issues. In his later years it was a delight of his to recall the patent cases on which he had been engaged, and he was able with his wonderful memory to relate the circumstances in close detail. The esteem in which he was held as a scientific investigator was signalised by his election during this time as a fellow of the Royal Society. One of his greatest efforts at the Bar was as counsel for the newly formed Metropolitan Water Board before the Commission on the water supply of London, and in this his mathematical knowledge was of great service to him in dealing with an intricate set of statistics.

Lord Moulton's Parliamentary career commenced in 1885, when he became M.P. for Clapham. Afterwards he contested other seats, ultimately becoming member for Launceston. He was, however, too independent in thought to attune himself readily to party politics. In 1906 he became a Lord Justice of Appeal, and in 1912 a Lord of Appeal and a member of the Judicial Committee of the Privy Council. He was also made a life peer. At the same time, he had numerous other activities in connection with medical research, engineering, etc.

Then came, in 1914, the great struggle which was to give scope for all his wide experience and wonderful energy. Few men had the vision in those early days of the war to foresee its magnitude as Lord Moulton did. For him there could be no peace of mind when he knew that other men were thinking in tons of explosives while he was already thinking in hundreds of tons. He knew the Germans, knew how they had for a generation specialised in organic chemical industry, and knew also that unless this country made a great and immediate effort, the war would end through shortage of supplies on the side of the Allies. Fortunately, he had a power of insistence which enabled him to impose his influence against all resistance and in spite of all difficulties. In November, 1914, he became chairman of a small Advisory Committee on Chemical Products. Two months later, in consequence of his efforts, the Committee on High Explosives ("A 6") was formed under the War Office, and ultimately he became Director-General of the Department of Explosives Supply under the Ministry of Munitions, and obtained a freedom of action which enabled him to make provision for the abundant supplies of explosives which he foresaw to be necessary.

Lord Moulton gathered round him a staff in which he placed entire confidence. The fear of a shortage was always before him, but he laid his plans with courage and prevision. At the beginning of the war picric acid was the standard high explosive. Lord Moulton realised at once that the supply of raw materials was absolutely inadequate. This necessitated the establishment of a new industry—the synthetic phenol industry—to increase the supply of picric acid, and at the same time the manufacture of T.N.T., which was new to this country, had to be inaugurated. As the demands increased, the T.N.T. had to be economised by mixing it with ammonium nitrate, and this was ultimately done without loss of efficiency. It was characteristic of him that he was untiring in his personal inspection of the explosives factories, and travelled thousands of miles, often at night, to spend Saturdays and Sundays in this way. From end to end of the country his visits were welcomed on account of his helpfulness and encouragement. He and his devoted staff had ultimately the satisfaction of seeing the supplies of explosives increase to such an extent that not only our own needs, but also those of our Allies, were met.

Later in the war the supply of poison gases also came into Lord Moulton's hands. This side of the work was most repugnant to him, but he met it, as a hateful necessity, with his full vigour and with notable success.

By reason of its very efficiency the work was but little heard of, and consequently imperfectly appreciated by the general public. It is pleasant, however, to recall that his efforts were recognised by the conferment of the K.C.B. in 1915 and of the G.B.E. in 1917. He had a host of foreign distinctions, and was a Commander of the Legion of Honour.

After the war Lord Moulton was untiring in his efforts to place the scientific industries of the country on a sound basis. Few, if any, can realise what the country owes to him for his work of the last six years. His self-sacrificing devotion was unbounded. He was a great patriot and a true friend.

R. C. FARMER.

BARON T. KIKUCHI.

MEN of science in this country and in Japan will hear with much regret of the premature death, on March 2, of Baron T. Kikuchi at the age of twenty-seven. The son of a distinguished father, the late Baron Kikuchi, at one time Minister of Education in Japan, he had a distinguished career in the University of Tokyo, specialising in physics under the direction of Prof. Nagaoka. In 1919 he came to England to work in the Cavendish Laboratory under the direction of Sir Ernest Rutherford. His first paper, published in 1920 in the Proceedings of the Royal Society in conjunction with Dr. F. Aston, contained a careful and able examination of the nature and velocity of the swiftly moving striations observed in neon and helium. An account of further independent work on this subject is in course of publication. In the midst of the preparations for the experimental attack on an important physical problem Baron Kikuchi was taken ill and died after a two months' illness in a nursing home in Cambridge. During his illness he was devotedly attended by his young wife, who had come from Japan to join him a few months before. Like his father before him a member of St. John's College, a special memorial service was conducted in the college chapel by the Master, attended by the Vice-Chancellor of the University. The remains were taken to London for cremation.

A man of marked intellectual energy and experimental ability, Baron Kikuchi had been

selected to fill an important post in the new National Physical Laboratory at Tokyo on his return from Europe. His intelligence and charm of manner had gained him many friends both in this country and Japan, who deplore the untimely end of such a young life so full of promise of achievement in science. E. R.

