sydney (Australia) from 15 May, 1972. Members of various Medical profession of Medical Colleges and Institutions from all over the world will be attending the Congress to discuss the latest developments in the field of medical record keeping.

ON THE WAY TO TREATING GENETIC DISEASE

Dr P.R. Cook

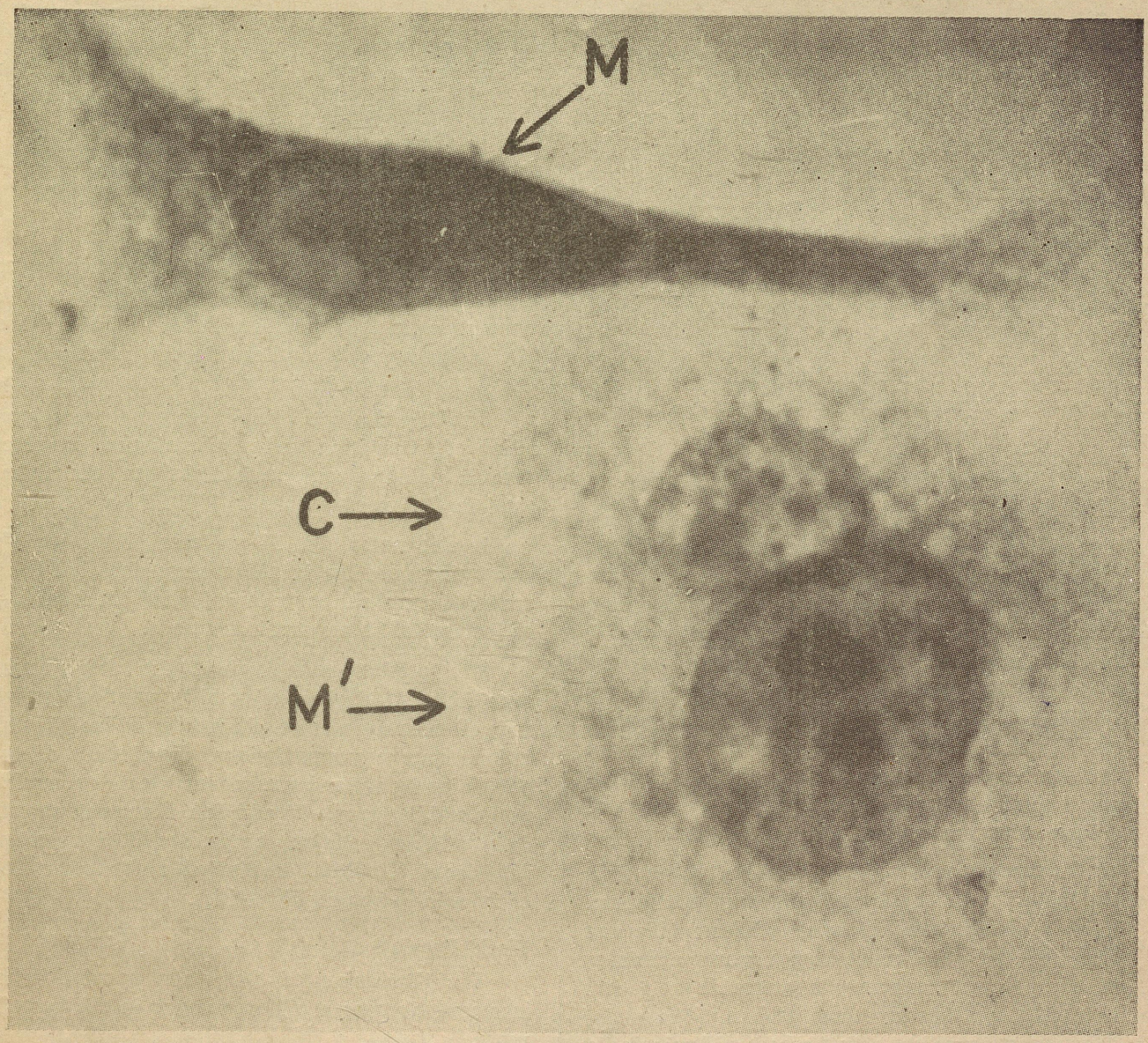
The purpose of our experiments at the William Dunn School of Pathology, Oxford was to see if we could use the genetic inheritance of a normal cell of one animal species to make good an inherited defect in the cell of another. This could lead to making good inherited genetic defects—though of course, whether this could ever be done in human beings is far from certain.

