

SUN-SPOT OBSERVATIONS,

MADE AT THE HAVERFORD COLLEGE OBSERVATORY, WITH THE 8-INCH EQUATORIAL,
By F. P. LEAVENWORTH.

1890	Time	Gr	Sps.	Fac Gr	Def. and Size	1890	Time	Gr	Sps.	Fac Gr	Def. and Size	1890	Time	Gr	Sps.	Fac Gr	Def. and Size
Jan. 3	11	1	1	0	poor	Mar. 9	5	1	18	0	fair ; all sm.	May 7	12	1	3	1	fair ; small
4	11	1	1	0	poor	10	10	1	9	0	bad	8	2	1	8	1	good ; small
6	11	1	1	0	bad	12	11	1	3	2	fair	9	10	1	22	2	fine ; small
8	11	1	3	1	poor	13	2	1	3	2	fair	12	9	2	11	1	fair
9	10	1	2	0	bad	15	3	0	0	2	fair	13	12	1	10	1	fair
11	3	0	0	2	fair	16	10	0	0	3	fair	14	9	1	14	2	good ; small
12	3	2	3	4	fine ; small	17	10	0	0	1	fair	15	4	0	0	0	fair
13	3	0	0	2	fair	18	10	0	0	3	good	17	10	3	9	3	fair ; large
14	11	0	0	0	poor	20	12	0	0	1	fair	18	10	2	9	3	poor
16	2	1	6	2	fair	21	3	0	0	1	fair	19	10	3	6	2	fair
17	10	1	8	3	good ; small	23	9	0	0	0	poor	20	4	3	4	1	fair
18	12	1	14	1	fine ; small	24	10	0	0	0	poor	21	9	2	3	1	poor
19	11	1	24	0	fine ; 2 large	26	9	0	0	2	fair	22	3	1	2	2	poor ; small
21	1	1	6	1	good	27	11	0	0	0	bad	23	4	1	3	1	fair
22	11	1	2	1	poor	28	12	0	0	2	good	24	4	0	0	2	fair
24	9	0	0	4	poor	29	10	0	0	0	poor	27	4	1	3	3	bad ; small
25	2	0	0	0	bad	30	2	0	0	0	good	28	9	0	0	1	fair
27	9	0	0	3	poor	Apr. 1	10	0	0	1	good	29	10	0	0	0	fair
28	10	0	0	3	poor	2	10	0	0	0	fair	31	10	0	0	1	poor
29	10	0	0	0	poor	3	10	0	0	0	poor	June 1	1	0	0	1	good
30	11	1	4	1	good	4	3	0	0	0	fair	2	10	0	0	1	good
Feb. 4	12	0	0	0	good	5	9	0	0	2	good	3	10	2	5	2	good ; small
5	9	0	0	0	poor	6	10	0	0	1	fair	4	10	1	1	1	good
6	12	0	0	0	fair	7	10	0	0	1	fair	5	10	1	7	1	fair
7	10	0	0	0	bad	10	9	0	0	2	good	6	10	1	11	0	poor ; small
9	9	0	0	4	fair	11	12	2	10	3	fine ; small	7	10	1	15	1	good ; 1 lar.
10	4	0	0	0	bad	12	10	2	18	3	fine ; 1 large	8	10	1	4	1	bad ; 1 large
11	2	0	0	0	fair	13	10	2	11	3	fine ; small	9	9	1	6	1	poor ; small
12	11	0	0	6	good	14	10	0	0	1	good	10	9	2	3	1	good
13	10	0	0	6	good	15	11	0	0	0	bad	11	9	1	3	0	fair
14	4	0	0	3	fair	16	9	1	3	0	fair ; small	12	12	0	0	1	fair
15	10	0	0	7	fair	17	12	0	0	2	fair	13	10	0	0	1	fair
16	12	0	0	1	bad	18	5	0	0	0	fair	14	9	1	4	3	good ; small
17	10	0	0	3	fair	19	11	0	0	0	poor	18	10	0	0	1	good
18	10	0	0	0	bad	20	12	0	0	0	fair	19	10	0	0	0	fair
20	4	0	0	0	poor	21	10	0	0	0	fair	20	10	0	0	0	good
21	10	0	0	3	fair	22	10	0	0	0	poor	22	12	0	0	0	poor
22	11	0	0	0	poor	23	10	0	0	0	good	23	9	1	1	1	good ; small
26	10	0	0	3	fair	28	9	1	3	1	good ; small	24	5	0	0	1	good
Mar. 3	11	0	0	1	poor	29	10	1	19	1	fine ; small	25	10	0	0	1	good
4	11	1	5	0	good	30	11	2	11	0	fair ; small	26	10	0	0	1	fair
5	12	1	5	0	fair ; large	May 1	12	1	2	2	good	27	10	0	0	1	poor
6	4	1	5	0	fair ; large	2	11	0	0	0	poor	28	11	0	0	0	fair
7	12	1	5	0	poor ; large	3	10	0	0	2	fair	29	10	0	0	2	good
8	10	1	10	0	poor ; 3 large	5	10	0	0	1	fair	30	10	0	0	0	fair

EPHEMERIS OF COMET *a* 1890, (BROOKS, March 19),

By W. W. CAMPBELL.

