pairs, though not with the high accuracy customary in photo-electric photometry, on account of the difficulties involved.

At the Bosscha Observatory, Java, a programme of photographic double star observation is being actively pursued. This is welcome news, as at Johannesburg we have not been able to do much in this line in recent years and are concentrating on visual and interferometer observation.

W. H. VAN DEN BOS
*President of the Commission*

## PUBLICATION OF A GENERAL CATALOGUE OF DOUBLE STARS

At the meeting of Commission 26, in Zürich on 13 August 1948, the desirability of a publication of General Catalogues for the northern and southern domains, to bring the ADS and SDS up to date since 1927, was briefly discussed.

I wish to make the following suggestions, in the hope that this important question may be fully discussed at the Rome meeting.

1. In my opinion, the publication of catalogues of the type of the ADS or SDS is no longer necessary, as a result of the existence of the two Central Offices of Information at Lick and Johannesburg. The very considerable expense and work required for such publications can no longer be justified. Furthermore, such catalogues are of necessity already several years out of date when they appear; for example, the ADS, complete to 1927.0, was published in 1932.

2. It seems to me that a single General Catalogue of Double Stars covering the whole sky, but giving only the information normally required by the general astronomer as well as the double star specialist, would be of much greater use, much less expensive to print and therefore justifiable. What information exactly such a catalogue should contain, is of course a matter for discussion. It may, however, be helpful, as a guide, if I give here my own thoughts on the matter. I can best convey them by giving a specimen entry and its explanation.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 04215 S2544 | 04174 S2558 | AB β744 | S26°1642 | 1891–1951 ∞ | 77y 0″50 0·56 | 6·5–6·7 Fo | C 0″066, 138° |
| | | AB,C h3644 | | 1891–1951 4 | 7° 3° 35′4 38′8 | 5·9–12 | R 0″072, 144° |
| | | AB,D h3644 | S26°1643 | 1891–1951 6 | 41° 41° 44′6 44′4 | 5·9–8·6 Go | C 0″069, 150° |

3. The first column gives the position for 2000. Following a suggestion by Dr Jeffers, this serves at the same time as a reference number. The first two figures give the hours, the next three the minutes and tenths of right ascension, N or S (or if preferred, + and −) stand for north or south declination, the next four figures give the degrees and minutes of declination.

It may be objected that, as a reference number, this is rather cumbersome, but in my opinion this drawback is more than offset by the advantages of Dr Jeffers's suggestion.

Our double stars are already encumbered by a variety of designations which convey no useful information: discoverer's number, BDS or JDS and ADS number, Durchmusterung and HD number, etc. Here we have a reference number which gives at once the 2000 position and cannot become obsolete or upset by insertion of new entries.

Entries will be in order of increasing right ascension, with those having the same right ascension (to 0·1 m.) in order of declination from north to south.

4. The second column gives the 1900 position in the same manner. For other epochs a position of sufficient accuracy for purposes of identification, for setting the telescope, etc., can thus be obtained at sight.

5. The third column gives the combination of components in a multiple star and the discoverer's number. Though the latter is of small practical use, its retention is justified for historical reasons and as a further check on identification.

6. The fourth column gives the Durchmusterung identification. As in the HD, BD from +90° to −23°, CD from −23° to −52° and CPD from −52° to −90°.

7. The fifth column gives the dates of the earliest and most recent reliable measure available at the time of writing the manuscript, and the number of sets of complete measurements. For well-observed pairs, where twenty or more complete sets are available, the symbol $\infty$ is used. This information should give a fair idea of the state of remeasurement and assist observers in drawing up a useful working programme.

8. The sixth column gives the position angles and distances for the dates given in the fifth. Where necessary to prevent a misunderstanding of the motion apparently indicated, the insertion of + or − between the angles discriminates between direct and retrograde motion, while the insertion of another distance between the values for the given dates indicates that the distance changed via an extreme value (which is given).

For the close pair AB in the example given, the sixth column gives the period, semi-axis major and eccentricity of the most recent orbit. Full information on the orbit should be obtained from the latest orbit catalogue, but the information given is sufficient to give an idea of the degree of reliability of the orbit (by comparison of the period with the interval of observation) and to enable the observer to judge whether or not the pair is likely to be within the capacity of his optical power.

9. The seventh column gives the visual magnitudes and spectral types of the components, the eighth the annual proper motion, if a reliable value is available. The letter C here indicates common, R relative proper motion. In the example given, the components A, B and D form a physical system while C is an optical component, from the measures of which the relative proper motion has been derived.

10. I realize well enough that some astronomers might wish for more information to be given by the catalogue, such as trigonometric, spectroscopic and dynamical parallaxes, radial velocities or if a component happens to be itself a spectroscopic binary, etc. It should, however, be kept in mind that, in order to preserve the catalogue's clarity and ease of consultation by the general astronomer—not a double-star specialist—as well as to prevent it becoming too bulky and costly, entries *must* be restricted to a single line (except of course for multiple stars). I have therefore omitted data which should be obtained from special catalogues compiled by experts on such matters. An exception is made in the case of a significant proper motion, because of its fundamental importance, e.g. in distinguishing between physical and optical pairs. The fourth column, Durchmusterung identification, is not really essential information and might be omitted for reasons of space, or something more useful substituted.

