

# Scientific Research in a Small Developing Nation — Sri Lanka

R. O. B. Wijesekera

*Dr. Wijesekera in this article expands on the theme of science in a developing country and studies the role of scientific research. Scientific research is the core activity around which science develops and has developed. One cannot "buy" science (buying presupposes evaluating the science one "buys") without a strong indigenous scientific base, a fact recognised by all countries successful in their struggle for development whether it be China or Japan, the Soviet Union or the United States. R. O. B. Wijesekera is the Acting Secretary General of the National Science Council of Sri Lanka.*

## Background and History

In relation to the development of scientific research, the small underdeveloped nation of the post-war world is a Cinderella awaiting a fairy god-mother. In this respect, Sri Lanka is a typical example. Its problems are doubtless common to the small nations of the third world: problems discussed by Dedijer under the apt title "Under-developed Science and Under-developed Countries". They are comparatively small problems—problems that are capable of solution sooner and more easily than those of the larger nations—the nations which contrive to draw the expertise, the aid benefits and the limelight due to the weighty political pressures that they can exert.

These problems are the problems of countries where science has been brought in as a transplant from a western society which knew an industrial revolution and thence a rapid growth of modern science. Indeed, the great J. D. Bernal, talking of developing nations and their science, has remarked<sup>1</sup> in this context:

"The particular lesson we have to draw may come from the study of the largely unconscious developments that led to the first industrial revolution, a process which gave rise to modern science to a much greater extent than it depended on science".

Bernal was optimistic in his belief that countries such as Sri Lanka should not have to live through the same problems and difficulties that were faced by the pre-industrial revolution European nations. He

believed that<sup>2</sup> "they should advance straight into the new industrial revolution which is scientific through and through, not only in manufacture and distribution, but also in administration". Somehow the countries of Asia and particularly the small nations like Sri Lanka, have been unable to make the necessary leap to the new situation. Science, in other words, has failed to germinate and the particular constraints governing each case would need careful study<sup>2</sup>.

## Agricultural Beginnings

The beginnings of scientific research in Sri Lanka were necessarily based on the requirements of a Crown Colony, with an agriculture-oriented economy—the plantation tripod of tea, rubber and coconut. The research institutes for these three plantation crops were formed during British times. They were serviced with British born and British educated scientists and concentrated their research efforts on keeping the respective crops healthy and productive for the avid export markets of the day. The tea, rubber and coconut research institutes in Sri Lanka from time to time attracted the attention of high quality British scientists who were mainly interested in the agronomic or bio-chemical aspects of these crops, and who took the opportunity to make such studies as interested them. The same situation existed in Ghana then the Gold Coast in relation to Cocoa. It may be significant to note here, in passing, the absence of attention given to two other commodities, now so important to the island—viz. rice and spices. Rice was mainly imported

from Burma, then another part of the British Empire. Of the spice plantations, only cinnamon was of any consequence since it was not obtainable from any other source in the world. Other spices such as pepper and cardamom were neglected.

## The Professions: Medical and Engineering

Next in the sequence to plantation crops research came the development of medical research, and particularly such problems that concerned the tropical diseases. The Bacteriological Institute in Colombo was set up to study the nature of some of the tropical diseases caused by local bacteria, which was useful from the standpoint of the health of the settlers as well. The Bacteriological Institute attracted such well-known medical researchers as Aldo Castalani, Lucius Nicholls and others, who did pioneering studies on diseases like malaria, malnutrition etc. The present Medical Research Institute is the successor to the Bacteriological Institute and has yet not been able to shake off its "bacteriological" tradition. Even today it has many divisions within it, performing tasks that are routine bacteriological investigations in one form or the other. In these "Research Institutes" the common feature was the requirement that they act as service institutions to a need. The same thing was true of the Government Analysts' Department which handled, and still does only forensic investigations. There was little evidence of an intention to train and equip local personnel to take part in any kind of research investigations. Local participants were initially limited save in one or two isolated instances to grades below those of today's laboratory technicians. This scant attention paid to the development of scientific research was in direct contrast to the development of the professions of medicine and engineering. The Ceylon Medical College was one of the first institutions of higher education to be set up and came into existence in 1870. It was later to become the Faculty of Medicine at the University of Ceylon in Colombo. The Ceylon Technical College was set up soon afterwards and this formed the University of Ceylon's Faculty of Engineering. A University College was created in 1940 and these three "colleges" formed the nucleus of what

became the University of Ceylon in 1941.

