

on the council of the Zoological Society of London. After his official retirement from the Museum in 1923, he continued his old work as though nothing had happened. The death of his wife in May 1928 was a severe blow from which he never recovered.

M. A. C. H.

PROF. HENRI ANDOYER.

By the death on June 12 of Marie Henri Andoyer at the age of sixty-six years, French science has lost a distinguished member of that characteristic school of mathematical astronomers of which such men as Tisserand and Radau were eminent examples and Henri Poincaré the most brilliant ornament. In Andoyer a rare combination of qualities was united. To his knowledge and ability as a mathematician and his acquaintance with the technical side of practical astronomy he joined a skill and a passion for numerical calculation which recalls the kindred taste of J. C. Adams in England. He was at the same time a gifted teacher, with an enthusiasm and critical sense which made his exposition equally attractive in the shape of lectures or in published form.

Andoyer was born at Paris on Oct. 1, 1862, and entered the École Normale Supérieure in 1881, devoting himself to the study of pure mathematics. The years 1885-92 were spent at Toulouse, where Andoyer was attached to the Observatory but more actively engaged as professor in the faculty of science. As astronomer, however, he took part in organising the work of the Astrographic Chart, and attended the early conferences on the scheme at Paris. In 1892, before this work had advanced beyond the preliminary stages at Toulouse, Andoyer was recalled to Paris to deliver a course of lectures on mathematical astronomy and celestial mechanics and to share in the teaching of mathematics in the Faculty of Science. To this period belongs his "Leçons sur la théorie des formes et la géométrie analytique supérieure", together with a number of more elementary text-books and some original papers, all devoted to pure mathematics. It was thus comparatively late in life that his devotion to mathematical astronomy asserted itself as an absorbing study, and even after 1903, when he was appointed professor of astronomy at the Sorbonne, his interests were not always confined in any narrow sense to the subject of his chair. The germ to be seen so early as 1887 in a paper on intermediary orbits, inspired by the work of Gylden, was a little slow in bearing fruit.

In 1910, Andoyer succeeded Bouquet de la Grye as a member of the Bureau des Longitudes, and on the death of Radau in the closing days of 1911 followed him as editor of the *Connaissance des Temps*. The annual ephemeris has appeared under his direction from the year 1914 onwards, and has fully maintained the high reputation earned for it under his predecessors.

Two works of permanent value embody the substance of Andoyer's teaching. One, "Cours d'astronomie", comprises a first volume on theoretical astronomy, which reached its third

edition in 1923, and a second on practical astronomy, of which the second edition, in collaboration with A. Lambert, appeared in 1924. The other, "Cours de mécanique céleste", in which stress is laid on the computational side of this intricate subject, was published in two volumes (1923 and 1926).

The theory of the moon's motion, after the work of Delaunay and Radau on one hand, and of Hill and E. W. Brown on the other, presents a field offering little scope for easy or striking achievements of a novel kind. But it was to this difficult and in appearance fully explored problem that Andoyer turned repeatedly with complete knowledge of what had been done by others. It is the subject of his last considerable work, "Sur la théorie analytique du mouvement de la lune", the culmination of a series of critical studies in a branch of astronomy for which he was exceptionally qualified by natural gifts.

Andoyer's passion for numerical calculation found scope in the recomputation of fundamental logarithmic and trigonometrical tables. Executed single-handed and with remarkable rapidity, equal evidence of unfailing industry and quite extraordinary skill, these tables were published between 1911 and 1918. It is likely that they will not be superseded by any later work of the same kind, at any rate performed in the same fashion.

Andoyer was elected an associate of the Royal Astronomical Society in 1914 and became a member of the Paris Academy of Sciences in 1919. He was Officer of the Legion of Honour. Of a modest and simple disposition, he will be mourned by a circle of colleagues, and his death removes from the ranks of astronomy a gifted and indefatigable worker not easily replaced.

H. C. P.

WE regret to announce the following deaths:

Mr. W. S. Andrews, at one time associated with Edison in electrical developments and distinguished for his work on fluorescence and phosphorescence and selenium cells, on July 1, aged eighty-one years.

Dr. Charles F. Brush, of Cleveland, Ohio, the inventor of the electric arc light known by his name, on June 15, aged eighty years.

Prof. Wilhelm Ellenberger, formerly rector and director of the physiological and histological institute and of the physiological chemistry research station of the Veterinary Highschool, Dresden.

Lieut.-Colonel George Henderson, formerly of the Indian Medical Service and for a time Director of the Royal Botanical Gardens and professor of botany in the University of Calcutta, on June 24, aged ninety-two years.

Major C. V. Hodgson, hydrographic and geodetic engineer and assistant chief of the division of geodesy, U.S. Coast and Geodetic Survey, who had taken part in many surveying expeditions to the waters of Alaska and the Philippine Islands, and was known chiefly for his work on geodetic astronomy, on May 19, aged forty-nine years.

Mr. G. R. Kaye, formerly of the Indian Education Department, author of some well-known works on Indian astronomy.

M. Léon Lindet, member of the Section of Rural Economy of the Paris Academy of Sciences, known for his work on the physiology of plant and animal foodstuffs, on June 16, aged seventy-two years.