Our experiments showed that small amounts of chick genetic material could be inserted into a mouse cell by a modification of the cell fusion technique and that the interpolated genetic material both functions and is inherited normally in the foreign mouse environment.

Replacing Missing Protein

The mouse cells used were mutants. They could not carry out a particular chemical reaction because they lacked a particular protein, an enzyme which performs a function essential for the life of the cell under some conditions but not others—the mutation is lethal only under certain conditions. The other partner of the cell fusion—red cells from the blood of normal chick embryos—contains that enzyme which the mouse cells lack. The chick red cells—specialized cells—do not grow indefinitely under any of the cultural conditions used.

The mutant mouse cells were fused with the normal chick cells, and immediately after cell fusion,



This photo taken down the microscope shows two cells one day after cell fusion. The mononucleate cells contain a mouse nucleus (M), and the binucleate cell contains one mouse (M') and one chick (C) nucleus.

cells could be seen containing the nuclei of both. When this population of cells was cultured under conditions in which the mutation in the mouse cells becomes lethal, it is only the hybrid cells which may survive.

Within two or three weeks some dividing cells appeared, and these, which contained only one nucleus (mononucleate), looked like the parental mouse cells but they contained that enzyme which the mutant parental mouse cells lacked and which is characteristic of the chick parents. These cells, therefore, retained the chick genetic material which coded for the enzyme, and this material was inherited on continued cultivation. Furthermore, the chick genetic material functioned normally—it directed the synthesis of the chick enzyme since it is this which conferred viability to the hybrid cell.

When mononucleate hybrid cells are generated from binucleate hybrids, the resulting hybrid nucleus usually contains the chromosomes of both parents.

However, when the chromosome content of the nuclei of the chick-mouse hybrids was analysed, no chromosomes characteristic of the chick could be seen. Too little chick genetic material to be visible in the microscope is present in these hybrid cells. The nature of the cells surface was also studied but no characteristics of the chick parent could be detected on the surface of the hybrids.

Thus genetic material sufficient to code for the chick enzyme necessary for survival can be inserted into a mouse cell.

Preliminary experiments indicate that this technique may be generally applicable for the insertion of small amounts of genetic material into cells.

Possible Uses and Problems

One problem of genetics to which our experiments may apply is the way the genetic material is organized within the chromosome. The insertion into cells of small fragments of foreign genetic material, should prove a valuable technique. If, for example, the genetic materials for two cellular functions are adjacent in the chromosome then the two functions are likely to be inserted together into the recipient cell; if, on the other hand, they are remote, they are likely to be inserted independently. With this technique it should be possible to locate the positions of different functions within the chromosome.

A second application is more problematical, but might eventually be of some practical value. There are some diseases such as haemophilia and phenylketonuria that result from a genetic deficiency in cells. A possible therapy is to provide the patient with cells not bearing these defects. The major difficulty is the rejection by the host of foreign cells. If it should prove generally possible to correct genetic defects in the way I have outlined it will then be possible to grow cells from the affected individual, correct the genetic defect in them without introducing foreign surface characteristics and then supply the patient with his own cells genetically corrected. These should not be destroyed as outwardly the genetically corrected hybrid would not appear foreign—there would be no foreign characteristics on the cell surface.

Formidable problems remain, but these could be tackled if the initial barrier of rejection were removed. □

TREND TOWARDS MORE AND LARGER CITIES

GROWING migrations from the countryside to cities and the relentless increase of the world's population to 3,632 million in mid-1970 are two of the main trends outlined in the latest edition of the Demographic Year book by the United Nations.

