

OBSERVATIONS OF COMET 1940c (CUNNINGHAM)  
WITH THE 26-INCH EQUATORIAL OF THE U. S. NAVAL OBSERVATORY

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(Communicated by the Superintendent, U. S. Naval Observatory)

U. T.	$\alpha$	$\delta$	$\Delta\alpha$	$\Delta\delta$	Comparisons	Log pp $\alpha$ $\delta$	Seeing	Star	Obsr.
	1940.0		1940.0						
Sept. 27.13606	20 <sup>h</sup> 13 <sup>m</sup> 10 <sup>s</sup> .65	+52° 20' 59".6	-1 <sup>m</sup> 0 <sup>s</sup> .87	+1' 59".6	30, 6	9.626 0.050n	f	1	Ly
Sept. 28.11604	20 10 42.59	+52 8 13.4	+2 52.05	+2 25.2	25, 5	9.554 0.137n	f	2	Ly
Oct. 4.11346	19 56 40.04	+50 39 19.0	+3 22.20	-0 18.4	23, 5	9.640 9.867n	f	3	Ly
Oct. 4.11346	19 56 40.11	+50 39 16.8	+1 33.43	-5 8.4	25, 5	9.640 9.867n	f	4	Ly
Oct. 5.08690	19 54 35.10	+50 23 14.4	-0 25.57	+1 15.5	8, 8	9.543 0.044n	p	5	Ry
Oct. 10.13448	19 44 36.73	+48 53 54.9	+2 38.87	+6 44.6	25, 5	9.749 9.748	p	6	Bn
Oct. 10.13448	19 44 36.65	+48 53 52.4	-1 30.56	+5 4.3	25, 5	9.749 9.748	p	7	Bn
Oct. 10.19122	19 44 30.56	+48 52 45.7	-3 10.32	-0 29.0	25, 5	9.826 0.345	vp	8	Bn
Oct. 11.08656	19 42 53.92	+48 35 56.9	+0 58.33	-2 2.3	28, 6	9.628 9.627n	f	9	Ly
Oct. 13.16138	19 39 21.73	+47 55 53.7	+1 40.07	+3 11.8	25, 5	9.800 0.244	p	10	Bn
Oct. 15.09772	19 36 17.07	+47 17 28.4	+2 28.60	-0 38.6	25, 5	9.696 9.513	p	11	Ly
Oct. 15.09772	19 36 17.13	+47 17 28.3	-1 27.24	-0 59.9	25, 5	9.696 9.513	p	12	Ly
Oct. 19.10325	19 30 37.71	+45 54 58.0	+3 37.67	-0 11.1	25, 5	9.730 9.995	f	13	Ly
Oct. 19.10325	19 30 37.64	+45 54 56.4	-0 42.76	+0 26.1	25, 5	9.730 9.995	f	14	Ly
Oct. 23.08739	19 25 55.43	+44 29 40.1	+1 53.31	-0 3.1	25, 5	9.716 0.047	f	15	Ly
Oct. 23.08739	19 25 55.34	+44 29 40.1	-0 47.16	-3 12.2	25, 5	9.716 0.047	f	16	Ly
Oct. 23.08739	19 25 55.25	+44 29 41.5	-2 10.20	-4 8.8	25, 5	9.716 0.047	f	17	Ly
Oct. 24.03578	19 24 56.22	+44 9 0.4	+0 20.01	-3 43.6	8, 8	9.582 9.090	p	18	Ry
Oct. 25.15738	19 23 49.48	+43 44 25.0	+2 4.99	-1 57.7	25, 5	9.797 0.520	f	19	Ly
Oct. 25.15738	19 23 49.29	+43 44 25.2	-5 14.42	+1 23.4	25, 5	9.797 0.520	f	20	Ly
Oct. 27.11448	19 22 3.53	+43 1 11.0	-2 13.66	+0 49.9	30, 6	9.766 0.369	f	21	Bn
Oct. 27.11448	19 22 3.49	+43 1 11.0	-3 15.19	+1 16.3	30, 6	9.766 0.369	f	22	Bn
Nov. 1.06359	19 18 28.14	+41 10 29.0	+3 17.31	+1 7.7	30, 6	9.704 0.215	p	23	Ly
Nov. 1.06359	19 18 28.13	+41 10 29.1	+0 52.63	+0 56.0	30, 6	9.704 0.215	p	24	Ly
Nov. 4.08895	19 16 52.31	+40 2 11.8	+3 35.65	+1 45.4	25, 5	9.746 0.419	p	25	Ly
Nov. 4.08895	19 16 52.37	+40 2 12.0	-0 47.76	+1 4.8	25, 5	9.746 0.419	p	26	Ly
