

Second meeting: Tuesday, August 9, at 14.30.

At the request of the President, Dr Menzel gave some information on the work concerning the Sun done at the Harvard Observatory under his direction, and not included in the Report. With his collaborators, he is making a recalibration of the Rowland scale and determining the abundances of different atoms. There are some difficulties about the continuous absorption coefficient and its variation with wavelength, and also about the electron pressure to be assumed. The investigation of complete multiplet arrays proved very useful for the determination of the curve of growth; in some cases, up to 200 lines could be compared with each other. A temperature of 4500° was found.

When the report of the President was written, the investigation of line profiles in sunspots and faculae was the main point not yet investigated for the moment at any observatory. Dr ten Bruggencate reported that this subject is being studied at Potsdam, and that Mr Houtgast, who is working there temporarily, will take part in these measurements.

Finally, Dr Thackeray presented some fine photographs, taken by Dr Evershed with a liquid prism; he does not use temperature control for this instrument, but simply places it some feet below the ground in an airtight aluminium box. By a system of two mirrors the light is made to run several times in succession through the prism, in some cases up to twelve times. The slides demonstrated show beautifully: (1) random Doppler effects at the Sun's centre; (2) H and K at the limb; (3) the D lines, their distance differing for about 0.009 Å. from that given by Rowland; (4) the Zeeman effect of $\lambda 5250$ in a sunspot, this line showing the strongest magnetic separation of all solar lines investigated; (5) radial motion in a spot.

The President thanked the speakers, and asked Dr Thackeray to transmit to Dr Evershed the cordial thanks of the Commission for his interesting photographs. He then closed the meeting of the Commission.

COMMISSION 13 (SOLAR ECLIPSES)

PRESIDENT: Prof. S. A. MITCHELL.

SECRETARY: Prof. G. ABETTI.

First meeting on Thursday, August 4, 11^h 30^m.

The President stated that several replies did not arrive in time to be printed and would be added to the Report. The discussion on the matter of the printed Report follows:

For the *polarization of the Corona*, the method of "polaroid" permits a separation of the true polarization of the corona from that due to instrumental causes and its use should be continued and extended because it is much simpler and less expensive. Menzel has used the polaroid screen at a distance of one-half to one inch in front of the plate in the plate-holder. Minnaert asked if the polaroid reflects the light of the brilliant parts on the faint parts of the corona. He prefers the polaroid before the objective-lens where it would give better results for photometric work.

For the *total light of the Corona compared with the full Moon* the President pointed out that the agreement of the various results is now very good and promising.

The Corona without an Eclipse and the spectrum of Corona. The President and the

Commission praised the work of M. Lyot, in securing such a brilliant success in the task of working under the difficult conditions of the high-altitude station. His spectra and those made during eclipses give a good knowledge of the spectrum of the corona of which we know now 23 lines. Davidson thought that the problem of the spectrum of the corona at the extreme infra-red could better be left to the Lyot methods while, on the other hand, Lyot pointed out that in the ultra-violet the work during eclipses will give better results.

Menzel spoke of the variability of the intensity of the corona lines. In 1932, he found 6374 stronger than 5303, and the reverse in 1936. At the present, we do not find any correlation between coronal intensities and the solar cycle and hence it will be well to secure additional observations on this problem. Lyot stated that in measuring the plates for the rotation of the corona the discrepancies between wavelengths found in different places seem to be greater than the errors of measurement. This might be due to small local radial velocities.

Lyot showed an original negative of the inner corona taken at the Pic du Midi on July 18, 1938.

Link spoke of his work on the sky spectrum during the eclipse of 1936 and proposed to study the intensity of the emission band 6300 on the whole celestial sphere to find out if the band is fainter in the shadow of the moon, especially in the vertical plane. A red filter with a panchromatic plate sensible to 6500 could be used.

About the new continuous spectrum observed by Menzel, and referred to on p. 76 of the Draft Report, he found that it was due to Venus near the Sun at the time of the 1936 eclipse.

A report of U.S.S.R. astronomers on the changes of the corona studied at the 1936 eclipse will be printed with this Report.

Chromosphere

Donitch presented a report on the photography of the spectrum of the solar atmosphere with monochromatic radiations.

Donitch spoke of the zodiacal light observed by him in Egypt and asked that this work should be included in the Eclipse Commission rather than in Commission 22. As a matter of fact, zodiacal light has been already discussed in the Draft Report. Minnaert pointed out the possibility of seeing the shadow of the moon projected on the zodiacal light according to a past work which has been published in the *Astronomische Nachrichten*.

The meeting was adjourned until Tuesday, 11^h 30^m.

Second meeting on August 9.

The second meeting dealt with plans for future eclipses.

Total Eclipse, September 21, 1941. Information regarding possible observing stations within the eclipse track may be obtained from

Dr C. S. Yü
National Institute of Astronomy
Kunming, Yunnan, China

or from

Prof. R. SEKIGUTI
Director Astronomical Observatory
Mitaka, Tokyo, Japan.

Total Eclipse, October 1, 1940. Maps were shown of both South America and South Africa. Dr James Robertson, director of the American Ephemeris, U.S. Naval Observatory, Washington, D.C. gave information regarding probable weather conditions in Brazil. His remarks were supplemented by Prof. Carroll and Mr Davidson.

Dr H. E. Wood, Director of the Union Observatory, has accumulated detailed information regarding the conditions to be expected in South Africa, but his report was given to the President of the Commission too late to be incorporated in the Draft Report. Dr Jackson had visited many of the possible eclipse sites and supplemented the remarks of Dr Wood.

