

THE RANSOME ORATION

“The Making of A Doctor”

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Gordon Arthur **Ransome** practised medicine for 42 years. Apart from the four years in the Burma campaign during the war, he spent the best part in Singapore, teaching, exhorting and inspiring two generations of doctors.

In the late 1930's I was among the eager-eyed disciples who each morning at 7.30 a.m. met the young handsome professor always immaculately attired in a blue pin-striped double-breasted coat with a fresh white carnation on the lapel at Ward 7 or 8 in Tan Tock Seng Hospital. **Rumours** had it that Professor **Brunel** Hawes had combed the teaching hospitals of London to find a successor and finally had chosen the most promising and brilliant registrar he could find. For many of us this personal teaching was a new refreshing experience and we spent many happy hours under the tin roof of the wards, forgot time and lunch when Prof **Ransome** would enthrall us with seemingly clinical magic but in fact he was titillating our dormant clinical senses. Not infrequently he had to call for extra lunches usually served to the free patients but they were for the famished students who had missed their lunch. Neurology came alive in Ward 7. After World War II, I became his first assistant and discovered that he was a demanding taskmaster where the patients' welfare was concerned. But he was always the courteous gentleman to all whether it was Mr Ong Bong Chong the trisha peddler or one of the titled gentry or royalty who frequently consulted him. In many ways he was the classical absentminded professor who forgot everything else when he was absorbed in clinical work. He was always engrossed in discussing new physical signs such as the great toe jerk, and over the 35 years I have known him, he has never lost his enthusiasm for teaching or learning clinical medicine. Perhaps a personal anecdote can better illustrate the kind of teacher he was. Not long after the war when I was yet undecided on neurology as my special subject in the membership examination, I wrote an anxious letter to him asking his advice whether it was the right thing to do since no one from Singapore had as yet attempted it. Back came his reply that he was confident I could do it. You must remember that at that time postgraduate courses in Singapore were nonexis-

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*Delivered on Saturday, August 23, 1975, at the 10th
Singapore- Malaysian Congress of Medicine.*

tent, the only course in neurology I had was the pre-war undergraduate stint in Tan Tock Seng Hospital and what I learnt as his assistant. It was the confidence of a great teacher that overcame my uncertainty and doubts. It is therefore with some nostalgia that I salute a teacher, colleague and dear friend who has been medicine's Mr Chips in Singapore and Malaysia for more than a third of a century.

In choosing a suitable subject for this **Ransome** Oration, I felt it is particularly fitting that I share my thoughts on the "Making of a Doctor" which has been Sir Gordon's preoccupation as a clinical teacher for 40 years and mine for almost 30. It is also appropriate this year which is the 70th anniversary of the founding of our medical school. Having been personally involved in the transition of medicine from the 1940's to the highly specialised 1970's with a brief period of war and rural medicine during the Japanese occupation I feel I could share my thoughts on a subject that is a recurring theme in medical education. What lessons have we learned from the past and what are the currently evolving patterns of medicine and medical education that the profession must face in a fast changing world? We must begin with the thesis that a doctor is carefully made and not an instant product. 'It is also being accepted that the practising doctor will be a student for life and not just a mature university graduate with a fixed role.'¹ First of all, I propose to recall important milestones in the history of the Singapore Medical School, of medicine in general, that have influenced our experience. Then briefly, I will present new attitudes to social organisation that have made and are making an impact on the medical profession. In discussion, I hope to cover changes in medical practice, trends in medical education and lastly I should like to end with a personal note on our Singapore situation.

Retrospective

The Medical School was started 70 years ago on 3rd July 1905 under an ordinance 'to provide a school for the teaching of medicine, surgery and midwifery'. Known then as the Straits and Federated Malay States Government Medical School, its first batch of students numbered 23. In 1920 the name was changed to "King Edward VII College of Medicine" in recognition of the bequest of \$120,000 from the King Edward VII Memorial Foundation for the advancement of a Chair in Physiology and the fact that the school was founded in the reign of King Edward VII. When the University of Malaya was established in 1949 it became the Medical Faculty of the University.

However, the first attempt to introduce medical education in Singapore dates back to the 18th

Century in 1822 with the experiment of a so-called subordinate medical establishment when local boys from the Penang Free School were made apprentices at a salary of US\$2.00 a month while under tuition and US\$3.30 a month when qualified. After 5 years, apprentices were made dressers at a salary equivalent to 40 rupees a month. Dressers of 10 years' standing were called Assistant Apothecaries and were paid 70 rupees a month after they had passed *Materia Medica*. The superior grade of Apothecary was obtainable after 15 years by merit and knowledge.² The programme failed because the poor remuneration did not attract sufficient number of persons to make it viable. The many tiered structure was too cumbersome and excessively long and failed to give promotional incentive. It was a pity because it put back medical education by 83 years.

Early Beginnings

In 1889 Dr Simon the Principal Civil Medical Officer attempted to establish a Medical School for the purpose of training assistant surgeons to reach the natives and to assist the European Medical Officers in the routine duties. This attempt proved abortive as only two students presented themselves and they were not physically fit. The course was abandoned and the students were sent by the Government to Madras Medical College for training as assistant surgeons.

In 1902, a Commission was appointed to inquire into the system of Medical Education. The Commission referred to the advantage of a medical school in the Colony because of "the great advantage that would accrue to the Colony and the native states by the introduction of a system of local material, men better qualified to supply the demand for Assistant Surgeons and General Practitioners among the native population and the poorer inhabitants. The introduction of this would pave the way to limiting practice to men who have attained the necessary qualifications." Two years later in September 1904 a petition was addressed to Sir John Anderson, Governor of the Straits Settlement by the leading Asian communities of Singapore headed by the Honourable Mr Tan Jiak Kim praying that a medical school be established. In reply the Government threw a challenge to the petitioners to raise \$71,000 of which \$1,000 was for the alteration of the vacant Female Lunatic Asylum to house the Medical School, \$10,000 for equipment, and \$60,000 for scholarships for students. Mr Tan raised \$87,000 among his Chinese friends, he himself giving \$2 1,000.³ Twenty-three young men were enrolled (16 for the full course, 7 for a two-year course for Hospital Assistants) each was given a scholarship of \$15 per month with a yearly increment of \$1 per month for the next 4 years. Of the

16 who entered the 5-year course, seven passed in Medicine, Surgery and Midwifery and received their diplomas in May 1910. The Medical School was known as the Straits and Federated Malay States Government Medical School. At the first meeting of the Council held on 12th July 1905, it was decided to approach the General Medical Council of the United Kingdom for recognition. This was deferred until 1916 when the GMC of UK recognised the Licentiate in Medicine and Surgery (L M S) Singapore as entitling its holder to have his name placed in the British Medical Registrar. ⁴

In 1923 it was compulsory for all medical students to register by passing the standard matriculation examination in the London Matriculation. This practice was continued until 1952, when students with a suitable Higher School Certificate could enter the second year of study. In 1923 the Medical Course was increased 5 to 6 years with the introduction of the pre-medical year for Biology, Chemistry and Physics.

The annual intake into the medical school averaged 15-20 students during the years 1905-1938. In 1939, the annual intake was doubled to 40. After the Japanese occupation, this figure was doubled again to 80 students per year. From 1965 onwards this enrolment in the second year was 120. In 1965 the then Vice-Chancellor Prof Lim Tay Boh ⁵ stated that the Medical Faculty of the University of Singapore planned to increase intake into the second year of 150 students in the hope of increasing the output of doctors to 130 per year from 1975. In the 33 years from 1910 to 1942 when there was a break during the Japanese occupation the Medical College produced 462 graduates. After the War from 1946 to 1948 another 66 graduated as Licentiates in medicine and surgery, giving a total of 528 L.M.S's. From 1950 onwards the graduates were awarded M.B., B.S. Up to today, 1894 doctors have graduated with M.B., B.S. (Singapore).

