It was concluded that the best months for the program were May, June and September. K. O. Kiepenheuer pointed out the difficulties involved in the analysis of the observations taken with different instruments.

A Working Committee of three members was formed:

R. Giovanelli, chairman; K. O. Kiepenheuer; A. B. Severny,

and it was decided that this committee would write a letter to all interested observatories concerning the co-operative program and including samples of pictures showing the essential features that one wishes to study.

12*a*. SOUS-COMMISSION DES ECLIPSES DU SOLEIL

Report of Meetings

PRESIDENT: R. O. Redman.

SECRETARY: J. Houtgast.

First meeting, 17 August 1961

DRAFT REPORT

In opening a brief discussion on the *Draft Report*, the President apologised for a number of omissions, which would be rectified. The Report was then adopted without further correction.

COMMUNICATIONS

Athay called attention to chromospheric observations that we still need. The chief shortcomings are in the ultra-violet and infra-red. We need measurements over a greater range of height, both for lines and continuous spectrum, including the Balmer continuum; line profiles of increased accuracy; studies of the relative behaviour of certain lines of He I, Ca I, Mg I, etc. He would like to see more study of central intensities, starting in the Fraunhofer spectrum of the disk and extending through the transition to the chromosphere, and also of coronal intensities down to heights as low as possible. He stressed the importance of more knowledge of variations of the chromosphere through the solar cycle. He showed some of the results obtained from the H.A.O. eclipse observations.

Houtgast reported observations made by Dutch observers during the eclipses of 1959 October 2 and 1961 February 15. These include photo-electric measurements of the darkening at the limb by T. de Groot and photographic observations by Koelbloed of the higher Balmer lines, the wings of H and K of Ca II, and of the transition from photosphere to chromosphere in some parts of the spectrum. Hα and Hβ were obtained in different phases of the 1961 eclipse, with high resolution (0·8 Å/mm).

Houtgast would like more measures of Hα and K in the high chromosphere, say between 10 000 and 15 000 km, because the observations of 1954 indicate an increase of the logarithmic gradient above 10 000 km for the K line and a comparison with Hα should lead to interesting conclusions about the state of the chromosphere at that height.

As to the low chromosphere, he emphasised the need for high time-resolution and for that reason intended at the next opportunity to use the moving film technique.

Suemoto said that he has a great deal of material still in course of measurement, from the 1958 eclipse, where he had photographed the chromospheric spectrum with a slitless spectrograph, using a large grating at high incidence. The observations show many details in the

chromospheric arcs of the stronger emission lines. He is concentrating at present on the height distribution and has found that the irregularities associated with spicules become conspicuous above 1 500 km.

Jefferies emphasized the importance of measurements of the He I line at 10 830 Å.

Waldmeier showed photographs of the intermediate-type corona of 1961 February 15. The more pronounced long streamers were in the northern hemisphere, whereas near the south pole there were diffuse patches and polar rays. At the time of the eclipse there were many polar faculae in the north, but none in the region of the south pole. Most of the northern polar rays and the northern polar faculae appeared west of the Sun's axis. An intimate connection between polar coronal streamers and polar faculae was suggested.

Laffineur reported on photography of the corona of 1961 February 15, using light around 6300 Å. A rotating diaphragm in the focal plane was used, cut so that the coronal surface brightness in the photograph would on the average be constant out to a radius $2{\cdot}5\ R_\odot$. The pictures show interesting structure, including a dark elliptical envelope around a large prominence, long polar rays and dark radial lanes in the corona.

Zirker showed a number of photographs of spicular structure in emission lines of the chromosphere. The photographs were taken at the Sacramento Peak Observatory outside eclipse.

Second meeting, 21 August 1961

The President gave a summary of existing questions and problems, with suggestions for needed observations, and then invited discussion.

Pecker recommended search for a discontinuity in the chromospheric continuous spectrum, near 4800 Å, similar to that found in the spectra of F-type stars. He also stressed the need for more measurements of prominence spectra.

Jefferies said that much information about prominence spectra could be obtained outside eclipses but that eclipse observations are needed of weak He I and He II lines. Observations of the ratio of triplet to singlet lines in He I, and their relative gradients with height in the chromosphere, would be very desirable. The importance of He I lines lies in their sensitivity to temperature variations.

Zirin confirmed the need for He II line strengths in prominences.

Thomas wanted height gradients in both the Balmer and the Paschen continuum. He thought that there is a sharp rise in temperature at about 1 000 km and also a change in chromospheric structure. Below 1 000 km the continuous radiation near 4 700 Å is probably mostly from H^- and there is hydrostatic equilibrium in a rather homogeneous chromosphere. Above 1 000 km the continuum is caused mostly by electron scattering. To verify this model, observers should concentrate upon all emissions from levels between 750 and 2 000 km, and aim at a height resolution of 20 km.

Suemoto has investigated the height distribution of the excitation temperature and of the ionization temperature up to 1 500 km. He finds a minimum temperature at 100-200 km. From the central intensities of medium strength lines he finds $T_{exc} = 4000°$ at $h = 0$.

Zirker wanted profiles of chromospheric lines for which $\log E(h) < 13{\cdot}00$, at $h > 2500$ km. There is an inconsistency between the temperatures determined from profiles (50 000°) and from total intensities (15 000° – 20 000°).

Newkirk called for measurements of the magnitude and orientation of the polarization in coronal emission lines, in order to determine the magnetic field in the corona.

Zirin asked for a determination of the distribution with height of the intensities of coronal emission lines; he wished to know the height at which collisional broadening changes to radiative broadening.

Rösch reported photography of the Sun at the Pic du Midi Observatory during the partial phases of the eclipse of 1961 February 15. He showed how the 'instrumental' profile at the limb, caused chiefly by scintillation arising in the Earth's atmosphere, depends on the position angle.

Wlérick summarized observations made at the St Michel Observatory during the total solar eclipse of 1961 February 15. They comprise: with the 60 cm telescope, gradient of the continuum; 80 cm telescope, polarization of the green coronal line; 120 cm telescope, photographs of the corona and of prominences in the red; 193 cm telescope, coronal spectrum in the red and infra-red; Schmidt telescope, photographs of the corona in the infra-red. The two spectra taken with the 193 cm telescope cover the region 5800–8800 Å, and will permit photometry of the continuum and of the emission lines. The line at 6535 Å, attributed to Mn XIII, is confirmed. A weak line at 6917 Å may possibly be due to A XI.

Righini made 3 cm radio observations at Arcetri during the same eclipse, in both linear and circularly polarized radiation, using a 2 m paraboloid. In the partial phases there was an excess of linear polarization; near the middle of totality there was more circular polarization.