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16-1/81/09/19

ADDRESS BY HAJI DR AHMAD MATTAR, ACTING MINISTER FOR SOCIAL AFFAIRS OF THE REPUBLIC OF SINGAPORE, AT THE "PROF. UNGKU DATUK OMAR-AHMAD MEMORIAL LECTURE", AT THE UNIVERSITI KEBANGSAAN MALAYSIA, IN BANGI, SELANGOR ON SATURDAY, 19 SEPTEMBER 1981 AT 10.00 AM

SCIENCE THE MOTIVATOR OF SOCIETY

It gives me great pleasure to be at this truly memorable occasion here this morning. Before proceeding with my address I would like to thank Chairman Dr Muhamad Yahya, and Members of his committee which organises this Prof. Ungku Omar Memorial Lecture for the honour given me at this morning's function.

In the course of preparing my paper for this function, I came across articles on the man in whose honour we are gathered here this morning - the late Prof. Ungku Datuk Omar-Ahmad. Although I did not have the opportunity to know him closer, I can visualise his contribution to society, especially in the field of medicine. Based on what I read, I can only describe the late Professor in these few words: He was truly great; he was no ordinary man.

He had in him the best qualities of character: determination, idealism, unassuming, dedication to selfless service, patience, respect for the opinion of others, and goodwill. If I may say so, the Institute of Medical Research (IMR) might have charted a different course if the Professor had not been appointed Director at the most critical stage of the Institute's history. Despite his short span of life, the meritorious services he had rendered to his country were of such magnitude that few could equal. It is my sincere wish that his efforts and contributions will long be remembered by society. May Allah Bless his soul.

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Coming back to events in Malaysia, I have followed with interest some of the statements made by your Prime Minister, Datuk Seri Dr Mahathir bin Mohamed recently. He has on numerous occasions stressed the importance of science and technology. He has, in particular, striven to dispel the notion that there was any conflict between the pursuit of science and the observance of religion. Far from obstructing the advancement of science, religion seeks to ensure that its benefits are equitably shared. In fact, without the conscious and purposeful application of technology, it will not be possible for nations to derive the maximum benefit from the natural resources which Allah has bestowed upon them.

The importance of science and technology in the economic and social development of Malaysia has long been recognised. It took many years of research to make Malaysia the world's largest producer of natural rubber and a leading producer of tin, palm oil and pepper. Malaysia has also achieved significant progress in padi production through the use of improved varieties. I believe that the Fourth Malaysia Plan further emphasises the scientific and technological basis of Malaysia's development.

Singapore has no natural resources whatsoever. Its industrial economy and urban infrastructure are the product of technology. Like Malaysia, our future depends on the success with which we adapt advanced science and technology to suit our needs.

Science is the sum total of knowledge about the physical world, man and society. Technology in its purest sense is the creation of tools and other inventions to aid man in satisfying his needs. Technology predated science. "Man" said Benjamin Franklin, "is a tool-making animal". Agriculture, the use of metals, and sophisticated construction all took place well before full scientific explanation of the physical laws was achieved.

While the development of modern science and technology has been continuous, in terms of social impact it is possible to recognise two generations of scientific technology. The first is associated with the First Industrial Revolution, and to the extent that developing countries are "industrialising", the process continues. The second generation of scientific technology emerged only in the last quarter century. The social and economic infrastructure of one technological generation is not suited to the needs of the next.

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Within most developing countries, there co-exist the modern and the traditional sectors. In Malaysia and Singapore, we have a trans-national component as well within the modern sector. While starting at different levels of development, every sector aspires to the common long-term objectives of the social development of the country. The basic problem is of course that the natural rates of evolution of the different sectors do not reflect the rates at which they should develop to catch up to a common level. Unplanned and uncontrolled, the gaps will widen rather than narrow. In most developing countries, the vast majority of the peoples are to be found in the traditional and least developed sectors. Their rates of population growth are much higher than that of the modern sector. The central issue of social and economic development, and therefore of the application of science and technology, is the complementary advance of all sectors with equitable distribution of the fruits of progress.