Until 1950 graduates of the King Edward VII College of Medicine were given the diploma of Licentiate in Medicine and Surgery. The LMS Singapore gave a wrong impression to the public of the professional status of the holder because as early as 1927, Col. R.A. Needham in his report to the General Medical Council stated that "the Singapore diploma is in no way inferior to the recognised M.B., B.S. degree".

In 1925 there was only one full-time academic officer, the Principal. Later chairs of Physiology, Anatomy, Medicine, Midwifery, Gynaecology, Surgery, Clinical Surgery and Pathology were created. Later with a \$350,000 contribution from Rockefeller Foundation, the chairs of Bacteriology and Biochemistry were added. With the establishment of the University of Malaya (now Singapore) in

1949, chairs in Social Medicine and Public Health (1950), Orthopaedic Surgery (1951) were established. The establishment of a separate chair in Botany and Zoology (1952) in the Faculty of Science led to the chair of Biology being converted to a Chair in Parasitology (1951). In 1969 the School of Postgraduate Studies was started.

In 1957 the Academy of Physicians and Surgeons was formed through the genius of its first Master, Professor G A Ransome. Later called the Academy of Medicine, it submitted a memorandum on postgraduate medical teaching in 1959 to the Ministry of Health and University of Malaya at Singapore. As a result a postgraduate committee was found in 1961 with representation from professional bodies including one from the Academy. It organised the Basic Science courses for the primary F.R.A.C.S. and ran the courses in advanced medicine. In 1968, the School of Postgraduate Medical Studies was formed as a result of discussion between the Academy and the then Vice-Chancellor, Dr Toh Chin Chye. Four members of the Academy are represented in the Postgraduate Medical Board, constituting 50% of the Board. The Master of Medicine examination has now been held for 5 years in internal medicine, and is now offered in Surgery, Obstetrics and Gynaecology, Paediatrics and Anaesthesiology as well. The Board also offers the M.Sc. in Occupational Medicine and M.Sc. in Industrial Health. In March 4th, 1974, the Academy of Medicine submitted a memorandum on its role in vocational or specialist registration, i.e. it is the appropriate professional body to grant specialist certification in Singapore. The Director of Medical Services in his reply suggested that the matter be kept in abeyance while developments in UK vis a vis the Todd Report is followed.

The College of General Practitioners was registered in June 1971 with education as its avowed primary function. Besides seminars and refresher courses, there is a hospital attachment scheme that enables a general practitioner to go back to the hospital to refresh his knowledge or learn new skills. The college has conducted three annual examinations leading to the Diploma of M.C.G.P. which has been recognised by the Royal Australian College of General Practitioners as being of equivalent standard to their M.R.A.C.G.P.

There is in Singapore a profusion of medical specialist — 17 at last count — societies besides the Singapore Medical Association and the Alumni Association. It is not unusual to be a member of several of them and many of the societies have achieved international recognition by their activities and conferences. They are : Singapore Anaesthetic Society, Cardiac Society, Dermatological Society, Endocrine Society, Gastroenterological

Society, Paediatric Society, Obstetrics and Gynaecological Society; Surgical Society, Society for Neurology, Neurosurgery and Psychiatry, Singapore Thoracic Society, Society for Occupational Medicine, Medico-Legal Society, Radiological Society, Society of Private Practice, Microbiological Society; Society of Ophthalmology, and Singapore Pathological Society. These are professional societies that play an active role in continuing education.

Health Care-Investment and Problems

When Rene Dubos said that "the real measure of health is not the Utopian absence of disease but the ability to function effectively within a given environment,"⁶ the implication of the physician's role assumes a greater dimension than was realised before. Historians have shown that the fate of nations is inseparably related to the state of their health since ill health means low productivity and overpopulation lowers the per capita income, the standard of living and leads to food and housing crises. The progress of a nation is slowed down by a growing residue of unsolved health problems. It is therefore realised that *pari passu* with technological and industrial advances medicine must advance in step or even slightly ahead if the quality of life of the people is to improve.⁶ Medicine in the present context comprises all aspects of health education, health care and health delivery. Gunnar Myrdal **urges** that health should not be considered in isolation from other elements in the development process and cautions against over simplification in our understanding of health by isolating it from other socioeconomic, institutional and policy factors in developing countries.⁷ He emphasizes rightly that education and health cannot be excluded from priorities of importance in the planning philosophy which too often places over-riding importance on investment in the physical elements of national growth such as roads, factories, dams, etc., which have been models based on a concept of capital output approach. The current concept has been widened to include "investment in man" rather than capital formation and physical investment. Myrdal insists that innovation must go further than the investment approach to probe institutional and attitudinal reforms which depend on political decision rather than budgetary considerations. The role of the consumers must now figure more in the concept of health and medicine.

Medicine claims to be a noble profession by all counts. Over the centuries the physician has surprisingly continued to uphold the lofty traditions of the profession and maintained a standard of ethics despite differing patterns of training and practice. There are times when doctors are accused of being

merely retailers of the commodity of nationalised medicine, or practising medicine as skilled craftsmen or as research workers more at home among colonies of mice and clones of cells than the community of man. Be it as it may, the physician (and here may I include the surgeon, the obstetrician, the general practitioner and others) is never more needed than ever before. I am not talking of medical assistants, auxiliaries or paramedical personnel but the physicians. The Executive Board of the WHO has thought it fit to define a physician in the following words: "A physician is a person who, having been regularly admitted to a medical school duly **recognised** in the country in which it is located, has successfully completed their prescribed course of studies in medicine and has acquired the requisite qualification to be legally licensed to **practise** medicine (comprising preventive diagnosis, treatment and rehabilitation using independent **judgement**, to promote community and individual health."^{*}

WHO in 1965 laid down a minimum target for the next decade of one doctor for every 10,000 of population. Throughout Africa, to take just one continent as an example (excluding Egypt and South Africa) the average doctor patient ratio was then 1:20,000. To meet the target an increase of 14,000 doctors from 10,000 to 24,000 was needed immediately. This was roughly equivalent to the complete output from all the medical schools in Britain concluded Prof Hill. He went on to point out that in East Africa out of 1,000 children attending primary schools, only 10 go to secondary schools, and only 1 continue training thereafter. Other equally important disciplines such as agriculture, engineering and education compete for such students eligible for university places. Northern Nigeria requires 17 times as many doctors to look after its 20 million people i.e., 3,000 doctors instead of the present number of 120. In 1965 it had no medical school; the first 30 doctors qualified in 1973. At this rate it would need 100 years to provide the 3,000 trained doctors but by A D 2000 the population is expected to double.⁶

It has been estimated that the world needs 750 new medical schools and 75,000 teachers. If the aim is one doctor for every 770 people as in Europe then the world is 3.5 million doctors short. Therefore in the growing gap between demand and delivery, many countries are turning their attention to training medical assistants.