From an observation made by Mr. BARNARD, on July 2, the correction to my ephemeris of Comet *a* 1890 (*Astr. Jour.* no. 218), was found to be : $\cos \delta \cdot \Delta \alpha = 4^s.5$, $\Delta \delta = +38''$.

The following continuation of the ephemeris will therefore approximately represent the path of the comet.

EPHEMERIS FOR GREENWICH MEAN MIDNIGHT.						1890	App. α	App. δ	log r	log Δ	Br.
1890	App. α	App. δ	log r	log Δ	Br.	Aug. 30	12 ^h 59 ^m 56 ^s	+35 ^o 41.9	0.3435	0.4541	0.85
July 17	13 ^h 34 ^m 24 ^s	+52 ^o 48.0	0.2992	0.3162	1.96	Sept. 1	59 56	35 10.6			
19	29 57	51 45.3				3	12 59 59	34 40.3	0.3483	0.4626	0.80
21	26 0	50 44.3	0.3024	0.3316	1.80	5	13 0 5	34 11.1			
23	22 30	49 44.7				7	0 13	33 42.8	0.3532	0.4705	0.75
25	19 23	48 46.7	0.3058	0.3465	1.65	9	0 25	33 15.7			
27	16 37	47 50.8				11	0 38	32 49.4	0.3581	0.4776	0.71
29	14 11	46 55.5	0.3093	0.3610	1.52	13	0 54	32 24.0			
31	12 1	46 2.4				15	1 12	31 59.4	0.3631	0.4841	0.67
Aug. 2	10 7	45 10.9	0.3131	0.3750	1.40	17	1 31	31 35.9			
4	7 56	44 20.9				19	1 52	31 13.1	0.3681	0.4899	0.64
6	6 57	43 32.6	0.3170	0.3883	1.29	21	2 14	30 51.3			
8	5 40	42 45.9				23	2 38	30 30.2	0.3732	0.4950	0.61
10	4 33	42 0.6	0.3211	0.4010	1.20	25	3 2	30 10.0			
12	3 36	41 16.7				27	3 27	29 50.6	0.3783	0.4996	0.58
14	2 46	40 34.3	0.3254	0.4130	1.11	29	3 53	29 32.0			
16	2 4	39 53.3				Oct. 1	4 19	29 14.1	0.3835	0.5034	0.56
18	1 30	39 13.7	0.3297	0.4243	1.03	3	4 46	28 57.1			
20	13 1 1	38 35.3				5	5 13	28 40.8	0.3887	0.5067	0.54
22	0 39	37 58.2	0.3342	0.4350	0.96	7	5 40	28 25.2			
24	0 21	37 22.4				9	6 7	28 10.4	0.3938	0.5093	0.52
26	0 9	36 47.7	0.3388	0.4449	0.90	11	6 34	27 56.3			
28	13 0 1	+36 13.8				13	13 7 0	+27 43.0	0.3990	0.5113	0.50

Lick Observatory, Mt. Hamilton, 1890 July 2.

SOLAR OBSERVATIONS AT SHATTUCK OBSERVATORY, JANUARY TO JULY 1890,

BY EDWIN B. FROST.

I. OBSERVATIONS OF SPOTS.

1890	E.S.C.T.	No. Gps.	No. of Spots	No. new Groups	No. new Spots	No. Gps Faculae	Sky	1890	E.S.C.T.	No. Gps.	No. of Spots	No. new Groups	No. new Spots	No. Gps Faculae	Sky
Jan. 2	10 20 ^{h m}	1	1	0	0	0	K	Feb. 10	12 15 ^{h m}	0	0	0	0	2	CH
3	9 0	1	1	0	0	0	K	11	13 55	0	0	0	0	3	CK
7	14 0	0	0	0	0	0	K	12	14 20	0	0	0	0	0	C
9	12 45	1	2	1	2	0	C	13	16 0	0	0	0	0	—	H
12	15 0	0	0	0	0	0	C	15	10 30	0	0	0	0	2	C
14	14 0	0	0	0	0	0	C	16	12 0	0	0	0	0	2	C
17	12 20	1	2	1	2	1	C	19	12 15	0	0	0	0	2	C
18	12 15	1	5	0	4	—	HC	20	15 0	0	0	0	0	0	CK
21	13 35	1	4	0	0	1	C	21	13 30	0	0	0	0	1	C
22	13 30	1	1	0	0	1	C	22	14 15	0	0	0	0	0	C
24	12 30	0	0	0	0	0	C	23	12 15	0	0	0	0	0	C
25	14 0	0	0	0	0	—	KK	26	13 30	0	0	0	0	0	C
26	12 30	0	0	0	0	3	CK								
27	15 30	0	0	0	0	1	C	Mar. 3	13 45	0	0	0	0	1	C
28	12 15	0	0	0	0	2	C	4	13 30	1	3	1	3	1	C
29	14 0	0	0	0	0	0	C	5	14 15	1	3	0	0	1	C
Feb. 3	14 0	0	0	0	0	3	K	7	14 0	1	4	0	1	—	C
5	14 0	0	0	0	0	2	C	8	13 40	1	5	0	1	0	CK
6	11 10	0	0	0	0	1	C	9	12 20	1	3	0	0	0	CC
7	11 15	0	0	0	0	2	K	10	12 0	1	4	0	1	0	C
9	11 45	0	0	0	0	1	C	12	17 0	1	3	0	0	1	K