The *Yearbook*, a wide-ranging annual compilation of population and vital statistics, estimates that 71 million people were added to the global total in the year up to July 1970.

It also notes that 34 per cent of the world's population now live in urban areas and that there are 1,784 cities with more than 100,000 inhabitants—an increase of 20 per cent in a decade.

The present issue reviews the development over the past 20 years of total population growth and of such important characteristics as urbanization, large city populations, distribution of the population by age and sex, economic activity, marital status and illiteracy. In addition, it presents current data on life expectation, births, deaths, marriages and divorces. Data are included for some 250 of the world's geographic entities.

World Population

The *Yearbook* states that global population has increased by over a billion persons in the past 20 years.

It notes that if the current growth rate of two per cent a year is maintained, population will increase by about 1.75 billion in the next 20 years and by the year 2,000 will be more than 6.5 billion.

Regional Population

The majority of the world's population, 2,056 million (56.6 per cent) lived in Asia in July 1970, says the *Yearbook*. Europe was home for some 462 million (12.7 per cent), 344 million (9.5 per cent) lived in Africa and 321 million (8.8 per cent) were in North America.

The Soviet Union had 243 million inhabitants

Swasth Hind

During the last few years the urban population in India has been rising at very high rate. Nearly 11 crores or about a fifth of the total population of the country is living in no more than 142 large cities with a population of a lakh and above. In the next decade, this is expected to rise by another 36 per cent to a total of 15 crores. What is of particular significance in this explosion is the fact that the larger a city the more rapid and the higher is the rate of growth in its population. A study, conducted by the Town and Country Planning Organization of the Government of India, has indicated that in the next thirty years there would be further spectacular increase not only in the total urban population but in the number of major urban cities.

(6.7 per cent), South America recorded 190 million (5.2 per cent) and Oceania 19.4 million (0.5 per cent).

Increasing Numbers in Cities

An increasing proportion of the world's population is living in cities larger than 100,000 persons —19 per cent in 1970 compared with 16 per cent ten years ago—the *Yearbook* indicates.

It also notes that Tokyo is the largest city of them all with 9,005,000 inhabitants in 1969, followed by New York and London.

Overall, it states, 34 per cent of the world's population now live in urban areas. Moreover, almost 90 per cent of the 100,000-inhabitant localities for which comparable data are available have registered an increase in population over the past 20 years and virtually all of the localities of 20,000 or more inhabitants have increased in population over this period.

It adds that three-quarters of the countries and territories in the world have within their borders at least one locality larger than 100,000 inhabitants. A third of the world's population now lives in urban areas larger than 20,000 persons compared with 30 per cent ten years ago.

Regional Urbanization

The region with the highest degree of urbanization is Oceania, according to the *Yearbook*. Of

region's population, 56 per cent live in cities of 100,000 or more inhabitants, and 63 per cent in cities of more than 20,000 inhabitants.

Australia leads the urbanization tables with 83.3 per cent of its inhabitants in urban areas, followed by Israel, Bahrain and Uruguay with more than 80 per cent. Australia also records the highest proportion of population living in cities of 100,000 persons or more 67.3 per cent, closely followed by the United States with 66.6 per cent, Japan records 51.2 per cent and New Zealand, Uruguay and England and Wales all report more than 40 per cent of their inhabitants in cities of 100,000 or more.

North America has 64 per cent of its population in urban areas, according to the *Yearbook* and 51 per cent in cities of 100,000 or more. The Soviet Union has 56 per cent of its people in urban areas—and 32 per cent in 100,000 population cities.

South America has a 54 per cent urbanized population and Europe 53 per cent. Both areas report about 25 per cent of their inhabitants in cities of more than 100,000 people.

Asia and Africa both have about 21 per cent of inhabitants in urban areas with 15 per cent of Asians and 11 per cent of Africans living in cities larger than 100,000 persons.

