quencies of the light elements for K-radiations plotted as ordinates against the atomic numbers as abscissæ. The values for all the elements from magnesium to chromium which are amenable to crystal methods have been determined accurately with crystal gratings by Fricke, who measured the wave-length at the absorption discontinuity. They all lie on a curve which is almost a straight line through the origin, and a few of them are shown thus, x. The aluminium value ⊡ is practically identical with Fricke's for the same element and was obtained by Holweck by measuring the voltage V_c on an X-ray tube for which the absorbability in aluminium of the total radiation is a maximum. This method contains features which, though found separately in the method used by Fricke and in the photoelectric methods, are not common to both, and the agreement will no doubt tend to promote confidence in the photoelectric methods. The points for oxygen (Kurth), nitrogen (Foote and Mohler), carbon (Foote and Mohler, Hughes, Kurth, Richardson and Bazzoni), and boron (Hughes) have all been obtained by photoelectric methods. The hydrogen point △ is the limit of the Lyman series which should correspond to the K level for hydrogen. It will be seen that the hydrogen, nitrogen, and oxygen points practically fall on a smooth curve which is continuous with the curve for the elements from magnesium to chromium. There is some disagreement in the case of carbon, but three of the points are very close to the same curve. The only notable deviation is the low value given by Hughes. The boron value also falls below this curve but there is, so far as I am aware, no known reason why the frequencies should be a smooth function of atomic number for these very light elements.

The next lower critical frequency for any element will presumably be that pertaining to the L group, or the highest L critical frequency if there is more than one. The square roots of a number of such critical frequencies for elements from boron to copper as given by photoelectric methods (boron and carbon, Hughes; carbon, oxygen, aluminium, silicon, titanium, iron, and copper, Kurth) are shown thus, x, in Fig. 3 (p. 120). These frequencies should be somewhat higher than those of the corresponding lines, and it will be seen that the observed points from aluminium to copper are all about the same distance above the broken projection of the curve through the values for the L_{α_1} lines for the elements from zinc to zirconium obtained by crystal measurements. This affords additional justification for extrapolating from the zirconium to zinc L_{α_1} values to the value for the L_α line for aluminium as was done in interpreting Millikan's vacuum grating data. It will also be observed that the values of the limits for boron, carbon, and oxygen given by the photoelectric methods are either very close to the values for the shortest lines in the L spectra found by Millikan or have a somewhat higher frequency. These properties are in harmony with those found in what is more usually regarded as the X-ray region. It should be added that data for elements between sodium and chlorine have been given by Mohler and Foote, which fall on or below the L_α curve as drawn in Fig. 3. These data, however, have been obtained by the electron bombardment of vapours, in many cases of compound vapours, and it is not improbable that the values for these will be different from those for the solid elements. Some of these data also appear to refer to radiation potentials, which correspond to lines, rather than to ionisation potentials, which correspond to limits.

Just as in the case of the L_α lines, the L limits for the light elements from helium to magnesium do not change smoothly with increasing atomic number as do the limits for the heavier elements. In fact the frequency for helium as obtained either by direct determination of the end of the corresponding spectrum or from the ionising potential is higher than that of succeeding elements until carbon is reached.

In the case of a number of elements ranging from aluminium to molybdenum, critical potentials have been observed (by Kurth and by Richardson and Bazzoni) at values corresponding to frequencies well below those which characterise the L spectra. The connexion with the generally recognised X-ray series of the heavier elements has scarcely yet been worked out in sufficient detail for the precise group allocation of some of these to be determined with certainty.

Turning to Fig. 1, C, D, and E show, on the same scale as in A and B, the position of some of the spectral limits given by these photoelectric methods. It will be seen that a majority of them lie in the gap between 16·35 and 17·38 in which so far no spectral lines, either X-ray or ultra-violet, have been detected by grating methods. If the interpretation of these photoelectric determinations as the ends of the various spectra is substantiated, it will have to be admitted that the gap in the spectrum between the ultra-violet and the X-ray region about which I have been speaking is not merely disappearing but has actually disappeared.

Obituary.

PROF. JOHANNES ORTH.

PROF. JOHANNES ORTH, whose death is announced, was born in 1847 at Wallmerod in Nassau. He received his medical and scientific training chiefly at Bonn, where he studied pathology under Rindfleisch, whose assistant he afterwards became. Later, he was appointed assistant to Virchow in Berlin. In 1878 he was appointed professor of general pathology and pathological anatomy in Göttingen and afterwards received the title of *Geh. Med.-Rat.* In 1902, on the death of Virchow, he was elected to the chair of pathology in the University of Berlin, and since then his energies have been devoted chiefly to the development of the Institute of Pathology, which was founded and equipped by Virchow.

