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EDITORIAL

INTERNATIONAL COOPERATION IN THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN THAILAND AND SOUTHEAST ASIA

The application of science and technology in industry, health, natural resources development and agriculture, as accomplished during the last hundred or so years in the developed countries, have had great impacts on the quality and longevity of life in these countries. Most of these countries have attained the present stage not without long and painful processes of trials and errors. It would appear that the developing countries have the advantage of being in a position to avoid these long and painful experiences and could simply "import" the appropriate developed methods and technological processes and transplant them to our ever lasting benefits. This view is supported by the contention that developing countries are, in general, poor and could afford neither the investment nor the delay necessary to develop science from the basic foundation.

Unfortunately and ironically, we can not deny that we have learned a painful lesson of a different nature. The judgement of the "right kind" of applicable science and technology to be imported and the ingenuity in adapting what we import to our set of circumstances proved to be difficult, and mistakes costly. Furthermore, the kinds of technology that we need in developing own resources may not be available elsewhere where circumstances are different. When available, we often found that most specialized methods and procedures that have good economic potentials are either patented or guarded as industrial secrets. We may not be so aware of this pain until we consider the fact that Thailand, for example, in an attempt to modernize, began to import science and technology more than 60 years ago and yet today the state of our domestic technology is as far, if not further, from that at the points of export. Lesson number one is, therefore, importing science and technology can be as painful as fundamental development and in addition we will become forever addicted to it.

This may sound pessimistic to many and does not reflect the true attitude of the author. In fact, the intention of this article is to call on policy makers to be realistic, to learn from past lesson and to go to work in drafting and implementing a comprehensive and farsighted program of science and economic development in Thailand and the Southeast Asia region. We all know what we need now but let us not forget what we want to be fifty or a hundred years from now. Let us evaluate our past efforts, ascertain our present manpower and other resources, formulate future policy and get on with implementation. Let us not hold seminars to argue for days on whether basic research is more or less important than applied research because both basic and applied research are needed. If one really has time to argue one should better contrast between good research and pointless "busy-work."

In assessing the present state of science and technology it is quite encouraging and we can be quite optimistic. There exist a substantial number of scientists, both basic and applied, and a reasonable pool of equipment in Thailand. Although meritorious research activities are still few, one can not help but notice a remarkable upsurge in the past ten years. The motivation, the intensity and the quality of research is improving at a satisfactory rate. It is timely to formulate a national science and technology policy which can make use of, as well as serve as, a catalyst for the ongoing momentum. In formulating this policy, a scheme envisaged at an UNESCO meeting on regional cooperation in basic sciences for development (Kakiuchi, Y. (1975) *Nature* **256,** 451) is pertinent. This scheme is summarized in the organogram as shown. The essence of the scheme includes the following:–

1. In the long run individual countries can not escape developing their own capability, i.e., domestic science and technology (steps 1 to 4) in utilizing their particular sets of natural resources.

2. Although importing technology (V) and investment (VI) may be a quick way for the development of domestic industry, addiction to them can endanger the fundamental steps (steps 1 to 4), i.e., development of relevant domestic scientific and technological bases to the extent of isolation or even attrition.

