experiment is instructive as well as amusing, and it provides a simple means of realising the effects of colour-blindness. The spectacles and wools are manufactured by Mr. J. Trotter, optician, Glasgow, and the price at which they are sold is 2*s*. 6*d*.

WE have received from Messrs. Isenthal and Co. their latest publication on Moscicki condensers, and Giles valves as applied to the protection of electric power transmission lines against atmospheric disturbances and surges. High-tension condensers for radio-telegraphy in particular are also dealt with. The publication is exceedingly well produced, the theory of surges and the practice of line and station protection being dealt with in part i., while part ii. deals chiefly with condenser batteries and choking coils and radio-telegraphy. A summary of the contents of various standard books dealing with these subjects is briefly given and set out with remarkable clearness in the brief description given. A noteworthy chapter is that dealing with the selection and design of plant, including generators, motors, transformers, and switches, and some very useful tables are included, giving safety coefficients for cables. The pamphlet is well illustrated with photographs and diagrams of the apparatus described. The Moscicki condensers and Giles valves are once again very fully dealt with, together with a list of places where they have been installed.

MESSRS. WATSON'S price list of apparatus for electro-therapy and diagnosis is too well-known to require detailed description. The novelties are principally found in the therapeutic section. The "Prana" carbon dioxide snow apparatus is described and illustrated. It is intended for the treatment of nævi and lupus, warts, and other superficial diseases. The apparatus is made in three different sizes. The carbon dioxide is contained in a cylinder, and is allowed to escape into a receptacle which permits of free evaporation with the production of carbon dioxide snow in the form of a crayon 5 inches long by 1 inch or ½ inch in diameter. A special high-frequency apparatus is constructed for diathermy or thermo-penetration. In this apparatus the heating effect of the high-frequency current is encouraged and used. Considerable benefit appears to have been obtained in various rheumatic conditions and neuralgia, sciatica, &c. These new high-frequency currents are at a voltage less than 3000 volts, but currents of 500 to 3000 milliamperes are used, and with the strongest doses the patient feels absolutely nothing except the increase in temperature. Thermometers introduced in animals prove that the increase is internal, and greatest in the path between the electrodes. Beyond the effects produced by the heat there are no other physiological or chemical effects. When the current is employed long enough, albumin coagulates; and tumours, &c., can be destroyed by these means: coagulated tissues behave like foreign bodies, and are gradually expelled. In the radio-active substances meso-thorium, of the same activity as pure radium bromide, is quoted for at the price of 12*l*. 10*s*. per milligram. Radio-thorium is listed at the price of 1*l*. per gramme. Several special radium applicators are illustrated.

Engineering for July 14 contains an illustrated description of a "Stock" oil-fired converter which is in operation at the works of the Darlington Forge Co., Ltd. All classes of steel can be manufactured in this converter, from soft-steel castings to special steels of the highest class. In form it resembles the ordinary Bessemer converter; it is lined with ordinary silica fire brick, and is used, not only for the conversion or blowing of iron, but also for melting the actual charge of iron and scrap by means of oil fuel, no separate cupola being required. The oil fuel—crude petroleum—is used for melting the charge, and when this has been effected the oil pipes are withdrawn and blowing commences. The air does not enter at the bottom and pass up through the molten metal as in a Bessemer converter, but is blown down on the top of the metal. For a three-ton converter, melting takes about 1½ hours and blowing from fifteen to twenty minutes, the total time, including charge, being about two hours. As an example of the punishment the steel will stand, the following may be mentioned: A steel wheel, about 4 feet 9 inches in diameter, was dropped edgewise on a steel ingot from the following heights—5 feet, 10 feet, 15 feet, and 20 feet, without showing signs of fracture. A drop of 40 feet on the rim broke one spoke. After this four more drops of 40 feet on edge caused no further fracture either to the rim or the spokes, and the wheel was finally broken up by a steel three-ton ball dropped ten times on the boss from a height of 40 feet. Some remarkably thin castings have been made.

OUR ASTRONOMICAL COLUMN.

COMET, 1911*b*.—Observations of the new comet discovered at the Lick Observatory on July 6 are recorded in No. 4511 of the *Astronomische Nachrichten*. Prof. Abetti, at Arcetri, on July 8, estimated the magnitude as 6·0, and Prof. Wolf found, the same day, that the photographic magnitude was 7·5; his photographs show a tail.

MM. Lagrula and Schaumasse observed the comet at Nice on July 8, and, in No. 2 of the *Comptes rendus* (July 10), they describe it as a bright object presenting a globular condensation surrounded by a nebulosity which is extended towards the S.S.W.; the whole appears to have a diameter of about 2·5′.