### Teaching University

The independent traditions of these three colleges have proved over the years to have been a severe drawback to the development of serious scientific research or even the fostering of a research orientation. The Ceylon Medical College and the Ceylon Technical College were geared solely to the production of Clinicians and Civil Engineers. The University College produced the "educated" elite of the day who became teachers and administrators in the colonial civil service, and a few radical politicians. As Joseph Needham put it in 1956, "The University of Ceylon failed to overcome the traditions of a teaching University".

So from the beginning the dice seemed heavily loaded against scientific research. The need for the development of an indigenous approach to it seemed to have been ignored. This aspect was left to the efforts of a few individual enthusiasts holding teaching professorships at the three colleges. Without any positive help or encouragement, the task was too formidable.

### Industrial Research

One of the first efforts to develop scientific research for the purpose of developing industry was begun, surprisingly, by a member of the Colonial Civil Service, Mr. D. H. Balfour, himself a non-scientist, who formed an Industrial Research Laboratory in the Department of Commerce and Industries soon after the war. His efforts towards developing some sort of industrial research, though commendable, ended in failure. This was due to several factors, among which were lack of scientific leadership and the atmosphere for research, and the lack of a correct political appreciation of the needs of scientific research.

It was also true that the better academic performers in those days preferred to remain in the more prestigious university teaching positions in the newly formed science faculty, or opted to do biochemical or chemical research in the various other Research Institutes or the Department of Agriculture. Even the Government Analyst's Department held more

attractions to chemistry graduates in the decade 1940-50 than did industrial research: obviously the wages and service conditions at IRL were primarily to blame.

### Post Independence

The post independence era saw the transfer of political power to the Ceylonese. This essentially meant that the overall executive power was thrust on the administrators who formed the Ceylon Civil Service, which became even more glamorous than in the colonial days. The emphasis was on the maintenance of the essence of colonial traditions—law, order, export-import activity, and little else.

Investment in scientific research thus was minimal and such investment was only half-heartedly doled out. Even the funds that were made available were not fully utilized as the constraints of a still colonially oriented bureaucracy mitigated against the requirements of scientific research. For example, promotions were on the basis of seniority and that only. Scientific attributes passed innocently unnoticed. The cadre principle was fiercely adhered to in the employment and promotion of scientists and funds were dispensed in rigid accordance with "financial regulations".

In neighbouring India this was also true, but at least it is significant that this malady was recognized by the highest political authority at the time. Jawaharlal Nehru once remarked:<sup>6</sup>

"You have to change your institutions so that they may function in a scientific way and not merely according to hierarchies and seniority and the like.....very difficult to change this, because the apparatus of government is built on seniority. People talk of the appeal of merit, but merit has no chance against seniority. Again, the official hierarchy of that type usually treats the scientist as an outsider, good enough to advise them occasionally, but a person who ought to know his own place in society and not be uppish! The result is that the atmosphere is not created for the development of science rapidly".

### Post Graduate Education Abroad and "the Oxbridge Traditions"

The one incentive young scientists had at the time was the inevitable training offered in the form of a sojourn in England and the opportunity to do a Ph.D. degree. This opportunity often signified the end of the road, for the man returned with his Ph.D. to an empty, infertile environment, and no encouragement to do further research nor even any opportunity of financial benefit. To all except the most dedicated of these, bitter frustration seemed the only prospect. Another factor contributed as much to this situation. Often the Ph.D. candidates did a research course lacking in any relevance or pertinence to a local situation. The training was in the "Oxbridge" traditions of the time. It was considered "beneath the dignity" to adapt one's ideas to a local situation. When as it happened the opportunity to continue in the same vein was not there, idleness and frustration was the only result. This indeed was an attitude which very few scientists were able to overcome and represents an obvious manifestation of the captive mind—a concept so brilliantly discussed recently by Alatus.<sup>7</sup>

The need to develop research groups of research within the country comprising, generally, young research students, as was the custom in the countries where research flourished, received no attention. A single Ph.D. was often considered a "specialist" in his field and was expected to parade his knowledge for ever and a day. These factors were equally true of those Ph.D. returnees who came back to join research institutes or the universities. Neither group, as a rule, produced scientific research of sustained quality. A few individuals by sheer determination and dedication struggled to do something; they struggled as much against a bureaucratic framework, inimical to any scientific growth, as against senior scientific colleagues whose disinterest in research and consequent inactivity manifested itself in an over-emphasis on bureaucratic requirements. The senior scientists had become more virulent pedlars of bureaucratic stringencies than the genuine bureaucrats themselves.

