stability of the rotation axis of an instrument, and also to call attention to the fact that the axial collimator furnishes an effective means of detecting and measuring change of position of the axis of an instrument arising from any cause. The importance of the axial collimator appears when we consider the danger of large errors in azimuth due to ellipticity of pivots, the existence of which may escape detection

by the ordinary spirit-level or by caliper measures however accurate.

Let us suppose a case of one elliptical pivot in an instrument the length of whose axis is 36 inches and where, in the elliptical section of the pivot, $a - b = 0.0001$ inches. Then $\sqrt{2}(a - b) = 0.00014$ inches and the range of error in azimuth will be $0^{\circ}53$.

U. S. Naval Observatory, Washington D. C., 1901 Jan. 10.

Milton Updegraff.

Hisgen's Variable 13.1900 Cygni.

By Edward C. Pickering.

At the request of Father Hisgen, an examination has been made of the Harvard photographs for the variable star, 13.1900, discovered by him and announced in the A. N. 3669. 181 plates were found covering the region, and showing stars at least as faint as the tenth magnitude.

The dates and corresponding magnitudes of the variable are given in the following table. The letter s denotes that the magnitude was derived from spectra, and not from chart images of the stars.

Date	Mag.	Date	Mag.	Date	Mag.	Date	Mag.
1887 Nov. 30	<12.5	1892 Jan. 1	11.09	1894 Aug. 17	<12.2	1896 Aug. 19	11.72
» Dec. 1	<12.5	» » 9	<11.6	» » 18	<10.8 s	» » 19	<11.1 s
1890 Mar. 30	<10.2 s	» July 1	10.11	» » 21	<11.6	» » 30	10.58 s
» April 7	11.62	» Aug. 3	<10.4	» » 22	<10.9	» Sept. 4	10.37
» » 11	11.43	» » 6	10.84	» Sept. 21	<12.5	» » 11	10.37
» » 20	12.22	» » 16	<11.6	» » 27	<10.8	» » 11	10.53
» June 2	<11.3	» » 23	<10.5	» Oct. 11	<12.6	» » 17	10.37
» » 2	<10.7	» » 24	11.43	» Nov. 12	<11.6	» » 20	10.37
» » 8	<10.2 s	» Sept. 1	<11.7	» » 22	12.22	» Oct. 10	10.53
» » 25	<11.7	» » 3	12.16	» Dec. 22	<10.6 s	» » 19	10.63
» » 27	<12.5	» » 26	<11.4	1895 Febr. 22	<12.5	» » 28	10.63
» July 11	<10.8 s	» » 27	<11.1	» April 5	<11.1	» » 28	11.09
» » 20	<11.9	» » 29	<11.3	» May 2	<12.6	» Nov. 17	11.67
» Aug. 16	11.09	» Oct. 6	<12.6	» June 18	<11.3	» Dec. 11	<12.6
» » 30	10.63	» Nov. 8	<12.6	» July 10	10.32	1897 Jan. 12	<12.1
» Sept. 1	10.53	» Dec. 28	<12.5	» Aug. 2	11.09	» Febr. 18	<11.9
» » 1	10.58	1893 Jan. 2	<12.0	» » 30	11.67	» April 15	10.32
» » 2	10.37	» July 10	<11.7	» » 30	11.62	» » 18	10.16
» » 20	<11.0 s	» » 19	<11.9	» Sept. 2	11.72	» » 19	10.32
» Oct. 11	10.63	» » 20	<12.5	» » 2	<11.91	» May 19	10.27
» » 25	11.09	» » 21	<12.1	» » 4	11.72	» » 23	<10.5
» Nov. 19	<11.0 s	» » 27	<12.1	» » 12	12.22	» June 14	11.43
» » 20	<10.5 s	» Aug. 2	<11.6	» » 13	12.13	» July 9	<12.5
» Dec. 2	<10.4 s	» » 10	<12.1	» Oct. 1	<12.6	» Aug. 5	<12.5
1891 June 12	<10.8 s	» Sept. 9	11.09	» » 22	<10.5 s	» » 17	<12.6
» » 23	<11.9	» » 13	11.04	» » 25	<11.0	» Sept. 8	<12.5
» July 10	<10.8 s	» Oct. 24	11.09	» Nov. 5	<12.1	» » 17	<12.5
» » 21	<11.6	» » 24	11.09	1896 Jan. 27	11.33	» » 19	<12.1
» Aug. 10	<11.6	» Nov. 6	<11.0	» Febr. 24	10.89	» Oct. 8	<12.5
» » 19	<12.5	1894 April 29	10.28	» Mar. 24	11.04	» Nov. 4	<12.5
» Sept. 4	<11.3	» June 13	11.43	» April 22	<12.1	» Dec. 6	11.43
» » 10	<10.8	» » 18	11.38	» May 19	<11.9	1898 Jan. 1	11.57
» » 25	<12.1	» » 18	11.62	» » 27	<12.5	» » 1	11.67
» Oct. 5	<10.6	» July 1	<10.8 s	» July 12	<11.8	» » 13	11.72
» Nov. 4	<12.2	» » 5	<11.7 s	» » 18	<12.5	» Mar. 6	<11.9
» Dec. 2	<11.0	» Aug. 6	<10.2 s	» » 28	<12.5	» April 21	<12.6
» » 12	10.84	» » 10	<12.6 s	» Aug. 4	<10.0 s	» May 14	<12.5

