

50,000 kw. convey the current to Bordeaux and one of 50,000 kw. to Toulouse and beyond, the total distance exceeding 500 kilometres. At the two extremities of the high-tension system (Bordeaux and Toulouse) and at the intermediate point of Dax there are transformer stations to reduce the voltage again to 60,000. The various demands of traction and industry are met from these centres, as well as from those of Laruns and Lannemezan.

The duties of the central organisation of the U.P.E.P.O. at Tarbes are considerable. Each day it is furnished by its constituent units with detailed particulars of the previous day's output, the energy available, the local requirements, the state of the water supply, lake levels, etc. From these data is prepared a chart of the aggregate resources, and a scheme of apportionment is arranged to meet the fluctuating demand, the

deficiency at one centre being made good by the surplus at another. The whole system is planned, in fact, with the view of eliminating unnecessary waste, obviating local breakdowns or shortage, and ensuring a regular and sufficient supply for the needs of the important region which it serves.

My acknowledgments are due to the U.P.E.P.O., as well as to the Midi Railway Company, for information courteously placed at my disposal and for their kind assistance. The photographs of the stations have been supplied by the Midi Railway Company, from which I learn that, up to the date of writing, a length of 1256 kilometres (say 785 miles) of track is electrically operated, representing about thirty per cent of the whole system. A further 336 kilometres is now being equipped for electric traction, and the electrification of a length of 270 kilometres is under consideration.

### Obituary.

DR. J. P. LOTSY.

THE death of Dr. Johannes Paulus Lotsy, which occurred at Leyden in November at sixty-four years of age, terminates the career of one of the leading workers of the day on evolution and heredity.

Dr. Lotsy's botanical work began when he was sent out to the East Indies in 1896 to study the alkaloids contained in various species of *Cinchona*. The results of his work were published in 1898. He then settled down to a long career of teaching and research in Leyden, varied by frequent visits to almost every part of the globe. In 1906 he published the first part of his "Vorlesungen über Deszendenztheorien", the second part of which appeared two years later. This very useful work was based on his lectures on evolution at Leyden and comprised a comprehensive survey of the state of evolutionary thought at the time. At the same time another monumental work began to appear, "Vorträge über botanische Stammesgeschichte" (3 vols., 1907-1911), an unfinished treatise on the plant kingdom from a phylogenetic point of view.

Lotsy now began to develop the views on evolution and the species question with which his name will always be associated. During the years 1912 to 1916 he published a series of papers putting forward the view that the fundamental unit of taxonomy was the homozygous biotype, and that to this only should be given the name species. Subsequent work has shown that such a unit has no existence in ordinary allogamous populations, and later on Lotsy himself abandoned his opinion and went to the further extreme of doubting the existence of such homozygous biotypes in Nature even in pure lines.

In 1916 Lotsy published his well-known book, "Evolution by means of Hybridisation", in which he vigorously attacked de Vries's work on mutations in *Oenothera*, and claimed that the phenomena observed in that genus were due to the heterozygosity of the material. He advanced the view that the sole method of evolution was by means of hybridisa-

tion, and denied that gene mutations played any part. The book was written in a style entirely the author's own, and many of his views cannot now be maintained, but, nevertheless, it will remain a classic in evolutionary literature. Lately, moreover, evidence has accumulated showing that hybridisation plays a greater part in evolution than Lotsy's critics imagined. One of the most striking examples of this is the grass *Spartina Townsendii*, which has recently been shown, beyond doubt, to have originated from a cross between *S. alterniflora* and *S. stricta*, followed by a doubling of the chromosomes. Other cases could be quoted, and it seems clear that one of the means of evolution of new species is interspecific hybridisation followed by chromosome doubling.

During the last six years, having given up regular teaching on being made emeritus professor at Leyden, Lotsy visited New Zealand, South Africa, and other parts of the world for the purpose of collecting evidence for his views on evolution. He was a tireless worker in the field, and everywhere he went he amassed a wealth of material and brought together a great number of arguments in support of his views. In South Africa he worked especially on the genera *Cotyledon* and *Euphorbia*, and took back material of the former genus to Leyden, where he was breeding them on a large scale. He also turned his attention to hybrid populations in the human species, and a large part of the paper on his South African work, published in conjunction with Dr. Goddijn, deals with the various races he had studied there.

At the time of his death, Lotsy was engaged on a large work dealing with his ideas on evolution, and it is much to be regretted that he did not live to bring it to completion.

Lotsy was always a welcome visitor to Great Britain, his last visit being to attend the London meeting of the British Association. His views, always frank and forcibly expressed, were very stimulating and were generally appreciated; since,

however, he was apt at times to disregard the opinions of some of his botanical colleagues, his theories and conclusions have not perhaps received the recognition which they merit.

