

THE LIMITS OF MEDICINE

By Ho Guan Lim

(S.M.A. Lecture delivered at the 6th Medical Convention)

SCOPE

You will recognise that the inspiration of this lecture is the historic publication by the Club of Rome—'The Limits to Growth'.

The Club of Rome predicted that population and industrial growth will come to an end when food supplies run short, when raw materials are exhausted and when pollution from the teeming millions and the outpourings of industrial wastes devastate the environment. Malthus, the 18th century country parson turned political economist, had first sounded the death knell of humanity. Both the Club of Rome's publication and the MIT Studies, which preceded it, refined the calculations and took into account other factors not known two centuries ago.

Doomsday predictions have since become fashionable. The prophets of doom have adopted the theme to grab headlines and to cloak themselves with respectability and erudition.

No one, however, likes the bearer of bad tidings. And this barrage of unpleasant forecasts merely irritates and numbs the senses. Even if the prophecies prove correct, no one will remain to appreciate these wise forethoughts.

Mine is not futurology. The Club of Rome dealt with the physical constraints to economic and population growth. The limitations I shall be speaking of are conceptual. I shall not be speaking on, what may be termed, external factors, which are all too familiar as restricting the development of medical services, such as the shortage of medical personnel or inadequate funds.

In recognising that there are limits to medicine, a reappraisal of our capabilities and role will have to be made.

It is difficult to accept that man's headlong rush for even greater achievements may be brought to a halt. It is difficult, in our pride in

man's unlimited genius, to believe that man will not overcome. After all, he has shrunk the world by the increasing speed of transportation and instantaneous communication. In his mastery of materials he has at his disposal almost unlimited power and an ability to refashion materials never dreamt of by the alchemists of old. The development of computers is bringing about a second industrial revolution. The first was ushered by steam and the harnessing of other power sources which vastly extended man's brawn. In the second, the computer will extend man's brain power and will increase human ability to ever greater heights.

There is a darker side to the picture. The thoughtless application or ruthless use of science and technology in peace or war can spell death to countless millions of people. Some see in the unbridled growth of population and industrialisation, the seeds of ecological collapse from pollution and widespread death from pestilence and starvation. The world will not end with a nuclear bang but with the whimper of the starving and the poisoned.

Parallels can be seen in medicine. The popular belief is that medicine has been a triumphant march toward perpetual health and well-being. Our successes need not be recounted. The conquest of the epidemic scourges plague, cholera, smallpox, diphtheria, typhus and poliomyelitis. Surgery has saved countless casualties of war and accidents. Sanitary measures have added security to human existence.

The discoveries continue to come thick and fast and the mass media publicises these discoveries widely. Most people, even many doctors, believe that new cures and new preventive procedures are just round the corner. It is not easily apparent that we are now moving into more difficult terrain as we reach the frontiers of medicine.

For medicine, according to MacFarlane Burnet, is, in a broad sense, concerned with two universals; disease and disability from the impact of the environment, and disease generated intrinsically in the body. Physical injury, infection, malnutrition are those which may be

HO GUAN LIM, F.R.C.P. Permanent Secretary (Health)/
Director of Medical Services.

described as due to the impact of the environment. They are the types which have been relatively easy to bring under control by the application of the scientific method. What remains to be prevented and cured has a different set of origins. Their control eludes us as they have a genetic basis and as the psyche and behavioural patterns can influence their onset and progression.

The easy conquests are now behind us. The evidence is that we are moving against much more complex and difficult problems. Already we can perceive the barriers—which limit our capabilities and limit our role.

THE EVIDENCE

What is the evidence that there is a limit to medicine?

Firstly on the general premise that there is a limit to knowledge. Here the term "knowledge" is used to refer to basic discoveries or understanding and perception—which explain the fundamental laws of nature. Knowledge—or understanding—in this sense is finite but the data would, of course, be infinite.