Medical education has been widely criticised for failure to produce sufficiently trained manpower and for producing doctors who fail to serve the needs of society. Other charges include neglect of teaching and over-emphasis on research and lack of

concern for the individual. The right product the consumers want seems to be 'an undefined but allegedly earnest combination of knowledge, skill, motivation, understanding and warmth.'" ⁹ The Ditchly Park Conference on Medical Education, Research and Medical Care in Developing Countries in 1971 put down the objective of medical education in these words, "Medical education must aim at producing a doctor who is trained for uncertainty, who is resourceful and adaptable and who is able to manage teams of auxiliaries to the best advantage within a very limited budget. He needs training in management as well as in medicine." ¹⁰

The response of the medical school, the medical profession, the teachers and the university has been to seek a new structure of medical training where a right balance between tradition and innovation, teaching and research, community and individual needs can be found. The Flexner report of 1910¹¹ has not only dominated American medicine for well over 60 years but also extended its influence to far flung developing countries previously ruled by western powers. Some medical educators charge that this "Flexner model" is seemingly out of touch with contemporary needs. They argue that the "dichotomy between the pre-clinical and clinical years must be scrapped. The Flexner model wastes precious time". There is a growing concern that the sharp distinction between pre-clinical and clinical studies tends to dissipate and even destroy the medical school's most valuable instrument i.e., the interest, enthusiasm and idealism with which students begin their studies. Attitudinal surveys show medical school students scoring lower on idealism and higher on cynicism each year they are in school so much so that many medical teachers refer to the pre-clinical and clinical years as the "precynical" and "cynical" years. There have been several attempts to propose reforms including the Case Western Reserve Medical School's assignment of a student to a family early in his first year and following and helping with the family's medical problems in the entire 4 years of medical school. The fact is that the needs of each country varies from another. In UK the Todd report of 1968 ¹² superceded the Goodenough Report of 1944, ¹³ in US A the Carnegie Commission in Higher Education of 1970 ¹⁴ succeeded the Coggeshall Report of 1965. ¹⁵ The Todd report is yet to be implemented. McMaster University developed certain innovative ideas in medical education which they present collectively as the "McMaster Philosophy." Briefly these are :-

1. Emphasis on individual capabilities and characteristics other than a store of knowledge.
2. Encouragement of a flexible ability to mani-

pulate data to recognise and define problems and to evaluate their solutions.

3. The production of "undifferentiated" physicians who at graduation will be able to select more specific post-graduate training programmes. ¹⁶

Implicit in this approach is a self-directed learning, the students acting as educators, a problem-based type of learning, the selective use of learning resources and evaluation of student learning programmes, the use of faculty members as resource persons and so forth. Perhaps few teachers of medicine can fail to see that they too have attempted in their own way some of these objectives. However such close monitoring of the student's programme especially the evaluation of individual student's personal characteristics, his ability to learn independently, his depth of reading, problem solving ability, and clinical skill requires teams of specially trained faculty members functioning as resource persons. It is obvious that their primary objective is teaching and that they cannot be given the heavy clinical load our medical teachers have to carry as well. One also wonders how many of our students can fulfil the high personal and academic qualities necessary for such a programme. It has been said not without some truth that it does not matter what form or content the medical course offers, but it matters more that the school gets the best students who do well despite the failings of teachers and course! One may as well perhaps continue to argue -- *reductio ad absurdum* -that coaching by correspondence is equally effective. The truth of the matter is that the doctor is not made by fitting together pieces of knowledge in science and medicine. There is no such thing as an "instant" doctor over the six centuries or so of modern medicine and education. The period of gestation seems to be fixed at five years, or six years if a year of internship is included. Milnes Walker in the Rock Carling Lecture in 1965 argues for 2 years' pre-clinical, 2 years' clinical and 2 years' pre-registration training. ¹⁷ I shall discuss more of this later.

Standards of Practice

In the year 1421, Parliament successfully petitioned King Henry V that the only legal qualification to practise medicine in England was a medical degree of a university. But in 1462 Edward IV granted a Charter to the Company of Barbers to treat the sick and injured as well as barbery. Neither the surgeon nor the apothecary were university trained, but progressed through apprenticeship to eventual licensing by the Barber-Surgeons or the London Society of Apothecaries. Some 50 years later an attempt was made to control medical prac-

tice by a law of Henry VIII passed in 1511 which laid down that “no person within the City of London, or within 7 miles of the same, take upon him to exercise and occupy as a physician or surgeon, except he be first examined, approved and admitted by the Bishop of London or by the Dean of St Paul’s for the time being.” It was of course natural that when most education and medical treatment was carried out in the monasteries the power to grant licences should be placed in the hand of the clergy since there was no other body organised or capable of undertaking it. Although Henry VIII founded the first two professorships of medicine in Great Britain, the Regius chair at Cambridge in 1540 and at Oxford in 1545, for a long time they were sinecures and very few lectures were given. There was in fact very little teaching in medicine at either of these universities. An M A could be granted after seven years’ study at Cambridge and then the candidate for a medical degree had to study for 4 more years during which time he had to witness two anatomies, before obtaining his Bachelor’s degree which permitted him to practise within the municipality. Four further years of study were required for the Doctorate. Most medical students however went to one of the foreign universities where they obtained their MD and on their return they were allowed to “incorporate” this at their own university of Oxford or Cambridge.¹⁹ “By the 18th Century the rising middle class of merchants and tradesmen was interested in medical care and could afford to pay for it. It was they who encouraged the highly trained graduates of Edinburgh University, who covered the whole field of medicine competently to come to England. . . The apothecaries who were at first merely dispensers of drugs, had their own guilds and the London Society of Apothecaries was founded by Royal Charter in 1617. The apothecaries were very active and gradually encroached upon the sphere of general practice. . . By 1815, the apothecaries secured a bill from Parliament which gave the London Society almost a monopoly of the training of general practitioners by a course of apprenticeship, clinical training in hospital and a qualifying examination. . . . This was an important advance in medical education for it became accepted that it was no longer by the study of books and the works of Hypocrates and Galen but by instruction in basic sciences and then learning about disease at the bedside that the student became a doctor.”¹⁸

This revolutionary change in education produced a body of new practitioners who were young, radical and energetic. They organised themselves into the reform group out of which emerged the British Medical Association. Due almost entirely to their demands for a high educational and ethical standards in the profession, the Medical Act of 1858

was passed thus providing the legal basis of the profession today. However the public was still free to choose their doctors registered or unregistered and quacks were not prosecuted as the doctors had hoped they would.

An important milestone in medical education was the founding of the John Hopkins Medical School at Baltimore in 1889. For the first time a school was established with organised clinical teaching units under Professors of Medicine, Surgery, Obstetrics and Pathology and these clinics were filled by outstanding men, Osler, Halsted, Kelly and Welch. The impact of this school was immense and was reflected in the report on Medical Education by Abraham Flexner for the Carnegie Foundation and in his book published in 1925.

In 1911 the representatives of University College in giving evidence before a Royal Commission on Higher Education advocated the setting up of units in clinical subjects with professors in charge who would not be debarred entirely from private practice. The Commission report in 1913 was in favour of units in medicine, surgery and obstetrics but the war put a stop to further action. After the 1914-18 war the first fulltime units were set up in London in medicine and surgery at Bartholomew and University College Hospitals and in medicine at St Thomas’s.