PROF. HUGO DE BÖCKH.

THE recent death at the age of fifty-seven years of Hugo de Böckh will occasion deep grief amongst those who in many lands enjoyed his gifts of friendship, admired his independent judgment and vigorous personality, and feel the loss to science. He was the son of a distinguished Hungarian geologist, and received part of his training under Karl von Zittel at Munich. In 1902, at the age of twenty-eight, he was appointed professor of mineralogy at the Hungarian School of Mines at Selmezbánya, and there turned his attention to economic geology and to the tectonic problems which he realised would prove of practical value in mining. He wrote a text-book on geology in Hungarian, and amongst other investigations studied the applications of the Eötvös balance to subterranean prospecting. During the War he was appointed Under-Secretary for Mines in Hungary.

In 1923 de Böckh received the appointment which gave him his great opportunity—he became the geological adviser to the Anglo-Persian Oil Company, and had a great influence in its development by his superintendence of its geological work. He was in charge of its surveys in Persia and Mesopotamia, Albania, Colombia, and Venezuela, and of the international survey of the oil-fields of Iraq. In this work his indomitable, restless energy, originality and insight, and his inspiring enthusiasm made him a most efficient leader in the pioneer field work.

Prof. de Böckh was asked to succeed Baron Nopcsa in 1929 as director of the Hungarian Geological Institute, and returned to Buda-Pest in 1930. He was given a seat in the upper house of the Hungarian Parliament. It was hoped that as soon as he had reorganised the Hungarian Geological Survey he would have time to publish the general conclusions of his world-wide study of oil-fields and their structures. He had published relatively little, partly owing to lack of time and to much of his work being confidential. His most important contribution was that, in conjunction with Dr. G. M. Lees and Mr. F. D. Richardson, to the British Association symposium on the structure of Asia (1929), in which he included some striking results of a study of the Magdalena rift-valley in Colombia.

Prof. de Böckh gave early this year a series of lectures under the auspices of the University of London, in which he summarised his general conclusions on current tectonic problems, and showed his independence of judgment by emphasising the need for caution with Eötvös balance observations and deductions from isostasy. It is to be hoped that those lectures will have been left in a form available for publication, as they state the matured judgments of a geologist of unusual insight and of unique experience and qualifications.

No. 3244, VOL. 129]

MR. J. H. LEONARD.

BY the death of John Henry Leonard, which took place at a Kensington nursing home on Dec. 4, the Trustees of the British Museum have lost the services of one who was the first to hold the office of guide-lecturer at the Natural History Museum. The appointment was, at the beginning, regarded purely as an experiment, and was the result of the steady campaign conducted by the late Lord Sudeley to make the great national museums more attractive and more interesting to the general public.

That the experiment was such an undoubted success at the Natural History Museum was due to Mr. Leonard's qualities, which rendered him so eminently fitted to discharge the duties of the post. To hold the attention of a group of people haphazardly brought together for a tour of part of the Museum, and with very varying capacity for understanding and appreciating what they were shown and were told, is no easy task, especially round exhibition cases in galleries of difficult acoustical properties. Mr. Leonard possessed the fundamental quality of a good carrying voice, and at the same time was successful in appraising the mentality of the average listener; he was always patient of questioners and took great pains to enlighten the genuine inquirer. With school children he was particularly successful, partly because he was naturally fond of young people; and there are many, of tender years when they first visited the Museum, who will ever bear him in kindly remembrance.

Born on April 19, 1864, Mr. Leonard was educated at Kensington Grammar School and at King's College and University College, London. He obtained the B.Sc. degree, his subjects being zoology, botany, and geology, in the last of which he gained honours. He taught science for a time, and was associated with the science sections at some of the exhibitions held at Earl's Court and Shepherd's Bush. He was appointed guide-lecturer at the Natural History Museum on May 20, 1912. Without having written anything, he has done no mean service in awakening an interest in natural history among those who, to the average annual number of 12,500, have attended his tours. He was also a lay reader for whose services in the pulpit there was always a good demand.

WE regret to announce the following deaths:

Dr. Melvil Dewey, formerly director of the New York State Library, originator of the decimal system of book classification, on Dec. 26, aged eighty years.

Mr. Beeby Thompson, formerly principal of the Northampton Technical School, who was a well-known consulting water engineer, on Dec. 12, aged eighty-two years.

Prof. Hermann Thoms, formerly director of the Pharmaceutical Institute of the University of Berlin and president of the German Pharmaceutical Society, aged seventy-two years.