The core of the relationship between science and technology and society is the human factor. Technology determines the level of material development, but it is the education and skills of the people that determine the effective level of technology. The educational infra-structure is accordingly the most vital aspect of development policy. When I speak of education, I mean both knowledge and appropriate skills. Given the differences in their cultural, moral and developmental objectives, countries today recognise science education as a basis for economic and social progress. It is both the vehicle for social advance and for transmitting the benefits of development to the individual.

The proportion of school entrants who enter tertiary education even in advanced countries is at most between 20 per cent and 30 per cent. In developing countries it is much less. Appropriate education and vocational training for the remainder is accordingly a major concern.

At one time, it was thought that academic education was the first pre-requisite for underprivileged communities. It is now increasingly realised that appropriate vocational training need not follow in step with education, but should be given on a pragmatic basis to equip the less developed sectors for work and employment, and a livelihood. The more sophisticated the level of development, the greater the need for science education and technical and vocational training. The provision and

harmonisation of education and training is essential for the successful application of science and technology.

To maintain overall national progress, due emphasis must be placed on development of the modern sector. This is in fact the policy in both Malaysia and Singapore. The question is how do we apply the gains of the modern sector to the traditional and less developed sectors.

Modern technology must achieve the accelerated uplift of the less advanced sectors. First generation technology has contributed immensely to the development of the traditional sector. We need only think of examples like roads, postal services, electrification, medical services, etc. Second generation technology holds even greater promise. Micro-electronic communication today can integrate the traditional sector with the modern sector. Second-generation scientific technology in fact has the potential to help the traditional sector to by-pass the ills of first generation industrialisation, thereby holding out a unique promise for the future. The problems are immense, but the technology is there.

The transfer of technology depends on two other things, firstly the provision of information, and secondly changing the attitudes of the people to adopt new technology. Each sector should expose those concerned as widely as possible to external technological developments and show how they may be beneficially adopted. The second factor is more complex and includes motivation. The chief element of the latter is that those concerned should be able to benefit directly from their own initiatives to adopt new technology.

The planned implementation of science and technology calls for a combination of approaches involving public and private sector participation as well as joint international collaboration. While much technological know-how is freely available, a good proportion is not. These considerations add to the cost and complexity of engaging in research and development and harnessing science and technology for national development.

Singapore has completed the transition to a technology-based economy. With satisfactory growth rates in the 1970's and a declining birth-rate we have, since the mid 1970s, come up against a shortage of manpower. The first-generation industrial technology adopted had been largely labour-intensive. To remain competitive we had kept wage-levels comparatively

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low. We are now no longer able to develop if we remain at the earlier technological level. This resulted in the launching of a restructuring of the economy in 1979.

The essence of this restructuring is to bring about a progressive rise in wage-levels, the phasing out of labour-intensive activity, the encouragement of new high-value added industries and the attainment of productivity gains. During the first half of 1981, we achieved a productivity growth rate of 6.3 per cent against a GDP growth rate of 10.3 per cent.

The foundation of Singapore's growth has been education and training. Total full-time university enrolment grew from about 5,700 in 1968 to about 10,000 in 1981. Polytechnic-level enrolment grew from about 1,900 in 1968 to about 5,700 this year. Technical education in schools was extensively restructured and vocational institutes were started in the late 1960s. From an enrolment of a few hundred in 1968, there are today about 10,000 full-time trainees in the vocational institutes and a further 6,000 in registered on-the-job training schemes.

At present the entrants into tertiary education represent some 10 per cent of primary school enrolment. This figure must be raised to 20 per cent in the present decade. Our objective is that those who do not succeed in academic education should go through vocational training.

