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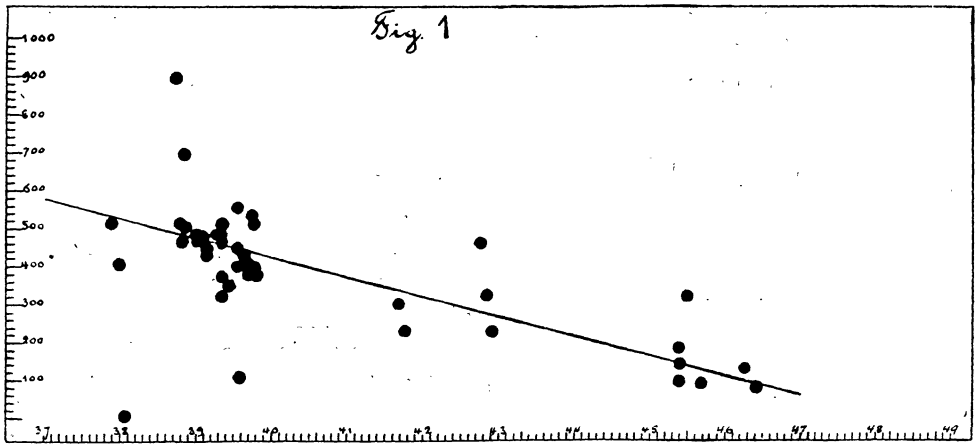
COMMUNICATIONS FROM THE OBSERVATORY AT LEIDEN.

On the variation of AA Velorum, by *W. E. Kruytbosch.*

Among the eclipsing variable stars, which HERTZSPRUNG has estimated on Franklin-Adams plates, AA Vel. = *B. A. N.* 65 *o* is the one showing the smallest range, viz. ^{s}·094. It therefore seemed desirable to re-examine this star, the more so as the number of plates available has been more than doubled since.

I used the same comparisonstars, viz. C. P. D. − 55°3898 and 3903, to which in the present note the brightnesses 0^{s} and 1^{s} respectively were assigned. In the technical performance of the estimates I followed the rules given in *B. A. N.* 77, page 212.

My estimates on 639 plates in this scale ranged from ^{s}·15 to ^{s}·75. The 45 plates on which the variable was estimated ^{s}·65 or fainter were considered as



epochs of minimum. For each of these minima the phase was computed according to the formula

·85626 (J. D. − 2420000) given in *B. A. N.* 65.

As shown on Figure 1 these phases change systematically with the J. D., thus requiring a correction of the reciprocal period ·85626 of about + ·00052. The new formula therefore is:

phase = ·85678 (J.D. hel. M. astr. T. Grw. − 2420000),

according to which the phases of my 639 observations were computed. The corresponding apparent period is 1^{d}·1672.

The 639 estimates were now arranged according to phase, and mean values were formed for groups of 40 or 39 observations each, giving 16 points of the lightcurve. The results are given in Table I, the lightcurve on Figure 2.

For a comparison of the present results with those given in *B. A. N.* 65 it should be noted, that the latter have been obtained by multiplying HERTZSPRUNG's estimates, which were made in the same way as described above, by ·345, being the difference between the two comparisonstars in HERTZSPRUNG's scale of steps.

This taken into regard it is seen, that my range of ^{s}·15 is not materially more than half that of H.: ^{s}·094/·345 = ^{s}·27.

Furthermore the width of the minimum measured as the difference in phase between the two points on

