ASTRONOMICAL OBSERVATIONS IN 1908.

MADE BY TORVALD KÖHL, AT ODDER, DENMARK.

VARIABLE STARS.

(The instrument used is a 3-inch Steinheil, power 42.)

S *Ursæ Majoris*.[1]

Jan.	2:	S > e. S < d.
	4:	id.
	5:	< d.
	10:	1 step < d.
	13:	= d.
	14:	id.
	18:	id.
	20:	id.
	21:	id.
	28:	id.
	29:	id.
	31:	id.
Feb.	2:	1 step > d.
	6:	2 steps > d.
	8:	id.
	10:	id.
	16:	id.
	19:	in the midst between d and c.
	23:	2½ steps > d.
	29:	in the midst between d and e.
Mar.	23:	1 step > e.
	24:	= e.
	25:	1 step < e.
	26:	id.
	27:	id.
	28:	2 steps < e.
	29:	id.
	30:	3 steps < e.
Apr.	1:	4 steps < e.
	2:	3 steps > f.
	3:	id.
	6:	id.
	7:	id.
	8:	id.
	19:	1 step > f.
May	1:	= f.
	11:	= g.
	18:	< g. > h.
	20:	id.
Aug.	14:	1 step > d.
	17:	2 steps > d.
	23:	id.
	24:	id.
	27:	id.
	29:	1 step > d.
	31:	2½ steps > d.
Sept.	3:	3 steps > d.
	9:	id.
	16:	5 steps > d.
	19:	6 steps < c.
	22:	5 steps < c.
	24:	id.
	25:	id.
	30:	5 steps > d.
Oct.	3:	id.
	5:	id.
	10:	4 steps > d.
	18:	1 step < d.
	22:	2 steps > d.
Nov.	1:	= e.
	6:	id.
	8:	id.
	16:	in the midst between e and f′.
	26:	2 steps > f.
	29:	< f. > g.

[1] Vide the sketch in the *Publications A. S. P.*, No. 73, **12**, 56.

T *Ursæ Majoris.*[1]

Jan.	2:	T 5 steps > a.
	4:	4 steps > a.
	5:	id.
	10:	2 steps > a.
	13:	1 step > a.
	14:	id.
	18:	2 steps > a.
	20:	1½ step > a.
	21:	2 steps > a.
	28:	1 step < a.
	29:	id.
	31:	id.
Feb.	2:	2 steps < a.
	6:	< b. > c.
	8:	1 step < b.
	9:	id.
	10:	2 steps > c.
	16:	id.
	19:	in the midst between c and d.
	23:	1½ step > d.
	29:	in the midst between d and e.
Mar.	18:	< e.
	23:	= f.
	24:	< f. > g.
	25:	id.
	26:	1 step > g.
	27:	= g.
	28:	id.
	29:	1 step < g.
	30:	id.
Apr.	1:	very faint.
	2:	id.
	3:	id.
	6:	id.
	7:	id.
Apr.	8:	invisible.
	15:	id.
	16:	id.
	19:	id.
	20:	id.
May	11:	id.
	18:	id.
	20:	id.
Aug.	14:	< b. > c.
	17:	1 step > b.
	23:	< a. 2 steps > b.
	24:	< a. > b.
	27:	1 step > a.
	29:	2 steps > a.
	31:	1 step > a.
Sept.	3:	2 steps > a.
	9:	3 steps > a.
	16:	id.
	19:	4 steps > a.
	22:	id.
	24:	id.
	25:	id.
	30:	= a.
Oct.	3:	id.
	5:	= b.
	10:	id.
	18:	= c. (?)
	22:	< c. > d.
Nov.	1:	1 step < d.
	4:	3 steps > e.
	6:	id.
	8:	id.
	16:	id.
	26:	= g.
	29:	= f = g.

The comparison stars f and g are found to be a little variable. August 24th, I have noted: g 1 step > f. On November 29th: f = g. Usually I note: f > g, the difference being only 1 step. B. D. has f = g = $9^m.5$; Harvard has f = $10^m.75$, g = $10^m.40$.

[1] Vide the sketch in the *Publications A. S. P.*, No. 22, **4**, 63.

