while the sun is not eclipsed, the observation of the helium (D_3) line in the chromosphere by Lockyer, twenty-five years before the element was discovered terrestrially, and even the very recent work of Dr. Nicholson in the theoretical construction of such spectra as those of the unknown cosmical elements nebulium and coronium. This brief enumeration will serve to show that Dr. Wolf's paper is not only comprehensive, but also up to date, and should be read by all interested in astrophysics.

ELEMENTS OF RECENTLY DISCOVERED MINOR PLANETS.—In No. 4607 of the *Astronomische Nachrichten*, Dr. Cohn gives the elements and permanent numbers of eighteen minor planets discovered during 1911–12. Four of these have been identified with older discoveries to which no numbers had been allotted, and eleven of the "discoveries" made during 1911 have since been identified with planets previously included in the official records. The total number thus included, as shown by the present list, is 732.

THE PHYSICAL SOCIETY'S EXHIBITION.

THE eighth annual exhibition of physical apparatus under the auspices of the Physical Society of London was held on Tuesday, December 17, at the Imperial College of Science, and attracted the usual large attendance. At both the afternoon and evening sessions a short discourse was given by Mr. S. G. Brown on "Some Methods of Magnifying Feeble Signalling Currents." The lecturer described several instruments designed by himself for magnifying the currents received through Atlantic cables, by the use of which largely increased speed of signalling had been made possible. The most interesting of these was one in which the original signalling current moves a thermo-electric junction into and out of a small flame, the thermo-electric current thus produced being twenty-seven times that of the signalling current. The magnifying power is approximately constant for all currents, an advantage over the ordinary form of relay in which the current of the local circuit is constant and is merely made or broken by the signalling current. Other mechanical methods of achieving the same result were also described.

Exhibits of apparatus were shown by some thirty firms of manufacturers. The principal exhibit of the Cambridge Scientific Instrument Co. was a complete cardiograph outfit, composed of an Einthoven string galvanometer, projection apparatus, camera with moving plate or continuous paper for cases where long records are necessary, and a switchboard by which the standardisation of the galvanometer, compensation for skin currents, and measurements of body resistance could be quickly made. By an auxiliary apparatus, records of the heart sounds could also be obtained. Another of their exhibits was a Wilson cloud apparatus for showing the path of α particles or X rays by the condensation of water upon the ions. Messrs. J. J. Griffin and Sons had an interesting exhibition of motor-gyrostats with models for illustrating the Schlick method of steadying ships, and the gyrostatic mono-rail car. Mr. C. V. Boys's rainbow cup for showing the colours of thin films was also exhibited in action. In addition to the usual laboratory instruments, Messrs. Gambrell Bros. exhibited a new convection radiometer by Mr. F. W. Jordon for measuring small, steady rates of evolution or absorption of heat. The convection current of gas produced by the source of heat deflects two very light suspended mica vanes the deflection being shown in the usual way by a mirror. The Marconi Co. exhibited instruments for use in wireless telegraphy, including a portable knapsack receiving and transmitting set for communicating across distances of fifteen miles. The Helsby Wireless Telegraph Co. showed a vibration-proof detector and a rotary quenched spark discharger.

Microscopes for ultra-microscopic and for metallurgical work were exhibited by Messrs. R. and J. Beck, Messrs. E. Leitz, and Messrs. Carl Zeiss. The last firm also had an example of its projection apparatus at work. The principal exhibits of Messrs. Alexander Wright and Co. consisted of various forms of Dr. Leonard Levy's apparatus for the examination of mine air according to the provisions of the Coal Mines Act of 1911. They also exhibited some good examples of palladium and platinum plating on metals and gold plating on glass.

Messrs. Kelvin and James White, Ltd., exhibited a compass for use on aeroplanes. It was of the floating type, and said to be entirely unaffected by the vibrations of the engines. A Fullarton vibrometer for obtaining the frequency and intensity of vibrations produced by any form of machinery was also shown. It consists of a vibrating reed which can be adjusted to the frequency of the vibration to be measured, the intensity being shown by the amplitude of the vibration of the reed. An Aitken portable dust counter for quickly estimating the number of dust particles in the air, based on the method of condensation of moisture on them, was exhibited by the same firm. Mr. R. W. Paul had a large exhibit of electrical measuring instruments, including several new types. Among them was a string galvanometer somewhat similar to the Einthoven, but with the string in a horizontal position. The Irwin optiphone was shown in use. This is an instrument for magnifying the motion of a vibrating body, such as the diaphragm of a telephone, the wave-form of the motion being obtained by the revolving mirror method.

Messrs. A. Gallenkamp showed some cheap electric furnaces and various laboratory apparatus for heat experiments, including a student's optical bench for radiant heat experiments. They also exhibited a sensitive flame for working at the low pressure of an ordinary gas supply, designed by Prof. S. P. Thompson. The Westminster Engineering Co. exhibited a small useful projection arc lamp for photographic work and optical lanterns. Resistance testing sets were shown by Messrs. Crompton and Co., Eversheds and Vignoles, and Nalder Bros., and a large range of switchboard instruments was exhibited by the Weston Co.

RIVERS, GLACIERS, AND THE ICE-AGE.

BRUNO DIETRICH, of Potsdam, has made a geographical study of the Moselle valley ("Morphologie des Moselgebietes zwischen Trier und Alf," *Verhandl. des naturhist. Vereins der preuss. Rheinlande*, 1911, for 1910, p. 83). Basing his description on the geological structure and history of the district, he shows how the valley has been cut in a pre-Miocene surface of denudation. The meanders that arose on this fairly even surface are now traced as winding ravines (p. 120), owing to the elevation of the country and the consequent lowering of the base-level of the Moselle. The tributaries of the left bank, however, are held to have been incapable of forming such large meanders as are now seen in the forms of their ravines. At present they wander somewhat aimlessly in the flat land of their floors, now cutting back one valley-wall, now the other. Their valley-flats (*Talauen*) are attributed to lateral erosion at a time when the land remained stationary for a time (p. 130), and we gather that these flats have become per-