

OBITUARY NOTICES.

THOMAS J. NOLAN.

1888—1945.

THOMAS JOSEPH NOLAN was born on November 9th, 1888, and received his early education at the Christian Brothers' Schools in Dublin. After making marked progress in science he gained the Archbishop Walsh University Scholarship, and entered University College, Dublin, in 1906. Three years later he obtained the B.A. degree with first class honours in chemistry and experimental physics and was awarded an Exhibition. Nolan commenced research work in University College, Dublin, under the late Professor Hugh Ryan, and, during the two years following graduation, he was senior demonstrator in chemistry and a teacher of chemistry in the City of Dublin Technical Schools. He was then awarded the travelling studentship in chemistry of the National University of Ireland for work on the higher ketones and secondary alcohols derived from the amides of palmitic and stearic acids, subsequently published in the *Proceedings* of the Royal Irish Academy. In 1912, he obtained the M.Sc. degree of the National University with first class honours in chemistry.

In the autumn of 1911, Nolan commenced research work in Geneva under Amé Pictet on the constitution of *isostrychnine*, and the use of methylal in ring syntheses. Owing to the illness of Pictet this work was not completed, and Nolan went to London, where his work under Samuel Smiles on the isomerism of the sulphides of β -naphthol was embodied in a series of five papers in the *Proceedings* and *Transactions* for 1912 and 1913.

Nolan worked under Zincke in Marburg in 1913, and published in the *Annalen* a paper on the action of nitric acid on 3 : 5 : 6-trichloro-*o*-cresol. Later in the same year, he went to the Kaiser Wilhelm Institut in Berlin where, working under Willstätter, who held him in high esteem, he isolated and established the constitutions of the colouring matters of the rose and the peony.

With the outbreak of the First World War, Nolan broke off his investigations and returned to Dublin, where he was awarded the D.Sc. degree of the National University. In the following year he joined the Research Staff of Messrs Nobel's Explosives Co., Ltd., and carried out research work on the manufacture and utilisation of nitro compounds and their by-products, and, later, on the manufacture of fine chemicals, including acriflavine, phthalic anhydride, and dimethylaminobenzaldehyde. In 1917, he was placed in charge of confidential research on the manufacture of propellant powders; this work led to the manufacture of a new stabilised propellant powder ("Ardeer Cordite") made without the aid of a volatile solvent.

On the amalgamation of the various explosives companies in 1919, Nolan was appointed chemist in charge of development work in propellants. He developed several new types of sporting powders (including "Improved Ballistite" and "Semi-Smokeless Powder"), and a series of powders of the nitro-cellulose type ("Nobel Neonites"). In 1924, he directed for Imperial Chemical Industries a detailed research into the production of "tetryl," and several novel features suggested by him were incorporated in the manufacturing plant. In 1925, he was sent by Imperial Chemical Industries to Czechoslovakia to report and advise on the manufacture of explosives.

While working on industrial and military explosives, Nolan kept in touch with general organic chemistry, and, when a biochemical research department was opened in 1922, studied the possible uses of kojic acid as a raw material for the production of synthetic drugs. Four years later, in conjunction with Professor (later, Sir) Robert Robinson, he published in the *Journal* a synthesis of peonidin chloride, the anthocyanidin of the peony, which confirmed the constitution which he had suggested in 1915.

In 1925, Nolan succeeded Dr. J. Reilly as assistant State Chemist in Dublin. Six years later he became State Chemist. While in the State Laboratory he published two papers in the *Proceedings* of the Royal Irish Academy on the pigments of the elderberry.

In 1932, Nolan was appointed Professor of Chemistry in University College, Dublin, in succession to the late Professor Hugh Ryan. During his thirteen years as professor, he carried out and directed extensive researches, published in a long series of papers in the *Scientific Proceedings* of the Royal Dublin Society, on the chemical constitution of products isolated from Irish lichens. In this field, he was the first to isolate a chlorinated depsidone, gangaleoidin, and in the last few years he succeeded in isolating two nitrogenous substances from the lichen *Lecanora epanora*.

