Observations of Comet b 1877 with the XXVI-inch Equatorial of the U. S. Naval Observatory, Washington.

(Communicated by Rear Admiral *John Rodgers*, Superintendent.)

N.B. Those observations of $\Delta\alpha$ enclosed in square brackets [] have not been directly observed but are derived from the data of the night.

Date 1877	Comp Star.	Washington Sidereal Time	$\Delta\alpha$ —	No. of Comp.	$\Delta\sigma$ —	No. of Comp.	δ		Remarks.
							α'	δ'	
April 7	a	17h38m 3s.0	+ 1m 9s.5	4			22h9m35s.58		9.6 in Equatorial
7	a	17.43.25.			+10' 20''7	1		+17°35' 5''2	
10	b	17.49.44.2	+ 0.45.20	10			22.12.13.81		c-d; $\Delta\alpha = +$ 0m 49s.15 (8)
10	b	17.48.18.8			+ 2.25.1	4		+21.26.24.8	
11	c	17.54. 2.0	+ 0.49.35	8				+22.47.27.9	
11	d	17.32.31.1			— 5.56.9	7			
11	d	18.18. 5	position angle of Comet from d = 175°3 (3)						
11	d	17.54. 2.0	[+0. 0.20]	4			22.13.14.80		+24.12.40.9
12	e	17.17.23.1			+ 1.45.5	4			
12	e	17.27.28.0	+ 0.38.02	6			22.14.19.13		+22.16.39.10
14	f	17.25.14.4	+ 3.12.80	3			22.16.39.10		
14	g	17.27.22.1	— 0.38.53	9			22.16.38.41		+27.15. 8.8
14	g	17.36.52.5			+ 4.33.5	3			
23	h	16.16.46.7	+ 1. 3.36	10			22.32.40.28		+22.32.40.22
23	i	16.16.46.7	+ 0.43.83	10			22.32.40.22		
23	j	16.16.46.7	+ 0.34.66	10			22.32.40.24		+43. 5.37.4
23	i	16.32.18.7			+ 1.53.4	5			
Mai 2	k	17.23.59.7	+ 0.40. 7	4			23.12.35.87		+62.31.30.7
2	k	17.44.46.8			+ 3.45.2	4			
2	l	17.28.59.7	+ 0. 7. 1	3			23.12.35.37		+62.32.24.0
2	l	18. 2. 3.4	+ 0.17.82	6			23.12.46.09		
2	l	17.53.22.8			+ 1.15.5	4			+70.54.25.5
6	m	15.52.13.2	+ 0.13.55	10			23.54.45.55		
6	m	16.11.23.3			+ 3.24.5	4			+76.25.53.8
9	n	17. 2.35.2			+14.10.0	1			
9	o	17.25.12.2			— 6.16.8	2			+76.27.19.6
9	o	17.41.26.8	— 4.34.67	4			0.59. 4.66		
12	p	15.57.10.2			— 1.32.1	2			+79.47.28.6
12	p	15.36.20.2	— 3.27.89	8			2.49. 3.81		
14	r	14.59.20.3	[+0.22.86]	4			4.25. 1.20		+80. 7.15.5
14	r	14.36.55.2			—10.23.4	5			
14	s	14.59.20.3	+ 2.25.21	7					
Meridian observations made by Prof. Eastman on May 12, 14, and 18.									
22	t	14.12.40.9	— 0.24.15	12			7.52.18.83		+71.24. 5.1
22	u	14.24.59.2			—12.53.2	4			
22	t	[9.54]*	p = 170°1	1					+70.. 7. 6.4
23	v	13. 6. 9.7			+ 2.58.6	3			
23	v	13.32.31.1	+ 5.24.24	9			8.2.55.98		+68.44.39.9
24	x	13.26.57.9	+ 0.18.02	20			8.11.32.00		
24	x	13.45.44.1			— 4.20.5	6			

*mean time

Date 1877	Comp Star.	Washington Sidereal Time	$\Delta\alpha$		No. of Comp.	$\Delta\delta$		No. of Comp.	δ		Remarks.
			α	δ		α	δ		α	δ	
June 23	y	16 ^h 17 ^m 5 ^s 1	+ 3 ^m 23 ^s 58		5				9 ^h 30 ^m 13 ^s 41		
23	z	16.17. 5.1	+ 3.17.20		5				9.30.13.91		
23	A	16 17. 5 1	+ 1.15.16		5				9.30.15.50		
23	z	15.52.51.9				+ 0' 29'' 2		3		+42° 0' 35'' 0	
23	A	15.55.38.9				— 1.16.1		2		+42. 0.26.3	
28	B	15.33. 2.8	+ 1.35.97		11				9.35.19.50		
28	B	15.50. 6.1				— 6.41.1		4		+39.24. 9.5	
29	C	15.19 36.6	— 0.25.01		10				9.36.17.67		
29	C	?				— 6. 0.7				+38 55.16.4	

} Observations of $\Delta\delta$ taken between 15^h29^m and 15^h40^m sid. t.
Times recorded on Chronograph which failed to register.

Cloudy till July 6, and at that date the Comet was too low to be observed with the 26-inch Equatorial.

