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Presidential Address

By Prof. J. C. Ghosh, D.Sc., F.N.I.

IN his presidential address to the twenty-sixth session of the Indian Science Congress, Prof. J. C. Ghosh, of Dacca, outlined the achievements of Indian scientists particularly in the fields of Chemistry, pure and applied. While he showed that Professor Simonsen's eloquent appeal, that Organic Chemists in India, should take up the investigation of the natural products, had borne rich fruit during the last decade, he deplored that the enthusiasm for research in organic chemistry had overshadowed the claims of inorganic chemistry in India. He said that "there are no longer any barriers between organic and inorganic chemistry. With our newer ideas of valency, the systematization of the enormous accumulation of chemical facts is no longer the prerogative of organic chemistry. Nor can it be said now that the nature of carbon-carbon links is better understood, in spite of its regularity of behaviour, than the links between the other atoms. The elucidation of the structure of inorganic compounds has to be tackled more or less on the same principles which are familiar to the organic chemist. In the common region of the two sciences a vast body of *organometallic* compounds has emerged, which apart from their interest in micro-chemical process of analysis, are now working miracles in the fields of industry and in the alleviation of human suffering".

He drew pointed attention to the changing attitude and outlook of physical chemists. The appointment of Lenard Jones to the chair of inorganic and physical chemistry in Cambridge, he considered, is a symbolic event. "Of a physical chemist is now demanded not only a sound basic training in chemistry, supplemented by a high experimental skill in handling delicate instruments but also a clear understanding of the higher branches of applied mathematics and statistics".

Prof. Ghosh invited attention to the fact "that outstanding discoveries in chemistry have in recent years been made in laboratories, where inspiring leadership has been associated with large-scale team-work. The paper on the synthesis and constitution of vitamin C appeared from the Birmingham laboratories under the joint authorship of a team of seven workers. Such team-work is, however, yet comparatively unknown in India. It is to be deplored that the idea of close co-operation among the scientific workers, has not taken a firm root in the Indian soil. Is it due to the fact, that the traditional religious atmosphere of India teaches a child to be self-centred, to be complete within himself and to work out his own salvation, unaided and in isolation? Then again, I am told, that a tradition has grown in some institutions, that the senior

member of the staff is given credit for senior authorship in a joint publication, independent of any consideration of the share he may have in the planning and execution of the work. This, if true, is unfortunate, for the highest spirit of co-operation, loyalty and devotion can only be evoked in an atmosphere of impartial justice and deepest sympathy and good-will. Notwithstanding these handicaps, there are pointers to the road of success. In the palmy days when Sir C. V. Raman was Professor in Calcutta, one could easily feel that in his laboratory, the researcher has become forgetful of self and mindful only of the work ahead."

Speaking about co-ordination of scientific knowledge and industrial enterprise the President said that the genius of Professor Bhatnagar has provided a bridge of communication between scientists and industrialists. "Nowhere is the beneficial effects of contact between universities and industry better exemplified than in the programme of researches on oil technology, now carried out under the supervision of Professor Bhatnagar, with the aid of funds provided by Messrs. Steel Brothers."

"The Government of India have, in recent years, done a good deal in promoting researches relating to agricultural industries. The Royal Commission on Agriculture has ardently looked forward to a state of affairs in which the universities will not only initiate agricultural research but will also undertake schemes of research, the importance of which is brought to their notice by the departments of agriculture. This end has been steadily kept in view by the Imperial Council of Agricultural Research. With the aid of funds provided by this Council, long-range schemes of research are in progress in the statistical laboratory at

Calcutta, in the chemical laboratories at Dacca, and in the botanical laboratories at Agra, Madras and Benares. The cotton technological laboratory at Bombay, the Institute of cotton breeding at Indore, the Imperial Institute of sugar technology at Cawnpore, the cane breeding station at Coimbatore, the jute technological laboratory at Calcutta and the agricultural research laboratory for jute at Dacca are notable examples of the solicitude of the Central Government for meeting the research requirements of valuable economic crops. Researches on forest products have been organized in the Forest Research Institute at Dehra Dun and the Lac Research Institute at Ranchi. The work that is being done in these institutions has gone far to refute the allegation that Indian chemists are doing little to help industry."

The President welcomed the resolution passed at the conference of the provincial Ministers of Industries recently held at Delhi that "the problems of poverty and unemployment, of national defence and economic regeneration in general, cannot be solved without industrialization; and as a step to such industrialization, a national planning committee should be set up which will formulate comprehensive schemes for the development of industries in India".

He suggested that "as an indispensable adjunct to this planning commission there should be set up an All-India Council of Scientific and Industrial Research with functions and powers similar to those entrusted to the Department of Scientific and Industrial Research in Great Britain".

"The universities of India have a great responsibility to discharge at this juncture. If the process of industrialization is going to

be a forced march in this country it will not do for them to take up an attitude of *laissez-faire*. The forces of nature are the enduring wealth of mankind, but for the solution of India's economic problems and the prosperity of her 380 millions, it is necessary that brilliant young men should be trained up in ever-increasing numbers, who are capable of tapping these sources of wealth. The modern young student of science must realize that while fundamental theoretical work must continue to be basis of all scientific advance, his subject would lose much of its importance, if this training did not fit him for tackling large-scale problems which arise in industries. Simultaneously with the development of industries, there arises in every country a great demand for well-trained personnel to man these industries. Prof. Philips recently estimated that 12,000 graduates in chemistry are employed in industrial pursuits in England. Lord Rutherford even complained that the demand in England for well-trained researchers in physics had outran the supply. Dr. Hamor, Assistant Director of the Mellon Institute for Industrial Research, has estimated that in 1937, America spent about 100 million dollars in scientific and industrial research; and though the expenditure is high, the results have more than fulfilled expectations, even if for a time, some of them may be kept secret. Such a consummation may be long in coming to India, but every effort should be made to prepare the ground in advance. A very good example of what the Indian universities can do in this direction has been shown by Bombay, where an

Institute of Textile Chemistry and Chemical Engineering has been established, which in equipment has few equals."

He observed that "the Indian industrialists are not all blind to the value of research as a means of improving production, and in consequence, of increasing the demand. The Tata Iron and Steel Works have led the way by the foundation of a magnificent laboratory at Jamshedpur for the study of alloys of iron and steel. The Lala Sriram Trust contemplates establishing soon at Delhi an Institute on the model of the Mellon Institute of America. The Luxminarayan Bequest at Nagpur may soon begin to yield the beneficial results which the donor so ardently cherished. But when one recalls that most of the industries in India are now sheltered by a tariff wall—call it revenue tariff or protective tariff as you like,—and that a substantial part of the income of the Indian business magnates accrues to them because of this tariff, one has a right to expect a much wider recognition on their part of the need for co-operation between science and industry, and a greater readiness to endow industrial research with a view to cheapening production. Such research is considered, in all enlightened countries, as an insurance against the dark days; and today when the world seems so much out of joint, the enlightened industrialists should do well to consider themselves only as servants of society—essentially moral beings whose main dividends are the benefits, which they confer by providing employment, and by manufacturing commodities essential for the national well-being".