in 1921 and went to live at Meudon near Paris, where he died on January 21 last. He leaves a widow, one son, and one daughter, the wife of Prof. W. Cra p of the University of Birmingham.

PROF. H. J. HAMBURGER.

HARTOG JACOB HAMBURGER was born at Alkmaar, a small town in the north of Holland, on March 9, 1859, and received his early scientific education from Dr. J. D. Boeke at the "Hoogere Burgerschool," where he was the most distinguished pupil of that eminent teacher. From school he passed to the University of Utrecht in 1879 and, as a student of chemistry, obtained his doctorate four years later. Trained as he was in the severe discipline of physics and chemistry (knowledge to stand in good stead later), other, and perhaps wider questions attracted him, for we find the subject of his thesis was "The Estimation of Urea in Urine."

During this period Hamburger was appointed assistant to Donders for physiological chemistry and to Engelmann for physiology and histology. From them, and through association with them, he obtained his first insight into, and that lifelong love of biological investigation which formed his subsequent work. One particular incident is worth recalling. In 1883 Donders attended a meeting at Amsterdam where de Vries delivered a lecture on plasmolysis. Returning to Utrecht, Donders told his young assistant about it, and the latter immediately applied himself to the somewhat analogous problem of hæmolysis, a question which, extended to the broader aspect of permeability, formed the basis of more than twenty-five years' steady and brilliant research.

After working with Donders and Engelmann for seven years, Hamburger obtained his doctorate of medicine, and in January 1888 he became lecturer in physiology in the Veterinary School at Utrecht, where he remained for thirteen years and occupied himself with such problems as respiration, red blood cells, lymph, and permeability. In 1891 he married Miss F. C. Gosschalk, who was a constant help to him, especially perhaps on the literary side of his activities.

The year 1901 saw Hamburger's appointment, in succession to Huizinga, to the chair of physiology at Groningen, a post he held to the end. Once more we find his outlook expressed in the subject of his inaugural lecture on December 28 of that year, namely, "Physical Chemistry in Medical Science," a subject singularly appropriate to his own research work. Thanks to the personality and assiduity of the new professor a modern Institute of Physiology was erected to replace the building originally equipped during the time of van Deen. This institute is still regarded as a model, and the final tribute of respect of his fellow-workers was reflected in the election of Hamburger as president of the International Physiological Congress, which he received at Groningen in 1913.

The contributions of such an arduous worker as Hamburger cannot be detailed here, but one can note his largest and most ambitious publication, "Osmotische Druck und Ionenlehre in der medizinischen Wissenschaften," produced between 1901 and 1904, only a short time after the fundamental work of Svante Arrhenius on ionic dissociation in liquid media. This and his "Physikalische chemischen Untersuchungen über Phagocyten" are quoted as revealing in no uncertain way the conception of the chemist and the physicist in the scientific objective of Hamburger. Even in the latest work from his laboratory on the elusive question of the biological behaviour of stereoisomeric sugars, one can see the desire to seek explanation on similar lines. A summary by himself of his latest views will be found in the *Lancet*, 1921, ii. pp. 1039 *et seq.*

An attitude such as this must necessarily, and perhaps correctly, entail opposition, but inspection will show the ingenious and simple (and by being simple all the more ingenious) experiments devised by Hamburger and by his school. As an antagonist he was kindly, and the writer treasures several long and careful letters from him on a point raised in conversation regarding some of his work. Such tolerance and patience was characteristic. His own and other countries bore witness to his scientific attainments. Member of the Royal Academy, Amsterdam, he was the recipient of honorary degrees, and a welcome lecturer in England and in America. In terms of years alone he was not an old man; he was but sixty-five; however, after the death of his wife last November he lost much of his wonted enthusiasm for work, his optimism disappeared, his health broke down, and on January 4 he passed away.

Holland as a country is singularly fertile as a source of men of genius. Not the least of this brilliant company was Hamburger. Those of us who were privileged to count him a friend know too well the loss that science has suffered. Physiology is not quite the same without him. J. A. H.

M. ARNAUD DE GRAMONT.

BY the death of Arnaud de Gramont on October 31 last, at the age of sixty-two years, spectroscopy has suffered a loss which it can ill afford. The chief feature of M. de Gramont's work was the investigation of the best means of producing spectra of various types and of the characteristics of the spectra yielded by substances under different modes of excitation. In this somewhat restricted but extremely important department of spectroscopy, he probably achieved more than any other single worker. His earliest efforts were devoted to synthetic chemistry and pyroelectricity, but he soon turned his attention to the subject with which his name is always associated. Spark spectra were the subject of most of his researches, and he early succeeded in devising a method of producing the spark spectrum of a liquid, uncontaminated by the lines of the metallic electrodes employed. Following the work of Schuster and Hemsalech on the effect of self-induction on the spectrum of an electric spark, de Gramont pursued the subject still further, particularly with regard to the spectra of compounds—the so-called "dissociation spectra." He gave great attention to the spectroscopic examination of minerals, embodying the results of his investigations in a very valuable book on the subject.

