

formylacetic acid, both of which are solid, and discusses the curious property of the β -form of combining with methyl alcohol.

It was not, however, in this field only that the experimental skill and keen insight of Wislicenus found scope. His activities in other branches of the science, too numerous to mention in a short monograph such as this, find expression in upwards of one hundred communications, published chiefly in the *Annalen* and in the *Berichte*. Nevertheless, some of these cannot be passed over without comment. For example, in 1892 he discovered a new and simple method for the preparation of hydrazoic acid by causing ammonia and nitrous oxide to react in the presence of sodium. Later, in 1905, in conjunction with Otto Dimroth, he utilised the sodium azide thus formed for the preparation of the simplest organic azide, methylazide (CH_3N_3), by causing it to react with methyl sulphate.

One of the most frequently occurring phenomena met with during the course of organic chemical reactions is that which involves the movement of groups, such as the hydrocarbon radicals, from one element to another, a change which appears to be closely related to that which is associated with the movement of a hydrogen atom within a tautomeric system. Numerous well-known reactions, such as, for example, the Hofmann synthesis of primary amines, the Beckmann rearrangement, and so forth, involve a transference of this kind, and it is, therefore, of interest to note that Wislicenus was able to discover certain typical examples of the migration of an alkyl group from oxygen to nitrogen, and to study the conditions under which the change occurred. Thus, in 1900, he showed, in conjunction with M. Goldschmidt, that phenylformiminoethyl ether, $\text{OEt} \cdot \text{CH}=\text{NPh}$, is converted, to the extent of about 40 per cent., into the isomeric methylformanilide, when it is heated at $230\text{--}240^\circ$. Later he was able to prove that the C-methyl ether of caffeine is readily converted into the N-methyl derivative.

Wilhelm Wislicenus was the distinguished son of a distinguished father. His name will always occupy a foremost place in the front rank of the organic chemists of his time.

J. F. T.

DR. A. G. MAYOR.

THE death of Alfred Goldsborough Mayor, at the comparatively early age of fifty-four, deprives the scientific world of a worker whose experience in tropical marine biology was unrivalled. Mayor stood in the direct historical succession of American participation in this field, for as the mantle of Louis Agassiz fell on his son Alexander, so did Alexander's mantle fall on the shoulders of Alfred Mayor, who accompanied him as assistant on many of his wanderings in the Pacific. When, in 1904, Mayor was appointed director of the Marine Biological Department of the newly founded Carnegie Institution of Washington, he really entered into his inheritance, and though so many of the projects of his fruitful brain will never mature, the work which has been accomplished at his laboratory in the Tortugas, Florida, and during many expeditions, forms his imperishable monument.

This laboratory, where Mayor died on June 24, is situated at the southernmost point of the United

States, 70 miles west of Key West, on a tiny island (Loggerhead Key) which is surrounded by the purest ocean water. It was selected for this especial reason, for Mayor felt that nowhere else in Florida could the proper conditions for the experimental investigation of marine animals be secured. The position is not without disadvantage, and it is generally considered advisable to close down for the autumn hurricane season and for the winter, during which Mayor carried out his expeditions to other seas and islands. The Tortugas Laboratory was generally only available between early May and the end of July. This, however, is the most suitable time for the university research workers of the United States, from whom Mayor drew his investigators by personal invitation. These invitations, to work free of all expense and with payment of travelling expenses, were freely issued to all those whom he felt had some problem which could be favourably attacked at the Tortugas, and until that problem was, as nearly as possible, solved, no pressure embarrassed the research, but season after season it was his custom to reinvent those who had studied with him before and put in their way opportunities which he felt they might have missed before.

The success of his policy is to be seen in the splendid list of researches which stands to the credit of the Tortugas Laboratory. His own publications range widely over systematic zoology ("The Medusæ of the World," published in 1911), comparative physiology (especially the series of studies on the jelly-fish *Cassiopea*), the physicochemical properties of oceanic water, and biological problems like the growth rate of corals, and reflect his many-sided personality and his abounding energy. The work of his colleagues in whatever subject shows his direct interest and influence and the pains which he took to provide the most complete and satisfactory equipment. Whatever novel line of investigation was likely to throw light on marine work was certain of his most enthusiastic co-operation, and in this connexion may be mentioned the encouragement given to workers on the bacteriology of sea-water, like Harold Drew and Lipman, and the development of scientific under-water photography by W. H. Longley.

The expeditions which Mayor organised and carried out are too numerous to mention, but those to Murray Island, on the Great Barrier Reef, in 1913, and to Tutuila, in American Samoa, in 1915-20, really broke fresh ground in the investigation of tropical marine faunas. At both places he made an intensive study of the coral reefs and was able to demonstrate certain very interesting relations between the physiological characteristics of the different reef corals and their position and development on the reef. These and many other problems of importance were attacked by Mayor and his co-workers, but all the results are not yet published.

Mayor was as faithful in friendship as he was fascinating as a companion. The energy and vitality of his body and mind, his dramatic sense, the tenacity of his memories of men and countries, the range and grasp of his knowledge, all never failed to rouse the admiration of his friends. Something has been said of the zeal with which he furthered the efforts of those who worked with him. It could even be stated that

he endangered the success of his own researches by the readiness of the aid he rendered to others.