## Voluntary Organizations

During this period of time (1950-60) two major events took place almost simultaneously. Firstly, the voluntary scientific organizations which were formed in the earlier decade, beginning with the Chemical Society of Ceylon (now the Institute of Chemistry) which was founded in 1941, and the Ceylon Association for the Advancement of Science, which sprang into existence in 1946, were gaining in strength.<sup>8</sup> Problems concerning scientists, scientific institutions, were being discussed by these bodies in open forums albeit preserving the academic character of their deliberations. Representations were being made to government regarding such subjects as the need for the organization of science, salaries of scientists and similar matters. The demand for a central organization to coordinate scientific activity was made by the CAAS around this time. The proposal to set up a Council of Scientific and Industrial Research miscued, via the inevitable advice of foreign consultant (from the World Bank) to end up as the Ceylon Institute of Scientific and Industrial Research. This research institute was formed with some of the former scientists of the Industrial Research Laboratory as a nucleus, with the World Bank expert on whose advice it was based as the first Director.

It commenced with the incongruent philosophy of servicing an industry that barely existed (this policy has since been revised). The CISIR set out to "sell" research with the ambitious intention of generating its own finances in a few years. Predictably this was a failure. The institute was inadequately staffed to fulfil its obligations and the problem-to-problem basis of its research activity was not self-sustaining. No attempts were made to build up research groups and expertise in selected fields. Moreover, the area of coverage attempted was too fantastically wide for the institute to make any impact. These set-backs notwithstanding, the CAAS pressed on for a National Research Council with the openly stated motive of coordinating scientific activity in the country, but with the hope that it would confer a much needed status on the country's scientific personnel.

## Industrialization

The second major event that occurred alongside these developments was the spate of industrial activity that overtook the country from 1956 onwards. It was no planned scheme of industrial development. Instead it was an avid and hasty plunge into an effort to meet the fashion of "Industrialization". The main features of this phase from the viewpoint of scientific development were all detrimental ones; the turn-key jobs, the foreign expertise purchased at immense cost, the civil servant-cum-skilled labourer-axis to run the industries and the development of a public sector "industrial elite" confined to formal bureaucrats. Again the scientists, scientific institutions and notably the newly formed CISIR, were bypassed. Scientific research was not thought necessary for industrial development even though in neighbouring India this was being given the highest priority with the patronage of Prime Minister Nehru himself. In this context a group of scientists in government service formed the first scientists trade union—the AGSO—Association of Government Scientific Officers. Through AGSO the scientists had a channel of approach to the higher echelons of government. At least their voices—and these voices were not those of a newer generation came to be heard if not heeded.

## Science Policy and the Organization of Science

It was only in 1963 that for the first time, the persistent demand of organized groups of scientists in Ceylon for a National Council for Science was heeded, and Prime Minister Sirimavo Bandaranaike,<sup>9, 10</sup> opening the 19th Annual Sessions of the CAAS, declared the government's intention of creating such a body. This was the first occasion on which the categorical acceptance of the CAAS's proposals regarding the need for scientific organization in Ceylon had been voiced by a high government authority. It has been preceded by much lobbying and hard work on the part of a newer generation of scientists. But alas for the hopes of scientists. The "hoodoo" that followed these efforts was not easily shaken off. Although the Prime Minister took immediate action to fulfil her promise, bureaucratic "dodge-ball"

dragged the issue along for almost a year, until in 1964 the election defeat of the Sirimavo Bandaranaike government halted proceedings for a while. However, in 1965 the government of Dudley Senanayake finally created the present National Science Council and for the first time in Ceylon a Ministry of Scientific Research.<sup>10</sup>

The formation of the National Science Council afforded a means of studying the problems confronting the development of scientific research in Ceylon. However, the National Science Council in its formative years tended to be pre-occupied over much with formal tasks of "formulating science policy" and such like, which were in reality only the embellishments on the real requirement. Now in 1975, the expected impact of the National Science Council has not materialized and the work of the Council itself appears to have been rendered etiolate by the same factors that have militated against the growth of science itself in the country.