Nov. 9.08478	19 15 8.61	+38 9 8.1	+2 24.41	-4 34.0	25, 5	9.744 0.487	p	27	Ly
Nov. 9.08478	19 15 8.63	+38 9 7.8	-0 46.60	-0 51.7	25, 5	9.744 0.487	p	28	Ly
Nov. 19.04533	19 14 39.44	+34 23 16.4	+3 33.12	+0 36.6	25, 5	9.712 0.494	p	29	Bn
Nov. 19.04533	19 14 39.38	+34 23 16.7	+2 22.63	-4 12.7	23, 5	9.712 0.494	p	30	Bn
Nov. 20.05102	19 14 48.13	+34 0 23.5	+3 5.11	-1 1.9	25, 5	9.718 0.524	f	31	Ly
Nov. 20.05102	19 14 48.15	+34 0 25.1	-1 10.68	-1 9.8	25, 5	9.718 0.524	f	32	Ly
Nov. 23.04740	19 15 25.76	+32 51 51.5	+3 37.46	-1 3.6	20, 4	9.717 0.550	p	33	Ly
Nov. 23.04740	19 15 25.80	+32 51 52.4	+2 15.82	+1 49.4	20, 4	9.717 0.550	p	34	Ly
Nov. 26.03914	19 16 19.53	+31 42 48.6	+3 46.80	-2 27.6	25, 5	9.710 0.557	f	35	Bn
Nov. 29.03316	19 17 28.17	+30 32 35.3	+4 8.45	-2 46.1	25, 5	9.706 0.572	f	36	Ly
Nov. 29.03316	19 17 28.19	+30 32 36.8	+1 42.75	-1 24.0	25, 5	9.706 0.572	f	37	Ly
Nov. 30.00248	19 17 53.49	+30 9 30.2	-1 17.44	+4 9.8	25, 5	9.673 0.504	p	38	Bn
Nov. 30.00248	19 17 53.30	+30 9 30.8	-2 32.44	+0 14.1	25, 5	9.673 0.504	p	39	Bn
Dec. 4.01740	19 19 51.37	+28 31 26.5	+2 17.02	+4 23.6	25, 5	9.694 0.579	f	40	Ly
Dec. 4.01740	19 19 51.41	+28 31 27.1	-2 6.73	+3 44.4	25, 5	9.694 0.579	f	41	Ly
Dec. 6.99289	19 21 31.08	+27 15 5.7	+2 14.50	-4 25.3	25, 5	9.671 0.555	f	42	Ly
Dec. 6.99289	19 21 31.06	+27 15 6.1	-2 36.23	+3 7.0	25, 5	9.671 0.555	f	43	Ly
Dec. 10.00166	19 23 20.27	+25 53 8.9	+3 37.71	+0 3.5	25, 5	9.682 0.600	f	44	Bn
Dec. 10.00166	19 23 20.38	+25 53 8.8	+2 40.08	+4 50.0	25, 5	9.682 0.600	f	45	Bn
Dec. 11.98526	19 24 36.38	+24 55 37.4	+1 7.91	-0 19.4	25, 5	9.666 0.586	f	46	Bn
Dec. 11.98526	19 24 36.21	+24 55 37.1	-1 20.13	+3 19.7	25, 5	9.666 0.586	f	47	Bn
Dec. 17.98060	19 28 32.31	+21 35 48.1	+3 6.21	-2 2.5	25, 5	9.665 0.629	p	48	Ly
Dec. 17.98060	19 28 32.33	+21 35 49.1	-3 13.65	+1 7.5	25, 5	9.665 0.629	p	49	Ly
Dec. 18.97347	19 29 11.19	+20 57 30.1	+3 6.48	+2 10.0	25, 5	9.658 0.627	g	50	Bn
Dec. 18.97347	19 29 11.12	+20 57 30.1	-1 13.38	+5 6.9	25, 5	9.658 0.627	g	51	Bn
Dec. 20.97310	19 30 27.64	+19 34 12.2	+0 7.35	+3 51.6	8, 8	9.659 0.643	f	52	Ry
Dec. 21.97354	19 31 4.44	+18 48 55.8	-1 23.93	-3 24.6	25, 5	9.660 0.652	f	53	Bn
Dec. 21.97354	19 31 4.37	+18 48 55.0	-3 39.58	-1 31.1	25, 5	9.660 0.652	f	54	Bn
Dec. 23.96797	19 32 13.78	+17 10 8.3	-3 14.00	+3 46.4	25, 5	9.655 0.660	f	55	Ly
	1941.0		1941.0						
Jan. 4.96311	19 34 38.43	+0 2 53.5	+1 38.60	-4 11.4	25, 5	9.654 0.740	p	56	Ly

Seeing: f = fair; g = good; p = poor; vp = very poor.  
Observer: Bn = Burton; Ry = Raynsford; Ly = Lyons.