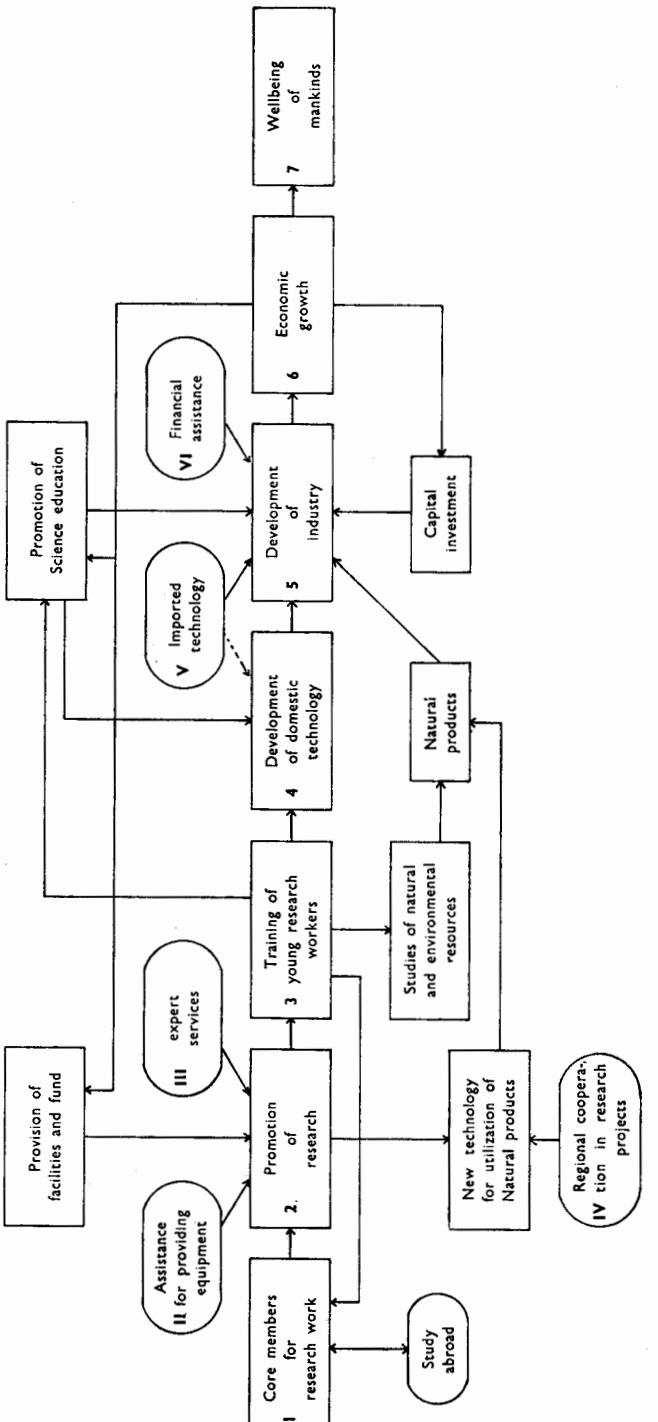
3. In importing technology, more often than not key methods and procedures considered "industrial secrets" have been kept from local staffs thus have not helped the development of domestic technology. New mechanisms should be devised (dashed line) such that this is corrected.

4. In developing countries, the links between basic scientists and technologists and between them and industry have been poor. New mechanisms should be devised to promote consultation and reciprocal assistance.

5. Depending on the stage of development, either substantial local investment or international assistance should be sought to strengthen weak areas in basic sciences in individual countries. To this end, regional cooperation (IV) can be of great value in pooling of resources and dissemination of advances.

It was thus recommended by that meeting that regional cooperation in basic sciences be promoted and that an efficient way was by establishing regional networks for each major disciplines. Since microbiology and chemistry of natural products appeared to have great potentials in application to regional economic development, they were selected as disciplines for which pilot regional networks should be established. This was subsequently done and the Regional Network for Microbiology was established in March 1975 (Matangkasombut, P. (1975) this journal **1,** 3) and

Organogram showing essential steps and feed-backs in the development of science and technology for economic development.



that for Chemistry of Natural Products was established in December 1975. Mahidol University and Chulalongkorn University were selected as Headquarters for the regional networks for microbiology and chemistry respectively. With initial funds from the regular budget of UNESCO and "Funds in Trust" donated by the Government of Japan, the networks have begun a series of activities. These include organization of regional training courses in relevant topics; issuance of network newsletters; compilation of directories of scientists and their specific areas of interests to promote interactions and sharing of equipment and knowhow; exchange of personnels at the levels of visiting professors and trainees; promotion of collaborative research projects and provision of needed equipment. In 1976, a regional training course on "Microbial Protein Production from Natural and Waste Products" was held at Kasetsart University. Several other regional training courses are being organized including one on "Synthetic Techniques in Organic Chemistry" to be held at Mahidol University in September 1976; one on "Soil Microbiology" at Gadja Mada University in Yogjakarta in August 1976; one on "Techniques in Chemistry of Natural Products" at the Australian National University in Canberra in August 1976, one on "Microbiology and the Environment" at the University of the Philippines in Manila in October 1976 and one on "Mushroom Cultivation" at the Chinese University in Hong Kong in March 1977. A directory of microbiologists in Southeast Asia is being compiled and should be completed in August 1976. A Regional Microbiology Newsletter was issued in April 1976. Some major pieces of equipment have been delivered and others are being arranged for delivery. Candidates under the exchange program are being nominated and in addition to the Funds in Trust the Government of Japan and the Japanese Society for Promotion of Science are considering supporting visiting professors from Japan to member countries.