## Scientific Traditions and Borrowed Expertise

The problems confronting the development of scientific research in Ceylon are in a way typical of those of any small backward nation, still suffering from the constraints imposed by its history. The lack of a tradition of scientific research is one of the most severe drawbacks. Many nations that suffered from this at one time or another in its history overcame it in one single way. They enticed eminent scientists from other countries to work in their country for a period of time and thereby organize schools of research; at the same time promising scholars from the country were sent abroad for research studies and on their return were given every encouragement to begin schools of research of their own. In Ceylon, although a few indigenous scientists were periodically sent out for studies, they were more or less abandoned in terms of scientific sponsorship on their return. The method of enticing eminent men to work here was conspicuously ignored. Instead, under this guise, scientists attached to United Nations Organizations were "borrowed" at various times in order to render "expert advice" on specific topics. These "experts" were often of dubious quality. Their intentions were super-

ficial, and having experienced top level hospitality they often departed leaving behind no special scientific contribution. One recalls here a poignant incident. A local scientist was accompanying a famous British Professor—a fellow of the Royal Society—on a “sightseeing” tour of the island. The distinguished Britisher visited a local scientific institution and, witnessing the quality of the “imported” Director of the institution, remarked: “How did you find such a fellow, and why? Any retired FRS would have been glad to take up this appointment with all the attendant perquisites”. Such was the story. One did not know how the particular selection was made, but the remark was perhaps too often true of many of these appointments of a couple of decades ago. Another mistake frequently made was to invite a foreign organization or country to lend experts to report on the “re-organization” of a scientific institution, or report on a set of problems. The local scientists were completely ignored. The report was in more cases than one little more than the expert learnt from the local men. The scientific traditions therefore had to be developed, in an indigenous fashion by another generation of indigenous scientists. This is not to belittle the contribution made by a few good quality scientists who served in the universities and research institutes for protracted periods of time. But it is true to say that this notwithstanding, a pattern of continuing research had yet to be forged.

### Choice of Areas for Research

The choice of suitable subjects for research activity was also a problem. In this respect the scientists themselves were to blame. It has been for too long the practice that scientists did not do work that had a bearing on the conditions in the country. This was aggravated to a large extent by the futile debate on the relative importance of what was termed “basic research” and “applied research”.

It was stated by the protagonists (an these included many high administrators and politicians) of “applied research” that a small underdeveloped country like Sri Lanka could not afford the luxury of basic research. It was implied that basic research was therefore a needless waste and that all research should be of an applied

nature. What was not realized was that there was hardly any basic research done at that time (or at any other time) in Sri Lanka. True, there were a few isolated instances of a University Professor or a government scientist importing an item of equipment for basic research which was then allowed to remain largely idle; the reasons for the idleness, however, could not always be attributed to a lack of enthusiasm on the part of the scientist. It was rather the fact that the ancillary services such as maintenance facilities, machine shops etc., were lacking, and mostly the concept of research studentship—by which the basic research of many countries had been developed—was not understood by the governing authorities here. A better choice of scientific subjects for research, particularly by university scientists during the early 1950’s, could have perhaps helped towards the development of a research tradition.<sup>12</sup>

The debate of “applied research” vs. “basic research” was altogether an irrelevant one. The real position should have been that all research both “basic” and “applied” which had a relevance to the country should have been supported. The relevance of the research, and its role in developing expertise and useful skills should have been the issue.

### Patronage

The most significant reason why scientific research failed to develop in Sri Lanka is, of course, the lack of high level political patronage. Even today, although there exists a Ministry of Scientific Affairs, the need to develop science itself and particularly to develop a scientific community within the country lacks recognition. The need for active liaison with the international scientific community, the need to keep abreast of scientific developments elsewhere in the world, the need to study and master the latest techniques, these are some of the basic considerations that go by default.

The dire foreign exchange situation has struck another blow, and the plight of the small developing country is such that the choice is one of funding for food or funding for science.

A large nation, such as India, by virtue of its political attraction has contrived to make good use of the

various aid-giving agencies and the United Nations Organizations. The smaller developing nations of Asia have been left stranded in this race. The development of “Centres of Excellence”—supported internationally—in relevant subject areas in each small developing country has recently been proposed as one remedy.<sup>13 14</sup> This has met with a measure of success in a few instances in Africa and Latin America.<sup>13</sup> But the question till remains who is to take the major initiative and from where would come the continued funding? Indeed, these smaller nations, Sri Lanka among them, still await their Fairy God-mother of Science.

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