Note on the Relative Number of Spiral and Elliptical Nebulae. — There has been a tendency in recent studies of nebulae to consider the truly spiral form as a rare type. The various ways of selecting and interpreting the available observations naturally govern opinions in this matter. The data given in the preceding note, however, tend to reinstate the spiral as a predominant form. It is shown that for the Coma-Virgo cloud (which appears to be one of the few groups of nebulae populous enough, and at the same time readily available, for such investigation) there are, to a given limit of magnitude, more spiral than non-spiral nebulae — thirty to twenty-seven, or twenty-four to twenty-one.

Many genuine elliptical (non-spiral) nebulae of course appear in this group but it is very probable that an increase of telescopic resolving power would increase still more the relative number showing spiral arms.

The observed frequency of the spiral character may be, as Curtis has insisted, mainly a matter of resolution; but some faint nebular groups, examined by Wolf and by Hubble, seem to show for practically all members the symmetries and texture of truly elliptical nebulae. Probably nebular clouds do not follow a single model. The Coma-Virgo group may be peculiar in its heterogeneity; and also possibly, though not very probably, in the relative dimensions of its principal types.

<div align="right">Harlow Shapley</div>

The Long Period Variable S Sculptoris. — The variable star S Sculptoris, *001032*, which has a period coinciding almost exactly with a year, was discovered at Harvard in 1894, and is one of the original southern variables observed visually at Arequipa and elsewhere since 1894. Although the early observations, as yet unpublished, were at times rather infrequent, fairly reliable dates of maxima and minima may be derived from them with the aid of mean light curves determined from the later and more continuous observations. A few photometric observations, made by E. C. Pickering in 1894–1897, aid materially in confirming the dates derived from the visual estimates (H. A., **46**, 231, 1904). Photographic observations were also obtained between the years 1889 and 1905 in sufficient numbers to warrant a study of the light curve from the photographic, as well as the visual, standpoint (H. A., **47**, 122, 1912).

Miss Cannon has derived dates of maxima and minima from the photographic observations (H. A., **55**, 111, 1909), but these have been supplanted by the dates

here derived by the more recently adopted method, which yields considerably more data. The following tables give, in the usual form, the material pertaining to maxima and minima, derived from the photographic and visual observations.

Müller has adopted the formula:

$$\text{Max.} = \text{J. D. } 2413150 + 366^d\,E + \sin\,(5°.\,0E + 330°),\ M\text{-}m = 162d,$$

as best satisfying the published observations made prior to 1909 (G. u. L., **1**, 7, 1918). This formula has been used in deriving the O–C, I values contained in Columns 5 and 11, respectively, while the O–C, II values (Columns 6 and 12) have been derived from the formula:

$$\text{Max.} = \text{J. D. } 2393544 + 366^d\,7E,\ M\text{-}m = 169d.$$

PHOTOGRAPHIC MAXIMA AND MINIMA OF S SCULPTORIS

| Maximum | | | | | | | Minimum | | | | | |
Mag.	J.D.	Wt.	N	O–C, I	O–C, II	m–M	Mag.	J.D.	Wt.	O–C, I	O–C, II	м–m
..	...	..	42	..	..	..	..	11139	1	16	4	..
7.0	11319	3	43	1	7	..	..	...	..	..	..	180
..	11690	1	44	7	11	189	..	11879	2	7	3	..
..	12059	2	45	11	13	..	..	...	..	..	..	180
..	x ...	..	46	..	..	..	..	12599	2	17	11	..
6.9	12771	3	47	6	8	188	..	12959	2	21	18	172
7.0	13138	3	48	3	8·	202	12.8	13340	3	6	3	179
7.3	13518	4	49	9	6	181	12.5	13699	3	15	10	178
6.5	13876	5	50	0	3	212	..	14088	3	7	11	177
6.6	14258	3	51	15	12	185	..	14443	2	5	0	170
6.9	14624	3	52	13	12	186	..	14810	2	6	0	181
6.9	14992	4	53	14	13	172	..	15164	2	19	13	182
..	15350	2	54	4	4	188	..	15538	2	13	6	186
6.7	15719	3	55	5	7	191	..	15910	2	8	0	181
6.6	16086	4	56	5	7	174	..	16280	2	6	3	176
6.6	16458	4	57	9	12	188	..	16646	2	8	2	178
6.6	16814	4	58	2	1	196	..	17010	2	11	0	168
..	17186	3	59	2	7	..	..	...	·	..	..	176

VISUAL MAXIMA AND MINIMA OF S SCULPTORIS

| Maximum | | | | | | | Minimum | | | | | |
Mag.	J.D.	Wt.	N	O–C, I	O–C, II	M–m	Mag.	J.D.	Wt.	O–C, I	O–C, II	m–M
..	13147	2	48	6	1	213	..	13354	2	8	11	..
6.6	13518	3	49	9	6	197	..	13719	2	5	9	164
6.4	13880	4	50	4	1	214	..	14100	2	20	23	159
..	14250	4	51	7	4	..	..	...	·	..	..	155
..	...	·	52	..	..	..	..	14827	2	11	17	..
6.3	15007	3	53	29	28	182	..	15189	2	4	12	180

