Professor H. E. Watson, D.Sc., F.I.C., M.I.Chem.E.

THE impending departure of Dr. H. E. Watson from the Indian Institute of Science, Bangalore, is widely regarded by men of science as an unrelieved misfortune for this country. Particularly among his past and present colleagues and students will the resultant breach in continuity of chemical work at the Institute be deprecated, because it is only by them that his unrivalled contribution to the achievement of that foundation can be truly estimated. Having been appointed assistant professor of general chemistry at the opening of the laboratories in 1911, and thereafter becoming professor (1916), he has been increasingly identified with the Institute's growth, and it may be claimed that his own share in its development is unexcelled.

This claim is not founded on length of service alone, but is based on the more steadfast footing of meritorious devotion to the interests of graduates coming under his guidance. That has been shown primarily by the rigid orthodoxy of his training methods, his unswerving adherence to the principle of scientific responsibility, and his unflagging industry. A further benefit derived by those in laboratory association with Dr. Watson follows from his extraordinary skill in the less conventional aspects of experimentation, enabling him not only to elaborate complicated apparatus in glass and quartz required for the study of rare gases; but, by his highly trained senses of sight and hearing to detect faults and suggest uncanny improvements in the design and construction of appliances for his physicochemical researches and radio-work. It is impossible to estimate the advantage to a developing scientific mind offered by direct laboratory contact with so subtle a craftsman.

A survey of Dr. Watson's early career reveals the promise that has been amply fulfilled, and excludes him from that band of successful men who have been the despair of their schoolmasters. At eighteen he left Marlborough (in 1904) laden with prizes and scholarships, gained principally for languages, mathematics and science. Although these included a mathematical scholarship at Trinity College, Cambridge. he preferred to enrol himself at University College, London, with Sir William Ramsay, among whose bright young collaborators were M. W. Travers, F. G. Donnan and E. C. C. Baly. To this association may be traced his early interest in the spectroscopy and physical properties of the rare gases helium, neon, krypton and xenon; it explains his later developed facility in glass-blowing, for which Ramsay was famous, and it was ultimately responsible for his joining the Institute, at whose foundation Sir Dorabji Tata depended largely on the judgment of Ramsay in selecting a staff. Meanwhile, however, Dr. Watson had continued at University College the course of academic distinction presaged by his Marlborough career, gaining a succession of prizes and scholarships that culminated in the 1851 Exhibition. While holding this he worked at Berlin with Nernst on the specific heat of gases at low temperatures (1909) and at Geneva with Guye (1910), concluding his *Wanderjahre* at the Cavendish Laboratory, Cambridge (1911) with Sir J. J. Thomson.

It is difficult for those more recently familiar with the laboratories at Hebbal to realise that 25 years ago the Institute was merely a name attached to an untenanted estate. The initial staff were veritable pioneers, charged with the dual task of establishing physical equipment and ethical tradition. Dr. Watson's material contribution to that labour has been very substantial indeed. It is witnessed by the range of

active laboratories growing under his direction, and more particularly, for reasons indicated later, by the workshop, machine-room and chemical engineering appliances attached to his department. Even more valuable to the students, though intangible, has been his constant example of intellectual honesty, characterising not only his methods of training but his conduct of research. In an age of hasty over-publication, his restraint has offered a sound corrective to an unwholesome tendency.

Allowing for this self-imposed factor, the volume of his published researches is most impressive, and illustrates his broad outlook on scientific problems. It embraces work on the kinetics of reaction and equilibrium, photochemistry, the colloidal state, inorganic changes, electrical properties of matter, supersonics, reactions at high temperatures, and further developments of his earliest observations on gases and spectroscopy in the direction of atomic and subatomic chemistry. Particularly his work on dielectric coefficients of gases has reached a very high standard, revealing new technique, and a conclusiveness regarding the structure of simple molecules not attained by earlier workers. In association with Dr. J. J. Sudborough, who retired from the Institute in 1925, he had elaborated methods for analysing the fixed oils and fats abounding in the natural products of this country, and these have now been applied to a very wide range of seeds.

It is commonly observed that a mind strict in academic principles and fruitful in their development, is disinclined to attack industrial problems. Dr. Watson provides a rare contradiction of this doctrine, and his unfailing interest in various branches of Indian chemical industry has been a fortunate circumstance for the Institute. Conspicuous among the subjects engaging his attention have been the extraction of oil from sandalwood, soap-manufacture from local raw materials, utilisation of wood-distillation products, manufacture of white lead, chromates from Indian chromite, refining of crude saltpetre, isolation of thymol and caffeine, catalytic production of ether, anhydrous alcohol for power purposes, chromium electro-plating, vegetable oil refining and hydrogenation. Some of these inquiries have brought definite advantage to local industries, and all have served to link a stimulus of potential utility to the investigations promoted in his laboratories.

Under his direction there has been affixed to the work of the department a very definite industrial complexion, of which the main features are: (1) examination of raw materials for manufacturing possibilities, (2) adaptation of known processes to Indian natural resources, (3) investigating the technical detaiis of processes incompletely specified, (4) devising new processes, and (5) solution of manufacturing difficulties. These have involved many thousands of exact analyses of natural and manufactured materials, providing numerous graduates with experience in the application of analytical principles, and sometimes leading them to congenial employment in branches of industry for which they may have developed an aptitude. Dr. Watson may also be grouped with the authors of the Bunsen burner and the Dewar flask as an unrewarded public benefactor, having invented the neon lamp in 1910 and even then recognising its decorative and advertisemental possibilities, without having derived any pecuniary gain therefrom. He has been for many years a zealous worker in the field of wireless, and was for some time engaged in experimental transmissions of radio-telephony from his well-known station V U 2 B F. He has also devoted much attention to the design and construction of wireless receivers and of audio-amplifiers for gramophone reproduction.

There are many other aspects of Dr. Watson's long and fruitful association with the Institute which will increase the sense of loss incurred by his departure. To his committee-work he brought a discriminating perspicacity which was of the utmost value to his colleagues; and the library, now the best of its kind in this country, has benefited widely by his constructive power of selection. His regular presence at the weekly colloquium was always associated with helpful contributions to the discussion, while his own addresses were invariably attractive and informing. In him the Gymkhana Club found one of its warmest and most loyal supporters, and successive generations of students will pleasurably recall many happy evenings at his own house, when the exercise of his generous hospitality was unreservedly shared by Mrs. Watson.