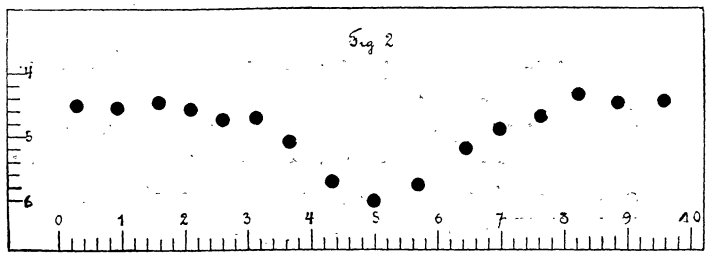
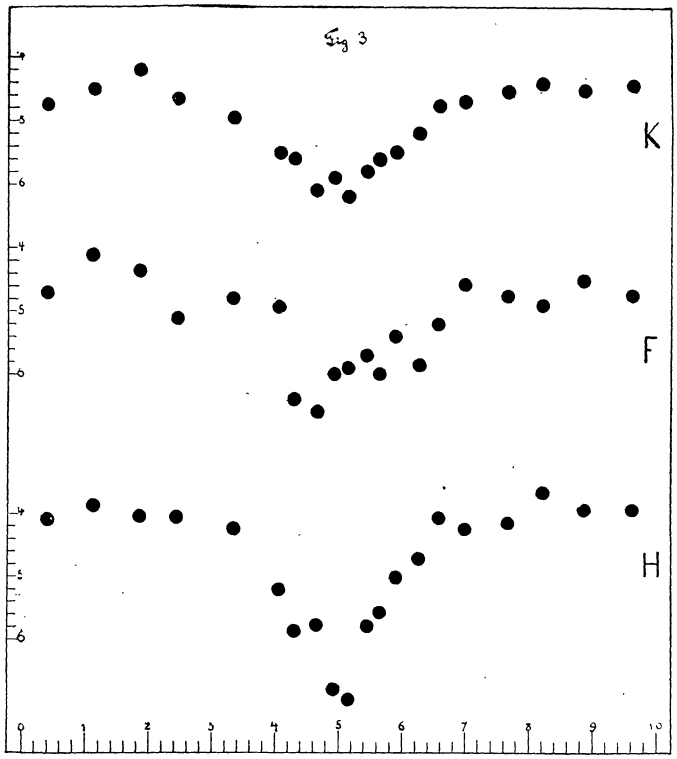


TABLE I.

Number of plates.	Phase.	Brightness in steps.
40	·0295	·451
40	·0926	·455
40	·1579	·446
40	·2109	·457
40	·2614	·474
40	·3155	·469
40	·3637	·509
40	·4334	·573
40	·4989	·603
40	·5685	·577
40	·6429	·520
40	·6985	·491
40	·7643	·471
40	·8236	·435
40	·8863	·447
39	·9580	·443

the descending and ascending branch of the lightcurve, where the brightness is midway between maximum and minimum, was found to be ^{P}·266 from my curve and ^{P}·147 from HERTZSPRUNG's. As an error in the period would tend to lessen the range and broaden



the minimum, I decided to make a new comparison considering only the 255 plates used in *B. A. N.* **65**. The variable had formerly also been estimated by FINSEN *) on these plates, there being thus 3 series of observations on the same plates available.

*) These estimates have not been published before.

For the purpose of this new comparison my own estimates on these 255 plates were rereduced with the period given in *B. A. N.* **65**. The results are presented in Table II and on Figure 3.

TABLE II.

Number of plates.	Phase.	Brightness in steps.		
		H.	F.	K.
20	·0421	·408	·468	·477
20	·1141	·387	·412	·447
20	·1867	·404	·435	·420
20	·2460	·415	·512	·465
19	·3369 *)	·424 *)	·480 *)	·495 *)
5	·4078	·522	·494	·550
5	·4316	·586	·640	·560
5	·4644	·578	·660	·610
5	·4934	·680	·600	·590
5	·5158	·696	·590	·620
5	·5426	·580	·570	·580
5	·5636	·558	·600	·560
5	·5900	·502	·540	·550
5	·6262	·472	·586	·520
11	·6585 *)	·407 *)	·521 *)	·477 *)
20	·6998	·425	·458	·470
20	·7669	·416	·474	·455
20	·8208	·366	·488	·442
20	·8877	·394	·452	·455
20	·9615	·395	·476	·445

It is seen that the shape of my curve is materially the same as before and practically identical with FINSEN's, thus proving that the difference between the curves of HERTZSPRUNG and myself is not explained by an error in the period. The conclusion is, that systematic differences exist between the estimates of different observers of this variable, the range of which is at the limit of what can be revealed by estimates of this kind.

HERTZSPRUNG's range depends on the mean of only 10 plates (representing the two lowest points of the lightcurve) and may thus be uncertain to a considerable extent.

An attempt was made to get an independent determination of the range by measuring 20 selected plates near minimum and 10 plates near maximum in the Schilt microphotometer, though the stars in question are rather overexposed for this purpose. For each of the two groups mean values of the galvanometer-readings were formed, the overexposed plates getting thus automatically less weight.

The C. P. D. magnitudes of 18 stars reduced to the international scale according to *H. A.* **80** No. 13 were

*) In *B. A. N.* 65 the phase corresponding to J.D. 2423818·5331 has been erroneously calculated to be ·357 in stead of ·657. The error is corrected here.