11. I believe that a General Catalogue of the form here suggested would supply the information required from it in the great majority of cases and for most purposes. The two principal exceptions are the needs of the orbit computer and those of the computer of dynamical parallaxes. The orbit computer requires a full list of measures in the case of a first orbit, or a supplementary list if an earlier orbit containing a list of measures has been published. This he can obtain by request from the card catalogues kept up to date at the two Central Offices, Lick north of $-20°$, Johannesburg south of $-19°$ declination. In this way the computer saves himself not only a laborious and often incomplete search of the literature, but also unnecessary duplication, as the Central Office would inform him that the orbit was already in process of computation elsewhere.

Though the computer of dynamical parallaxes might derive a fairly reliable result from the information given in the catalogue, he too will in general require a complete list of measures, though not—as in the case of the orbit computer—for one or a few pairs, but for a large number. As this is not a reasonable demand on the Central Offices, the solution would seem to be that such work should be performed at the Central Offices immediately from the cards, either by someone on the staff or by a visiting astronomer.

12. I have kept the vexed question of what to include in the catalogue and what to reject for the last. This point has often been discussed before. Formulae for a limiting distance, generally with the combined magnitude as parameter, have been set up. They serve their purpose admirably, if one simply wants to get rid of the excessively wide and frequently very faint pairs listed in earlier days. If, however, one wishes to discriminate

between binary systems and chance combinations, such formulae are useless. They will always exclude many genuine physical systems and include optical pairs.

My own view is that, if a General Catalogue is drawn up on the lines indicated above, there will be no need for drastic rejection. We can make a rough estimate of its probable bulk as follows:

The ADS, covering three-quarters of the sky and using (not too strictly) a limiting formula, contains 17,180 entries. Aitken stated that he rejected 642 out of the first 2000 entries in the BDS. As the BDS has 13,665 entries, I estimate the total number of rejects from it at about 4,500. Allowing for discoveries after 1927 and adding the southernmost quarter of the sky, we may consider that 30,000 entries is probably a generous estimate for the entire sky, without (drastic) rejection.

At fifty entries to the page, a single volume of about 600 pages, plus a comparatively small number for introduction, etc., should be found sufficient. The ADS is in two volumes, containing together 1488 pages, plus sixty-eight pages of introduction, etc.

W. H. VAN DEN BOS
*President of the Commission*

*Procès-verbal des séances*

*Séance du* 5 septembre 1952

PRÉSIDENT: Prof. G. VAN BIESBROECK.

SECRÉTAIRE: M. P. MULLER.

La séance est ouverte par le Prof. G. van Biesbroeck, mandaté par le Comité Exécutif pour remplacer le Dr W. H. van den Bos, Président en exercice, empêché de prendre part au Congrès. La Commission se range à ses propositions d'adopter pour secrétaire P. Muller et de charger ce dernier d'adresser en son nom un message au Dr van den Bos; puis elle observe un instant de recueillement en souvenir de son Président d'honneur le Dr R. G. Aitken, décédé depuis la dernière Assemblée Générale.

La discussion du Draft Report est abordée point par point, à l'exception de toute question relative au futur catalogue général, ce sujet étant dès maintenant réservé pour une seconde séance. Les principales interventions font ressortir l'intérêt que soulève actuellement la détermination aussi précise que possible des $\Delta m$ et des indices de couleur dans les couples visuels, et témoignent des efforts en cours dans ce sens (Struve, Weaver, Lacroute, Arend, Haupt, van Albada, Wallenquist, Muller). Wallenquist signale qu'il établit un fichier de $\Delta m$ photométriques et prie les auteurs de mesures inédites de bien vouloir les lui communiquer.

La Commission adopte sans discussion le principe des propositions de résolutions présentées par Arend et Muller. Les auteurs en rappellent les motifs; Jonckheere suggère un amendement dans la rédaction (résolution Muller), Struve et Luplau-Janssen appuient la résolution Arend. Les auteurs sont invités par le Président à les rédiger en accord avec les opinions exprimées.

Au nom des astronomes soviétiques, Kulikovsky souligne l'intérêt des systèmes multiples dont les distances relatives sont de même ordre (type Trapèze d'Orion), ceci en liaison avec l'importante intervention du Prof. Ambartsumian dans le Symposium sur l'évolution stellaire prévue pour le lendemain.

Suite remise au 10 septembre.

*Séance du* 10 septembre 1952

Le Président donne la parole à Kulikovsky pour présenter les remarques de la délégation soviétique qui n'avaient été que brièvement commentées à la première réunion. Ces remarques portent principalement sur trois points: (1) intérêt que devrait porter la Commission aux satellites invisibles décelés par l'astrométrie; (2) étude des systèmes