Of the countries reporting, the lowest percentage of urbanization is shown in Burundi—2.2 per cent, and the lowest percentage for a recent year of urban population living in localities of 100,000 or more inhabitants is shown in the United Republic of Tanzania—2.2 per cent in one locality (Dar Es Salaam).

More Large Cities

The *Yearbook* notes 1,784 cities with population larger than 100,000—an increase of 20 per cent in ten years. One hundred and thirty-three cities are listed as having one million or more inhabitants compared with 104 a decade ago. There are 44 "million-or-more" cities in Asia, 34 in North America, 29 in Europe, 10 in the Soviet Union, 9 in South America, 5 in Africa, and 2 in Oceania.

The way in which the boundaries of a city are defined varies from country to country, the *Yearbook* points out. But taking data for the "city proper", it indicates the following as the world's twenty largest cities :

1. Tokyo	9,005,000 in 1969
2. New York	7,798,757 in 1970
3. London	7,703,400 in 1969
4. Moscow	6,942,000 in 1970
5. Shanghai	6,900,000 in 1957
6. Bombay	5,700,358 in 1970
7. Sao Paulo	5,684,706 in 1968
8. Cairo	4,961,000 in 1970
9. Rio de Janeiro	4,207,322 in 1968
10. Peking	4,010,000 in 1957
11. Seoul	3,794,959 in 1966
12. Delhi	3,772,457 in 1970
13. Buenos Aires	3,600,000 in 1970
14. Leningrad	3,513,000 in 1970
15. Chicago	3,322,855 in 1970
16. Tientsin	3,220,000 in 1957
17. Calcutta	3,158,838 in 1970
18. Karachi	3,060,000 in 1970
19. Mexico City	3,025,564 in 1970
20. Osaka	3,018,000 in 1969

This list does not include cities with a very lage "urban agglomeration" but a relatively small "city proper". Among those excluded for this reason are Paris, with an urban agglomeration of 8,196,747 in 1968; Los Angeles, 6,974,103 in 1970; Philadelphia, 4,777,414 in 1970; and Detroit, 4,163,517 in 1970.

Expectation of Life

The highest life expectancy at birth is found in Sweden according to the *Yearbook*. It indicates that female infants born in Sweden can expect to live on average the longest in the world—76.5 years. Those born in the Netherlands have an almost equally long life expectancy of 76.4 years.

Among males the longest expectation of life at birth is 71.9 years—also found in Sweden. In only five countries—Sweden, Norway, Netherlands, Iceland and Denmark—is male expectation of life at birth more than 70 years. But it is greater than 70 years for females in 41 of the 108 areas for which data are available.

(*Contd. on page 156*)

ON FAMILY PLANNING

FAMILY PLANNING MAKES HEADWAY

ABOUT 9.4 million births have been averted in the country up to December 31, 1971 since the inception of the family planning programme. Consequenty the national birth rate has gone down to 37.7 per thousand in 1970-71 from 38.3 in 1969-70.

During the same period 12.43 million couples were protected out of a total of about 100 million couples in the reproductive age group.

The total number of acceptors of family planning methods in the country during the period April—December, 1971 was 41,47,668 as against 30,68,858 in the corresponding period last year.

During the period under review a total of 15, 62,136 sterilizations have been performed as against 9,41,732 during the corresponding period last year. Of these, about one-fourth were tubectomies. The performance of vasectomy and tubectomy has gone up by 81.65 per cent and 30.74 per cent respectively during the period.

Since the inception of the family planning programme, up to December 1971, a total of 1,02,21,213 sterilization operations have been performed in the country.

During the nine months under review 3,38,497 IUCD insertions have been done as against 3,32,204 during the corresponding period of the previous year. The total number of IUCD insertions since the inception of the programme was 41,38,420.

The number of conventional contraceptive users has also gone up to 22,47,035 as against 17,94,922 during the same period last year.

The number of sterilizations, IUCD insertions and conventional contraceptive users have increased by 65.9 per cent, 1.9 per cent and 25.2 per cent respectively during the period under review as compared to the corresponding period in 1970.

