

OUR ASTRONOMICAL COLUMN.

A LARGE GROUP OF SUN-SPOTS.—A remarkable spot outburst, including a great irregular active spot followed by a widespread disturbed area, was easily seen with the help merely of dark glasses on May 27, 28, and 29. Its reappearance on the eastern limb should occur about June 12 or 13.

THE TOTAL SOLAR ECLIPSE OF FEBRUARY 3, 1916.—A brief announcement in the Publications of the Astronomical Society of the Pacific (April) states that totality was observed through thin clouds by a party from the Argentine National Observatory stationed at Tucacas, Venezuela. Astronomer Chaudet had charge of the expedition, and the equipment included two cameras for coronal photography, two prismatic cameras for recording the "flash" and corona spectra, a small slit spectrograph, and a photometer.

THE SPECTRUM OF NOVA GEMINORUM NO. 2.—On a photograph taken by Messrs. Adams and Pease at Mount Wilson on the nights of February 12 and 13, with a total exposure of nine hours, the spectrum still shows Wolf-Rayet features—bright hydrogen lines and a very prominent bright band at  $\lambda$  4686 are mentioned. The continuous spectrum is described as very strong (Publications, Astronomical Society of the Pacific, No. 163).

LATITUDE OBSERVATIONS BY PHOTOGRAPHY.—The work of the International Latitude Commission bids fair to be remembered as the last great piece of visual measurement. The results obtained at Gaithersburg alone would demonstrate that by means of photography here, as in so many other departments of astronomy, a precision of superior order is now obtainable. From this point of view the report by Dr. Ross might almost be regarded as epoch-making (Special Publication No. 27, U.S. Coast and Geodetic Survey, a quarto memoir of 127 pages and 18 plates). The photographic zenith tube as developed by Dr. Ross is a remarkable and ingenious instrumental achievement, and the detailed description will no doubt be read with the greatest interest by instrument-makers in this country. It consists essentially of a fixed vertical tube carrying a horizontal lens over a dish of mercury, forming an image of zenith stars just below the plane lower surface of the lens on a photographic plate. The objective end can be rotated carrying with it the plate-holder, during exposures by clockwork through a magnetic clutch at suitable rate to give point images, or by hand for reversal through 180°. The design of the lens practically eliminates the effect of errors of level. Freedom from tremor in the mercury reflector was secured by floating the amalgamated dish in a second placed on a tripod resting on a small pier independent of the main concrete base of the tube. The visual routine programme was continued without intermission, and thus a valuable comparison of the two methods has been secured. Numerically the superiority of the photographic procedure is most obvious when the results from a single pair of stars are considered, the mean accidental error of a determination of latitude being reduced from  $\pm 0.113''$  to  $0.060''$ . Especially important is the fact that although both methods yield abnormal values at times, no systematic differences can be traced. The comparison brings to light an error with the visual instrument that results in a progressive increase of latitude during the night. Dr. Ross is of the opinion that his work substantiates the reality of the Kimura term, and, moreover, proves the existence of "fluctuations" not due to a motion of the pole.

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THE ROYAL OBSERVATORY, GREENWICH.

THE report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, was read at the annual visitation on Saturday last, June 3. The report describes the chief observations and other work carried on at the observatory during the year ending May 10, 1916. The subjoined extracts refer to a few points of particular interest.

The 28-in. refractor has been throughout the year at the disposition of M. Jonckheere, director of the Lille Observatory, whose observations have been mainly of stars which have been discovered to be double since 1905. He has spent a good deal of time in the identifications and verifications necessary to the completion of the catalogue of double stars referred to in last year's report. During the year 140 new double stars with separation less than  $4''$  have been discovered.

With the Thompson equatorial photographs have been continued for the determination of stellar parallax in accordance with the programme outlined in last year's report. During the year ended May 10, 1916, a first exposure has been given to 209 plates, and a second exposure, approximately six months after the first, on 226 plates. In the same period 164 plates have been measured, but the measurement has had to be discontinued. During the year thirty-seven photographs have been taken for the determination of the magnitudes of the stars in Kapteyn's selected areas. Of these thirty-four have been passed as satisfactory for measurement. Altogether of the ninety fields from declination  $+15^\circ$  to  $+75^\circ$ , 149 photographs of fifty-nine fields have been taken. The measurement is well advanced for the plates in zone  $15^\circ$ , but has made very little progress during the year.

The comparison of the position of stars given in vol. iii. of the Greenwich Section of the Astrographic Catalogue with those given in earlier catalogues for the determination of proper motions has been continued. With the exception of from 12h. to 0h. in the zone  $65^\circ$  to  $70^\circ$ , this is practically completed. A search for all stars in the *Bonn Durchmusterung* between the pole and declination  $64^\circ$  with large proper motions is in progress by comparison of photographs from sixteen to twenty years apart. Already 200 plates with centres at declinations  $66^\circ$ ,  $68^\circ$ ,  $70^\circ$  have been compared in this way.

Photographs of the sun were obtained on 244 days. Of these 502 have been selected for preservation, including thirty-six with double images of the sun for the determination of zero of position angle. The mean daily spotted area of the sun, which was 152 millionths of the sun's visible hemisphere in 1914, as against 7 in 1913, rose in 1915 to considerably over 700 millionths.

The mean values of the magnetic elements for 1915 and four previous years are as follows:—

Year	Declination W.	Horizontal Force in C.G.S. Units	Dip
1911 ...	15° 33' 0"	0.18549 ...	66° 52' 6" (3-in. needles)
1912 ...	15 24.3	0.18548 ...	66 51 46 " "
1913 ...	15 15.2	0.18534 ...	66 50 27 " "
1914 ...	15 6.3	0.18518 ...	66 49 27 " "
1915 ...	14 56.5	0.18494 ...	66 51 13 (dip inductor) " "

There were no days of great magnetic disturbance in 1915, but three were classified as of lesser disturbance.

The principal features of interest in the meteorolo-