It seemed to be the general opinion that the weather promised as favourable conditions in Brazil as in South Africa. Brazil furnished the additional advantage that eclipse locations could be reached by shorter trips inland than would be the case in South Africa. It was emphasized that the eclipse observers should spread out as widely as possible under the principle of not putting all the eggs in one basket.

Dr Wood will publish from the Union Observatory the report on the weather conditions in South Africa, and Dr Robertson will publish from the U.S. Naval Observatory a similar report regarding Brazil.

The British *Nautical Almanac* will publish a supplement giving information regarding times, altitudes, azimuths, lists of naked-eye stars, etc., for most of the chief locations along the eclipse track.

Interested persons can obtain each of these three reports by writing separately for them.

The importance was emphasized that Commission 13 should act as a clearing house of information regarding plans for the 1940 eclipse. Leaders of expeditions should therefore communicate their detailed plans of observations and possible location to the President of the Commission so that a report may be published and circulated well in advance of the 1940 eclipse.

Investigation of changes in the Solar Corona made in the Soviet Union

One of the problems studied by the Soviet astronomers at the total solar eclipse of June 19, 1936, was the investigation of the motions in the corona.

Six coronagraphs of focal length 5 m. constructed especially for this purpose were placed along the path of the central eclipse on the territory of the U.S.S.R., from the Caucasus to the Far East. At four stations, viz. Belorechenskaya, $\lambda = 2^{\text{h}} 40^{\text{m}}$, $\phi = 44^{\circ} 8'$ (expedition of the Kharkov Observatory); on the River Ural, $\lambda = 3^{\text{h}} 47^{\text{m}}$, $\phi = 49^{\circ} 5'$ (expedition of the Leningrad Astronomical Institute); Omsk, $\lambda = 4^{\text{h}} 53^{\text{m}}$, $\phi = 55^{\circ} 0'$ (expedition of the Pulkovo Observatory); and Kuibyshevo, $\lambda = 8^{\text{h}} 34^{\text{m}}$, $\phi = 50^{\circ} 9'$ (expedition of the Sternberg Astronomical Institute), the expeditions were favoured with fine weather and obtained 30 photographs of the outer and inner corona. At two stations, near Krasnoyarsk, $\lambda = 6^{\text{h}} 14^{\text{m}}$, $\phi = 56^{\circ} 6'$ (expedition of the Tashkent Observatory) and Khabarovsk, $\lambda = 9^{\text{h}} 0^{\text{m}}$, $\phi = 48^{\circ} 6'$ (expedition of the Moscow Branch of the Astronomical and Geodetic Society), the sky was completely overcast. The time interval between the observations at the extreme stations was $1^{\text{h}} 57^{\text{m}}$.

The rich observational material obtained by the expeditions was subjected to a detailed investigation at the Pulkovo Observatory. The investigation was carried out collectively by E. J. Bugoslavskaya of the Sternberg Astronomical Institute, S. K. Vsekhsvyatsky and A. N. Deutsch, both of the Pulkovo Observatory. The photographs of different expeditions were compared and measured with the aid of the

blink comparator and other methods. The preliminary results of the investigation are published in Vol. I of the *Publications of Eclipse Expeditions* (in Russian).

The results may be summarized as follows: It was established with certainty that a number of formations in the outer corona shifted in various directions during the time covered by the observations; the apparent velocities did not exceed 2 or $2\frac{1}{2}$ km./sec. A discussion of the shifts showed that they can be generally accounted for on the assumption that the corona follows the solar rotation with the daily angular velocity 14° .

Many conspicuous changes were found to have occurred in the inner corona during the two hours of observations. Motions of the coronal clouds with velocities from 5 to 20 km./sec. and in outstanding cases to 40 km./sec. were established. Strong qualitative changes in the coronal arches and loops were detected, sometimes completely altering the appearance of a coronal formation.

An examination of the plates of the inner corona showed that the structure of the corona is intimately connected with that of the chromosphere. In several cases formation of coronal clouds from condensations and details in prominences (these clouds had the greatest velocities) and ejection with coronal velocities from salient points of the chromosphere were directly observed.

COMMISSION 14 (STANDARD WAVE-LENGTHS)

PRESIDENT: Dr W. F. MEGGERS.

SECRETARY: Prof. G. R. HARRISON.

Dr Meggers expressed regret that so many members of the Commission had been unable to attend the meeting, most because of ill-health.

The tragic death of Dr C. V. Jackson was a great blow to the work of the Commission, but the President felt that the measurements on the lines of the noble gases and of the iron arc made by Dr Jackson would stand as an enduring monument.

The recommendations listed on p. 101 of the Draft Report were brought up for detailed consideration, the following visitors taking part in the discussion: Messrs Carroll, Dingle, Edlén, Green, Merrill and Swings, and Mrs Moore Sitterly.

At the suggestion of Prof. Harrison the wording of recommendation 1 was changed to read as follows: "It is recommended that the specification for producing the primary standard of wave-length, adopted in 1935 by the International Committee on Weights and Measures, be adopted by the International Astronomical Union in lieu of the specification set up by the Union in 1925." The recommendation was adopted as amended.

Recommendation 2 was adopted in the form given on p. 101 of the Draft Report.

Recommendation 3 was adopted in the form given on p. 101 of the Draft Report.

Recommendation 4 was discussed at length. Prof. Harrison believed that some modification in the definition of the symbol A. was desirable. Prof. Dingle pointed out that the term "Ångström unit" was not technically correct, the name of the unit being the angstrom. Accordingly the definition of A. on p. 100 of the Draft Report was amended to read as follows: A. = angstrom, the international wave-length unit. It was emphasized that the word angstrom, while derived from the name Ångström, was not in fact that name, the Å and ö having been modified.

Dr Merrill expressed the opinion that the use of *r* and *R* for indicating lines with