REORIENTATION OF FAMILY PLANNING STRATEGY

PROFESSOR D. P. CHATTOPADHYAYA, Minister of State for Health and Family Planning stressed the need for a "down-to-earth approach" in formulating and implementing the family planning programme in the country. He wanted a constant dialogue between the policy makers and academicians so as to influence, determine and shift the policies thereby giving a new dynamism to the programme.

The Minister was addressing a two-day Seminar of Demographers and Economists in New Delhi on 17 February, 1972 which was convened by the Department of Family Planning to discuss the current demographic situation in the country, its relationship between socio-economic changes and demographic variables, to review progress of family planning programme with special reference to its impact on demographic situation and suggest priorities. The Seminar was attended by about 50 research workers and academicians from universities and research institutes both in the public and private sector from all over the country.

Professor Chattopadhyaya felt that family planning programme should form part of overall socio-economic development of the country. As such the language used in communication should be intelligible to the masses. He cautioned against "seeing the trees and missing the wood" which will defeat the very purpose of the programme.

Shri K.K. Dass, Secretary, Ministry of Health and Family Planning, earlier said that the work done by demographers was of great interest to the Department of Family Planning, particularly in view of the changing picture of socio-economic conditions in our country. He wanted demographers to play their role in "freeing the country from the future predicted by others".

Dr K. C. Seal, Director (Planning) in the Department of Family Planning stated that rapid growth of population which had already set in, in India and

elsewhere had made it difficult to attain the desired economic and social changes. If the current rate of population growth in India continued for some more time, Dr Seal pointed out, the population would exceed 1,000 million mark by the end of the century. Family planning programme had made a good impact and the total acceptors had increased from 2.26 million in 1966-67 to 3.82 million up to November, 1971. Nearly 7.4 million births had been averted as a result of the performance up to 1970-71.

Recommendations

The Seminar stressed the need to re-orient the strategy and methodology of family planning to suit the changing socio-economic conditions of India. To stepup the family planning programme,the seminar recommended involvement of other agencies like the community development, cooperation and education departments. It also stressed the need for studies to find out reasons for high birth and death rates in selected areas with special reference to the performance of family planning programme.

Studies on sex ratio at regional and district level and their inter-relationship with migration; fertility and mortality estimates at regional and district level among various socio-economic classes; effects of current economic development plans on fertility and incidence of childlessness and sterility were also recommended by the Seminar.

The need to undertake studies on factors responsible for the gap between knowledge and practice of family planning methods, greater involvement of universities in demographic research and regular feed back of research findings into the family planning programme after proper evaluation, were also among the major recommendations.

TREND TOWARDS MORE AND LARGER CITIES—(*Continued from page 154*)

In only seven countries—Nigeria, Upper Volta, Cambodia, Ceylon, India, Jordan and Pakistan—men can expect to live longer than women. These are all areas where birth rates and maternal mortality rates are high.

Infant Mortality Rates

Infant mortality rates are considered by demographers to be a good indication of a population's general level of health and welfare. According to the *Yearbook*, they continue to show a downward trend in much of the world and Iceland has the lowest rate of 11.7 deaths per 1,000 live births in 1969.

At the other end of the scale, rates of more than 100 deaths per 1,000 live births are still recorded for some countries in Africa, Asia and South America.

Birth Rates

Birth rates continue at a high rate in a number of developing countries. The *Yearbook* notes birth rates of 50 or higher per 1,000 population in 13 countries. Seven of the countries are in Africa: Angola, Dahomey, Madagascar, Niger, Rwanda, Swaziland and Togo. The remainder are Asian states: Afghanistan, the Maldives, Pakistan, Saudi Arabia, Yemen, and the People's Democratic Republic of Yemen. The highest birth rate recorded is for Swaziland with an estimated 52.3 births per 1,000 population.

Economically Active Population Rates

Data from more than 100 countries on the proportion of inhabitants making up the supply of labour—the economically active population—are included in the *Yearbook*.