REMARKS

Sept. 27 Well-defined nucleus. Barely visible in 5-inch finder.  
Oct. 13 Comet faint. Moonlight.  
Oct. 15 Comet faint. Not seen in 5-inch finder. Moonlight.  
Oct. 23 Easily visible in 5-inch finder.

Nov. 1 Barely visible in 2-inch finder.  
Nov. 20 Easily visible in 2-inch finder.  
Nov. 23 Nucleus near star but distinct. Visible in binocular.  
Dec. 17 Near naked-eye brightness. Bluish color.  
Dec. 21 Not visible to naked eye.  
Dec. 23 Visible to naked eye. Color blue-green.  
Jan. 4 Not visible to naked eye. Color definitely green.

## MEAN PLACES OF COMPARISON STARS FOR BEGINNING OF YEAR

Star	BD	$\alpha$		$\delta$		$\mu\alpha$	$\mu\delta$	Epoch	Authority
		$^{\text{h}}$	$^{\text{m}}$	$^{\text{s}}$	$^{\text{h}}$				
1	+52° 2666	20 <sup>h</sup> 14 <sup>m</sup> 11 <sup>s</sup> .52	+52° 19'	0".0	+0.0012	-0.015	1916.12	Yale 4, 6448	
2	+51 2782	20 6 5.13	+51 54 21.1		+ .0109	+ .067	1916.12	Yale 4, 6390	
3	+50 2920	19 51 31.38	+50 29 22.8		- .0020	+ .033	1915.71	Yale 4, 6264	
4	+50 2930	19 53 20.05	+50 34 2.1		- .0002	+ .009	1915.71	Yale 4, 6277	
5	*	19 55 0.67	+50 21 58.9		—	—	1940.76	Plate taken with 40-in. reflector, FK3 system	
6	+48 2943	19 41 57.86	+48 47 10.3		—	—	1877.2	AG Bonn 13337	
7	+48 2952	19 46 7.21	+48 48 48.1		—	—	1878.6	AG Bonn 13416	
8	+48 2957	19 47 40.88	+48 53 14.7		—	—	1876.5	AG Bonn 13443	
9	+48 2942	19 41 55.59	+48 37 59.2		- .0003	+ .014	1927.4	Second Greenwich 8108	
10	+47 2890	19 37 41.66	+47 52 43.9		—	—	1876.2	AG Bonn 13252	
11	+47 2873	19 33 48.47	+47 18 17.0		.0000	- .015	1925.8	Second Greenwich 8024	
12	+47 2891	19 37 44.37	+47 18 28.2		- .003	.000	1898.63	Bonn No. 10 (1900.0) 8720	
13	+45 2906	19 27 0.04	+45 55 9.1		- .0013	+ .043	1918.13	Lund Med., Series 2, No. 27, 269	
14	+45 2920	19 31 20.40	+45 54 30.3		+ .0016	+ .005	1926.7	Second Greenwich 7999	
15	+44 3132	19 24 2.12	+44 29 43.2		—	—	1893.81	Astr. Helsingfors +45° 1925, 164	
16	+44 3146	19 26 42.50	+44 32 52.3		—	—	1893.81	Astr. Helsingfors +45° 1925, 315	
17	+44 3154	19 28 5.45	+44 33 50.3		+ .0004	+ .016	1925.4	Second Greenwich 7964	
18	+44 3139	19 24 36.21	+44 12 44.0		—	—	1893.81	Astr. Helsingfors +45° 1925, 199	
19	+43 3227	19 21 44.49	+43 46 22.7		+ .004	- .01	1912.33	Poulkovo, Series 2, 41, 2744	
20	+43 3267	19 29 3.71	+43 43 1.8		- .005	- .02	1911.58	Poulkovo, Series 2, 41, 2764	
21	+42 3341	19 24 17.19	+43 0 21.1		—	—	1895.67	Astr. Helsingfors +42° 1920, 406	
22	+42 3345	19 25 18.68	+42 59 54.7		.000	.00	1895.67	Astr. Helsingfors +42° 1920, 454	
23	+41 3292	19 15 10.83	+41 9 21.3		+ .0002	- .009	1927.0	Second Greenwich 7849	
24	+41 3312	19 17 35.50	+41 9 33.1		- .0048	- .017	1927.0	Second Greenwich 7874	
25	+39 3699	19 13 16.66	+40 0 26.4		- .0003	- .010	1925.8	Second Greenwich 7830	
26	+39 3722	19 17 40.13	+40 1 7.2		+ .005	+ .05	1923.6	Lund (1925.0) 8605	
27	+38 3499	19 12 44.20	+38 13 42.1		+ .001	+ .01	1921.7	Lund (1925.0) 8524	
28	+38 3527	19 15 55.23	+38 9 59.5		+ .001	.000	1921.6	Lund (1925.0) 8573	