The units at University College Hospital so impressed the representatives of the Rockefeller Foundation that they made a gift of nearly a million pounds for the endowment of these units.¹⁷

Abraham Flexner surveyed medical education in N America and Europe and his appreciation of the influence of John Hopkins is indicated by his comment, “Could the medical school at Cambridge be completed on a daring basis, English medicine might react as American medicine reacted to the stimulus of John Hopkins Medical School.” The challenge was not taken up then. His remarks in 1925 is pertinent today. “A medical school cannot expect to produce fully trained doctors, it can at most hope to equip students with a limited knowledge to train them on the method and spirit of scientific medicine, and to launch them with a momentum that will make them active learners, observers, readers, thinkers, and experimenters for years to come.” He qualified his admiration of British medical education on which was founded our medical school, with these words, “Unity of conception is the first requisite, next the resolute determination to introduce in all the laboratory subjects the principles worked out in England for teaching physiology would effect enormous improvement without any expenditure whatever.” That Flexner was also realistic is shown by the comments, “The

medical faculty must offer salaries adequate to enable their competent professors to live at the level prescribed by custom and common practice. . .” “For the study of diseases and the training of students the university must completely control an adequate supply of clinical material.”¹⁹

In 1960 there were for each doctor 580 people in USSR, 620 in Austria and Czechoslovakia, 670 in West Germany, 750 in Italy, 780 in US A, 860 in Australia, 910 in Canada, 102,000 in Ethiopia, 48,000 in Indonesia. In 1970 published statistics showed that no fewer than 20 countries had only one doctor for every 25,000 to 75,000 inhabitants, 42 countries had 1 doctor for fewer than 1,000 inhabitants. Some of these countries consider their needs are not fully met. Russia for example aims to reach a ratio of one doctor to 300 inhabitants. In Thailand of about 5,000 registered physicians, more than half live and work in Bangkok giving a doctor : population ratio of 1: 1,000 in Bangkok, 1: 7,000 in the nation, but 1 : 100,000 in the rural area. The position in Indonesia is somewhat similar in that 40 per cent of the 6,000 doctors reside in Jakarta. We have one doctor to 1,350 of population in Singapore.

In Russia the bulk of medical care for the people was provided by feldshers or field barbers introduced by Peter the Great into the Russian Army in 1864. At World War I feldshers had already outnumbered physicians 3 to 1. Most of them are women and there are 400,000 in medicine in the USSR. The important point to notice is that their training takes place alongside the training of physicians and not in place of them. This is also the case in China where some 180,000 doctors trained in 4-6 years Western medicine are complemented by 172,000 assistant doctors, 500,000 practitioners of traditional medicine and 1 million part-time auxiliaries variously called barefoot doctors, worker doctors, Red Guard Doctors, public health workers, family health workers.

The total number of physicians doubled between 1950 and 1970. It will have to double again before the end of this century if the present ratio of physicians to general population is not to decline. In 1950 (excluding People's Republic of China, North Korea, Khmer, Bhutan and Sikkim) there were 1.1 million physicians or a medical density of 5.7 per 10,000 population ; in 1960 there were 1.6 million doctors and a medical density of 6.9 per 10,000, by 1971, it was 2.2 million and 7.9 per 10,000 respectively. From 1950 to 1970, there was a mean annual growth rate of 3.9% in the number of physicians but because of general population growth, the mean increase was only 1.6 %.

The present decade is crucial. Unless the in-

crease in doctors in the 1970's is greater than in 1960, Asia's already low medical density will fall further. There is a positive correlation between the medical density of a country and the expectation of life of its citizens. Such a correlation no longer exists where there is more than 15 doctors or fewer than 1 per 10,000. Underdevelopment in the social and health fields can be so great that modest advances in medical manpower will produce no effect.²⁰

The cost of making a doctor is considerably higher than that of other professions. In the University of Singapore, the cost for producing a Accountancy or Business Administration graduate is approximately \$4,000, for Engineering \$6,000, for Medicine \$10,000 a year respectively. It has also to be taken in the total picture of education in our Republic-where 528,000 or a quarter of the population are in school in 1974 and each student costs \$600 a year to the country. Education absorbs 13% of the nation's budget. Of this 16% goes to tertiary education .²¹

The Changing Face of Medicine

When the medical school was founded, the main causes of death were malaria (which accounted for 20 deaths a day in the Singapore Municipal area alone in 1911), dysentery, beri-beri (of which the aetiology was unknown at that time), tuberculosis for which no specific treatment was available and venereal disease which according to Dr Chen Su Lan was in almost every Straits-born home.³

Even in the 24 years span from 1948 to 1971 the pattern of disease in Singapore has greatly changed. Excluding ill-defined conditions and senility, the principal causes of death in Singapore in 1948 were firstly infective and parasitic, secondly respiratory and thirdly digestive. In 1971 the "killer" diseases were circulatory, neoplastic and respiratory in this order. What is most revealing is that infective and parasitic and digestive system deaths have been reduced to one-third of the 1948 figures and deaths in early infancy to half, but neoplastic and circulatory system deaths have increased five-fold from 347 to 1,728 and from 626 to 3,120 respectively. Accidents, poisonings and violent deaths have increased slightly more than two-fold from 418 to 968. There was no significant change for nervous, respiratory, genito-urinary and psychomatic deaths. However, mortality cannot tell the full story of medicine. Morbidity in society can result from changing patterns of living e.g., from rural village to high rise estates, from shop to factory. Even success has its price with the current demand for higher standards of living and health care.

The practice of medicine has also changed. Family medicine is being replaced by contract prac-

tice in which firms of general practitioners treat employees of companies and their families as a result of legislation. The well-to-do tend to use specialists more often for their ailments than the general practitioners. The arrival of the antibiotic/sulphonamide era has radically altered the treatment of fevers and infections such as pneumonia. There is no longer any need to wait for a crisis. The leisurely diagnosis preceded by detailed description of the disease was often succeeded by little effective treatment. Today rapid diagnosis and treatment is mandatory to prevent death and provide a rapid turnover of costly hospital beds. This change in medicine has *ipso facto* led to a change in the pattern of disease. Diseases that are genetically determined and degenerative disorders are more apparent. Self-induced diseases are increasing e.g., cancer of the lung due to tobacco smoking. The Sunday Telegraph sums it up recently by noting that the "refusal to prevent is our decision" (Aug 18, 1968). Likewise the patient with angina stands a three times greater chance of dying suddenly if he continues to smoke heavily.²² The increased incidence of psychiatric illness in general practice is supported by a recent survey by the National Institute of Mental Health of America that 15 % of US adults aged 18 to 74—20 million people—suffer from significant depressive illness every year.²⁴ I am reliably informed that in general practice in Singapore today psychological problems constitute as high as 70% of cases seen in the town and 50% in the suburbs.

The Changing Pattern of Hospital Medicine

Prof Biorck²³ gave examples of the change in hospital medicine. In 1958 emergency cases constituted only 10% of the medical beds of Seraphimer Hospital in Stockholm. In 1974, they have increased to 70-80%. This was in clear contrast to the experience of surgeons whose wards have 30% acute cases, the remainder being admitted for planned elective surgery. The Singapore situation has similarities in that there are more emergencies but they occur equally with medical and surgical beds. During one week in June this year there were 123 emergencies and 78 cold cases admitted to Medical Unit II of Singapore General Hospital which has 179 beds. During the same week, Surgical 'A' Unit admitted 145 emergencies and 80 cold cases. Speaking only of medical cases, Prof Biorck lists 3 reasons for this change in hospital medicine: (i) aging of population leading to more cardiovascular emergencies, (ii) intoxications, and (iii) failure of general practitioner to provide round the clock responsibility for his patients. He pointed out that office hours in the modern urban society are 40 out of the week's 168. For the remaining 128 hours, the

hospitals and the police share the responsibility for the city and the citizens. He sees no likelihood of acute medical admissions diminishing. "They cannot be prevented by preventive medicine, only postponed and the more of them that strike older people or very old people, the more urgent will become the demand for hospital services as such people will have no family setting to back them up." In Singapore the number of 55 years old and above more than doubled from 92,792 in 1952 to 183,652 in 1970. By 2,000 A D the number of persons older than 60 years will increase 2½ times from 118,600 in 1970 to 266,800.²⁵ The problem of geriatric medicine will figure more both in hospital and general practice with the increasing age of the population; the average life expectancy for men being 65 and for women 70 in Singapore. The chronic sick will still be with us in the foreseeable future because people are growing older. Hospital medicine will become more specialised, more expensive and more remote from family medicine unless points of convergence are established.

