

stars have yet been measured. It suggests that observers, or observing organizations, should all use the same magnitudes for work on stars of List A.

In connection with the Report, the President's proposal, that the systematic investigation of Cepheids in ten fields, taken up by the Commission after the Leiden meeting of 1928, be continued at least till the following meeting under the same conditions, met with unanimous approval.

Prof. Danjon offered the collaboration of the Strasbourg Observatory for sequence work, and this announcement was received with gratification.

Prof. Dugan recommended that observers using the Argelander step method should not content themselves with deducing their light scale from the observations, but should also tie the comparison stars together by estimates made for this sole purpose on several nights. They should use several comparison stars, six if possible, when the Variable is faint.

Mr de Roy suggested that visual observations with colour filters be kept in the experimental stage for the present, some well-tried observers taking them upon the basis of Minnaert and Van der Bilt's preliminary results. Prof. Grouiller recommended colour filter observations of red stars of small amplitude, some of which (R Scu, U Mon, etc.) are bright, and Prof. Lundmark proposed to add bright Novae to the suggested list.

Prof. Mitchell stated that, in his extensive work on sequences, he found little difference between visual and photovisual magnitudes.

On the President's proposal, the Commission delegated Dr Schilt to approach Commission 28, with the request that it should urge observers to record more frequently the epochs of variable stars in globular clusters.

#### *Commission 28. (NEBULAE AND STELLAR CLUSTERS.)*

ACTING PRESIDENT: Dr K. Lundmark.

SECRETARY: Mr F. D. Miller.

Dr Lundmark called attention to the deaths of two members of the Commission, Miss Adelaide Ames and Father J. G. Hagen, and of a past member and former chairman, Dr G. Bigourdan, and outlined their contributions to the subject.

The secretary read a letter from the chairman, Dr Hubble, suggesting that the meeting be devoted primarily to informal discussion of relevant problems.

Dr Lundmark, as an introduction, read the recommendations adopted by the Commission in 1928. This was followed by the reading of the first part of the acting chairman's report on the advance and present state of knowledge of the anagalactic nebulae.

A communication from Dr Hubble was also read, in which he outlined the progress of the co-operative survey of the bright nebulae, which had been recommended at the 1928 meeting of the Union. With the exception of a single zone, the whole northern sky down to Declination  $-15^{\circ}$  is assigned. A synopsis of the procedure to be followed in the survey was included.

Dr Shapley outlined the extensive programmes, complete and projected, for Harvard surveys of the extra-galactic nebulae, with particular reference to the recently published photometric catalogue complete to the thirteenth magnitude. Attention was also drawn to Dr Hubble's suggestion of a nebular magnitude scale independent of the stellar.

The meeting adjourned.

The second meeting opened with the reading of the second part of the report of

the acting chairman, upon which comment was then invited. Dr Shapley spoke briefly, and moved the acceptance of the report. The motion was carried.

Mme Roberts presented to the Commission a copy of the second Atlas of Herschel's 52 Nebulous Regions, made from camera charts similar to those included in the first Atlas, and intended for the use of observers with small instruments. This was followed by short reports and suggestions from several of those present. Prof. Lindblad announced that it was intended to apply the new thirty-six inch reflector of the Stockholm Observatory to nebular problems. Dr Adams discussed briefly the bright nova of 1931, with details as to spectrum and absolute magnitude. Dr Carpenter remarked that the work on the Steward Observatory zone was nearly finished. Dr Van de Kamp drew attention to the application of the extra-galactic nebulae in discussing the distribution of dark material in our own system. Dr Oort commented on the connection between the apparent distributions of faint stars and extra-galactic nebulae. Dr Menzel outlined his work on the solution of a generalized form of Milne's special case of radiative equilibrium. He also warned against over-emphasis by the committee of the extra-galactic nebulae, as compared with planetary nebulae, and suggested the creation of a sub-committee to deal with the latter problem. It was decided to refer the question of the appointment of such a sub-committee to the Chairman of the Commission.

Dr Schilt announced that he had been delegated by Commission 27 to request that Commission 28 adopt the following recommendation:

"It is recommended that variable star workers note the importance of more accurate determinations of the epochs of cluster type variables, particularly in globular clusters that have large numbers of variable stars."

The recommendation was adopted.

The acting chairman brought up the question of including our own galaxy in the scope of the Commission's activities. Dr Shapley was of the opinion that the inclusion should be informal, and incidental to the real aims of the Commission.

#### *Commission 29. (STELLAR CLASSIFICATION.)*

PRESIDENT: Prof. H. N. Russell.

SECRETARY: Dr C. S. Beals.

The Commission held two meetings and the time was taken up almost entirely in a discussion of stellar classification.

Dr J. S. Plaskett moved, seconded by Miss Payne, that a sub-committee be appointed to consider the classification of Wolf Rayet and related spectra.

The committee was appointed as follows: Miss C. H. Payne, Prof. H. H. Plaskett, Dr C. S. Beals, Chairman.

Dr W. S. Adams moved, seconded by Dr J. S. Plaskett, that a sub-committee be appointed to tabulate and bring up to date criteria of classification for both high and low dispersion at present in use throughout the stellar sequence.

The committee was appointed as follows: Miss A. J. Cannon, Dr O. Struve, Prof. H. H. Plaskett, Dr B. Lindblad, Dr W. S. Adams, Chairman.

#### *Commission 30. (RADIAL VELOCITIES.)*

PRESIDENT: Dr J. S. Plaskett.

SECRETARY: Dr W. E. Harper.

The Report as printed was discussed section by section. Section I being only a summary of progress was, with the correction of a typographical error, accepted.