Nolan was elected a Fellow of the Chemical Society in 1913, and served on the Council from 1926 to 1929; from 1939 until his death, he was the Local Representative of the Society in Eire. He became a Fellow of the Institute of Chemistry in 1918 and, in the same year, was admitted a member of the Royal Irish Academy, serving on its Council from 1927. He joined the Royal Dublin Society in 1925, served on the Science Committee from 1926 to 1931 and, from June 1931 to the time of his death, he was on the Science Section of the Council. While holding the chair of chemistry in University College, Dublin, he was a member of the Governing Body of the College and, later, of the Senate of the National University of Ireland. He represented the Irish Government at the World Power Congress in 1936 and University College, Dublin, at the London University Centenary Celebrations in the same year. As chairman of the Board of the Industrial Alcohol Factories, set up by the Irish Government, and as a member of the Irish Industrial Research Council and of the Irish Medical Research Council, he was frequently consulted by manufacturers and others on chemical matters arising out of the shortages of imported raw materials and finished goods during the last six years.

Nolan's death on March 12th, 1945, at the early age of fifty-seven, came as a great shock to his colleagues, research workers, and students. He had a high reputation, both as a chemist and as a professor. He ably encouraged and directed his younger research workers, and was noted for the excellence and clarity of his lectures. Despite the very large increase in the number of students taking chemistry in University College, Dublin, during his term of office, he maintained a personal contact with all of them after they had left the University. He leaves a wife and five children.

D. REILLY.

PRAFULLA CHANDRA RAY.

1861—1944.

THE death of Sir Prafulla Chandra Ray at the University College of Science, Calcutta, India, on June 16th, 1944, at the age of 83 deprived the Society of a very distinguished Fellow and India of one of her foremost scientific pioneers and leaders, who was held in high esteem and sincere affection.

Prafulla Chandra Ray was born on August 2nd, 1861, in a village in the district of Khulna, Bengal. His father, Haris Chandra Ray, was a landed proprietor. Till the age of nine, Prafulla Chandra was educated in the village school founded by his father. He then entered the Hare School and, later, the Albert School at Calcutta whither the family had migrated. While at Hare School he had a severe attack of dysentery. He recovered, but was a chronic sufferer from this malady, his constitution remaining always very delicate. In 1879 he passed the Entrance Examination of the Calcutta University and entered the Metropolitan Institution founded by the late Pundit Iswar Chandra Vidyasagar, a great philanthropist, social reformer, and pioneer of advanced English education in Bengal. At that time the Metropolitan Institution had no science classes or laboratories and Prafulla Chandra, desiring a scientific career, had to attend lectures in physics and chemistry at the Presidency College, Calcutta. Here he was specially attracted by the chemistry courses of Professor (later Sir) Alexander Pedler. It was Pedler who first awakened his interest in natural science. While taking the science course for the B.A. Degree, he was awarded in 1882 one of the two Gilchrist Scholarships after an all-India competitive examination. Without completing the course for his degree, Prafulla Chandra Ray proceeded to the United Kingdom for further study and entered the University of Edinburgh. In Chemistry, he was a pupil of Professor Alexander Crum Brown, F.R.S., noted for his philosophical outlook and engaging personality. Alexander Smith and James Walker were his fellow students. He obtained the B.Sc. degree in 1886, and the Doctorate in Science in 1887. In the latter year, he was awarded the Hope Prize and served as Vice-President of the Edinburgh University Chemical Society.