One of the most useful of the experimental processes which we owe to him is a convenient method

of obtaining the spectra of refractory materials, such as silicates. The substance is mixed with sodium carbonate, placed on platinum foil heated by a Mekker burner, and sparked. Perhaps his best-known work is the investigation of the *raies ultimes* of the elements; *i.e.* the spectrum lines which are most persistent when an element is gradually reduced in quantity. The presence of the *raies ultimes* is the readiest criterion of the presence of an impurity in a substance.

Spectroscopy at the present time is developing more rapidly on the theoretical than on the practical side, because the theoretical workers are more numerous. The loss of M. de Gramont is, therefore, particularly to be deplored. He leaves in the minds and hearts of those who knew him a memory cherished no less because of his noble character and kindly disposition than because of his scientific eminence.

WE regret to announce the following deaths:

Capt. Alfred Bertrand, an honorary corresponding member of the Royal Geographical Society and of the Royal Scottish Geographical Society, a well-known African traveller, on January 30, aged sixty-eight.

Sir Kennedy Dalziel, formerly professor of medical jurisprudence and public health, and also of surgery, at Anderson's College, Glasgow, on February 10, aged sixty-two.

Dr. H. Rashdall, Dean of Carlisle, the author of numerous philosophical works, on February 9, aged sixty-five.

Current Topics and Events.

QUITE recently a Committee, on which science was not represented, recommended curtailment of the operations of the Imperial Institute, including the closing of the public exhibition galleries, which contain representative collections of the natural products of the British Dominions and Colonies, and the reduction of its laboratory work to merely preliminary investigations. It is interesting in this connexion to see that the Dutch have opened recently a Colonial Institute in Amsterdam, which is to carry on for the Dutch Colonies work similar in type to that which the Imperial Institute has conducted for so many years for the British Empire. The new Institute is a handsome building containing excellent collections of Dutch Colonial produce, partly derived from the old Colonial Museum at Haarlem, which has been merged in the new organisation. Extensive laboratories have also been provided in which these products will be investigated systematically. The maintenance of the Institute is secured by annual grants from the Ministries of the Colonies and the Interior and the Municipality of Amsterdam. This Institute has long been under consideration in Holland, and before the War a number of the most earnest advocates for its establishment visited the Imperial Institute and accounts of the operations of the latter played a considerable part in propaganda for the opening of a similar institution in Holland. But in Holland scientific matters are dealt with by scientific men, and as a result the Dutch have, in Java and Sumatra, tropical agricultural industries, such as cinchona-planting, which other countries cannot hope to compete with, and in addition they are able in these Colonies to start the cultivation of such things as tea, rubber, and the oil palm, and by the superiority of their methods to attract British capital away from British Colonies, and to compete seriously with the latter even when their entry into the industry is belated.

VISITORS to the Royal Society's soirée in 1900 and also in 1921 will recall, perhaps, an exhibit of a large enclosed box with peep-holes at either end, through which one saw a painted representation of the interior of a Dutch house, approximately of seventeenth century date. This box belonged to the late Sir Henry Howorth. The authorities of the National Gallery, who deem the box of high interest, have received it as a gift from Col. Howorth, the former owner's son. The chief interest of the interior, apart from its character as a painting, is that it is an extraordinary *tour de force* in perspective, since the picture is painted on three planes and there are no lenses in the holes. Sir Henry Howorth always considered the portrayal of the interior to be the most remarkable example of the application of the scientific principles of perspective extant.

THE British Science Guild is inaugurating on Monday, February 18, a science news service, to which a number of lay journals have already subscribed. It is intended that the service shall provide a weekly signed article dealing with some subject of special interest and a weekly column of science notes. It will also furnish reports of scientific progress. The possibilities of such a service doing useful work for science in promoting the dissemination of accurate information on scientific work are indeed great, but its success must depend on the extent to which it secures the co-operation of men of science. To this end, the Guild is asking for correspondents in the various laboratories throughout the country, in order that it may be possible to keep the public informed of the work that is being done by British men of science. Scientific workers who would be prepared to act as correspondents for the laboratories in which they are working are requested to communicate with Mr. Gordon D. Knox, 2 Guilford Street, London, W.C.1.

WE learn from *Science* that a Metric Standards Bill, providing for gradual adoption in the United States of the metric units of weights and measures in commerce, has been introduced in the House of Representatives by Mr. F. A. Britten, of Illinois, and in the Senate by Mr. E. F. Ladd, of North Dakota. More than 100,000 petitions, directly representing several millions of voters, and urging adoption of world units for weighing and measuring, have been prepared. According to the provisions of the Britten-Ladd bill, the buying and selling of goods, wares and merchandise will be in terms of the metric units after a period of ten years. Manufacturers