

times in which the subjects dealt with lived, in order to show the relation of discovery in physical science to the progress of civilisation.

A SOMEWHAT novel way of keeping a book up to date, other than by issuing new editions, has been devised by the Cambridge University Press, which has projected a series of monographs intended to serve as supplements to Dr. Norman R. Campbell's "Modern Electrical Theory." The series will be edited by Dr. Campbell, who, however, will not write all the volumes. The first three monographs will deal with spectra, the quantum theory, and the constitution of atoms and molecules. It is proposed that the series shall correspond roughly with the chapters of the original book, and eventually supersede the latter.

ANNOUNCEMENT is made of the amalgamation of the firms of Messrs. John Wheldon and Co., of 38 Great Queen Street, Kingsway, W.C.2, and

Messrs. William Wesley and Son, of 28 Essex Street, Strand, W.C.2. Both firms are well known in the world of science as booksellers and publishers of repute. The business of John Wheldon was established in 1844, and was concerned mainly with supplying collectors and institutions with scientific works; recently it has developed in the direction of economic and applied natural science. Of particular value to the new firm will be the collection of scientific journals held by John Wheldon and Co. The business of William Wesley and Son was established in 1855, and dealt similarly with books and journals of science. A valuable side of the firm's activities, which will be continued by the new company, is the numerous agencies which are held for the sale of publications of foreign and Colonial Governments and societies. The establishments will be carried on in future in the name of Messrs. Wheldon and Wesley, Ltd., under the guidance of Mr. H. K. Swann and Mr. E. F. Wesley, who have been managers and proprietors of their respective firms for a number of years.

Our Astronomical Column.

A STUDY OF THE STARS OF TYPE N.—The stars of type N (Secchi's fourth type) are of great interest; they were formerly supposed to be near the end of their career as suns. However, their concentration in the galaxy is a proof of great distance, and shows that they are in the giant stage. Lick Observatory Bulletin No. 329 contains a photographic study of the spectra of two bright stars of the class, 152 Schjellerup and 19 Piscium, by C. D. Shand. Lines in these spectra are very numerous, which increases the difficulty of identification. The presence of carbon, hydrogen, iron, titanium, vanadium, chromium, sodium, manganese, calcium, scandium, and yttrium is certain; four other elements are suspected. It is difficult to decide whether apparent bright lines are really emission lines or mere spaces between absorption lines; the author inclines to the former view.

The most striking feature of the spectra is the "Swan" carbon spectrum; the cyanogen bands are also prominent, and possibly carbon monoxide is indicated. The suggestion is made that the oxygen present may all combine with carbon, thus explaining the absence of titanium oxide, which is prominent in the M stars.

Many of the N stars are variable, resembling in this point the Md stars. It was formerly suggested that the variability of these faint red stars is due to incipient crust formation, which caused accumulation of heat within, leading after a time to the melting of the obstruction. However, the discovery that these stars belong to the giant class renders the crust theory unlikely. Dr. Merrill recently suggested an alternative; he postulates a veil of blue smoke above the photospheres of these stars, producing almost complete absorption of the shorter waves, and also to some extent obstructing the longer heat-rays. An accumulation of heat results which may suffice to vaporise the occulting clouds of carbon, so that a temporary increase of light occurs.

Spectral changes at various stages of the cycle are discussed. The bright hydrogen lines are most intense at maximum and practically absent at minimum, at which time the carbon absorption becomes stronger.

These changes are closely analogous to those in the Md stars.

THE MADRID OBSERVATORY.—The Anuario of the Madrid Observatory, 1921, in addition to the usual tabular astronomical data, contains full details of sun-spots and prominences during 1919, with diagrams of remarkable prominences, including the great May one seen during the total eclipse. There is also an article on the spectrum of Nova Cygni 1920 by P. Carrasco. Spectra, photographed at Madrid on nineteen days between August 23 and September 29, are reproduced in a manner making it easy to trace the progressive changes. There is a full table of wave-lengths of lines, with probable origin, and comparison with the spectra of α Cygni and β Orionis. The earliest spectra (August 23-24) are almost purely absorption spectra. The bright bands are traceable on August 25 and conspicuous from August 27 onwards. The volume also contains the meteorological observations made at Madrid Observatory in 1919.

POPULAR ASTRONOMY IN SWEDEN.—*Populär Astronomisk Tidskrift* is an attractive and well-illustrated periodical the publication of which was commenced last year by the Swedish Astronomical Society under the editorship of S. Arrhenius, K. Böhlin, N. V. E. Nordenmark, and H. von Zeipel. The articles in Häfte 3-4 deal with Nova Aquilæ, the moving cluster of the Hyades (for which a parallax of 0.027" is found), and Dr. Harlow Shapley's work on the globular clusters. Mr. Nils Tamm contributes an illustrated article on the Kvistaberg Observatory; the work during 1920 included studies of Mars, Jupiter, Saturn, nebular photography, and magnitude determinations of Nova Cygni. M₁. Gyllensköld reproduces several pictures of auroral streamers, including some interesting photographs obtained at Bossekop, Lapland, in 1910. Some artificial auroræ obtained by Birkeland by cathode rays are illustrated, and the forms deduced from his theory are discussed and shown to agree very closely with the streamers of the solar corona in the eclipse of 1901.