We have largely covered the change in medicine as occurring in the urban situation, but with greater social and international contacts doctors have awakened to the grievous needs and global responsibilities of medicine in developing countries that require a more basic structure of medicine that has been called primary health care.

Primary Health Care

At the 28th World Health Assembly on April 18th this year, it was resolved that WH 0 should concentrate its efforts to assist governments to direct their health service programme for the rapid and effective development of the health delivery system for the underserved population. "The seriousness of the problem is manifested by the high morbidity and mortality rates that exist in the rural and peri-urban populations which still constitute 80.85% of the world population where some 550 million people are still suffering from absolute poverty (with a per capita annual income of US\$50 or less). . . Large segments of the world's population have limited or no access to the health service. In other areas these services have often operated in an isolated manner neglecting other aspects contributory to human well being such as education, communication, agriculture, social organisation, community motivation and involvement. . . If present trends continue the existing gaps will be further widened. For example the difference between urban and rural health service will be accentuated. . . The solution to this problem will require an approach integrating all the elements necessary to make an impact on the health status of the people parti-

cularly the underserved groups. One approach which will respond to the various needs is referred to as primary health care. PHC should be based on modern scientific knowledge and health technology as well as accepted and effective traditional healing practices. The two dimensions should generate methods and techniques which are appropriate, inexpensive, acceptable and easily handled by the health personnel working at the community level."

No doctor worth his salt can ignore this crisis and challenge in medicine especially as he sees the needs all around him in South East Asia and other continents. Some highly motivated doctors will see themselves called to practise primary health care as the medicine of first choice.

Change in Medical Education

Is change necessary? What forces are taking place that should change our traditional pattern of medical education? Have we not successfully produced 2,422 doctors in the 70 years of medical education and have they not been competent in professional and social life. Have they not succeeded in obtaining the highest qualifications in medicine? And have we not instituted our own Postgraduate degrees of Master of Medicine with 87 doctors receiving this degree in four specialities? We can therefore take the line that there is no need for us to adopt new policy directions in medical education even though we see major changes in many well known institutions in several continents. Or we could take a closer look at our innate conservatism as well as look at some of these changes that are even now taking place.

In the first place we should not change merely for change's sake. But should we not also judge whether we are right in accepting inherited patterns and traditions that were appropriate fifty or even twenty years ago when the physician was trained as a rugged individualist to tackle all sorts of situations involving skill in surgery, obstetrics or public health? We are familiar with the horse and buggy doctor coping with every crisis and emergency as well as the institutional perennial all rounder medical officer. However, there is a limited scope to medical versatility for the present day graduate who cannot be a multidiscipline expert. Whether we like it or not we are living in an age of rapid social change of massive strides in technological advance, with knowledge doubling every ten and perhaps even now every five years. It will take a doctor's lifetime to excel in one discipline.

The concept of health has been and still is in many countries the eradication of disease so simply and gloriously typified by the surgeon's scalpel. The sulphonamide antibiotic and psycho-

tropic drug discoveries were major advances that helped to change the face of medicine. The threat of population explosion, the potential destruction of the world's ecosystem by man's pollution, have forced the physician to look at man in his community and environment. The community confronts medicine as a complex patient. The doctor has merely to observe the major threats to its health and realises that the total well being of the community is as much his responsibility as that for the individual patient. New policy directions have come from world bodies such as WH O. Terms such as comprehensive health care, primary health care, health care team indicate that medicine cannot be exclusive but must somehow be related in a comprehensive programme to food, housing, work, education and general living conditions. This total health care must involve both hospital and community, specialist and family physician, doctor and paramedical personnel. Total or comprehensive health care is defined as the community guaranteeing all groups of population the best available medical care and the maximum coverage for the prevention of illness and promotion of health. Medical education that does not teach these new directions will fail to promote health in its fullest dimensions. The community is made up of 'population units' to whom health care must be delivered in terms of material resources by a team of trained personnel.

The consumer unit is the family, including the sick and healthy members. The health service to be comprehensive must reach out to the home in contrast to present services which expect the sick to come for care and therefore reaches only about 15-20% of the population. Given the infrastructure it should be possible for each individual in a community to obtain the highest level of health in a given situation and within available resources. Health cannot be measured merely in terms of disease reduction. Such ideas are not new but are revolutionary in terms of present medical practice. Community participation is essential and the local health care is the focus of this activity especially in the rural situation. It is increasingly realised that the doctor's place in the health delivery team is becoming more managerial, planning and specialist. However his skills are more needed than ever because some of his other functions can and should be taken over by assistants. He is freed to be more fully a health care practitioner in the fullest sense. He is not just a retailer of a health service product. Everyday he is making decisions that affect the life and well being of his patients in a living community. The real decision making is at the periphery of the doctor-patient interface. The family physician — the physician of first contact — will play a greater

role in prevention of disease and forestalling of crisis, medical certainly and social inevitably. It is therefore necessary that the medical school does not produce an institutional type of doctor who fails to relate to the community, but rather a balanced 'undifferentiated' doctor who is exposed early to community medicine and comprehensive health care. Irrespective of his final choice of discipline or speciality, he is the better doctor because he is made aware of his social responsibility.

The Objective of Medical Education

Every medical school should have in mind the kind of doctor it wants to produce. But not every school has defined the objective of its programme of training to ensure that the finished product i.e., a doctor possesses certain qualities, knowledge and skills. In its proposal for a revised medical curriculum for 1976-77, the curriculum committee of the Board of Faculty of Medicine of the University of Newcastle upon Tyne reiterated the objectives and aims of the present curriculum. Phrased in general terms, they are so well stated under subject headings that I can do no better than quote them: —

1. *General intention*

He should have developed an attitude to medicine which is a blend of the scientific and humanitarian.

2. *Scientific method*

He should know that conclusions should be reached by logical deduction and he should be able to assess evidence both as to its reliability and its relevance.

3. *Professional standards*

He should be imbued with the high ethical standards required of a doctor. He should have learned how to care for patients and their relatives with sympathy and with understanding.

4. *Human biology*

He should possess a knowledge of the structure, function and development of the human body; of the factors which may disturb these, and the disorders of structure and function which may result.

5. *Clinical knowledge*

He must learn how to elicit facts from a patient. He should have a good knowledge of those diseases which are an acute danger to life and of the more common disabling diseases. He should recognise the limitation of his own clinical knowledge

and should be prepared, when considering treatment and management, to seek further help.

6. *Environment and health*

He should understand the effects of environment on health and should appreciate the responsibility of his profession for the prevention of disease.

7. *Continuing education*

He should appreciate that medicine is a continuing education and that he has an obligation to remain a student and to contribute if he can to the progress of medicine through the whole of his professional career.

