Note on the eclipsing variable star DG Carinae, by *Ejnar Hertzsprung.*

The eclipsing variable star DG Carinae = *B. A. N.* **54** *g* = C. P. D. — 60°2642, 11ʰ6ᵐ51ˢ·0, — 60°33′·7 (1875) was examined on 408 plates taken on 117 different nights between J. D. 2423786 and 3993 and on the 12 old plates mentioned in *B. A. N.* **54**, 96. Of the 129 nights on which the variable has thus been observed it was only found faint on 2 nights, viz. on 10 plates from J. D. hel. M. T. Grw. 2423828·3345 to 28·5654 and on 3 plates from 3967·2040 to 67·2532. It is uncommon that an eclipsing variable star is found faint on only 2 nights out of 129, as the minimum usually lasts more than ·05 of the period. The rule is that further investigation of a case like that of DG Carinae will prove it to be merely due to accidental arrangement of the observations and not to exceptionally rare occurrence of eclipse. Nevertheless this variable deserves special attention. The star was found of normal brightness on J. D. hel. M. T. Grw. 2423966·2566 and 3968·2150. As the second minimum mentioned above occurred between these two dates, the duration of the minimum cannot be longer than 2 days, while the interval between the two minima observed is 139 days.

The range of variation is considerable. I estimate it to amount to about 2^m.

The variable is situated in a region rich in nebulous matter.

Provisional estimate of the "surface-brightness" of the Small Magellanic Cloud, by *Ejnar Hertzsprung.*

The Small Magellanic Cloud has an elongated shape, the northern part showing some marked condensations, while the southern part has a more uniform appearance. Using a fieldglass put out of focus it was found that the "surface-brightness" of the centre of the southern part of the Cloud is equal to that of an out of focus image half a degree in diameter formed by a star of the visual Harvard magnitude $5^m{\cdot}2$. This surface-brightness corresponds to a stellar magnitude of $5{\cdot}2 + 5 \log \sin \frac{1}{4}^\circ = 5{\cdot}2 - 11{\cdot}8 = -6^m{\cdot}6$. That is to say that the whole sky covered with this surface-brightness would give the same illumination on the earth as one star in the zenith of magnitude $-6^m{\cdot}6$.

From the numbers given by Kapteyn and van Rhijn (*Ap. J.* **52**, 30, Table IV, computed) I find that the total light of all the stars contained in one cubic parsec near our sun is equal to that of ·0546 stars of absolute visual magnitude zero (parallax = 1″), or to one star of absolute magnitude $-2{\cdot}5 \log {\cdot}0546 = 3^m{\cdot}16$. The "surface-brightness" of a layer of this light density one parsec thick is therefore equal to $3{\cdot}16 - 2{\cdot}5 \log \pi = 1{\cdot}9$ stellar magnitudes. Hence the "surface-brightness" in the centre of the southern part of the Small Magellanic Cloud corresponds to a layer of this kind $10^{\cdot 4(1\cdot 9 + 6\cdot 6)} = 2500$ parsecs thick. As a first approximation we can consider the southern part of the Small Magellanic Cloud as a sphere of constant stardensity. I estimate the angular diameter of this sphere to be about 40′ or ·012 radians. We then have $D/p = 2500/{\cdot}012 =$ about 200000, where D is the amount of light per unit volume as compared with the neighbourhood of our sun, and p the parallax of the Cloud. If e. g. the parallax is ·″00005, the light density in the Cloud would be about 10 times that near the sun.

Note on a new irregular variable star, by *Ejnar Hertzsprung.*

Most irregular variable stars show a small range and slow variation. Exceptions to this rule are therefore of special interest. The star 11ʰ 4ᵐ 54ˢ·9, —59° 33′·3 (1875), forming the object of this note, is an exception of the kind mentioned.

The variable was estimated on in all 12 old plates, taken on 12 nights, and 373 recent plates, taken on 106 nights during the first 7 months of 1924. The comparison stars were

	α (1875)	δ (1875)	
A	11ʰ 4ᵐ 37ˢ·6 ,	—59° 32′·7	—ˢ·61
a	50·1	32·9	·0
b	59·2	33·1	·76

Figure 1 shows the field in question. The stars have been represented by rather large disks, in order not to deviate too much from the real appearance of the photographs. The brightest star on Figure 1