The assertion that there is a limit to knowledge is based on the following: There are few questions remaining which have not been identified or which rational, even if partial, answers cannot be given. If we systematically order our knowledge, few gaps will be found. It is unlikely that there are other discoveries which are as yet unsuspected or unknown. If there are any fresh discoveries, they must be minimal, not to have impinged on our senses and not to have been suspected in all our sensitive probes and measurements.

Carrying the point further and if we accept the premise that scientific knowledge—as it is presented in scientific publications—doubles every 15 years and just assuming that we know a quarter of all knowledge, it follows that in about 30 years we will exhaust all discoveries.

If we find it difficult to accept and understand the first reason perhaps the second, drawn from examples within our own experience, may be cited. The decline of discoveries in medicine may be forecast by the evidence of diminishing returns in many familiar examples.

The control of the venereal diseases is an example. Despite the fact that there is effective treatment for the diseases and the rationale for prevention is well-understood, the venereal diseases continue to be resurgent.

The modern epidemics of coronary heart disease and cancers are further examples. A considerable but incomplete body of epidemiological knowledge has grown on coronary heart disease. There is evidence that eschewing over-rich foods, abstaining from cigarette smoking, or being less slothful would reduce the incidence of this disease. But it is this very point: that medicine alone will not be able to persuade persons to change their life-styles and ingrained habits.

In the case of the cancers, less is known of the causative factors. It is unlikely that a simple cause-and-effect factor alone is involved, as in the infectious diseases. Again causation is multifactorial and again the prevention or the control of the cancers fall outside the ken of medicine.

And when we consider smoking, alcoholism and drug addiction, we perceive that we are in areas which are even further removed from our experience and training. We might perhaps be successful in treating persons suffering from the acute effects of over-indulgence of drugs or alcohol or mend the body broken by drugs. But when faced with weaning the person from the clutches of addiction, we become aware that it is beyond the capabilities of our conventional tools. It is a vain hope that a drug will be found to cure addiction; or that a person can be immunised against it. Revulsion therapy has limited application. Few will admit that the treatment of addiction will have to be found elsewhere.

Prevention will be achieved by the control of the psyche so that the individual will be capable of sustained and intelligent effort to resist these cravings. Clearly, alterations of behaviour and social habits require the combined efforts of educationists, sociologists, anthropologists, psychologists, physiologists and a whole host of other scientists of which the doctor would only be one.

In surgery, we are limited by our capabilities. In microsurgery, there is a limit in the size of the tissues which can be operated on. For instance, there is a limit to the size of the blood vessels that can be anastomosed by suturing. In transplants, we have advanced from skin transplants to corneal transplants and kidney transplants, even to heart transplants. But the more ambitious transplants of lungs and livers are probably just beyond our technical abilities, and certainly transplants of the brain and nervous tissues will be impossible.

Thirdly, the subject of our ministrations is mortal. The human individual has a finite life-span. It is true that life expectancy has gradually increased. It is said that in Roman times, the average life-span was 30 years. In Singapore, for males at birth it is about 68 years and for females it is slightly greater. If the experience in America and more developed countries is any guide, life-expectancy will not increase very much more—this despite the major advances in medicine in this century. There is a biological barrier to immortality. It is calculated that if all the common diseases, such as hypertension, heart-attacks and cancers, are eliminated, the longevity of the human being will be increased overall by only five to seven years. Tissue culture experiments have shown that there is a limit to the number of times tissue cells can divide. All normal tissue cells eventually die off after 60—80 divisions. Teleologically this makes good evolutionary sense. For the death of the individual allows for a rapid turnover which favours genetic selection of advantageous characters.

We are likened to a clock which gradually runs down. Dressed in a more contemporary form we are said to be programmed for obsolescence.

Why this limit occurs is of course the critical question. Work is now focussed on the molecular or genetic level of cells to explain this phenomenon. The currently favoured theory is that there is an accumulation of random defects in the genetic code. This accumulation of errors eventually cannot be compensated for and leads to a catastrophic break-down which leads to death.

Finally, the limitation in medicine is imposed by ourselves. Simply it is that we cannot experiment on human beings. We cannot test our theories and practise our skills on human beings.