W *Pegasi.*[1]

Jan.	1:	W = b.
	2:	in the midst between b and c.
	4:	< b. > c.
	5:	id.
	14:	1 step > c.
	18:	= c.
	20:	id.
	21:	1 step < c.
	29:	3 steps < c.
	31:	1 step > d.
Feb.	2:	1½ step > d.
	9:	1 step > d.
	19:	= e.
	29:	in the midst between e and f.
Aug.	14:	< g. > h.
	18:	= h.
	23:	id.
Aug.	24:	id.
	27:	< g. > h.
	29:	id.
	31:	id.
Sept.	3:	id.
	4:	id.
	12:	id.
	16:	a little > h.
	20:	< g. > h.
	24:	= g.
	25:	= f.
	30:	id.
Oct.	3:	1 step< f.
	5:	id.
	18:	1 step < e.
Nov.	8:	2 steps < c.
	16:	1 step < b.
	26:	= b.
	29:	id.

SS *Cygni.*[2]

Jan.	1, 6h:	SS = g.
	2, 9h:	< g.
	4, 6h:	= h.
	5, 7h:	very faint.
	14, 6h:	invisible.
	18, 6h:	id.
	20, 6h:	id.
	21, 7h:	id.
	29, 7h:	1 step < b.
	31, 7h:	= b.
Feb.	2, 7h:	< b. 2 steps > c.
	6, 6h:	2 steps > d.
	9, 6h:	= e.
	16, 7h:	invisible.
	19, 7h:	very faint.
Apr.	20, 12h:	invisible.
	21, 10h:	id.
	26, 11h:	id.
May	1, 11h:	1 step < e.
	9, 10h:	1 step < c.
May	11, 11h:	3 steps >c. 1 step< b.
	15, 10h:	1 step > c.
	18, 11h:	1 step < c.
	20, 12h:	= d.
Aug.	14, 10h:	> e. < d.
	15, 10h:	in the midst bet. d and e.
	17, 11h:	< e.
	18, 10h:	4 steps < e.
	23, 10h:	= f.
	24, 10h:	> f. < e.
	27, 10h:	1 step > f.
	29, 10h:	> f. < e.
	31, 10h:	= e.
Sept.	3, 10h:	= e.
	4, 9h:	> f. < e.

[1] Vide the sketch in the *Publications A. S. P.*, No. 60, **10,** 23.

[2] Vide the sketch in the *Publications A. S. P.*, No. 100, **17,** 18.

Sept.	9, 9^h:	= d.
	11, 8^h:	2 steps < c.
	12, 8^h:	1½ step < c.
	16, 9^h:	2 steps > c.
	19, 9^h:	in the midst bet. b and c.
	20, 8^h:	b(3)SS(2)c
	23, 8^h:	< c.; > d.
	24, 10^h:	= d.
	25, 9^h:	2 steps < d.
	30, 12^h:	4 steps < d.
Oct.	1, 10^h:	id.
	3, 9^h:	= e.
Oct.	5, 8^h:	< d′.; > e.
	18, 9^h:	d′(3)SS(2)e
Nov.	1, 8^h:	< d′.; > e.
	4, 8^h:	= e.
	6, 9^h:	= e(?).
	8, 7^h:	d′(3)SS(2)e
	14, 7^h:	2 steps > c.
	16, 8^h:	= d.
	26, 6^h:	= e.
	29, 6^h:	1 step > f.

Z Cygni.[1]

Jan.	1:	Z 2 steps > a.
	2:	1 step > a.
	4:	< a.
	5:	< a.; > b.
	14:	1 step > a.
	18:	2 steps > a.
	20:	1 step > a.
	21:	id.
	28:	= a.
	29:	2 steps > a.
	31:	1 step > a.
Feb.	2:	= a.
	6:	= b.
	16:	2 steps > b(?).
	19:	= b.
Mar.	25:	very faint.
Apr.	1:	id.
	20:	invisible.
	21:	id.
	26:	very faint.
May	1:	faint, < e.
	9:	invisible.
	15:	id.
	18:	id.
	20:	id.
Aug.	14:	id.
	18:	id.
	23:	id.
Sept.	3:	= e.
	9:	> e.; < d.
	11:	> d.; < c.
	16:	id.
	19:	= d.
	22:	> c.; < b.
	24:	id.
	30:	= b.
Oct.	3:	= b′.
	5:	id.
	18:	< a.; > b′.
Nov.	1:	= b′.
	4:	= b.
	6:	1 step > b.
	8:	1½ step < b.
	14:	1 step < b.
	16:	< b.; > c.
	29:	= d.