In measuring our objectives against theirs, at no point can I find any disagreement. However, their curriculum committee proceeded to enunciate 14 more principles and aims for the new curriculum of the 1980's! Those interested should study the detailed document but we can take note of the bold declaration of the first of these: "We regard the Practice of Medicine as the medical care in health and disease of men and women in society from the time that a new person is conceived, through foetal life, childhood, adolescence, early adult life, with marriage and the creation of families, later adult life and finally old age and death."

Time for change?

It is fashionable nowadays to flog the hobby horse of curricular changes. However if we envisage a graduate product able to meet the challenge of the 1980's it is time to consider courageous moves. While one would not be so bold as to make a detailed comment, nevertheless certain general statements are justified in the light of new knowledge and advances in medical education. For example, should the preclinical course be strictly scientific?

In the first place we can achieve a better economy of faculty time and financial resources by all departments and indeed all medical teachers defining the objectives of their part of the course and setting out a statement of what they regard as the basic information that every student should obtain during that part of the course. Then by joining forces, overlap can be avoided and a better integration promoted between various disciplines. We recognise for example that it is ineffective to teach clinical biochemistry out of context with the clinical situation or microbiology apart from clinical infectious disease. In internal medicine (as in other clinical disciplines), pathophysiological mechanisms can be better understood if there is more correlated teaching with physiology, biochemistry and pathology. Hence there should be more systematic

integration between the clinical and preclinical departments.

Secondly present day medical education would question the validity of continuing to use large sections of time for heavy anatomical teaching especially dissection of the whole human body and clinical attachment to departments more suitable for graduate and vocational than undergraduate training. For example Anatomy has three times more lecture hours than Medicine. In practical or tutorial time it is almost three times longer than Social Medicine and Public Health including biostatistics but excluding field surveys. This is not to deny the importance of anatomy as a core subject in the basic medical sciences but rather to accept the growing emphasis in skills than learning large quantities of fact. Would it not be more appropriate for the undergraduate of today to devote some time, say, to human psychology and human society at the same time that he learns human biology in Anatomy, Biochemistry and Physiology. When he graduates and has decided to specialise in Surgery a more detailed study of Anatomy is certainly necessary. Until recently certain anomalies persisted in our curriculum which used to allow only one week's posting in psychological medicine and this takes place in an institution which is a custodial hospital for patients with advanced psychopathology. On the other hand there are 11 weeks' posting in orthopaedic surgery, 11 weeks in obstetrics and gynaecology and 20 weeks in surgery which are considered to be vocational specialities. Minor specialities such as anaesthesia, ENT and ophthalmology merit 3 weeks each while dermatology and venereal diseases together used to get one week until this year. In general practice today psychological medicine assumes a far greater role; dermatology likewise deserves more emphasis for one in five patients in general practice has a skin ailment.

Every school has changed the form and organisation of its curriculum from time to time and we are no exception. From what I can observe, every curriculum acknowledges some defects in concept and context. There is a strong conformist tendency in those schools who have inherited patterns from past colonial days. But certain general facts do emerge when our current curriculum is studied. Despite drastic reduction in teachings hours e.g., from 2 to 1½ years in Basic Medical Sciences and from 825 to 490 hours in anatomy alone in 1969, teaching in the faculty is still possibly too concentrated and detailed and factual content is too great. This feature is also present in secondary and even primary schools. We have yet to achieve complete integration although staff and student cross over from preclinical to clinical areas and vice versa and

our correlated teaching sessions have achieved a fair degree of success. Self learning has hardly been encouraged and this is partly due to lack of free time available for the student at all stages of the curriculum. Perhaps our strongest points have been the more than ample opportunities for clinical examination and actual in-service training during the final year. But there is little or no personal contact with patients during the preclinical period and the division is in fact clear cut. Although Faculty has resolved the setting up of a department of psychological medicine, mental health as opposed to psychiatric medicine has not been emphasized adequately. The behavioural and sociological aspects of medicine including the new medical ethics brought on by the use of advanced technologies have not received their rightful place in the curriculum. Exposure to general practice has not been a success, but this could be due to widely differing standards of family medicine which the College of General Practitioners is trying to raise. While there is no better method of instruction than an able lecture with chalk and slides, we should make more use of seminars and small group discussion and audio-visual aids. Indeed a large range of learning resources should be made available. However the conventional lecture is still the most economical and in many ways the most attractive form of teaching and should not be abandoned entirely. Students probably require an initial course of introduction to self-directed learning and the acquisition of a scientific, critical and inquisitive approach with themselves as evaluators of their own progress. Students also require instruction in the developing new information systems so as to be able to ask appropriate questions and find the sources of the data necessary to answer them. We have begun with the freshmen being given an orientation session in the medical library. With increasing quantities of knowledge stored in adequate computer libraries the student and professionals of the future will have to learn to consult them at will. Their teachers will need to help them recognise the differing validity of information in the various sources to which they are directed. The McMaster programme has many excellent features that are boldly innovative yet attractive to faculty and student. It encourages the student with appropriate guidance to define his own learning goals, select appropriate experiences to achieve these goals, be responsible for assessing his own learning progress and assess the contribution of faculty tutors. The student is assumed to be a responsible, motivated and independent adult capable of developing his own career goals. The tutor has a key role in such a programme which emphasises facilitating of learning rather than didactic teaching. He himself has to be an example of self-direct-

ed learning and problem solving. While it is perhaps too early to judge the success or otherwise of the McMaster's programme, it should be noted that there are two ingredients that would appear to be essential for its success. Firstly it requires a highly selected group of students with a basic 5-year university experience and a minimum of 'B' average, and more important still who are selected on the basis of personal characteristics and abilities. They should demonstrate abilities for independent learning, imaginative problem solving, emotional stability, responsibility, motivation for a medical career and a capacity for self-appraisal. Secondly it requires the explicit commitment of the full-time faculty member to a minimum of 20% of his time to educational activity and to the undergraduate programme as a first priority.

Student Selection

We should also look into the methods of selection of medical students other than on grounds of academic achievement. Success in an academic career is not matched by success in later life as Osler Petersen has shown.²⁶ Indeed I have watched with delight and some relief, the subsequent successful careers of a few students who had been labelled as poor in their studies but had shown leadership in extramural activities. Computer selection of the medical student fails in assessing motivation, attitude and intelligence. The interview may be old fashioned and laborious but a skilled and small panel has much to recommend.

It has been our unfortunate experience to coach students who have lost their motivation if not enthusiasm for medicine by the time they reach the clinical years. It is recommended in the recent Merrison Report²⁷ that University staff should see it as part of those responsibility to dissuade unsuitable students preferably before they begin the clinical years. The British Medical Association would like a formal assessment of mental and physical fitness for the medical student in order to 'weed out' those students who while possessing adequate academic ability, are otherwise unfit to practise medicine. Fortunately this kind of experience is not common. In the 8-year period 1962 to 1970 inclusive, 898 students were admitted to the course in our Medical School, 872 completed, 21 dropped out, 2 died, and 3 are still in the course. Of the dropouts, 9 occurred in the session 1962-63 alone; 10 in the preclinical and 11 in the clinical period.

Teacher Training

Perhaps it is traditional for medical schools including our own to recruit teachers with academic

and research backgrounds and specialist skills. However it is common knowledge that teaching competence is not a requirement. The need to train university teachers has only recently been recognised. For example King's College Hospital Medical School has run workshops for teachers training for four years using educational psychology and methods for medical teachers that have been used for primary and secondary school teachers for the past decades. It is interesting to note the comments of the King's College group headed by Prof John Anderson: "Nothing is more difficult to change than the person who thinks he knows exactly what he is doing and why he is doing it. Thus, there is a need not only to create new efficient teachers by making some form of teacher training compulsory, but also to persuade those actively teaching at present of the need to undertake such training themselves."²⁷ Medical teachers must be respected by their peers and should show exemplary conduct to the apprentice doctors who all too easily can spot failings and faults but are inspired by good examples. Medicine to a large degree is still learnt by precept and example at the bedside and in small groups.

