On the period of BF Ophiuchi
Hertzsprung, E.

Remark on AB Centauri, by *Ejnar Hertzsprung*.

In *B. A. N.* 52, p. 86 three epochs of minimum of this eclipsing variable star have been quoted and it was mentioned that these epochs are satisfied by a period of $46^{d}{\cdot}853$. Subsequent estimates on plates taken at Johannesburg with the Franklin-Adams instrument have shown that $46^{d}{\cdot}853$ is the real period.

From a comparison with Selected Area 193, which is on the same plates, the photographic magnitudes in maximum and minimum are estimated to be $10^{m}{\cdot}6$ and $13^{m}{\cdot}2$ respectively. The descending and ascending branches are steep and there is a long constant minimum occupying about ·05 of the period or about 2 days. Assuming the whole duration of the minimum to be ·08 of the period and the eclipse to be central, the radii of the two components are found to be about ·2 and ·05 of the distance between their centres and the densities, supposing the masses to be equal, 1/2000 and 1/20 respectively that of our sun taken as unit. However, these figures are still very uncertain, the available material being too scanty for a reliable determination of the elements.

The following observations are on the descending or ascending branch, the magnitudes being expressed in the rough scale indicated above.

J. D. hel. M. astr. T. Grw.	
d	m
2423886·242	12·8
3933·273	11·6
4261·288	11·7
·311	11·4
4586·513	11·1
·537	11·2
5383·431	12·8
·454	12·9

The star was found in full minimum at J. D. 2423790·506, 91·539, 3884·272, ·355, 85·251, 3931·222, 4259·213, ·236, ·260, ·283, ·307, ·330, ·354, ·370, ·424, ·445, 60·232, ·256, ·279, ·303, ·326, ·350, ·373, ·403, 5337·576, 85·228, ·343.

The epochs of minimum are given by the formula

Min. J. D. hel. M. astr. T. Grw.

$$2423885^{d}{\cdot}15 + 46^{d}{\cdot}853 \times E.$$

On the period of BF Ophiuchi, by *Ejnar Hertzsprung*.

The period of BF Oph. has been derived by D. BROUWER from 599 estimates on Harvard plates made by the writer and found to be $4^{d}{\cdot}06790 \pm {}^{d}{\cdot}00002$ (m. e.) (*B. A. N.* 135). In *H. B.* 875 HARLOW SHAPLEY has from 838 estimates made by Mrs. ROBINSON derived a period of $4^{d}{\cdot}0680116 \pm {}^{d}{\cdot}0000199$ (m. e.) [1]), the difference from BROUWER's value being ${}^{d}{\cdot}00011$ or about 5 times the indicated mean error, while most of the plates were the same in both cases.

SHAPLEY used 28 epochs of maximum light for the derivation of the period. Epochs of this kind are certainly very convenient for provisional orientation, but they do not make full use of the material and are therefore insufficient for a final solution.

Happily SHAPLEY gives the details of six lightcurves, each computed from estimates covering a certain interval of time.

I first combined these 6 sets to a normal lightcurve [2]) and then determined for each of the 6 lightcurves the shift, which would make the sum of the squares of the deviations from the normal curve a minimum. In this way I found:

J. D. assumed mean	shift in fraction of the period	$O-C_1$	$O-C_2$
	P	P	P
2415900	— ·021	— ·006	— ·001
18000	— ·002	+ 5	+ 6
19400	— ·008	— 5	— 7
20500	+ ·007	+ 6	+ 1
22200	+ ·017	+ 9	+ 1
24500	+ ·006	— 10	(— 23)

The period found from these 6 epochs is $4^{d}{\cdot}067954$, giving the residuals $O-C_1$, and from the first 5 epochs

[1]) The mean error of the period corresponding to the figures of Table I (l. c.) is $\pm {}^{d}{\cdot}0000125$, while Shapley gives the probable error as $\pm {}^{d}{\cdot}0000134$. This last value has been used here, though the discrepancy mentioned has not been solved.

[2]) The phase of the maximum as derived from this mean lightcurve is about ${}^{P}{\cdot}02$ later than assumed by SHAPLEY, again showing how little the maxima are suited for fixing normal epochs. The last phase of column 4 was supposed to be a misprint for ·939.