

Applied Research and The Indian Institute of Science, Bangalore*

IT is recognised that the principal objects of the Institute are three-fold, namely, (1) Technological Instruction, (2) Research in Pure Science, and (3) Research in Applied Science. The first two objects are receiving attention to a reasonable extent but the facilities available for achieving the third object have been neither adequate nor clearly specified.

I am giving prominence to applied research because this is an industrial age and production of primary products is comparatively far less profitable than products of industries and manufactures. If you continue importing products of manufacture which the people of this country can produce for themselves, you will not only be paying for them from your slender income in uneconomical occupations, but you will also be increasing unemployment at the same time.

It is unnecessary at this stage to enter into any discussion whether this Institute should give greater attention to research in Pure Science or Applied Science. Both are necessary. Theoretical research is the basis, but it should be linked up and correlated with applied research. If, in some foreign institutions, pure research is given prominence it is because they have their surfeit of industrial income and those countries can afford it. Even there in cases in which the outlay is small as here, more attention is given to practical than to theoretical research. If regard be had to the small sums we are spending, it is incumbent on us to spend a greater portion on practical research than we do at present. A distinguished scientist connected with the General Motors Corporation, Mr. C. F. Kettering, has remarked: 'A development is no good so long as it is in the laboratory. It is only good when everybody in the country uses it.'

A large amount of fundamental research is being done in Europe and America, the results of which may be examined with an

eye to their adaptation to local conditions and application to local uses. Pamphlets may be written and articles published in technical journals to spread the result achieved abroad among industrialists and research workers in this country. The professors in the Japanese Universities, within my own observation, are very good at this kind of work. They vie with one another in giving the earliest possible information of foreign discoveries and inventions to their countrymen.

This Institute being an all-India concern, a Bureau for collection of information of value to practical research and to industries should, in my view, be created as one of its independent departments. Notes, files and books giving the latest particulars and state of advance should be maintained in the Institute Library. Business men would themselves come or would send their representatives here to seek information and knowledge, and the service rendered to industries by this means would be of the maximum value for a minimum outlay.

An officer who has knowledge of the working of industries should be attached to the new Information Bureau just suggested by me. He should be able to compile the information required for each branch of industry in collaboration with the professor of the branch of science concerned.

Another point to be borne in mind in this connection is that, in the case of research in applied science in foreign countries, the results of practical value are usually revealed in general terms, while the actual processes which are of commercial value are kept secret. In such cases, secondary research may be profitably carried on with advantage in this Institute to discover such secrets earlier than they are revealed so as to put the results to practical use.

If it gets a reputation for service to industries and industrialists in these matters, the Institute will surely be able to obtain additional funds to extend its scale of working. It is on record that in Great Britain quite recently the research associations increased their resources by 30 per cent. in

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two years by working in closer association with industrial firms in this way.

In regard to most of the work I have mentioned, a beginning can be made if the Professors, Assistant Professors and Readers are all of one mind in the matter of encouraging industrial research and making themselves useful to industries. If they are able to meet and discuss the needs of the industries, if all the departments can work in unison for a few months in succession, and if each Professor undertakes some work in applied research in one or two industries, they will soon be beginning to achieve practical results even without requisitioning additional equipment and facilities from the Council. Any such voluntary effort on their part will have a tremendous moral effect, both on the controlling authorities and the industrially minded public. And there will be no dearth thereafter of funds or staff for continuing the work.

The principal measures to this end which suggest themselves to me are:—(1) To get into touch with industries and industrialists and ask what work they want to be done for them at the Institute, and to consider how much of it, it is reasonable to provide for, what part of it, if any, is done at present and what additional funds and facilities are necessary to do the remainder—in other words to work on a plan, (2) To endeavour to set apart from the resources of the Institute, staff, equipment and funds to be specifically devoted to industrial research in future, (3) To announce after careful investigation what information and data the Institute can supply or collect for industrial firms and corporations from outside centres by charging a fee for the purpose, (4) To find out how many industries are willing to employ research workers under the supervision of Professors to work out their problems in applied research.

The country is undeveloped. The unemployment problem is staring us in the face. The resources of the Institute are meagre and the Irvine Committee too has expressed the opinion that concentration on

industries and on work of a practical character is our sorest need to-day. At such a time, theoretical research should not be pursued to the extreme extent of overshadowing all work of practical value. It is for this reason that I have suggested that at least half the resources of the Institute and half the time of the staff should be set apart to those branches of applied science that have a bearing on practical pursuits and the income-earning professions of the people.

Some people would like all objects of material gain to be eschewed and the Institute made to do its work in a purely cultural and scientific atmosphere. Have that atmosphere as thick as you like where you can afford it, but in the present circumstances, the country's prime wants—its basic needs—should be the first concern of the Institute. Industries are needed to give work for the unemployed and relief to the distressed. And applied research, which the Institute can do much to encourage, may be regarded as the mother of industries.

The expectation of the public is that the Institute should actively help in the direction of developing industries, training industrially minded young men and creating an industrial atmosphere in the country to promote production and income and raise the standard of living of our people. If this great change be effected, we may then with confidence appeal for larger contributions from Provinces, States and business public generally. But if the Institute remains content with pure science and the creation of a scientific atmosphere, when the tragedy of an illiterate, under-nourished population is being enacted before our eyes, we will not be doing our duty in the spirit of the wishes and ideals of the eminent founder of the Institute. I think, therefore, we must now unhesitatingly revise our notions about practical research, its influence on the country's progress and its place in the scheme of work of this Institute. In the words of the Irvine Committee, we must 'make applied research the first and most responsible duty of the Institute'.