On his return to India in 1889, he was appointed Assistant Professor of Chemistry at the Presidency College, Calcutta. He held this position till 1911, becoming Senior Professor for the remainder of his service under the Government. Within a short time, his reputation as a successful and inspiring teacher became widely known, and his lecture theatre was always crowded with enthusiastic chemistry students and others, attracted by the personality of the lecturer. His lectures had a great influence upon his pupils and inspired students with a spirit of enquiry and love of truth. The Professor took special delight in narrating the life and work of the great leaders in chemistry. We, his pupils, still remember his animated account of the pilgrimage of Wöhler from Germany to the great Swedish savant, Berzelius, and the vivid description of the latter's "kitchen-laboratory." At the same time, a band of devoted workers gradually gathered round him, and the chemical laboratory of the Presidency College, though rather ill-equipped judged by standards in Europe, became an important centre of original chemical investigations.

In 1896, he published his first important paper concerning the preparation of mercurous nitrite, a fairly stable compound, which, it was previously believed, could not exist. This was soon followed by a large number of papers on nitrites and hyponitrites of various metals and their decomposition by heat, as well as on nitrides of ammonia and organic amines, which represented the results of long, painstaking, and thorough work. The late Professor H. E. Armstrong, once writing about him, described him as "Master of the Nitrites." Thus, an Indian School of Chemistry was created with Prafulla Chandra Ray as its leader.

After a service of about thirty years Sir Prafulla retired from the Presidency College in 1916, and joined the University College of Science, established out of a great benefaction from the late Sir Tarak Nath Palit, as its first Palit Professor of Chemistry. Here, in a more congenial atmosphere, assisted by a continuous stream of devoted workers, he turned his attention to new investigations, notably, the co-ordination compounds of gold, platinum, iridium, and other metals with mercaptyl radicals and organic sulphides, and a number of papers were published on the subject, most of which appeared in the *Journal of the Indian Chemical Society*.

In 1902, he published the first volume of the *History of Hindu Chemistry*, followed by a second volume in 1908. This is the only authoritative work on the subject, and is a valuable contribution to the history of science. The work was inspired by the great French chemist Berthelot, and represents nearly ten years' painstaking search through obscure and ancient Sanskrit manuscripts and through papers on Indian history by orientalists. It is a monument of scholarship and of sound judgment on problems of Indian history, but its contents remain practically unknown even to Indian scholars on account of the highly technical nature of its presentation. Professor Prafulla Chandra Ray long cherished hopes of writing a popular edition but

could never take it up seriously owing to his other preoccupations; perhaps some of his pupils will undertake this work.

In 1936, at the age of 75, he retired from active service and became Professor Emeritus. Long before that, on the completion of his 60th year in 1921, he made a free gift of his entire salary to the Calcutta University from that date onward, to be spent for the furtherance of chemical research, and the development of the Department of Chemistry in the University College of Science.

Outweighing his achievements as a scientific worker, the creation and fostering of an Indian School of Chemistry will ever remain his conspicuous contribution towards the national progress of Indians. The Indian Chemical Society which came into being in 1924, mainly through his inspiration and the help and service of his former pupils, and of which he was the Founder President for the first two terms, constitutes another very important contribution of Prafulla Chandra Ray to the advancement of science in India.

Realising that the appalling poverty of Indian masses can only be ameliorated through the economic advancement of the country by the development of industries on scientific lines, he risked his own small income to start, in 1893, a private firm under the name of the Bengal Chemical and Pharmaceutical Works which formed the nucleus of a chemical industry in India. Subsequently, in 1902, it was made into a limited company, which, under his able guidance and advice, has rapidly grown to its present prosperous condition. It rendered very good services to the Government during the two great wars, especially during the first. He also associated himself either as promoter, patron, director, or adviser with many other industrial concerns of the country.

He received the honorary degree of D.Sc. from the University of Durham in 1912, from Dacca in 1936, and that of Ph.D. from Calcutta in 1908. The University of Benares also conferred on him a similar honorary degree. He was made a Companion of the Order of the Indian Empire in 1911 and received the Order of Knighthood in 1917. He was Honorary Fellow of the Chemical Society and of the Deutsche Akademie, München. He was President of the Indian Science Congress in 1920.