Y *Tauri* (B. D. + 20° 1083).

A number of forty comparisons have been made upon this irregular variable star, which during the whole year was either

[1] Vide the sketch in the *Publications A. S. P.*, No. 100, **17**, 16.

equal to or some steps brighter than the star A = B. D. + 20° 1095 ($7^m.4$). In February, March, and April the star Y had reached its maximum ($7^m.1$), but in January and November it had decreased a few steps.

U *Herculis.*

Apr.	20:	U invisible (?).
	26:	2 steps < h.
May	1:	id.
	18:	1 step > h.
	20:	id.
Aug.	15:	= a.
	17:	$\left\{\begin{matrix} > c \\ < a \end{matrix}\right\}$ b > a.
	18:	2 steps < a.
	23:	id.
	24:	id.
	27:	id.
	29:	id.
	31:	= c.
Sept.	3:	id.
	4:	1 step > c.
	9:	½ step > c.
Sept.	11:	$\left\{\begin{matrix} < c. \\ > d. \end{matrix}\right.$
	12:	= c.
	16:	$\left\{\begin{matrix} < c. \\ > d. \end{matrix}\right.$
	19:	C(2)U(3)d.
	22:	id.
	23:	in the midst between c and d.
	24:	id.
	25:	C(3)U(2)d.
	30:	id.
Oct.	3:	$\leqq$ d.
	5:	2 steps > d.
	10:	1 step > d.
	18:	= e.
Nov.	29:	2 steps < f.

I have used the sketch in the *Publications A. S. P.*, No. 106, **18**, 52, drawn by Miss Rose O'Halloran, but have added the two small neighboring stars g at a and h at f, both northward.

A Suspected Variable Star.

138.1908 *Herculis.*

During my observations upon U *Herculis* my attention was directed to the two comparison-stars,

a = B. D. + 19° 3096 $7^m.0$.
b = B. D. + 19° 3089 $7^m.8$.

The star b is here eight steps fainter than a. On August 5, 1907, I found b > a, and so I have seen it until October, 1908. On October 5th, 10th, and 18th, I have noted: b 2-3 steps < a. But when the ocular was screwed out the reddish star a was "diminished," and then seemed to be equal to or even dimmer than b. In A. G. Berlin A 5856 is

a = $7^m.2$
b = $7^m.7$,

and in *Harvard Annals,* **37**, 170 and 183, we find

$$a = 7^{m}.36$$
$$b = 7^{m}.39.$$

Whether the variable is a or b is still difficult to decide. According to its red color, it might perhaps be the star a, though a look at the differences might point out b as the variable one. It will be necessary to compare b with a and c. (Vide *Astronomische Nachrichten,* No. 4274, **179**, 29.)

Meteors.

Fireballs have been observed from stations in Denmark at the following dates: January 3d, 21st; March 2d, 16th, 25th; April 8th, 15th; May 1st, 11th, 29th; June 25th, 26th; July 2d, 20th, 21st; August 6th, 20th; October 7th, 24th; November 8th, 21st; December 3d, 7th.

Shooting-Stars.

A little swarm of shooting-stars, during five minutes more than thirty meteors, was observed on January 2d, $8^{h}\ 10^{m}$–$8^{h}\ 20^{m}$, at Hjörring, Denmark, radiant $= 300° + 61°$; and on January 3d, $11^{h}\ 23^{m}$–$12^{h}\ 42^{m}$, seventeen large shooting-stars were mapped at Paderborn, Germany. (Vide *Astronomische Rundschau,* No. 98, and *Astronomische Nachrichten,* No. 4263, **178**, 255.) On June 25th, $10^{h}\ 30^{m}$, an observer at Odense, Denmark, mapped a most interesting twin-meteor, two shooting-stars with parallel paths, with a distance of $\frac{1}{2}°$, one on each side of the pretty star *Arcturus.*

The weather was, in the year 1908, quite unfavorable for the planned observations on shooting-stars in August, and after November 29th the sky was overcast with clouds every night here at Odder.

The above-mentioned estimations of variable stars have often been controlled by my young assistant, Jörgen Fog.