Mag.	Maximum J.D.	Wt.	N	O–C, I	O–C, II	m–M	Mag.	Minimum J.D.	Wt.	O–C, I	O–C, II	M–m
7.0	15361	3	54	15	15	190	..	15551	2	0	7	172
..	15710	2	55	4	2	214	..	15924	2	6	14	159
6.9	16092	3	56	11	13	198	..	16290	2	4	13	168
6.4	16456	4	57	7	10	195	..	16651	3	3	7	166
6.3	16824	4	58	8	11	195	12.9	17019	3	2	9	173
..	17174	2	59	10	5	201	13.0	17375	3	13	2	155
6.4	17556	3	60	5	10	202	..	17758	3	2	16	181
6.7	17924	5	61	6	11	197	13.0	18121	3	2	11	166
6.3	18300	5	62	14	21	201	12.5	18501	5	11	24	179
6.2	18662	4	63	9	16	209	13.0	18871	3	13	27	161
..	19038	3	64	18	26	...	..	...	..	..	..	167
..	...	..	..	..	..	..	..	19980	2	32	36	..
..	20139	2	67	19	26	227	..	20367	2	43	56	159
..	20527	2	68	40	47	189	..	20716	3	25	39	160
6.2	20877	3	69	24	31	203	..	21080	2	22	36	161
..	21251	2	70	31	38	198	13.4	21449	3	25	28	171
7.5	21618	5	71	32	38	185	13.0	21803	5	13	26	169
6.9	21968	5	72	16	22	194	12.6	22162	5	6	18	165
7.1	22320	5	73	2	7	194	12.2	22514	5	8	3	158
6.7	22681	3	74	3	1	195	12.4	22876	5	13	2	167
6.3	23037	5	75	12	9	203	..	23240	3	13	4	161
6.9	23399	5	76	16	14	178	12.9	23577	4	41	34	159
7.0	23761	5	77	19	19	177	12.3	23938	4	46	40	184
6.9	24112	5	78	34	35	194	..	24306	3	44	38	174
6.8	24477	5	79	34	36	194	..	24671	2	43	40	171

Figure 1 represents, in graphical form, the accordance of observed and computed times of maxima and minima, the top curve being that derived from the straight linear term of 366 days; the middle curve (O–C, I), that obtained from Müller's adopted value ; and the lowest curve (O–C, II), that derived from the newly adopted formula. In each of these curves the published material, omitting the Harvard dates, is indicated by crosses; the Harvard photographic data, by circles; and the Harvard visual data, by dots. A list of maxima and minima — not represented in these curves — derived by Miss Cannon from the manuscript kindly supplied by Roberts, satisfactorily confirms the dates here deduced from the Harvard visual observations. The Harvard dates of maxima and minima occur, on the average, nine days later than those derived from Roberts' observations, while the minima occur two days earlier. This is doubtless due, in great measure, to the different methods employed. It will be seen that the adoption of the sine term does not materially improve the form of the first O–C curve, especially after the year 1915, when the period underwent a marked change. Little

weight can be attached to the maximum derived for the year 1846, and a period of 366.7 days satisfies the observed data very well up to 1906. From then to the year 1915 a period of 371 days is indicated, and from 1915 to 1925, a period of 361 days seems best to fit the results.
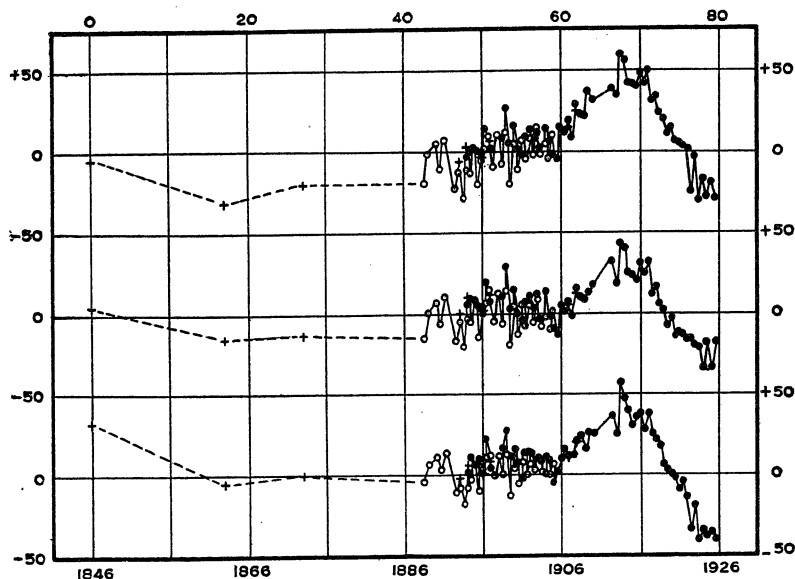

FIGURE 1. — S SCULPTORIS, *001032*

Top curve, O–C, Max. = J.D. 2413150 + 366^d E, M–m = 162^d.
Middle curve, O–C, I, Max. = J.D. 2413150 + 366^d E + sin (5°.0 + 330°),
M–m = 162^d.
Lowest curve, O–C, II, Max. = J.D. 2395544 + 366.^{d}7E, M–m = 169^d.