29	+34 3466	19 11 6.32	+34 22 39.8		—	—	1923.03	Erstes Bergedorfer Stern. 3559	
30	+34 3475	19 12 16.75	+34 27 29.4		+ .0018	+ .099	1926.6	Second Greenwich 7820	
31	+33 3376	19 11 43.02	+34 1 25.4		+ .002	- .01	1919.5	Berlin-Babelsberg (1920.0) 7055	
32	+33 3403	19 15 58.83	+34 1 34.9		+ .001	+ .01	1919.5	Berlin-Babelsberg (1920.0) 7077	
33	+32 3365	19 11 48.30	+32 52 55.1		+ .001	- .01	1919.5	Berlin-Babelsberg (1920.0) 7058	
34	+32 3372	19 13 9.98	+32 50 3.0		—	—	1875.1	AG Leiden 7220	
35	+31 3514	19 12 32.73	+31 45 16.2		+ .0040	+ .011	1910.8-12.2	Greenwich (1910.0) 8867	
36	+30 3492	19 13 19.72	+30 35 21.4		—	—	1904.10	Bonn No. 16 (1900.0) 1539	
37	—	19 15 45.44	+30 34 0.8		—	—	1901.84	Astr. Oxford +30° 1912, 50073	
38	+29 3567	19 19 10.93	+30 5 20.4		+ .0037	.000	1911.8	Greenwich (1910.0) 8964	
39	+29 3576	19 20 25.74	+30 9 16.7		+ .0014	+ .023	1912.0	Greenwich (1910.0) 8986	
40	+28 3293	19 17 34.35	+28 27 2.9		+ .0004	+ .002	1911.8	Greenwich (1910.0) 8940	
41	+28 3319	19 21 58.14	+28 27 42.7		+ .0010	.000	1912.2	Greenwich (1910.0) 9002	
42	+27 3357	19 19 16.58	+27 19 31.0		+ .0005	- .004	1912.0	Greenwich (1910.0) 8965	
43	+27 3391	19 24 7.29	+27 11 59.1		+ .0069	+ .087	1909.6	Greenwich (1910.0) 9035	
44	+25 3808	19 19 42.56	+25 53 5.4		- .0010	- .033	1910.9	Greenwich (1910.0) 8973	
45	+25 3813	19 20 40.30	+25 48 18.8		- .0032	- .012	1911.4	Greenwich (1910.0) 8988	
46	+24 3742	19 23 28.47	+24 55 56.8		+ .0033	+ .012	1911.7	Greenwich (1910.0) 9028	
47	+24 3758	19 25 56.34	+24 52 17.4		- .0018	- .008	1911.3	Greenwich (1910.0) 9062	
48	+21 3790	19 25 26.10	+21 37 50.6		+ .0006	- .009	1929.20	Yale 10, 7036	
49	+21 3829	19 31 45.98	+21 34 41.6		- .0001	+ .005	1929.20	Yale 10, 7100	
50	+20 4155	19 26 4.71	+20 55 20.1		+ .0005	+ .001	1929.20	Yale 10, 7043	
51	+20 4178	19 30 24.50	+20 52 23.2		- .0001	- .020	1929.20	Yale 10, 7088	
52	—	19 30 20.29	+19 30 20.6		—	—	1896.58	Astr. Paris +20° 1928, 447	
53	+18 4137	19 32 28.37	+18 52 20.4		—	—	1904.8	Abbadia (+16° to +24°) 10844	
54	+18 4162	19 34 43.95	+18 50 26.1		+ .0003	- .023	(1950.0)	General Catalogue 27145	
55	+16 3925	19 35 27.78	+17 6 21.9		+ .0002	- .024	(1950.0)	General Catalogue 27163	
56	- 0 3789	19 32 59.83	+ 0 7 4.9		- .0009	- .009	1909.2	Abbadia (+4° to -2°) 10878	

\* Reference Stars for Position of No. 5

BD + 50° 2913	Yale 4, 6253	Epoch	$\alpha$	$\delta$	Dependences
+ 50 2925	6275	1915.71	-0.0004	-0.031	0.17146
+ 49 3144	6285	1915.71	- .0003	- .015	.38937
		1915.71	+ .0025	- .017	.43917

FK3 - Yale 4 = -0.038 and -0.06

NEWCOMB'S precession constants were used in computing the precessions.

Proper motions were applied to the positions of the comparison stars by use of the annual rates given under  $\mu\alpha$  and  $\mu\delta$ . Where the proper motions were computed from

the catalog equinox instead of epoch the year of the equinox is given in parentheses under Epoch.

U. S. Naval Observatory,  
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