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## SCIENTIFIC RESEARCH IN NATIONAL PLANNING

THIS war has proved beyond doubt that human valour and determination cannot compensate for scientific and technical efficiency, and that a nation with a low *per capita* income and limited industrial development, even though large in numbers, has little chance of honourable existence in this world. The aim of every post-war reconstruction in India, therefore, should be the removal of these two weaknesses—a low *per capita* income and limited industrial development.

It will be idle to ignore the fact that there are powerful leaders in India who have been so impressed by the evils of the modern world that they do not hesitate to declare that the introduction of the Western methods for increasing our national income should be resisted and that it is no business of the State to help scientific and technological development. They would prefer the culture of cottage industries, peasant farming, and living on subsistence level with its inevitable doses of famine and pestilence to the immense wealth but inhuman greed of modern societies. It is hoped that they would soon recognise, now that the Fascist world has tumbled down, that the powerful tools of science are capable of doing immense good if handled for the benefit of humanity; that in these days of rapid communications, we cannot live in isolation from the rest of the world even if we wish to do so; that life in India will be stagnant if we run counter to the characteristics of the present age which consist in applying the principles and products revealed by scientific research to industry and agriculture.

It is also unfortunate that our powerful industrial magnates and *entrepreneurs* do not always believe that scientific and technical research is necessary for the industrial development of a country. They consider that all that is needed is to decide on general grounds, if the country has the potential resources in raw materials, power and transport facilities which will justify the establishment of any particular industry, and then import into the country the necessary machinery and experts for the purpose. They are in favour of providing such technical education which will enable the industry to be run by indigenous talent after a period of probation under foreign experts; but they would stop at research as being more in the nature of a luxury. To them the history of the dyestuff industry should be an object lesson. The first synthetic dye was made in England by Perkin, but the industry soon found a congenial home in German soil. In Germany, the practical outlook of businessmen was enthused by that faith in scientific knowledge which came from first-hand knowledge. Thus twenty long years of painstaking research were necessary at a cost of more than a crore of rupees before Bayer's process for the synthesis of indigo could be commercialised; but once it was done, the fate of the natural indigo of Bihar was sealed and it disappeared from the world's market in another twenty years. The attitude in Great Britain was one of complacent "wait and see"; and the result was, that when the first world war broke out, she had no dyestuff industry of any importance. As that war

progressed, it was soon realised that this dependence on Germany for dyes was an intolerable weakness of the British chemical industry. Modern war depends for its successful prosecution on an abundant supply of a large variety of chemicals; and a dyestuff and fine chemical industry must be considered an integral part of every defence programme. The British Government, under Lloyd George, took immediate and far-reaching steps. Beginning with a large subsidy for the formation of the British Dyestuff Corporation, millions of pounds were spent on developmental research in every branch of the industry. Later on, the importation of dyes and even intermediates were prohibited. As a result, Sir Gilbert Morgan could claim in 1939 with justifiable pride that out of the five most fundamental discoveries in dyestuff chemistry since 1921, the world owed three to British talent. In this war, the British Dyestuffs factories not only produced their home requirements, but had in addition a considerable export trade.

In India we are now very anxious to increase the productivity of the soil by use of synthetic fertilisers; and ammonium sulphate factories on a large scale are being built in Travancore and Bihar. It is, therefore, of topical interest to recall that exciting venture of the late Prof. Haber when in 1909 he demonstrated before the Badische Chemical Engineers that it is possible to obtain small quantities of ammonia by direct combination of nitrogen with hydrogen. Millions of pounds had to be spent before this discovery could be exploited commercially; and today, synthetic ammonia, apart from its value in war, constitutes the biggest single item in the fertiliser industry with an annual production of more than 150 crores of rupees. It is also a proof that the direct return of one fruitful piece of long-range research pays back many times over the cost of ninety-nine which may not find useful application. The conviction has now become universal that a nation which habitually applies scientific method and knowledge to industry and agriculture, can only seize the more spectacular achievements of science in its economic life. "No nation can also depend only on the efforts of other nations for the purpose of promotion of knowledge. This is not only because such dependance is an ignoble parasitism, but also because in the field of international relations, no less than in national life, the power that comes from knowledge comes from its early and rapid use and from close contact with men who have created such knowledge."

It is, therefore, a matter of considerable satisfaction that the Report of the Industrial Research Planning Committee, appointed by the Government of India, contains a bold five-year programme for the development of industrial and scientific research, at an estimated expenditure of Rs. 6 crores. The building and

equipping nine specialized laboratories, including a technological institute on the lines of the Massachusetts Institute of Technology; a two crores of rupees grant for strengthening the scientific departments of India's eighteen universities and the training of seven hundred research workers in five years—these are some of the recommendations made by the Industrial Research Planning Committee.

In its Report the Committee recommends the setting up of a national research organisation to be called the National Research Council which would be authorized to initiate the Five-Year Plan immediately.

Recurring annual expenditure is estimated at 2 crores of rupees and the Committee recommends that half this amount be met by a grant from the Government and the other half by a proposed cess on industries, including railways.

The Committee recommends that the National Research Council should consist of representatives of scientific bodies, universities, industry, labour and administration, with the Government of India's Member for Planning and Development as *ex-officio* President. The Council will organize and maintain national laboratories and specialize research institutes; stimulate and encourage research activities by Industry and in co-ordination with all existing research institutes and departments of Government, undertake the planning of research programmes on a nation-wide basis. The Council will also serve as a national trust for patents and will set up a Board of Standards and Specifications.

Apart from the establishment of a National Chemical and a National Physical Laboratory, which is recommended at an estimated cost of 40 lakhs of rupees each, the other specialized laboratories proposed to be set up are, in order of priority, those for Food Technology, Metallurgy, Fuel-Research, Glass and Silicate Research, Oils and Paints, Leather and Tanning, Industrial Fermentation and an Electro-Chemical Institute.

Industries will be encouraged to set up their own research associations on a corporate basis and the expenditure incurred on research will be exempted from income-tax assessment.

It is also proposed that Research Councils on the model of the National Research Council be set up in all Provinces and major States.

A small executive body called A Research Board will be responsible for the administration of the Council's work. The Board will prepare comprehensive plans of research programmes and will take an active part in the establishment of research institutions by industries.

We hope the Government of India will give due consideration to this report and funds will be made available for industrial and scientific research on adequate scale in the near future.