velopment curve for a group differs considerably from that of its leader-spot. This result was to be expected, as at the beginning of a group there are, apart from the leader, a number of companions contributing largely to the total area of the group. At the return of the group, these companions are fewer in number and finally the leader is usually all that remains of the group. So from the maximum area reached by the group one can expect a well-pronounced drop in total area. That this occurs can be seen from Fig. 1, where the measured areas, corrected for foreshortening, of "60-day" groups are plotted against time. No such drop occurs in Fig. 2, which gives the same but for the leader only.

Similar results have been obtained for "30-day" and "45-day" groups. The bumps in the development curve for the groups show that great caution is needed in the use of linear expressions for the rising and falling portions of the curve for statistical purposes.

I am, Gentlemen,
Yours faithfully,
N. BOERSMA.

References

(1) *M.N.*, **85**, 553—560, 1925.
(2) Greenwich Photoheliographic Results 1924, page D 79.
(3) M. Kopecký, *The Outline of the Theory of Distribution and Occurrence of Sunspots on the Solar Disc* (Publ. No. 28 Czech. Academy of Sciences).

Colour Differences in the Milky Way?

GENTLEMEN,—

In his Lois Slocum Memorial Lecture[1] Bart J. Bok gave a highly interesting discussion of the differences of occurrence of Star Populations I and II in different parts of our Galaxy and other systems. Whereas the highly luminous A, B, and O type stars of Population I which are characteristic of the spiral arms and knots are seen in the Cygnus and the Carina Star clouds, the less luminous reddish stars of Population II, which are characteristic of the globular clusters and the nuclei of galaxies, are seen most abundantly towards the Sagittarius centre of our system.

Could such differences in structure show themselves in a difference of colour between different parts of the Milky Way?

In 1926 I was engaged at the Lembang Observatory in comparing the brightness of different parts of the southern Milky Way. The results of this work have been published.[2] In the introductory text there is a short chapter entitled "Farbenunterschiede in der Milchstrasse". There we read that on May 14 I had some difficulty in comparing the relative brightness of the galactic light between ξ Sgr and Scutum with the points situated between δ, η, ϵ and τ Scorpii. I then became aware that the cause of the uncertainty was a difference in colour. The first named region looked somewhat more yellowish or reddish than the parts about η Scorpii and south of α Scorpii. Then I remembered that some days earlier I had met with the same uncertainty: the light about β Arae had appeared to me duller and more reddish, but I had ascribed it to its lower altitude. On May 20 it was again noted as a difficulty that the light between α and λ Scorpii was more whitish or bluish compared with the ruddy colour

between ξ, λ Sgr and 2H Scuti. Once more, on June 9 the remark was noted: the light about β and ϕ Cygni appears more whitish and the Scutum cloud more yellowish.

It was not possible to arrive at complete certainty because time was lacking for a systematic investigation. We started travelling home on May 19 and every hour of passable clearness had to be used to complete the main task, the distribution of galactic brightness. Colour differences in the Milky Way then meant rather awareness of an obstacle than ascertaining a new interesting fact. There is now, however, sufficient conformity to the statements derived by Bok to consider systematic observation of such colour differences as a possibly useful contribution to the study of the galactic system.

Here is a work that can be done by an amateur without any astronomical instrument. What he wants is a first-class clear sky, such as are found in the subtropical zones of the Earth. Since the southern hemisphere contains the richest and most important parts of the Milky Way it is the southern subtropical zone (comprising South Africa, Australia, Peru) that offers the best conditions. The observations consist in attentively looking in turn at the two regions to be compared. The chief difficulty in coming to a result will be how to decompose the diversity in aspect into two values, a difference of brightness and a difference of colour. The former, which here has a secondary importance only can be expressed most practically—as Argelander did for the stars—by "steps". For the latter it seems more practical—following the example of observers of stellar colours—to express the faint galactic colours by simple numbers, e.g. 0–1 for white, increasing to 3–5 for increasing yellow or reddish hues. The observer must find out the best method by experience.

I am, Gentlemen,
Yours faithfully,
A. PANNEKOEK.

Englann 7,
Wageningen, Holland.
1957 October 29.

References

(1) Bart. J. Bok, *The Depths of the Milky Way*, Lois Slocum Memorial Lecture, 1951.
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REVIEWS

The Changing Universe, by John Pfeiffer. (London, Victor Gollancz, 1956). Pp. 243. Price 18*s*.

All astronomers find themselves at some time or other faced with the difficult question "What use is astronomy?" Their reply is not usually that expected by their interlocutor, i.e. a justification in terms of human welfare. It is more often (after a long pause) a reference to deeper understanding of the Universe or some similar remark. Since much of the research nowadays is supported by public funds the public has surely a right to expect a return from its money and this can only take the form