NEW DIRECTIONS

Enough has been said to support the proposition that there are limits to medicine. As we reach the frontiers of knowledge, there will be fewer and fewer discoveries. Our technical ability is limited as we are also limited by the tremendously complex—yet mortal—object of our ministrations, and finally by our self-imposed restrictions which inhibit our practices.

Up to this point it has been an interesting intellectual exercise. It will remain one if we do not direct our minds to what it means. If indeed

we are reaching the frontiers of knowledge and reaching the limits of our capabilities, we should pause before pushing ahead. Should we set a new course?

Some contemporary questions raise pertinent issues: Should medicine concentrate on providing speciality care which can be excessively costly and would benefit only a relatively few? Because we have mastered certain procedures does it follow that society should make it available to all who seek it? Should coronary artery by-pass operations be perfected or should we concentrate on improving methods of early detection and prevention of coronary artery disease? Should esoteric research on the molecular basis of ageing and genetic engineering be undertaken?

The basic question is what should be the objectives, and what would be the order of priorities, in medical education and medical care. In other words what are the tasks for medicine in the world of to-day?

It may perhaps be helpful if we re-examine the basis of our objectives. The primary motivation of medical men is compassion. Our basic function accordingly is to care for the sick, to relieve the pain of the injured and the distress of the disabled. The ideal will be to restore the person to health. From this simple foundation of medicine, two extensions are sometimes advanced.

(1) That the primary purpose of medicine is the preservation of life. Some, perhaps unconsciously using the hortatorial argument, would go further, asserting that it is medicine's function to restore health because it is its function to preserve life and because life itself is sanctified. Developing from this line of argument, it is sometimes asserted that underpinning medicine's function is its reverence of life.

Up to recent times such a statement was accepted without question. It is an elegant way of describing what motivates medical men. It clothes us with a god-like aura.

It is illogical and untenable. It is illogical as it does not necessarily follow from the premise that life is sacred and it certainly cannot be substituted for our primary motive—which is our compassion and caring for others.

Let us see why it is untenable.

With our wonderful machines it is possible to sustain the vital life processes indefinitely. Even though the brain may have been irreversi-

bly damaged or when all hope is past we are unwilling to step aside to allow the patient to die gracefully, in peace and in comfort. Instead we prolong the suffering by prodding, poking, needling, wiring and intubating the dying.

With our ability to transplant organs and replace damaged tissues we have been able to give a fresh lease of life to a few. But it has also brought us up against the awkward question as to who should benefit from the procedures and who will be cast aside.

As if such questions have not put us on guard, we continue to play god.

With spare-part surgery, it is within the realm of possibility that we will be able to create hybrid robot-men. We are tinkering with our genetic make-up to correct defects and to prolong life. The prize in absurdity, if it were not so tragic, is placing dead persons in liquid nitrogen, keeping them in deep-freeze until they can be resurrected.

We enjoy this role until the awkward questions are raised when we feign responsibility. Not being omniscient we will not have the answers to these questions; who decides which person will have the transplants or other life-prolonging procedure; who will decide on which are the defective characters and what are the superior characters to replace them when we are able to manipulate our genes. What would be the consequences of prolonging life on the population which will not only add to its growth but will also make it an aged one; what would be the consequences of preserving defectives on the human race? Are we reversing the evolutionary process of the selection of the fittest and instead gradually degrading it?

I would suggest that we should retain our primary function: to care for the individual in distress and to restore the person to health wherever possible.

(2) The second extension advocated as our function is probably less controversial. It is accepted as axiomatic that it is better to prevent disease or accidents than to care for the persons after the event. Hence the prevention of disease is generally accepted as a primary function of medicine. In accepting this proposition, I would, however, make two points:—

- (a) that it is cheaper to prevent than to cure. The costs of the huge organisations to maintain the public health are not normally counted. It should also be

noted that these direct their work largely against the infectious diseases. With the modern epidemics a whole new game-plan will have to be designed—and a much more costly one too. These changes will require the complete control over individuals—their behaviour, their thinking, their likes and dislikes. This will require fundamental changes in the fabric of society, in the pattern of trade, in agricultural and animal husbandry etc.