The UNESCO Regional Cooperation in Basic Science Program in Southeast Asia as described represents the first effort in the promotion of basic sciences in the region. Undoubtedly, regional networks for other disciplines of basic sciences will soon be similarly established. It is important that the regional networks complement and harmonize with existing programs of regional cooperation that involve the more applied aspects of these disciplines in basic sciences. The Regional Network for Microbiology, for instance, must work in complementation and harmony with the TROPMED and the SEARCA projects of SEAMEO and the Protein Project of ASEAN and the UNEP/UNESCO/ICRO Panel on Microbiology. One interesting and useful feature of the network scheme is the encouragement of maximal number of scientists to participate in the coordinated activities. The traditional institutional barriers that have existed in the region can be gradually eroded as scientists gain faith in working with each other across the institutional boundaries. Since concerted effort by scientists is a fundamental ingredient of national scheme for science and technology development, this feature, among others, of the network activities can be of great benefit.

Pornchai Matangkasombut

NEWS AND COMMENT

LAYING THE GROUNDWORK FOR A SCIENCE POLICY IN THAILAND

Although science policy occupies the interest of a number of scientists, administrators and planners, most of them have had no previous training in this subject and rely mainly on experience and "common sense" to guide them. When science policy is discussed, as has been on a few occasions at various levels, much time is wasted in coming to a common understanding of the meaning of various terms and parameters used. Worse still, a common understanding may not be achieved at all, and the discussants end up by talking about different issues using a confused terminology. Science policy, for example, has been commonly confused with science and technology policy. The word "policy" is sometimes misunderstood as a set of prescription rather than as a course of action towards desired objectives.

The Symposium on Science Policy and Planning, held on 9-10 February, 1976 at the Office of the National Research Council, was organised with the aim of arriving at a common baseline for scientists, administrators and planners, regarding terminology, objectives and structure of science policy. The symposium was organised jointly by the National Research Council, Mahidol University and the United States Information Service. Some fifty participants attended the symposium. Prof. Michael J. Moravcsik, a distinguished physicist and an expert on science development, led the two-day discussion, which centred on basic principles in science policy and planning, with special emphasis on those applied to developing countries. The seminar ended with an enumeration of important measures for a successful science policy. In brief, some of these measures are as follows. A mechanism should be found to create scientific awareness at an early age. Science education should deal less with memorizing than with understanding. Mass media should be effectively employed to bring science to the people, and the task should be that of scientists and not newspapermen. Scientists must be allowed channels of communication with the international circle. These channels can be established through, for example, bilateral exchanges of information, material and personnel between institutes in Thailand and abroad, or through regional organizations. As concerning the complex problems of research evaluation, the importance of international experts or committees was much emphasized.

What are the lessons to take home from this symposium? If the complaint is perhaps justifiable that the symposium dealt too much with elementary knowledge on science policy, at least it serves as a common starting point for a number of interested persons with different backgrounds. One is painfully reminded that even after many

years of repeated attempt, Thailand still has accomplished little in the area of science policy. Perhaps now that some basic concepts have been laid, the task will be made a little easier.

FAOB–FLOAT OR FLOP?

from Montri Chulavatnatol

What is FAOB? What are its past, present and future? Are you asking these questions? If so, you should not be taken by surpise that they were also asked by the FAOB Council members gathered in the Council Meeting held in the Department of Biochemistry, Faculty of Science, Mahidol University, Bangkok, 26–28 February, 1976.