A good example of our problems of technological change is computerisation. It is imperative that we achieve quick transition to computerisation if we are to maintain our rate of development. This involves fundamental economic and social changes. The computer has to become the standard tool of economic and social organisation and productive activity. Changes will include changes in production processes, choice of product lines, creation of new occupations, conversion to systems operations and scientific management. Infrastructure must include computer-based public administration, data-bases and information systems for economic and social decision making.

All these changes call for massive efforts in attitudinal development. We are trying to achieve this by intensive formal and social education so that people will apply computerisation in their work, and life. Computer studies have now been incorporated and expanded in

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education and training curricula at all levels. Eighteen community centres in several constituencies have now introduced computer clubs. Specialised institutions are being created such as the Japan-Singapore Institute of Software Technology, and the Institute of Systems Science. The Japan-Singapore Institute of Software Technology which is jointly set up by the Japanese and Singapore Governments will train programmers and systems analysts. The Institute of Systems Science, a partnership programme between the IBM and the National University of Singapore, will conduct courses and training in computer studies at post-graduate level. A National Computer Board has also been formed recently. There is, in parallel, a concerted drive to inculcate concepts of productivity, teamwork, labour-management relations, safety, interpersonal skills, courtesy, and effective human communication. The stress is on the human factor to be both the catalyst and the agent of our desired development.

The Science Council of Singapore was formed in 1967 and exerts a major influence in government and professional circles. The Science Centre opened in 1977 promotes public understanding of the sciences. The various professional institutes under the Singapore National Academy of Science and the Singapore Professional Centre are responding with a deeper appreciation of professionalism and their mutually supportive roles.

Lastly I should mention Research and Development (R&D). This has been going on at the university, in the specialised agencies like Singapore Institute of Standards and Industrial Research (SISIR) and the Applied Research Corporation (ARC), and a limited number of companies. A survey conducted in 1978 indicated that R&D investment was 0.23 per cent of GDP, which is substantially below the 0.5 per cent recommended by the UN for developing countries. However as more and more local manufacturers take their place as mainline exporters, competing on the open world market, R&D is more and more a vital necessity. The Government has now announced a policy for R&D in the 1980s. A 40-hectare area adjacent to the National University of Singapore is being developed into a R&D Centre. Called the Science and Technology Park, this centre, when completed, will promote and develop high technology industries and software enterprises. Success will again depend on our developing trained manpower and the response of the people.

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During the last decade, great emphasis has been given by Malaysia to the development and transfer of appropriate technology covering major areas of activity such as agriculture, industry, energy, medical and health. I am aware that continuing research on a wide area of subjects is being carried out by Malaysian Agricultural Research and Development Institute (MARDI), Rubber Research Institute Malaysia (RRIM), Palm Oil Research Institute of Malaysia (PORIM), Forest Research Institute (FRI), Mines Research Institute (MRI), Institute of Medical Research (IMR) and institutions of higher learning. I have also been told that the private sector has also undertaken a considerable degree of research activities and in addition, is able to call on the research programmes of their parent companies abroad.

The establishment of the Standards and Industrial Research Institute of Malaysia (SIRIM) has been of major significance with Malaysia's impressive industrial growth. In particular, in the field of nuclear research, Pusat Tenaga Atom Tun Dr Ismail (PUSPATI) has been established here in Bangi to undertake training and research in the application of nuclear technology for agriculture, industry and medicine.

Both Malaysia and Singapore maintain close liaison with various international scientific organisations such as the International Council of Scientific Unions (ICSU), Commonwealth Science Council (CSC), International Atomic Energy Association (IAEA) and the Pacific Science Association (PSA). As members of ASEAN, our two countries collaborate closely in a wide range of common areas including our work on the ASEAN Committee on Science and Technology.

The invitation to me to address you at this Prof. Ungku Datuk Omar Memorial Lecture is another feature of experience-sharing between our two countries. Much of this has been going on for years. In the years ahead there is even greater need for exchanges of this nature among our academic, professional and policy-makers to share mutual knowledge and experience.

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