The recent setting up of departments of medical education in national universities in Korea, Philippines, Thailand and Australia highlights the importance of the proper preparation and direction of medical teachers. Although we have but one medical school, if we are to achieve a better graduate product, we have to develop at least a training programme for medical teachers. The teacher's role is to help create doctors rather than to teach medicine.

The Pre-registration Year— Graduate Clinical Training

It is rightly understood that all doctors will need vocational training before being able to practise independently i.e., during the pre-registration training and even after registration. It is not expected that, at the conclusion of the pre-registration training, the doctor would be capable of the highest skills in all branches of clinical medicine, but he "must be able to put into practice the general principles learnt in the undergraduate years and in particular, through experience in selected clinical specialities to have practice in the understanding of people (crucial to diagnosis and management), in diagnosis, and in making decision on clinical management."²⁸ "All too often the houseman is treated as a much needed extra pair of hands rather than a probationer doctor still requiring supervision and training at a significant point in his career."²⁹ In UK, the Junior Hospital Doctors Association reported that "most posts appeared to be treated as

service posts." The Association's survey in 1971 showed that 45% of the house officers sampled "lacked the immediate, experienced registrar cover to call on if faced with an emergency foreign to their experience." "In 85% of pre-registration appointments there was a failure to provide the time for study recommended by the GMC."³⁰

The Merrison Report of 1975 proposes the replacement of the pre-registration year by a period of graduate clinical training between graduation and the beginning of specialist training where the graduate's further education and exposure to responsibility are supervised. It recommended a series of posts providing a wide range of general clinical experience and suitable for the development of responsibility, including some specialty work.³¹

It further recommended that all the arguments they heard "point in the direction of making graduate clinical training last something like two years." The undergraduate course would be correspondingly reduced in length. The Report stated that "such a change would allow a better balance between clinical and other teaching and facilitate greater curricular flexibility. It would also lead to doctors receiving a salary earlier than at present."³²

A two year housemanship period or graduate clinical training without loss of time for registration would mean that the undergraduate curriculum would be reduced to four years. This can only be accomplished if some courses are shortened, and some subjects now taught in the clinical period are taught earlier in the first two years. Surgery, Orthopaedic Surgery, Obstetrics and Gynaecology and other subjects provided for during the graduate clinical training would have proportionately less time in the curriculum. In fact it would be possible to give every graduate a full rotation of house posts in medicine, paediatrics, surgery, obstetrics and gynaecology and an elective posting to certain specialties including non-clinical specialties such as biochemistry. The length of graduate clinical training can be changed and specified by the Medical Council.

Specialist Training

The Merrison Report states **unequivocally**,³³ "Specialist education should complete the education of the doctor by providing the knowledge and skills of the particular specialist discipline to the point where the doctor is competent to take the highest level of clinical responsibility for patients requiring the relevant specialist treatment." Singapore may be justly proud of its specialist medical education in that the Master of Medicine degree now includes Medicine, Surgery, Paediatrics, Obstetrics and Gynaecology, and Anaesthesiology.

Hitherto specialist education in UK has been supervised by the Royal Colleges and the universities. In UK the Joint Committees on Higher Training emerged following the report of the Royal Commission on Medical Education, they cover Joint Higher Committees for 17 medical, 9 surgical specialties, the specialties of obstetrics and gynaecology, community medicine, anaesthetics and psychiatry. They provide accreditation in the relevant speciality. The Royal Australasian College of Physicians now recognise two phases of physician training, Basic Physician Training and Advanced Training. The former ordinarily commences after the intern year but may commence any time after this and will occupy at least two years in which the trainee acquires broadly based knowledge and skills in the principles and practice of internal medicine or paediatrics at one or more hospitals or up to 3 months in supervised general practice. Advanced Training may be undertaken in general medicine, or any one of the 13 recognised subspecialties and will last 3 years, but the duration of training will vary according to the particular subspecialty. The training is undertaken in accredited programmes. During the latter half of the second year of the Basic Physician Training programme, an examination is taken but success will not admit the candidate to the College but present the trainee to commence his Advanced Training. Upon completion of Advanced Training, a trainee may apply for admission to the Fellowship of the College. The Board of Censors reserves the right to examine individual applicants should they deem this to be necessary. To be accredited, hospitals have to provide approved training programme, adequate staff establishment and support by ancillary departments. Prior to sitting the Part I FRACP candidates' supervisors will certify he has satisfactorily undertaken the basic training programme. At the present state of development Singapore could conceivably offer advanced training programmes in general medicine, paediatrics, cardiology, endocrinology, gastroenterology, haematology, neurology, renal medicine, thoracic medicine. Clinical pharmacology, clinical immunology, nuclear medicine, rheumatology have not yet developed to the stage to offer advanced training. Our trainee scheme is somewhat similar to the Clinical Attachment Scheme but if specialist training is to follow graduate clinical training, many more posts are definitely required.

The Merrison Report recommended a specialist register on the following grounds: "We believe that every doctor should have received a specialist education; a specialist register will, on the whole secure that a specialist education is a precondition of the independent practice of medicine."³⁴

The University Medical Centre

The mould that shapes the kind of doctor the medical school intends to have must be applied from the very first day of undergraduate training if it is to be effective and before hardening of attitudes and sensitivities has taken place. This special environment must extend beyond the classroom. Young people are not just seeking medicine as a skill or profession; their active minds need to be cultivated in a community of learning and sharing where like minds and more mature persons communicate freely without the restriction of set lectures and confines of laboratories. This is the setting of the University Medical Centre in the campus where the rich mixture of disciplines of science and arts of living and playing in community can only enhance the spirit of learning and growth.

The Goodenough Committee recommended that an annual intake of 100 students requires a teaching hospital of 1,000 beds. In Singapore we have been fortunate that the main teaching hospital, the Singapore General Hospital, has 1,400 beds at present and is building a new complex with modern facilities for the specialties. Few teaching hospitals are university based with the main purpose of planning it as a student centred environment for learning i.e., faculty and support elements are brought to the students contrary to the usual and opposite approach. The emphasis will lie on interdisciplinary and multidisciplinary team approach to health care. It should cover all services from basic health sciences to in-patient, ambulant patient care and family medicine. If the medical centre is to benefit fully from its association with the university, it should be within the university proper to maximize the use of its facilities. It can have ready access to learning resources, research laboratories, meeting rooms, and recreational facilities for students, faculty and staff. Thus it is identified with the university community. Its very nature will allow an integrated approach to teaching and research services. It should feed a continuing study of man from all aspects. Though optimal delivery of health services to the community should be fostered through research and education, it should undertake the actual responsibility of comprehensive health care of a community. It should be flexible to accept an increase of student enrollment, expansion of teaching and learning support and adjustment of facilities. It should comprise a network of communities in itself including where the student works, where he studies, where he sleeps and where he has recreation. However it should avoid being a dehumanised machine like structure. It is worth waiting for.