THE death of GEORGES HUMBERT on January 22 has removed a mathematician of exceptional powers. Humbert may be compared with Clebsch, because, although he may not have invented a new mathematical engine, he showed unexpected uses of those already provided. In his hands Abel's theorem and Poincaré's researches on Fuchsian functions became magic keys to unlock the treasures of geometry, and give us concrete and elegant images of analytical ideas. One of his most characteristic works is his memoir on hyperelliptic surfaces, for which he obtained the Bordin prize, and which was published in *Liouville's Journal*. In his later years he was attracted by the theory of numbers, and published several papers on arithmetical forms. Humbert gave lectures at the Ecole Polytechnique, and also at the Collège de France. M.

Notes.

DR. H. K. ANDERSON, Master of Gonville and Caius College, Cambridge; Prof. W. M. Bayliss, professor of general physiology, University College, London; and Sir William H. Bragg, Quain professor of physics, University of London, have been elected members of the Athenæum Club under the provisions of the rule of the club which empowers the annual election by the committee of a certain number of persons "of distinguished eminence in science, literature, the arts, or for public service."

ON Monday last, March 14, the Albert medal of the Royal Society of Arts was presented to Prof. Albert Michelson, foreign member of the Royal Society, for his discovery of a natural constant which has provided a basis for a standard of length. The award was made last year, but the actual presentation was deferred until Prof. Michelson could come to England to receive it. In the absence of H.R.H. the Duke of Connaught, the president, the medal was presented by Mr. Alan Campbell Swinton, the chairman of the council of the society. By the use of his interferometer Prof. Michelson found the length of the Paris standard metre to be 1,553,164 times the wave-length of the red line of cadmium, and his calculations have since been verified as accurate within a limit of error of one wave-length, or say two-millionths of a millimetre. To the society the award is of especial interest, because in 1774 it offered a prize for an invariable standard of length, and up to the present date there has never been found a successful competitor. As the Albert medal is limited to practical applications of science, the society could not recognise any other of Prof. Michelson's scientific discoveries, but its council was doubtless influenced by an appreciation of their extent and value. His construction of optical gratings, determination of the velocity of light, and precise experiments on the relative motion of æther and matter are of fundamental importance, and his échelon spectroscope has provided physicists and astronomers with a most valuable instrument of high resolving power. Several years ago Prof. Michelson used his interferometer to measure the diameters of the four chief satellites of Jupiter, and suggested its application to the fixed stars. This has now been done at the Mount Wilson Observatory, and a short account of the remarkable results obtained was given in NATURE of January 20, p. 676.

THE magnetic research steamer *Carnegie*, of the Carnegie Institution of Washington, returned to San Francisco on February 22 after a scientific expedition to the Indian Ocean, West Australia, New Zealand, Tahiti, and Fanning Islands to investigate the magnetic condition of the earth over ocean areas. The only information as to the results of the voyage yet announced is that the Royal Company Island was sought for in vain. The Royal Company Island or Islands figured on charts of the Southern Ocean for more than a century, having been reported by the Spanish ship *Rafaelo* about 1776 in 49° S., 142° E. Bellingshausen in the Russian Antarctic Expedition appointed the island as a rendezvous for his two ships in January, 1820, but both vessels sought it in vain. Dumont D'Urville on the French Antarctic Expedition in 1840 also searched for the island, but could not find it; still, the name remained on the charts in various positions between 49° and 53° 30′ S. and between 141° and 145° E. The re-discovery of Bouvet Island by the *Valdivia* in 1898, after Cook in 1772 and 1775 and Moore in 1845 had passed within twenty miles without sighting it in their searches, reawakened doubts as to the non-existence of other islands reported in the Southern Ocean and never seen again. Capt. J. K. Davis in the *Nimrod* of Shackleton's expedition in 1909, and again in the *Aurora* of Mawson's expedition in 1912, sailed over most of the assigned positions and got soundings of more than 2000 fathoms in the vicinity. The work of the *Carnegie* should be held to have completed the difficult task of proving a negative, and so to clear the chart of another iceberg.

THE *Daily Mail* of Saturday last, March 12, publishes a message from its Paris correspondent referring to a prediction by the Abbé Moreux that the next fourteen years will be relatively dry in Western Europe. The alternation of wet and dry periods of about seventeen years each referred to in the report, and in the short leading article upon it, is, however, by no means a new discovery. Indeed, a cycle of precisely the same length and type as that now announced was mentioned more than three hundred years ago by Francis Bacon, and in our own time Prof. E. Brückner, of Berne, has traced its effects in a variety of meteorological phenomena. The Abbé Moreux may have found a new weather-period, but