FAOB or Federation of Asian and Oceanian Biochemists is a regional body formed in August 1972, presently consisting of 10 biochemical societies or groups from Australia, Hong Kong, India, Indonesia, Japan, Korea, New Zealand, Philippines, Singapore and Thailand. As drawn up by the founding President, Professor E.C. Webb of Australia, and the executive members, Professors T. Murachi of Japan and N.R. Mouldgal of India, the Foundation Statutes clearly state that the objective of FAOB is "to promote science of biochemistry, in particular by the dissemination of information, by arranging meetings and in other ways encouraging contacts between its members"

The FAOB Council Meeting in Bangkok was called by Professor A.W. Linnane of Australia, the second and present President, and attended by Drs. T. Murachi (Japan), N.R. Moudgal (India), McEvoy-Bowe (Singapore) and Serene Vimokesant (Thailand). Drs. A.J. Lamb and Montri Chulavatnatol were invited observers. It was quite evident in the meeting that the FAOB objective was not achieved in the past. Several aspects of the Federation were not suitable for implementation of the objective. Subscriptions were not regularly received. Communications among the executive members and member countries were ineffective. The FAOB Newsletters, printed in India, reached very few member countries. Geographic distances among the member countries seemed to be too great to allow frequent gatherings of the members. The FAOB-sponsored symposia, one in Japan and two in India, were not well publicized. These factors definitely made several member countries lose their interest and enthusiasm in FAOB.

The future of this new Federation is now dependent on the strong and initiative leadership of the present President, Professor A.W. Linnane, the persistent effort of the Secretary General/Treasurer, Professor T. Murachi, and the collaboration of the member countries. An FAOB Workshop is being planned to be held in conjunction with the annual meeting of the Japanese Biochemical Society in Tokyo in 1977. A possible inclusion of FAOB Publication in the Journal of Biochemistry (Tokyo) is being explored. If successful, these two activities should re-vitalize the interest of the member countries and should draw more funds to allow the Federation "to float and

sail into property". The next Council Meeting will be held during the 10th International Congress of Biochemistry in Hamburg in July 1976. There, these plans will be more critically considered. If the plans fail, then FAOB will be a "flop".

NATIONAL COLLABORATING SYSTEM OF RADIOIMMUNOASSAY

from Institute of Health Research, Chulalongkorn University

The first national symposium on radioimmunoassay organised by the Institute of Health Research, Chulalongkorn University was held in Bangkok during 24–26 December 1975. Essential knowledge on theoretical and practical aspects of radioimmunoassay was summarised in three invited papers under the headings: Basic Principles of Radioimmunoassay, Radioimmunoassay Protocol and Standardisation of Radioimmunoassay. Twenty free papers included the development and establishment of various radioimmunoassays and their applications. General discussion were concentrated on radioimmunoassay and application in obstetrics and gynaecology, the role of radioimmunoassay on thyroid dysfunctions and the plan for close collaboration between all existing working groups in the country. The proceedings of the symposium is in progress under the sponsorship of the World Health Organisation and Roche Company.

The meeting group had unanimously agreed that the Institute of Health Research should act as the coordinating centre in setting up a national collaborating system of radioimmunoassay. The initial plan was to collect information on existing techniques and facilities in various institutes so that these will be available for any interested group. Other possible undertaking which could be carried out in the near future are technical training and also collaborative work on assays services both in clinical and research work.

REGIONAL MEETING OF PHARMACOLOGISTS

from Chiravat Sadavongvivad

Pharmacologists from ten countries will meet in the first South-East Asian and Western Pacific Regional Meeting of Pharmacologists in Singapore from 11th-14th, May 1976. The Meeting was organized under the auspices of the Singapore National Academy of Science and the International Union of Pharmacology (IUPHAR). The idea of holding a meeting like this one came to Professor K. Hashimoto of Japan and Professor M.J. Rand of Australia in 1972. After the Council of IUPHAR endorsed the plan, Dr. Rand did most of the preparatory works. Pharmacologists from all the ASEAN countries including Thailand and those from Hong Kong, Australia, New Zealand, Japan and USSR had also contributed. The meeting aims for concerned and interested individual scientists rather than representatives of national groups; there are only a few national societies in this region and one of the purposes of the meeting is to stimulate formation of such societies.

The scientific sessions, which take up the entire scheduled times of the meeting will include symposia, reports of research and demonstrations of a dozen areas of pharmacology; these areas were selected from a list of suggestions from potential participants. A number of speakers of international renown from outside the region will also participate; this includes Professor J.J. Burns, the President of IUPHAR.