It concludes that the highest labour force participation rate is 84.7 per cent on the small African Island of Ascension, and the lowest is in Algeria—21.7 per cent. Sikkim records a rate of 64.3 per cent and the Falkland Islands, Thailand, Bulgaria, Romania and several African countries have rates between 50 and 59 per cent.

The United States has 40.9 per cent of its inhabitants in the economically active population, according to the *Yearbook*.

It notes that out of 127 countries reporting trend figures, 90 (71 per cent) indicate declines in activity rates in the past two decades. Some of the decline is attributed to changes in the age structures of the population—less people in the working age group—but other factors are the lengthening of school life, earlier retirement, and the general shift away from agriculture into industrial economies.

Courtesy : Participant Journal, December, 1971.

Around the states

MAHARASHTRA

High Rate of Dental Decay

"RECENT surveys have shown that 10 per cent to 15 per cent of our school children under 12 years of age are free of dental decay. Comparison of this data with the data collected earlier, *i.e.*, 20—30 years back shows that the prevalence of dental decay has increased by 30 per cent to 40 per cent. At that time 40 per cent to 60 per cent were free from dental decay and now it is 10 per cent to 15 per cent." This was revealed by Dr K.L. Shourie in his Presidential Address at the 43rd Session of the Dental Council of India at Nagpur on 11 January, 1972.

He said that the prevalence of periodontal disease had remained high. But because of the population explosion and death rate going down and marked improvement in the expectancy of life from 27 years in 1947 to 50 years today, the number of cases suffering from periodontal disease had tremendously increased.

TAMIL NADU

Doctors Asked to Render Voluntary Medical Service

"DOCTORS should come forward to render voluntary service in the Armed Forces at least for one or two years", said Shri K. Anbazhagan, Minister for Health, Tamil Nadu in his inaugural address at the 47th All India Medical Conference held at Madras on 12 February, 1972. Dr A.K.N. Sinha, the newly elected President of the Indian Medical Association, presided.

Shri Anbazhagan said though there was a military medical college, it could not meet the entire needs of the Army. A short period of service in the Army would give the doctors an insight into the functioning of the armed forces and inculcate in them a sense of discipline. He also exhorted doctors to organize voluntary health services in the rural areas.

Shri Anbazhagan said that in the family planning programme, the family physicians in whom people reposed confidence could play an effective role. Doctors attached to teaching institutions should concentrate on research and try to evolve low-cost drugs.

The Tamil Nadu Government, he said, had instructed the State Industrial Investment Corporation to advance loans to rural medical practitioners to open clinics, nursing homes and laboratories in villages.

Dr Sinha in his presidential address suggested the need for the nationalization of general practice. "My idea is to draw every individual and family to the scheme of general practice where they may get the benefit of medical advice and pharmaceutical supply at the initial stages with very modest contribution. This may in future be enlarged in the shape of hospitals and institutional benefits. The whole thing can be worked up in close collaboration with somebody, like the L.I.C. or similar bodies which will be responsible for conferring the benefit.

Need for Popularizing Indian Systems of Medicine Urged

SHRI K.K. SHAH, the Governor of Tamil Nadu, stressed the need for popularizing the indigenous systems of medicine and placing it on a scientific footing.

Shri Shah was speaking at the inaugural session of the Joint Annual Conference of the Association of Physicians of India held at Madras on 21 January, 1972.

The Governor said that it had been conceded by experts that 80 per cent of the ailments could be treated without costly drugs and if clinical trials established the usefulness of indigenous medicines, they could well be prescribed. "The urgency of this should be realized from the fact that our raw materials find their way to foreign manufacturers who, in turn, sell the patent drugs to us at an exorbitant cost", he said. It would be in the interest of the medical profession to study the indigenous system which would provide a vast field for research and give a fillip to the growth of cottage industry.

Shri Shah appealed to philanthropists to maintain a chain of hospitals, preferably one for each

district where experts were available. He wanted co-operatives of doctors to run hospitals.