From observations made on July 6, 8, and 9, Prof. Kobold has determined the following elements, which are said to be similar to those of Comet 1790 I.

Elements.

$$\left.\begin{aligned} \omega &= 99^\circ\ 31{\cdot}99' \\ \Omega &= 172^\circ\ 27{\cdot}52' \\ i &= 148^\circ\ 39{\cdot}25' \end{aligned}\right\} 1911{\cdot}0$$

$$\log q = 9{\cdot}89936.$$

An ephemeris derived from these elements gives 4h. 26m. 27s., +32° 54·0′ as the position for July 20 (12h. Berlin M.T.), with a daily decrement of about 2m. in R.A. and 13′ in declination. The calculated magnitudes for July 12 and July 20 are 6·5 and 6·4 respectively. Given a clear horizon the object should be visible, with opera-glasses, from midnight to dawn; at about 10.30 it rises some 30° east of north, and at 2 a.m. is about 20° above the horizon. The present position is about one-third the distance between ι Aurigæ and ζ Persei from the former star along a straight line joining the two.

THE SOLAR ECLIPSE OF APRIL 28, 1911.—Dr. L. A. Bauer sends us a detailed narrative of a journey to Tau Island of the Manua group, where observations were made of the total solar eclipse of April 28, 1911. The U.S. cruiser *Annapolis* took Dr. Bauer from Pago-pago harbour, Tutiula Island, to Tau. Dr. Bauer's prime object was to secure magnetic observations during the eclipse, and he arranged for simultaneous observations to be made at the five magnetic observatories of the U.S. Coast and Geodetic Survey, as well as at Apia, Christchurch, and Melbourne. His attention was, therefore, devoted to this subject, and the astronomical observations were made by officers of the ship.

Mr. Abbot, director of the Astrophysical Observatory of the Smithsonian Institution, provided Dr. Bauer, at short notice, with a hand-driven, equatorially mounted, double-lens camera of about 11½ feet focus, and suggested one exposure of 15s., and another as long as possible—about 1m. 10s. These exposures were made, and four negatives were obtained as the result. On account of a difficulty with the sighting telescope just before totality, a hastily-constructed finder had to be employed, and this did not prove wholly successful as a means of keeping the image

central upon the plates. The photographs show, however, the inner corona and some details and extensions mainly on the north-eastern and south-western edges, reaching out in places to a distance of more than half the sun's apparent diameter. The size of the photographic image of the sun's disc upon the plates is nearly one and one-fifth inch. No member of the shore party, or of the party aboard the *Annapolis*, reported having seen these coronal extensions, or any stars, which fact is probably due to the comparative brightness during totality, writing being easily legible. The times of the four contacts were observed by the shore party, as well as aboard; the observed duration of totality was 2m. 1s.

The magnetic observations cannot be discussed until those made at other stations within and without the eclipse track are available for comparison.

THE LIGHT OF ALGOL'S COMPANION.—In a previous paper Mr. Joel Stebbins arrived at the conclusion, from his selenium photometer observations, that the companion of Algol is brighter on one side than the other, the difference being caused by reflection and by the heating effect of the primary on the one side, chiefly the latter. His argument for the untenability of the reflection theory having been questioned, he returns to the subject in No. 5, vol. xxxiii. of the *Astrophysical Journal*, and shows by a different method that only a small portion of the extra light can be due to reflection. Our knowledge of the radiations emitted by the satellite is insufficient to determine the question definitely, but it is evident that radiation, and not reflection, is the chief cause of the extra brightness of the one side.

OBSERVATIONS OF MIRA.—The maximum of Mira which took place in July, 1910, was observed at the Catania and Utrecht observatories, and the results appear in No. 4506 of the *Astronomische Nachrichten*.

Dr. Bemporad finds that the maximum, mag. 3·3, took place on July 21, 1910, and the neighbouring minima on March 25, 1910, and February 17, 1911, respectively: for the maximum, this was fourteen days earlier than predicted by Guthnick's ephemeris. The mean period would appear to be about 318 days, and the range of magnitude nearly 7.

Prof. Nijland's observations give a maximum, of mag. 3·2, on July 20, 1910, and a tabulated comparison of observed dates, with predicted dates for the last seven maxima, shows a period ranging from 342 to 310 days.

MICROMETER MEASURES OF JUPITER.—Dr. Lau continues his series of papers on Jupiter in No. 4509 of the *Astronomische Nachrichten*, where he records the micrometer measures, made during the opposition of 1910, of many different features. A number of minor changes from the previous oppositions were noted, the matt-white egg-shaped mass which was so marked a feature of the 1905 opposition being totally invisible. The geometrical network joining bands iii. and iv. was frequently seen and its points measured. Sketches of the Red Spot region show that while on April 10, 1910, the spot was of the usual pointed-egg shape, on May 4 its western extremity had become rectangular, and on May 10 dark masses of matter at the middle of both sides gave it an egg-boiler form.

