COMMISSION 12 (SOLAR RADIATION)

PRESIDENT: Prof. G. ABETTI.
SECRETARY: Prof. M. MINNAERT.

First meeting: Thursday, August 4, at 9.30.

The President reminded us of the death of our member Bernheimer; on his proposition, the Commission decided to send a letter of condolence to Mrs Bernheimer.

The members who wrote reports about their work were then asked to give some additional information. Abbot explained why a re-reduction of his solar constant determinations had to take place; the results are smoother than before, more consistent for the different stations, and the variations more clearly indicated. The station at Mt Katherine has had to be abandoned; but another one was being erected in south-west Mexico at an altitude of 8000 ft. As the winter months are there the best part of the year, this station will contribute in an important way to the solar constant determinations. It was hoped that it would be in operation by October 1. Important results are expected from the measurements of Brian O'Brien with sounding balloons.

To H. H. Plaskett, inquiring how Brian O'Brien corrects his measurements for atmospheric extinction, Abbot replied, that at the great altitudes reached there is very little atmosphere left. The radiation is measured in the ultra-violet, but outside the ozone band. An accuracy of 1 per cent is reached.

Dingle called the attention of the Commission to a new method, devised by Paneth, for determining the amount of ozone in a direct chemical way. This gas is condensed on silica gel at liquid air temperature, and can be separated from the nitrogen peroxide, which is also present in traces in the atmosphere. By this method we find the local ozone concentration, whereas the optical methods give only mean values over a great distance. Paneth has already determined the ozone content of the air above London and studied the influence of weather conditions.

Mrs Moore Sitterly reported on her new identifications of solar lines and on the spectra analysed up to that time. In addition to the elements enumerated in the Draft Report, she obtained N I from Edlén, which is important in view of the atmospheric lines, from Swings she will receive Fe III, and probably Mn I will also be obtained; the most serious lack is that of Co II.

Minnaert gave some more details on the Photometric Atlas of the Solar Spectrum, prepared by the Utrecht Observatory. He expressed his thanks to the staff of the Mt Wilson Observatory, who generously allowed him to obtain all the photographs necessary. For reproduction purposes a method was tried by which the curves were not printed as a collection of separate points, but as continuous lines on a network of square millimetres. The publication of more than 300 curves involves a considerable expense, a great part of which will be paid by a subvention of the "Hollandsche Maatschappij der Wetenschappen" and by the Utrecht Observatory. Minnaert hoped that for the remaining part it would be possible to obtain a grant from the I.A.U., and he asked if the Commission could vote a resolution in order to recommend his request to the Executive Committee. The Atlas will be distributed freely to all observatories.

H. H. Plaskett and Carroll insisted on the importance of a strong recommendation and on the interest of the work. The members agreed upon the following text of a

resolution, proposed by Plaskett: "The Commission on Solar Radiation unanimously requests that a subvention of 2000 gold francs (the remaining part being given by the Dutch Society 'de Hollandsche Maatschappij der Wetenschappen') be made by the Union towards the costs of reproduction of the Utrecht Photometric Solar Atlas, giving the profiles of all Fraunhofer lines from Mt Wilson plates between λλ3300 and 8900. This will be a publication of wide significance not only to solar physicists, but to all astrophysicists, and is one for which the Commission believes that the fullest possible support should be given by the Union. The Atlas will be distributed freely to all observatories."

Ten Bruggencate gave some more details about the investigation of the granulation made at Potsdam. By cutting down the object glass to a diameter of 10 cm., much less trouble of scintillation is experienced. A colour filter is used, transmitting only that part of the spectrum where the focal curve has its flat minimum. The photographs are made on Agfa isopan film FF, which has an extremely fine grain. By these precautions a very fine granulation is observed, in which the brightness differences seem to be considerable, amounting to at least $0^{m}\cdot3$.

To Dingle, inquiring why films and not plates are used at Potsdam, ten Bruggencate replied that the isopan films are as sensitive in the green as Agfa spektralgrün, and that they show much less grain. It seems that the same emulsion cannot well be made on glass.

Carroll and Redman remarked also that film is generally more homogeneous than plates; in order to measure it in the microphotometer, it is flattened by enclosing it between two glass plates.

Unsöld insisted upon the importance of investigating the influence of collisions on the formation of solar lines; collisions by electrons, by hydrogen molecules and resonance collisions by atoms of the same kind have to be considered. He asked for the assistance of the observers in studying "long multiplets".

Minnaert hoped that the solution of this important problem would be facilitated also, if we were able to compare lines of the several multiplets with each other. We therefore ask the physicists to determine *f*-values for a great number of lines.

The following motion, proposed by Unsöld and Minnaert, was unanimously adopted by the Commission for submission to the General Assembly: "The Commission insists on the astrophysical importance of determining the oscillatory powers for a great number of atomic transitions, and asks for co-operation of physical laboratories in these measurements."

Dingle described the way in which the Imperial College of Science in London would co-operate on the line contour measurements, required by the Commission of Solar Radiation in selected regions of the spectrum.

Two methods have been followed for obtaining integrated light of the solar disc: (1) removing the objective and condensing the light on the grating by a lens before the slit; (2) throwing the sunlight upon a white screen by means of a bad lens, and directing the spectrograph toward that screen.

The grating is placed in a box with careful temperature control. Standardization is obtained by a wedge slit. The plates are measured with a Cambridge microphotometer. For studying the properties of the apparatus, neon lines have been used, and in addition the second members of the principal series of potassium and sodium.

The President then closed the discussion, and fixed the next meeting of the Commission for Tuesday, 14.30.

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 A. 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