As the medical profession had to concentrate simultaneously on the curative, preventive and promotional aspects of health, unless hospitals were spread all over the country, especially in rural areas, it would be impossible to provide opportunities for the specialists who needed practical experience of climate, environmental conditions and people's habits to guide them in their career. It would take a long time for the Government to raise the bed strength from 2.5 lakhs to 6 lakhs, he said.

Instead of concentrating on expertise in all specialities in every State, he emphasized development of advanced studies in some specialities in each State. Such an arrangement would lead to stronger bonds and cement national integration. He said the basic doctor should take his legitimate place. For, however, highly advanced a speciality might be it could not be applied to people's advantage unless there was a basic doctor who knows to what speciality the patient must be directed.

The Governor appealed to intellectuals to strengthen the country by making it self-reliant. Shri K. Anbazhagan, Minister for Health, who released a souvenir, said the Government had to meet the needs of the masses as also the demands of the specialists. He said the medical facilities should be extended to every village.

Dr K.S. Mathur, President of the Association of Physicians, said that medical institutions should grow side by side with the institutions of basic sciences in the atmosphere of universities away from the administrative control of the Government.

WEST BENGAL

Health Education Gets a Spurt

THE influx of refugees in huge numbers following the military atrocities by Pakistan in March, 1971 and after on the people of Bangla Desh, put a heavy strain on the health and medical services of West Bengal. Health education also contributed its bit by educating the refugees on the need for cholera inoculation and sanitation. Health education material was distributed in the refugee camps, health talks were given and films were screened. The paucity of health education materials and shortage of staff were as keenly felt as the need for better and more effective dissemination of the knowledge of health education. The health education set-up in the State was augmented and in December, 1971 the State Government sanctioned the establishment of three additional Regional Health Education Units. Each Unit will have a health educator, a projectionist-*cum*-mechanic and a general duty assistant.

The Health Education Bureau in the State was established in 1960 and with a view to seek proper utilization of the methods and media evolved by the Bureau, three Regional Health Education Units were formed in August, 1961. Each of these regional units covered five districts in the State. With the sanction of three additional units, the regions have been reorganized. The six Regional Health Education Units will now cover following districts :

(1) 24-parganas Region with headquarters at Tolly Ganj, Calcutta—24-parganas and Hoogly.
(2) Midnapur Region in the headquarters at Midnapur—Howrah and Midnapur.
(3) Burdwan Region in the headquarters at Burdwan—Burdwan, Bankura and Purulia.
(4) Murshidabad Region with headquarters at Berhampur—Murshidabad, Nadia and Birbhum.
(5) Malda Region with headquarters at Malda—Malda and West Dinajpur.
(6) Jalpaiguri Region with headquarters at Jalpaiguri—Jalpaiguri, Cooch Bihar and Darjeeling.

The regional units will work by rotation in different districts.

DELHI

Central Squad to Prevent Food Adulteration

A Central Food Squad to prevent effectively food adulteration has begun functioning in the Directorate General of Health Services. It will be headed by the Additional Director-General of Health Services. It will visit various food manufacturing units in Delhi to test the quality of their products.

The Squad can function effectively only if the public cooperates in full measure. Complaints, if any, about the quality of food products can be addressed to Dr P. Diesh, Additional Director-General or Deputy Assistant Director General dealing with food adulteration in the Directorate General of Health Services, New Delhi.

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CORRECTION

Please read "Andhra Pradesh" for "Mysore" on page 92 (March 1972) under Sub-heading "Award For East Godavari" (1st line).