PHOTOGRAPHS OF THE AURORA BOREALIS.—Prof. Carl Störmer, of Christiania, sends us abstracts from the *Comptes rendus*, in which he describes his method of taking simultaneous photographs of the aurora for the purpose of determining its altitude, and gives the results so far obtained. The photographs accompanying the paper of May 1 are very striking, and were taken in northern Norway during February and March, 1910, while from the diagrammatic summary of the results it is seen that the greatest proportion of auroræ measured were at altitudes ranging from 100–150 kms.

THE EPHEMERIS FOR HALLEY'S COMET.—Preliminary measures of plates showing Halley's comet, taken with the Crossley reflector during the period March 27 to May 27, are published by Dr. H. D. Curtis in No. 4506 of the *Astronomische Nachrichten*. A comparison with Dr. Ebell's ephemerides shows that the necessary corrections to the latter are of the order of only +12s. and −0·2′ to −0·9′.

THE DIFFERENTIAL QUALITY OF THE MOON'S REFLECTED LIGHT.—No. 4510 of the *Astronomische Nachrichten* is accompanied by a splendid two-colour photographic reproduction of the full moon, showing the different quality of the light reflected by different regions of the lunar surface. The reproduction is from negatives obtained by Dr. Miethe and Herr Seegert, whose work and results have already been described in these columns.

SUTTON DOUBLE STAR OBSERVATIONS.—Dr. Doberck continues his record of double star observations made at Sutton in No. 4507 of the *Astronomische Nachrichten*. These particular observations were made during 1910–11, and deal with more than 100 doubles, including α Geminorium and α Leonis.

THE CANYON DIABLO, OR COON BUTTE, METEORITES.—An interesting paper by Mr. C. R. Keyes, dealing with the multeity of meteorites in the Painted Desert, Arizona, appears in No. 9, vol. xix., of the Transactions of the Academy of Science of St. Louis. After discussing the volcanic nature and the general geology of the surrounding land, the author arrives at the conclusion that Coon Butte, a conspicuous mound, was not formed by any abnormal meteoric fall, as has been frequently suggested, but is probably of volcanic origin. That such immense numbers of meteoric stones ("heavy stones" or "green stones") have been secured in the immediate neighbourhood he explains by the extraordinary dryness of the atmosphere preventing weathering, and the assiduity with which the objects have been sought; in fact, he suggests that any desert district enjoying similar climatic conditions would probably prove as fruitful in these objects as has the Painted Desert.

UNIVERSITY DEVELOPMENT IN WALES.

OPENING OF NEW BUILDINGS BY THE KING AND QUEEN.

THE visit of the King and Queen to North Wales in connection with the historical ceremony of investiture of the Prince of Wales at Carnarvon has been happily associated with two events of international as well as national interest: the opening of the new buildings of the University College of North Wales at Bangor by the King, and the laying of two foundation stones of the National Library of Wales at Aberystwyth by King George and Queen Mary.

The development of the university movement in Wales will probably stand out as a unique feature in contemporary history, owing to the large extent to which its success depends on popular enthusiasm and support. It owes its inauguration to the foundation, in 1872, of the institution in Aberystwyth, which still bears the name, "University College of Wales." When the establishment of colleges for North and South Wales was decided on as a result of the deliberations of the Government Committee appointed in 1880, the appeal for funds met with an enthusiastic response, not only from the wealthier, but also from the poorest classes of the community, the miners and quarrymen at Bethesda contributing their shillings, and even the children in the board schools contributing their pence. The question of permanent buildings was, however, deferred until the movement had time to mature, with the result that the work of the University College at Bangor has up till this year been carried on entirely in the buildings of the old Penrhyn Arms Hotel, while until recently the college at Cardiff was wholly located in what had previously been an infirmary.

It was only four years ago that King Edward laid the foundation stone of the buildings which were opened by his son last Friday, and in the interval there has been raised in Upper Bangor a fine college, the architectural features of which will compare favourably with those of the more ancient foundations of Oxford and Cambridge. As will be seen from the illustrations, the college stands on a hill overlooking the old town of Bangor, in a park the slopes of which are in the spring covered with bluebells. It is quadrangular in form, the class-rooms being on the first and second floors facing the park, while the other sides of the quadrangle are occupied by administrative buildings, examination rooms, and studies, and the Prichard Jones hall. On the left of the tower are seen the museum and library, which, when the scheme is completed, will form the side of a great outer quadrangle, the remaining sides being allocated to the science departments. The work of these is, however, for the present, being con-