Besides being a chemist by choice and profession, Prafulla Chandra Ray had a profound interest in literature, history, and philosophy. Shakespeare, Tagore, and Madhusudan Dutt (a Bengali poet of the nineteenth century) were his favourite poets, from whose works he could quote extensively. He was also very fond of the writings of Emerson and Carlyle; a copy of Emerson's Works was a constant companion. He contributed articles in Bengali to many monthly magazines, particularly on scientific topics, and his writings were eagerly read. He published the first volume of his autobiography *Life and Experience of a Bengali Chemist* in 1932, and dedicated it to the youth of India, with the hope of stimulating their activities. The second volume of this work was issued in 1935. In reviewing this book in *Nature*, Professor H. E. Armstrong wrote: "From beginning to end the message of the book is one of the highest endeavour—pulsating with vitality and intellectual force."

Possessed of a highly sensitive and sympathetic disposition, and born in a land whose people were struggling against enormous odds for existence, Prafulla Chandra Ray could not have lived the cloistered life so congenial to his temperament. We, therefore, find him an earnest social reformer and social worker, always ready to come to the relief of his suffering countrymen liable to be stricken by such natural visitations as flood, famine, fire, etc. In 1923, Northern Bengal was overwhelmed by a flood of unusual dimensions rendering millions homeless and starving. With remarkable promptitude, Prafulla Chandra Ray organised the Bengal Relief Committee, which collected nearly 2.5 million rupees in cash and kind which was distributed in the affected area through a network of properly manned and organised relief centres. His charity was not bounded by any consideration of personal comfort or well-being. He gave away freely for the poor and, particularly, for the benefit of poor students of whom he was a great friend. He loved his pupils and took a great pride in their success.

In spite of his small income, his large and unostentatious charity was made possible by the voluntary poverty he imposed on himself. Prafulla Chandra Ray was a bachelor and made a corner room in the University College of Science his home. His mode of life was characterised by spartan simplicity and he had complete indifference to dress and conventionalities. He mixed freely with all—young and old, learned and illiterate—and was loved by all. He was always at home with people in humbler walks of life and felt somewhat ill at ease in society. He was methodical in his work and could not tolerate the least waste of any material whether in the home or in the laboratory. A gas burner left burning, a water tap left running, a filter paper soiled or a lamp burning unnecessarily in a room would make him indignant enough to shower a volley of reproaches on the offender. His punctuality was almost proverbial and his daily programme was rigidly controlled. He implanted, so to say, modern rationalistic western methods in a framework of oriental culture and habits. He never enjoyed good health, but a strong will power made possible a "life overfull of action."

On the occasion of his seventieth Birthday Celebration the Indian Chemical Society presented to him a Commemoration Volume of its Journal containing contributions from many distinguished European and Indian scientists. A similar volume together with an Address on behalf of the people of Bengal was also presented to him at the time. His eightieth birthday was celebrated by the University of Calcutta when he received a large number of addresses from educational, scientific, and industrial organisations of the country.

No truer words about the life and character of Prafulla Chandra Ray and their influence upon his country-

men can be said than those so beautifully spoken by the late poet, Tagore, when presiding over his Seventieth Birthday Celebration : “ It is stated in the *Upanishads* that The One said, ‘ I shall be Many.’ The beginning of Creation is a move towards self-immolation. Prafulla Chandra has become many in his pupils and made his heart alive in the hearts of many. And that would not have been at all possible had he not unreservedly made a gift of himself. The power of creation having its inception in self-sacrifice, is a divine power. The glory of this power in Prafulla Chandra as teacher will never be worn out by decrepitude. It will extend further in time through the ever-growing intelligence of youthful hearts; by steady perseverance they will win new treasures of knowledge.”

This notice may be concluded by the words of the late Sir T. E. Thorpe when he wrote about Prafulla Chandra nearly a quarter of a century ago : “ India’s elevation will not come in Sir Prafulla Chandra Ray’s time. A small, spare man in feeble health and a confirmed dyspeptic, he will be spent in her service. But the memory of these services will survive.”

J. N. MUKHERJEE.