Thailand has played an active part in the planning of this meeting from the early stage. A number of pharmacologists from Thailand will give reports and chair some sessions in the meeting.

Like most international meetings, this one has had its complications of politics, misunderstandings, delays, etc : neither China nor Taiwan had any local representative; some regional scientists of international fame may not attend; some concerned and interested scientists of the region may never learn of the meeting. Most scientists, including Australian and Singaporean, received the final announcement they were supposed to receive before December 1975 in February and March, 1976 instead.

It is certain now that there will be a large number of concerned scientists in the meeting; we can look forward to tighter friendship and more cooperation between pharmacologists of the region in the future.

UNIVERSITI KEBANGSAAN MALAYSIA (UKM) MEDICAL FACULTY–IMPRESSION OF AN EXTERNAL EXAMINER AND PROGRAM ASSESSOR

from Chiravat Sadavongvivad

As part of his ambitious program for national development, Tun Abdul Razak established Universiti Kebangsaan Malaysia or the National University several years ago. At the time when all developing countries are experiencing the drain of their preciously small but badly needed elites into the industrialized nations, few governments took such active, bold measures UKM was built to train the traditionally less privileged students from poor or remote parts of the country, not simply because social unjust must be eliminated, not because it will be easier to prevent them from migrating out of the country, and not to train them by any standard lower than other traditional universities. Without maudlin lamenting of lack of patriotism among their professionals, or quixotic pledge to change their entire existing educational system to serve the community, or gamble by making such change, the Malaysian Government implemented the most innovative aim of university education: to tap the hitherto unrecognized man-power resource residing in the largest sector of developing nations– the poor and underprivileged.

Nothing tells the confidence of its sponsor better than the enormous financial support both in rate and absolute amount; nothing tells the urgency of the program better than the big and costly, but *temporary* campus of UKM; and the hope for long range dependence on it can be seen clearly in the all-out staff development program set for the initial ten years of operation. After only a few years from the start, at the time the first batch of medical students are ready to go on to clinical

courses, UKM is already one of the best staffed and equipped universities in this region of the world with programs ranging from social to pure and applied sciences in full operation.

One might cast doubt on the validity of the rationales, approaches, plausibility, value, and cost-benefit balance of such project; but there must be more who agree that the overall benefits should exceed the program aimed at changing the existing universities into one loosely labelled with the nebulous phrase "to serve the community". This agreement, however, is assuming that the program falls short of the original expectation; how the program should be carried out so that the original aims can be attained is more important to consider.

I think it takes a genius to recognize that it may be possible to mine the potentials of the less privileged majority of a society and to put this aim in higher priority than equalizing opportunities and benefits which is often mentioned as lip service to the poor. There are diametrical differences between permitting students from underprivileged community to study in a university system designed for the wealthier ones compared to taking them into a system designed for them so that they can become as useful to the country as the others. The educational approach for the latter requires that teachers change their attitude from the traditional "make it or leave it" into "we shall help you until you make it". This is very difficult: most teachers will fall easily into the trap of "we shall let you go on even though you cannot make it". Education experts have been urging, preaching, appealing and begging teachers to assume more active roles in helping students, use less punishing examination systems etc. without much success. At UKM, this change in teachers' attitude is mandatory.

I am certain the first batch of graduates from UKM will be as good as those from other universities in this region; the teaching system at present is also as traditional as any others. Whether the graduates will behave non-traditionally once they join the privileged group remains to be seen. How much more man-power can be salvaged by change of teaching system is an open question; it is like asking how many so-called stupid students can become intelligent through extra efforts of teacher. In medical education, the idea of training medical personnels by standards analogous to the much publicized "bare-foot doctors" of China seems to be gaining popularity everywhere. The question has often been raised whether better distribution of *decent* health services can occur by providing more doctors with lower, overall capability; one might also ask whether existing teachers in medical schools can teach such students; are we making good wine then dilute with water or are we using a new method to make wine which is less expensive, not as good, but more suitable for us? Can the same method and equipment be used for the latter? For those who are not yet convinced, there is an ingenious alternative being implemented at UKM and the results should be heuristic for all aspects of "steering education toward community service".