The mean light curves, as derived from the photographic and visual observations, respectively, are given in the customary form in the next table, and represented graphically in Figure 2, the photographic curve being placed above, and the visual one, below. In this instance, as in the case of T Columbae(cf. H. B. 837, 1926) there appears to be a slight shift of the times of minima for the two curves, but in the reverse order. The photographic curve agrees well with the Harvard Type III, while the visual curve is best satisfied by Type IV. This may be due to the paucity of photographic observations, especially near minimum, when the star was usually in conjunction with the Sun. Both curves show a slight "still-stand" on the increase to maximum, more marked in the photographic than in the visual curve.

This is another variable for which Miss L. B. Allen has determined radial velocity, with a value of +35 km/sec from the absorption lines, and +14 km/sec from the emission lines, (L. O. B., **12**, 72, 1925) the difference agreeing well with Merrill's curve value (Mt. W. Contr. 264, 1923).
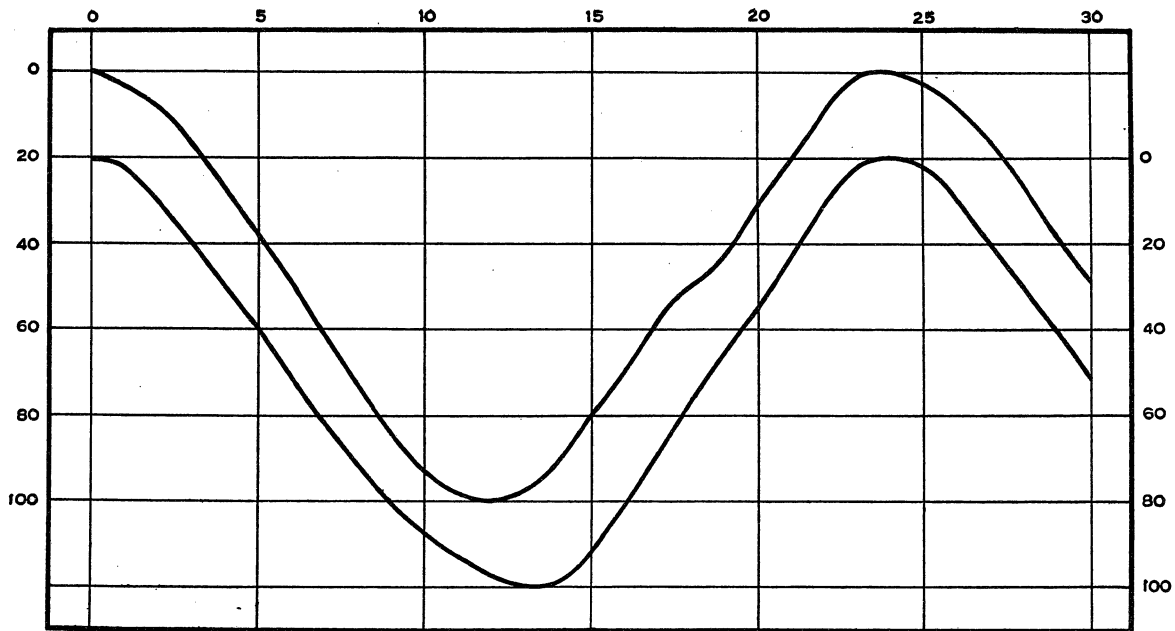
FIGURE 2. — MEAN LIGHT CURVE OF S SCULPTORIS, *001032*
Upper curve, Photographic, 1889–1909.   Lower curve, Visual, 1894–1926.

MEAN LIGHT CURVES OF S SCULPTORIS

| 24th Part | Phase d | Photographic | | Visual | |
		Mag.	Percent. Range	Mag.	Percent. Range
0	0	6.90	0	6.88	0
1	15	7.04	3	7.02	2
2	30	7.32	8	7.46	10
3	46	7.80	16	8.02	20
4	61	8.38	27	8.60	30
5	76	9.03	38	9.20	40
6	92	9.66	49	9.88	52
7	107	10.38	62	10.54	63
8	122	11.00	73	11.02	71
9	137	11.60	84	11.57	81
10	152	12.18	94	11.98	88
11	168	12.40	98	12.28	93
12	183	12.49	100	12.53	97
13	198	12.40	98	12.69	100
14	214	11.97	91	12.58	98
15	229	11.38	80	12.22	92
16	244	10.80	70	11.60	81
17	259	10.12	58	10.88	69
18	274	9.69	50	10.12	56
19	290	9.32	43	9.48	45
20	305	8.66	30	8.90	35
21	320	8.04	20	8.20	23
22	336	7.37	9	7.52	11
23	351	6.97	1	7.00	2

Leon Campbell