Orth was the author of numerous papers on pathological subjects, and also of several books, the two most important of which were his "Compendium der pathologisch-anatomischen Diagnostik," which was translated into English in 1878, and his "Lehrbuch der speciellen pathologischen Anatomie," published in 1893. Orth was undoubtedly a pathologist of great eminence and made many valuable contributions to his subject, but his reputation rested rather on his powers as a teacher and expositor and on his width of knowledge

than on any discovery in a special department. He was essentially a disciple of Virchow and a follower of his methods.

MR. E. W. NELSON.

THE science of oceanography and the scientific study of fisheries have lost a devoted and able worker by the tragic death of Mr. E. W. Nelson, the scientific superintendent of the Fishery Board's marine laboratory at the Bay of Nigg near Aberdeen, who was found dead in his laboratory on the morning of January 17. He had been appointed in September 1921 to succeed Dr. T. Wemyss Fulton in the service of the Fishery Board for Scotland, and he was proving himself a very effective investigator of Fishery problems. He was much liked and respected by his staff, and every one was looking forward to the work that he would do, especially as regards the physical conditions of the sea in their relation to fisheries, for it was in the bearings of physics on biology that he was most interested. He had an ingenious mind, more of the mathematical than of the biological order; though he was a keen naturalist as well. He was particularly well suited for the post that he held and he seemed to be very happy in his work.

Mr. Nelson was educated at Christ's College, Cambridge, and he was working at Plymouth Biological Station when he was chosen in 1910 to be a biologist to the British Antarctic Expedition led by Capt. Scott. He made an elaborate biological survey around the Cape Evans station, and Scott speaks in his "Journals" very appreciatively of his enthusiasm, carefulness, and practical ingenuity. Mr. Nelson was one of the thirteen men who stayed at Cape Evans for a third year under the command of Surgeon Atkinson. During the war Nelson served in the Royal Naval Division.

Mr. Nelson was a pleasant and cheerful personality, very kindly, though fond of an argument, very keen about his own work, but delightfully willing to help others, not wearing his heart on his sleeve, but full of good-will.

DR. TALFOURD ELY.

DR. TALFOURD ELY, whose death was recently announced at the age of eighty-six, was a nephew of Frank Ely, the dramatist, and great-nephew of Sir T. N. Talfourd, author of "Ion." During the greater part of his life he was closely connected with University School and College, London. He was vice-principal and classical tutor at University Hall, classical master at University College School, and secretary of the College. This last post he resigned in order to study archæology at Berlin, where he worked with Ernest Curtius, Kirchof, Robert, Furtwängler, and Waltenbach, and became acquainted with other leading scholars. He travelled largely in Europe, and had an exciting adventure at Olympia with brigands whom he routed. In his later years he was connected with many learned societies—the Antiquaries, Hellenic, Royal Archæological, and others. The literary works by which he will be best known are "A Manual of Archæology" and "Roman Hayling," embodying the results of his own excavations at Hayling Island, besides many papers on archæology.

THE death of Miss Charlotte Sophia Burne has left a gap in the ranks of English students of folklore. A native of Shropshire, she edited with additions the collections of Miss G. F. Jackson, which were published under the title of "Shropshire Folklore," one of the best local manuals. Her later years were spent in London, where she became a pillar of strength to the Folklore Society, serving on the council and as president. In 1914 the Society published her admirable "Handbook of Folklore," but the main work of her later days was the collection of a great mass of materials for a new edition of John Brand's "Observations on Popular Antiquities," which was intended to become an encyclopædia of English folk beliefs. When her health broke down the task of editing this work was undertaken by Dr. E. Sidney Hartland.

Current Topics and Events.

THE centenary of the death of Edward Jenner on January 26, 1823, was celebrated by the Academy of Medicine in Paris on Tuesday, January 23. At 3 P.M. a large meeting was held at the Academy in the Rue Bonaparte, when the president, M. Chauffard, gave a short address, which was followed by a long, critical, and yet eulogistic speech by M. Lucien Camus, and by communications on the subject of vaccination in detail from MM. Pierre Teissier, Jeanselme, d'Espine, and Sir St. Clair Thomson. The fine large hall of the Academy was crowded, the French Minister of Health, M. Strauss, and Madame Curie being present, in addition to other distinguished people. The busts of Jenner and Pasteur were placed on the right and the left of the platform. After the ceremony a number of mementoes of Jenner in the form of letters by him, and of old cartoons commemorating or deriding vaccination, were shown in one of the halls of the Academy. The president announced that communications in honour of the event had been received by him from learned societies in many parts of the world. Sir Ronald Ross, a foreign associate of the Academy, who represented the British Ministry of Health, handed in also a letter from the president of the Royal Society, and other British societies were represented by Sir St. Clair Thomson and by Dr. R. O. Moon. Sir Almroth Wright, another foreign associate of the Academy, was also present. After the ceremony the president and council of the Academy, in honour of the commemoration, gave a dinner at the Club de la Renaissance Francaise.

BY the will of the late Prof. Emil Chr. Hansen, director of the Physiological Department of the Carlsberg Laboratory, Copenhagen, and his wife, a fund bearing his name was established in 1911 providing