- (b) Preventive Medicine is in a different dimension. Medicine's primary concern is with the individual. Prevention is concerned with the community. Herein lies the seed of conflict. The conflict can arise from the need to protect the community as a whole while consigning the individual interest to second place.

To question the concept of prevention is not to challenge its worthiness, but only to suggest that preventive medicine might be practised by quite a different person because he is trained differently, his outlook is different and his method of work is different.

The drift of my thesis is (i) that there are limits to medicine and (ii) that the responsibilities of the practitioners of medicine should accordingly be restricted. If our concept of our role is accepted, how do we see the priorities in medical practice and the direction in medical education in the future?

The following random thoughts are relevant in this context.

On specialisation. There is no doubt that medical science and technology will take medicine to even greater heights. A further fragmentation of medicine into specialities is inevitable. It is necessary to ensure that the wider perspectives are retained within the narrowing view of specialisation. The question is how the high skills and deeper knowledge of the specialist can be made to advance the cause of human well-being, and are not channelled into ill-conceived schemes which lead to excesses and disaster because the consequences have not been foreseen.

On the Divisions within Medicine. A possible way of ensuring that the patient is treated as a whole—as an individual—will be the rise of the generalist, or if you prefer, the primary care physician.

The specialist will probably be confined to work only in medical institutions (hospitals) or in corporate practice. The primary care physician will have a wider range of options—working in solo entrepreneurial practice, in group practice or in hospitals. The primary care physician will be responsible for planning the care of the patient and directing the patient, where necessary, for treatment by a specialist.

It is possible that the fundamental differences between preventive medicine and personal medicine will see the separation of medicine into two great disciplines. If this is an accurate prediction, persons choosing medicine as a career will have to decide to “stream” either into personal care medicine or into preventive medicine right at the onset.

The training in personal medicine will essentially be in the classical basic medical sciences of anatomy, physiology, biochemistry, pathology, while the new basic medical sciences for preventive medicine will be in epidemiology, biostatistics, medical sociology, psychology, management and operations systems.

On drug addiction. It is sometimes claimed that these conditions of which I include smoking, alcoholism, homo-sexualism, delinquency—are mental disorders. The advocates of such views would have us accept that these conditions should be within the responsibility of medicine. The question is not so much whether they are or are not mental disorders. The more important issue is whether medicine alone has the ability to treat these disorders. My view is that the treatment of alcoholism, and of the psychological and social disorders is outside the training, experience or ability of medical men. A clear line should be drawn where our responsibilities lie—and end—in these matters.

This is not to say that medicine completely abandons all responsibilities in these conditions. Quite the contrary. Medicine, being in the unique position to recognise these disorders, and concerned with the prevention of disease and the restoration of health, should provide the leadership and initiative in tackling these problems through the unified efforts of social-scientists, behavioural scientists, sociologists and the like.

Prevention of drug addiction, the weaning of the addict from dependency on drugs is necessarily a joint responsibility.

The doctor as a teacher. Quite clearly the doctor will be as concerned with the quality of life. He will be increasingly concerned with the problems of living, the burdens of disability and distress.

The doctor, would in this context and in the original sense of the word, be a teacher. He would be responsible for educating both his patients as well as the community so that its members can better cope with the problems of alcoholism, drug addiction, smoking, delinquency, the problems of loneliness, depression, boredom and suicide.

Again, these matters are not entirely the responsibility of doctors but a joint responsibility with other social scientists and workers.

Medicine, metaphorically speaking, has been led up to the pinnacle believing that the world was at its feet, only to be shown that all this was an illusion. Our eminence in the community we find, will be maintained if we accept a restricted role, and if we are prepared to toil within the smaller field. Our mission is to lead our people to a better life through the combined efforts of ourselves and like-minded scientists.