Mayor cherished a great ambition to remove the equipment of the Tortugas Laboratory to some locality in the West Indies and make it a truly international meeting-place for biologists. Just before the war his opportunity seemed to have come, and he was about to enter into negotiations for a site in Jamaica when the storm broke. It was a bitter disappointment to Mayor that he was not able to proceed with his project after the war, not least because he hoped that, in his yearly assemblies, English biologists would be represented more fully than in the past, and that in this way the cause of Anglo-American unity, which he held very dear, would be furthered. F. A. P.

DR. ALEXANDER GRAHAM BELL.

ON August 1 Dr. Alexander Graham Bell, one of the world's greatest inventors, died at the age of seventy-five years. The effects of early upbringing and environment always leave their mark on a man's life, and in Graham Bell's case they are specially apparent. His father spent the first half of his life as a lecturer on elocution at Edinburgh, and was also a prolific author of books on the same subject. Among his son's earliest experiments were the recording of speech waves on smoked cylinders. Graham Bell was a student at Edinburgh University, and later he assisted his father when the latter was a lecturer at University College, London. In 1870, for reasons connected with Graham's health, the family migrated to Brantford, near Tutela Heights, Ontario. In 1873 Graham was appointed professor of physiology at Boston University. In 1874 he invented a system of harmonic multiple telegraphy, and in that year he began a series of experiments which led him at last to realise in practice his conception of an articulating telephone.

Considering the marvellous results achieved the mechanism of the telephone is wonderfully simple. Previous to its invention, elaborate devices had been proposed containing large numbers of tuned reeds so as to cover the whole gamut of the human voice. The final form of the instrument is fully described in Graham Bell's patents of 1876 and 1877. Although he made several other notable inventions, the telephone will always be outstanding as his supreme achievement. It first attracted world-wide attention at the Centennial Exhibition in Philadelphia in 1876. After Graham Bell had laid down all the essential principles of telephony, Edison developed his carbon transmitter.

In 1878 the first telephone exchange was established. There are now about twenty-one million telephones connected with the various exchanges throughout the world. In the early days Graham Bell regarded twenty miles as the limit to which articulate speech could be sent. It has now been sent over five thousand miles.

In 1917 the Bell Memorial Committee presented to Brantford, Ontario, a public park, the house in which Graham Bell lived when he made his epoch-making discovery, and a noble monument, to commemorate the invention of the telephone. Graham Bell in his later years took the keenest interest in aeronautics and geophysics. When Father Cortie recorded the mag-

netic storm of August 11, 1919, in NATURE (vol. 103, p. 483), Graham Bell wrote to say that he had noticed a display of the Aurora Borealis at Cape Breton Island on that date, "Pulsations of light swept upward to the zenith resembling clouds driven before a heavy wind" (vol. 104, p. 74). He was made a doctor of science at Oxford in 1906, and in 1913 the Royal Society awarded him the Hughes medal and the Institution of Electrical Engineers made him an Honorary Member. On his visit to this country in 1920 the freedom of his native city of Edinburgh was conferred on him. He was held in universal esteem. As the founder of a great and flourishing industry which ameliorates the conditions of life he was a great benefactor to humanity.

A. R.

WORKERS in many branches of science and education will deeply sympathise with Prof. W. A. Bone, professor of chemical technology in the Imperial College of Science and Technology, on the death of his wife on July 26. Before her marriage to Prof. Bone in 1916, Mrs. Bone, who was then Miss Liddiard, was headmistress of the St. Albans High School for Girls, and had previously been a member of the teaching staff of the Ladies' College, Cheltenham. She was a graduate in arts of the University of London, and possessed exceptional capacity for teaching as well as for organisation. While she was head of the St. Albans High School, the domestic economy school was inaugurated there. Mrs. Bone took an active interest in science progress in general, and her husband's researches in particular, and her death will be regretted by a large circle of pupils and friends who came under her strong and delightful influence.

ORIENTAL learning has suffered a serious loss by the death, at the age of eighty-five years, of Mr. Charles Henry Tawney, C.I.E. Educated at Rugby and Cambridge, where he gained the highest classical honours, and a fellowship at Trinity College, Mr. Tawney joined the Indian Educational Service, and became professor at the Presidency College, Calcutta, where he won the esteem of his pupils by his kindness and learning. He became Director of Public Instruction in Bengal, and retired from the Educational Service in 1892. On reaching England he became librarian at the India Office. Much of his time was occupied in assisting writers on Indian subjects, by whom he was regarded with the greatest esteem. He was an admirable Sanskrit scholar, and published several works, the best known of which are translations of two great collections of Indian folk-tales, the Katha Sarit Sagara and the Katha Kosa, enriched with valuable notes, which displayed a wide knowledge of the literature of folk-tales. One of his sons, Mr. R. H. Tawney, Fellow of Balliol, is a distinguished writer and lecturer on economic problems.

WE regret to see the announcement of the death, on July 25, of Dr. Arthur Ransome, F.R.S., lately professor of public health in Owens College and examiner in sanitary science in the Universities of Cambridge and Manchester.