

series describing the physical properties of metals, together with a discussion of the relation of these properties to the composition and treatment of the materials. In it are described the properties of nickel and of its commercially important alloys: nickel-steel, ferro-nickel, copper-nickel, and nickel-chromium alloys. The pamphlet is illustrated by numerous photomicrographs and curves, and provided with a very complete bibliography. The collection of data will be valuable to metallurgists.

THE Wireless Press, Ltd., announces for early publication a volume by Prof. J. A. Fleming, who was recently awarded the Albert medal of the Royal Society of Arts in recognition of his many valuable contributions to electrical science. Under the title "Fifty Years of Electricity: The Memories of an Electrical Engineer," the work will record the pro-

gress of electrical engineering since 1870, the year in which Prof. Fleming attained his majority.

THE catalogue of optical instruments recently issued by Messrs. Adam Hilger, Ltd., 75A Camden Road, London, N.W.1, contains details of a number of instruments not previously obtainable in this country. Amongst them may be noted a monochromatic illuminator, an infra-red spectrometer, a vacuum spectrograph, a linear thermopile, a spectrophotometer, and several refractometers. Messrs. Hilger are offering a limited number of their instruments at a special reduction of 20 per cent. off their current prices.

ERRATUM.—We regret that the price of the fifth edition of Sir J. J. Thomson's "Elements of the Mathematical Theory of Electricity and Magnetism" was incorrectly given in NATURE of July 21, p. 647, as 30s. net instead of 25s. net.

### Our Astronomical Column.

DISPLACEMENT OF LINES IN THE SPECTRUM OF VENUS.—The *Astrophys. Journ.* for June contains a paper by Dr. Chas. E. St. John and Mr. Seth B. Nicholson, in which they test the result announced by Mr. Evershed that his Venus spectrograms supported the view that the earth exerts a repulsive effect on the solar gases, analogous to that which the sun appears to exert on comets' tails. The authors took two series of Venus spectrograms: in 1919 with Venus east of the sun, and in 1919-20 with Venus west of the sun. Their analysis of the results leads them to conclude that the effect can be correlated with the altitude and the angular diameter of Venus; hence they conjecture that it is due to atmospheric dispersion, the centre of the visual image which was adjusted on the slit differing from the centre of the photographic image. They propose in future to take some further plates viewing the image through a blue screen, which should eliminate the above source of error. They have incidentally examined the measures to see if they afford any evidence of a rapid rotation of the planet, but conclude that "the difference between the morning and evening series . . . is not of an order that would indicate . . . a rate of rotation higher than that found by Slipher." In all the plates of the series, whether on Venus, the sky, or the sun, an iron-arc spectrum was photographed simultaneously.

PLANETARY PHOTOGRAPHY.—Pubns. Ast. Soc. Pacific, June, 1921, contains a lecture by Mr. E. C. Slipher on this subject, illustrated by numerous reproductions of photographs of Venus, Mars, Jupiter, and Saturn. Those of Venus failed to record any surface markings, but illustrate the changes of diameter and phase that occur in the synodic period. The photographs of Mars taken at Flagstaff are stated to number 100,000. Numerous exposures are made on each plate, in the hope that some will catch the moments of best definition. Mr. Slipher gives a long list of features that he claims can be verified from the plates. It must, however, be admitted that not all of these can be seen on the reproductions, though they may be visible on the original negatives. The polar cap is shown with great clearness, and it would seem to be worth while to make measures of its position angle in order to obtain an independent determination of the position of the axis.

The photographs of Saturn yield much interesting

information. The great excess of luminosity of ring B over ring A, and the semi-transparency of the latter, permitting the outline of the ball to be seen through it, are well brought out; also the faintness of the ring when the sun is near its plane. There are reproductions of two exposures on April 28 last, when the earth and sun were on opposite sides of the ring-plane. There is a dark stripe across the centre of the disc, formed by the dark side of the ring and its shadow; it is narrowest in the middle, the two edges being curved in opposite directions. One feature shown in all the photographs is the extreme regularity of the fivefold belt in Saturn's southern hemisphere. The edges appear to be exactly parallel to the equator. One is inclined to mistrust this regularity on drawings, but the photographs are free from bias.

MEASUREMENT OF THE DIAMETER OF ARCTURUS.—Mr. F. G. Pease (Pubns. Ast. Soc. Pacific, June, 1921) gives an account of the work with the interferometer on the 100-in. Hooker telescope at Mount Wilson since the successful measurement of the diameter of Betelgeuse. Observations on Arcturus in February and March, with poor seeing, showed some diminution of the visibility of the fringes with increasing distance between mirrors. At length on April 15 the seeing was perfect, and the fringes were found to disappear when the mirrors were separated by 19.5 ft. As the maximum separation at present is 20 ft., it was not possible to proceed to the next point of greatest visibility of fringes; but the value 19.5 is considered to be correct within 0.5. Assuming an effective wavelength for type Ko as 5600, the angular diameter of Arcturus is 0.0237", very near the mean of the values estimated by Eddington, Russell, and Hertzsprung. The parallax is taken as 0.116" from the mean of the best recent measures, giving a linear diameter of 19,000,000 miles, or twenty-two times that of the sun.

Observations of Aldebaran on nights of poor definition give grounds for thinking that its angular diameter is somewhat greater than that of Arcturus; Pollux and  $\alpha$  Ceti give indications of weakened fringes, but probably a longer beam than 20 ft. would be needed to make them disappear. The mirrors have hitherto been moved by hand, which has taken much time. Two screws driven by a single motor are now being mounted, which should greatly facilitate the measures.