

and the other way

$$\begin{aligned}
 a\Delta a &= +A'\Delta A + B'\Delta B - F'\Delta F - G'\Delta G \\
 a^2 \sin i \Delta i &= +(G'+G'')\Delta A + (F'-F'')\Delta B + (B'-B'')\Delta F - (A'+A'')\Delta G \\
 -a^2 \sin^2 i \Delta \omega &= +(F'-F'')\Delta A + (G'+G'')\Delta B + (A'+A'')\Delta F + (B'-B'')\Delta G \\
 a^2 \sin^2 i \Delta \Omega &= -(B'-B'')\Delta A + (A'+A'')\Delta B + (G'+G'')\Delta F - (F'-F'')\Delta G \\
 C\Delta C &= +A''\Delta A - B''\Delta B - F'\Delta F - G'\Delta G \\
 H\Delta H &= +A'\Delta A + B'\Delta B + F''\Delta F - G''\Delta G.
 \end{aligned}$$

In these formulae Δi , $\Delta \omega$, $\Delta \Omega$ are in radians, the others in seconds of arc.

COMMISSION 27. (VARIABLE STARS.)

PRESIDENT: Dr A. A. NIJLAND.

SECRETARY: Mr FELIX DE ROY.

The draft report was discussed, and adopted with some alterations and additions. The following resolutions were referred to the General Assembly:

1. The Commission recommends that the yearly subsidy granted by the Union for the publication of the Cracow Ephemerides of Eclipsing Binaries (Prof. T. Banachiewicz) be continued to the amount of 700 gold francs, and expresses the wish that the decimal division of the day used in these ephemerides will be, in the future, counted from Greenwich Noon.

2. The Union having endorsed the proposal made by Prof. Grouiller to compile a list of unpublished observations of Variable Stars, and recommended that this compilation be published by the Union, the Commission recommends that a subsidy of 200 gold francs should be granted to that object.

3. The Commission recommends that Prof. Nijland's Lists *A*, *B*, and *C*, brought up to date, together with a new list *D*, should be published by the Union with a subsidy not exceeding 300 gold francs.

In addition, the following recommendations were adopted:

4. The Commission expresses the wish that all observations of Variable Stars (including Novae) should be recorded in Greenwich Mean Astronomical Time, counted from noon to noon, and directs the attention of editors of astronomical publications towards this point.

5. The Commission recommends the simultaneous observation, by photometric and spectrographic methods, of eclipsing binaries, and suggests that, as far as practicable, interested astronomers should coordinate their efforts to bring about this result.

6. The Commission recommends that a selected list (see p. 172 of the Report) of six Long Period Variables be observed by experienced observers through Schott's VGI, 2 mm. green filter, and expresses the wish that a photographic and a photovisual sequence of comparison stars for these stars be measured and published as soon as possible.

7. The Commission recommends that, with a view to studying the secondary variations in the period of eclipsing binaries, at least one epoch of minimum should

be observed, as far as possible, in each opposition of at least the brightest of these objects.

8. Commission 27, though not prepared to extend its scope to the photometry of minor planets, recommends the observation of the brightness of asteroids to Variable Star observers.

By a formal vote, the Commission wished to congratulate heartily Dr R. Prager upon the completion of the first volume of the second edition of the *Geschichte und Literatur des Lichtwechsels der veränderlichen Sterne*. They also desired to record their appreciation of the important effort recently made by Russian astronomers in the field of Variable Star research, and their regret that one of the Commission's most active members, Mr G. B. Lacchini, had to direct his activity to other subjects.

With reference to the growth of photovisual photometry, the Commission considered that its application to the measurement of new sequences of comparison stars seemed desirable, but, despite the fact that certain observers found that photovisual sequences could be directly applied to visual observations, they thought that the question of the relation of the photovisual to the visual scale or scales should be left open for the present. Mr Leon Campbell emphasized the need for distinguishing between both systems in all future publications where a doubt could arise about the system used.

In connection with the wish of the Harvard Members of the Commission that more photometric work with a simple type of photometer should be encouraged, Prof. Graff showed two types of small and inexpensive photometers which he has recently devised and constructed.

Prof. S. A. Mitchell described his work in the revision of 218 visual sequences, with altogether 6250 comparison stars, which he has recently completed and is about to publish. He announced his intention of observing visually the photovisual sequences of the *Atlas Stellarum Variabilium*, Part VIII.

The Commission voted that co-optation to its membership should not be limited, either to observers taking part in co-operative work, or to a certain number.

COMMISSION 28. (NEBULAE.)

PRESIDENT: Dr H. SHAPLEY.

SECRETARY: Dr J. H. OORT.

Except for a brief discussion of the zero point of the period-luminosity curve and the influence of the absorption of light on its determination, the discussions were mainly confined to the draft report which was approved by the commission. The President read a report from Dr Lampland, which had not been included in the draft report and Prof. Lundmark gave an account of his work on extragalactic nebulae, in particular of the catalogue of about 50,000 nebulae which is now being prepared at Lund.

The President drew special attention to the importance of the problem of the spiral arms for future cosmogonic theories and urged further theoretical investigations on the origin of the spiral structures.

It was decided to defer the discussion of the spectrophotometry of nebulae to a joint meeting with Commission 36, and that of the problems connected with stellar statistics to a joint meeting with Commission 33.