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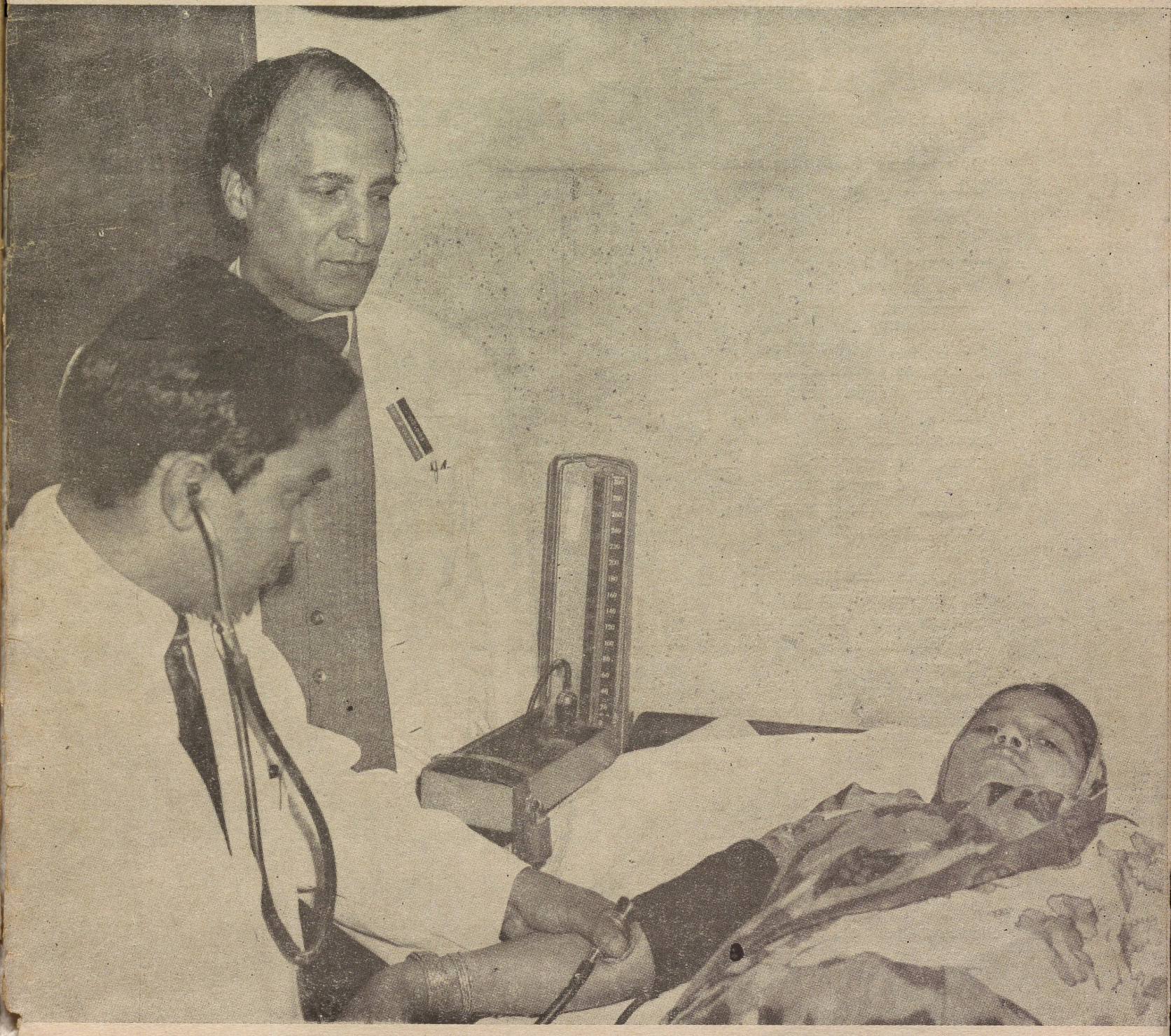

SIX RULES FOR A HEALTHY HEART : 1. Stop cigarette smoking. 2. Stop eating too much. 3. Reduce the amount of saturated fats in diet. This is achieved by cutting down fat, meat products (sausages, salami, etc,). 4. Avoid egg yolk. 5. Use grain, fruit, vegetables, fish salad and cooking oils, and new soft margarines. 6. Have your blood pressure checked at least once every five years; if it is too high, stick to the treatment prescribed.

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