Date	Mag.	Date	Mag.	Date	Mag.	Date	Mag.
1898 July 5	10.53	1899 June 3	<11.6	1899 Sept. 12	10.63	1900 Oct. 19	11.72
» Sept. 27	<12.5	» » 17	<11.3	1900 Mar. 10	<12.5	» » 25	<11.6s
» Oct. 3	<12.2	» » 17	<10.8	» April 3	11.43	» Nov. 2	10.97
» » 6	<12.5	» » 19	<12.5	» » 14	10.84	» » 10	10.53
» » 20	<10.4s	» » 26	<11.0	» » 15	10.89	» » 14	10.37
» » 25	<12.5	» July 10	<12.6	» » 15	10.94	» Dec. 12	10.37
1899 April 23	12.22	» » 14	<10.6	» May 10	10.70		
» May 3	<12.5	» » 15	<10.8s	» Sept. 14	<11.0s		
» » 26	<12.1	» Aug. 30	11.33s	» » 26	<11.3		

These observations were plotted using magnitudes and Julian Days as coordinates. By inspection, the times of thirteen of these maxima were estimated in Julian Days. It appeared that these times of maxima could be closely represented by the formula $J. D. 2411419 + 218 E$. The observed and computed Julian Days, and the former minus the latter, are given below.

Obs.	Comp.	O—C	Obs.	Comp.	O—C
2411440	2411419	+21	2413820	2413817	+3
1630	1637	—7	4050	4035	+15
2280	2291	—11	4220	4253	—33
2740	2727	+13	4480	4471	+9
2920	2945	—25	4900	4907	—7
3380	3381	—1	5130	5125	+5
3610	3599	+11			

The average of the differences shown in the last column is $\pm 12^d$. A second approximation using a mean light curve would doubtless greatly diminish these differences. It, therefore, appears that the star varies with moderate regularity in a period of 218 days. It has a magnitude of about 10.2 at maximum and 13 or fainter at minimum.

Harvard College Observatory, Cambridge, U. S. A., 1901 Jan. 26.

Edward C. Pickering.

A Photographic Search for Periodic Comets.

By Edward C. Pickering.

At the suggestion of Professor Kreutz, a search has been made, at Arequipa, for Barnard's comet (1884 II), by means of photographs made with the 8 inch Bache and the 24 inch Bruce photographic telescopes. The region covered by a single Bache plate is about 100 square degrees, and by the Bruce plate, about 40 square degrees. Charts of the regions covered by the ephemerides were just made with the Bache. An examination of these plates gave negative results, and the search was continued with the Bruce, using, in many cases, an apparatus for guiding, which allowed for the computed motion of the comet. By this arrangement, which is carried out by a systematic movement of the plate, by means of a micrometer, in a direction opposite to that of the comet, the stars appear on the photographs as trails, and the comet, if obtained, should show no movement during the exposure. The following Bruce plates were obtained. The successive columns give the date, the plate number, the right ascension and declination of the centre of the plate, and the duration of the exposure.

1900	Plate	RA.	Decl.	Exp.
Nov. 9	A 4854	18 ^h 34 ^m	—26°5	60 ^m
9	4855	18 34	—26.5	25
10	4863	18 52	—26.5	95

1900	Plate	RA.	Decl.	Exp.
Nov. 12	A 4869	18 ^h 46 ^m	—26°0	105 ^m
13	4872	18 36	—26.0	60
13	4873	19 31	—24.3	71
17	4878	18 44	—26.0	52
17	4879	18 44	—26.0	18
19	4882	19 43	—24.8	70
19	4883	19 43	—24.8	60

The above plates were carefully examined and no trace of the comet was found. E. Swift's comet (1894 IV) was also looked for on several of these plates, since at the time they were made, its computed position was near that of Barnard's comet. For E. Swift's comet three photographs had also been made in October as follows:

1900	Plate	RA.	Decl.	Exp.
Oct. 23	A 4821	17 ^h 47 ^m	—26°5	20 ^m
23	4822	17 47	—26.5	90
24	4828	17 49	—26.5	135

Swift's comet was not found on any of the above plates.

A search for Brorsen's comet has also been made, using precisely the same methods as in the case of Barnard's comet. The following plates were made with the Bruce telescope, an examination of which, however, failed to show any trace of the comet.