New Directions

When the graduate leaves the somewhat artificial academic environment to enter practice, he faces an abrupt change for which he is totally unprepared. The transition from full-time study to full-time practice should evolve over the undergraduate years, and graduate training. Initially at university he might spend 70-80% of his time in study and 20-30% at practice. During clinical training he should be spending 50% of his time training and 50% at practice. By the age of 25 when he will begin graduate clinical training as a house officer he will devote 70-80% of his times to professional work and the remainder to continuing education. About 10% of any individual doctor's time is required to rebuild and maintain his competence.¹ In more recent years there are schemes to tie continued registration to periodic tests of competence. In Singapore this would be premature and unfortunate since the introduction of relicensure schemes would be a completely revolutionary change in regulation for which doctors on the present register are unprepared. However when specialist registration is introduced, the Merrison Report proposes that in order to get off to a good start and as a once-for-all arrangement, every general practitioner who has been in practice as a principal for a number of years and after consultation with the profession, should receive specialist registration as a general practitioner. By 1977 in UK sufficient training programmes will exist for all intending general practitioners. Singapore is probably ready for a specialist register but few practising general practitioners will want to consider themselves as specialists. However in line with specialist training schemes already in existence, the training general practitioner could be assigned by a responsible body such as the College of General Practice to a supervisor general practitioner who is paid fees for teaching and in turn pays emoluments to the trainee for service.

The Physician of the Future

We will do the future generation of students an injustice by perpetuating the 'generation gap' by providing a medical education that prepares them for the medicine of yesterday rather than the medicine of tomorrow. Sir Theodore Fox once said, "The more we know how to do things the more we shall need to know just what we really want to do. . . we shall have to learn how to refrain from doing things because we know how to do them." Just because we have an ICU or CCU does not mean we need to give an old man of 70 more than 10 electric shocks to resuscitate him. All doctors responsible for personal patient care (hospital doctor or general practitioner) should know :—

1. the likely outcome of any medical problem if left untreated,
2. the solution current medical technology has to offer to the problem,
3. the cost of any solution to the patient and his family in terms of discomfort, psychological stress, risk to life and risk of permanent disability, and
4. the cost of any solution to the community in terms of hospital and or home health care.

It is apparent that more and more instances where the current solution for the individual patient can only be found by careful and sympathetic consideration of the four factors.³⁵ With the increasing tendency for patients to be managed by a team, where decisions are made in committee, the young doctor's and where appropriate students' opinion should be invited. This will help to counteract a feeling of minor responsibility for the management of the patient and a lessening of personal involvement. The student is without any authority and is unable to help the patient. Consequently he sees the rewards are meagre until he feels his vocation again during the intern year.

Dr Charles Berry, Director of Medical Research and Operations, NASA, Houston and Professor of Aerospace Medicine, University of Texas presents a futuristic picture : "The physician of the future must have administrative, diagnostic and therapeutic assistants and he must have sociological inputs concerning the individual, his family and the community. He must also be supported by a technology that provides him with a machine-patient diagnostic capability, a physician-machine interrogative capability and a patient-machine therapeutic capability. In short, the physician of the future must become a health director of a given area. Because of increasing and different responsibilities, he must rely on a large staff of associates and assistants, who can help him in the day-to-day diagnostic and therapeutic "tricks of the trade". He must work in close relations with a sociologist, the family advisor, the urban planner and other leaders in the community health service system. He must be substantially aided by modern data processing techniques connected with modern sensing techniques, so that the patient's history, the results of various physical examination procedures and tests, laboratory procedures, data on the proper titration of medication and lists of differential diagnoses may be presented by a machine for his consideration and discussion with the patient. He will thus become the ultimate decision maker for the health care not only of his individual patient but of his area. He would thus achieve that level of thoughtfulness and logic which is difficult to come by in the present system. Most importantly, these changes will not take from

the physician his humanitarian role as confidant and adviser to the sick."³⁶

Perhaps it is well to see another picture presented by another American. In 1968, Dr Dwight L Wilbur, President of the American Medical Association said that in the US A, Medicine will be the third largest industry in 10 to 15 years. It already spends about US 33 billion dollars on health care and with the added cost of medical research, education and hospital construction about 50 billion dollars are involved in this industry as are 4 to 4½ million professionally and technically trained persons, each one associated with 6 or 7 others in a non-medical capacity. Yet health care in the most affluent of nations is not available to everybody. It spends 2 billion dollars a year on medical quackery. Developing nations could learn a lesson here in that large sums could be spent in acquiring equipment and building large institutions without improving the total health of the country. Dr Wilbur was concerned that with the trend of professional independence, the patient no longer dealt with an individual physician but with a committee of various professionals, technicians and therapists. He concluded. "Always the physician and the patient will need to deal with one another on an individual basis, one seeking and the other giving relief. It is the responsibility of the medical profession to see that the physician who gives relief has full understanding of his patient and can apply all the science that medicine has to offer for that patient."³⁷ The doctor whether for the present or the future, must do more than "tinker with a mechanism". He must heal a total person.

Epilogue

"Perhaps the most essential inborn quality required by the doctor is kindness, but even if he is endowed with this quality he can, for example during his training, be shown how to use it to the best advantage." This statement was part of the Report of the Planning Committee from the Medical School of Rhodesia.³⁸ Intellectual honesty, humility, and a sense of compassion are qualities not taught in course but they are marks of a good doctor. Curiosity is as important as a high mental ability because not many are endowed with brilliance but curiosity will carry many a doctor through continuing education to avoid dullness, boredom and staleness in his practice and who knows may even make excellence out of mere competence.

Conscientious and devoted care is not exciting as the glamour of sophisticated machine medicine. The care of spectacular medicine squeezes out the more mundane aspects of personal medicine and is itself overtaken by the line of lucrative practice. The

students who sees the hard slog of the hospital medical officer or the general practitioner in the poorer housing estate and compares this with the glamour of get-rich-quick types of practice makes his mind up in no time that he will take the easy road to money and luxury living. With such disturbing trends, some observers feel that the profession is losing its soul. I am not so pessimistic. So long as there are examples set by doctors themselves such as we see in the life of Gordon Arthur **Ransome**, there will be a measure of idealism of giving the highest priority to the greatest need; there is hope for the profession which itself is a source of hope to other for was it not Samuel Taylor Coleridge who wrote, "He is the best physician who is the most ingenious inspirer of hope."

Acknowledgements

I wish to thank Dr John C Beck, Director of Clinical Scholar Programs, The Robert Wood Johnson Foundation, Prof David N Kerr and Mr D short, Deputy Registrar of the Medical School of the University of Newcastle upon Tyne, Dr Bryan Hudson, Chairman of Accreditation Committee of the Royal Australasian College of Physicians, Dr Victor Neufeld, Coordinator, Program for Educational Development, Faculty of Health Science, **McMaster** University, Prof John Anderson of King's College Hospital Medical School, University of London, Prof Phoon Wai On, Department of Social Medicine and Public Health, University of Singapore, Dr Ho Guan Lim, Director of Medical Services, Ministry of Health, Singapore, Dr Wong Heck Sing, President, College of General Practitioners, ColCD Paul, Singapore Armed Forces, Ministry of Defence, Mr Ling Sing Wong, Assistant Registrar, Faculty of Medicine, University of Singapore, Dr Chen Ai Ju, Head, Research and Evaluation Unit, Family Planning and Population Board, Singapore, Mr Cyril Fernandez, Unit Nursing Officer, Medical Unit II, Singapore General Hospital and many colleagues, house officers and students whose provoking thoughts, criticisms, even "moans and groans" over these years have stimulated me to a fresh appraisal of the subject. To Miss SC Tang and Miss LC Chong who repeatedly typed the manuscript, I am grateful for their patience and ability to read my writing.

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