Date 1877	Comparison Star.	Comparison Stars.				Remarks.
		α 1877.0	α'	δ 1877.0	δ'	
April 7	a = W ² B. 175	22 ^h 8 ^m 26 ^s 11	22 ^h 8 ^m 26 ^s 08	+ 17° 24' 35'' 5	+17° 24' 44'' 5	a is Vienna Zones; XXII No. 78
10	b = W ² B. 249—51	22.11.31.32	22.11.31.31	+ 21.23.50 1	+21.23.59.7	
11	d = D. M. 4614	22.13.16.6	22.13.14.60	+ 22.53.15.—	+22.53.24.8	
	c = D. M. 4611	22.14. 3.75	22.14. 3.75	— — —	— — —	
12	e = D. M. 4575	22.13.41.1	22.13.41.11	+ 24.10.46.—	+24.10.55.4	
14	f = W ² B. 288	22.13.26.58	22.13.26.60	+ 27. 4. 0.2	+27. 4.10.7	
14	g = D. M. 4303?	22.17.16.32	22.17.16.34	+ 27.10.24.8	+27.10.35.3	
23	h = W ² B. 698—9	22.31.36.58	22.31.36.92	+ 42.57.44.4	+42.57.56.1	
23	i = W ² B. 710—1	22.21.56.05	22.31.56.39	+ 43. 3.32.3	+43. 3.44.0	
23	j = W ² B. 715	22.32. 5.34	22.32. 5.68	+ 42.59.23.2	+42.59.34.9	
Mai 2	k = D. M. 2208	23.11.53.7	23.11.55.17	+ 62.27.35.—	+62.27.45.5	
2	l = Anon. 10 ^m	23.12.26.9	[23.12.28.27]	+ 62.30.58.:	[+62.31.8.5:]	
6	O. A. N. 26144	23.47.39.64	23.47.42.44	+ 70.48.23.5	+70.48.30.8	
6	m = Anon.	23.54.29.2	23.54.32.00	[+70.50.53.7]	[+70.51.1.0]	} k—l; $\Delta\alpha = - 33^s 2 (3)$ $\Delta\delta = - 3' 23'' 3 (1)$ m — O.A.N.26144; $\Delta\alpha = + 6^m 49^s 5 (2)$ m — $\Sigma 3052$ (north *); $\Delta\delta = + 9' 53'' 8 (2)$
6	Σ . 3052 (north*)	23.56.37.58	23.56.40.38	+ 70.40.59.9	+70.41. 7.2	
9	n = O. A. N. 937	0.51.58.94	0.52. 3.15	+ 76.11.36.4	+76.11.43.8	
9	o = D. M. 37	1. 3.35.12	1. 3.39.33	+ 76.33.29.	+76.33.36.4	
12	q = O. A. N. 3176	2.42.34.25	2.42.39.99	+ 79.45. 0 7	+79.44.53.4	
12	p = O. A. N. 3326	2.52.25.96	2.52.31.70	+ 79.49. 8.0	+79.49. 0.7	
14	r = Oel.Schwerd 259	4.24.34.19	4.24.38.34	+ 80.17.52.7	+80.17.38.9	
14	s = Anon.	— — —	[4.22.35.99]	— — —	[+80. 7. —]	
22	t = O. A. N. 8476	7.52.44.63	7.52.42.98	+ 71.33.26.9	+71.33.10.3	
22	u = O. A. N. 8511-2	7.55.13.05	7.55.11.40	+ 71.37.14.9	+71.36.58.3	
23	v = Groombr. 1470	7.57.33.38	7.57.31.74	+ 70. 4.23.9	+70. 4. 7.8	
24	x = O. A. N. 8815	8.11.15.77	8.11.13.98	+ 68.49.16.0	+68.49. 0 4	

} δ from Seven Year Catal. No. 715,
& new seven Year Cat. No. 1001;
& from Radcliffe 1845 No. 2077.
O. A. N. is triple (Anderson) A & B.
p = 323° 5 (3) $\Delta\alpha = 2^s 25 (14)$;
s = 20' 51; A & C p = 140°
(est); s = 7" (est). A = 8—9^m,
B = 10^m, C = 12^m

Date 1877	Comparison Star.	Comparison Stars.				Remarks.
		α . 1877.0.	α'	δ . 1877.0	δ'	
June 23	y = W ² B 533	9 ^h 26 ^m 51 ^s 38	9 ^h 26 ^m 49 ^s 83	+ 41°56' 6".5	+41°56' 0".9	The following & larger component alone used. Seeing too poor to use both.
23	z = W ² B. 535	9.26.58.26	9.26.56.71	+ 42. 0.11.7	+42. 0. 6.1	
23	A = D. M. 2029	9.29. 0.9-	9.28.59.34	+ 42. 1.48.—	+42. 1.42.4	
28	B = W ² B. 686	9.33.45.06	9.33.43.53	+ 39.30.55.1	+39.30.50.6	
29	C = W ² B. 762—3	9.36.44.21	9.36.42.68	+ 39. 1 21.4	+39. 1.17.1	

Notes. Comet b 1877.

April 7 1877. The Comet appears like a nebulous star. The sky is hazy and I could see no tail as described in telegram from Vienna. It has a decided elongated nucleus and a coma concentric with it (9.62 inch Equatorial).

April 12 1877. Fixed wire A placed on nucleus and movable wire placed tangent to the following side of the coma. The measure gives the difference of R.A. = 36".6(1) at 16^h14^m W. M. T. The daylight is already coming on, and the above measure is about

$$\begin{aligned} \text{Diameter of nucleus} &= 0^r.34 + 0^r.115 \\ " " " &= 0.27 + 0.115 \\ " " " &= 0.26 + 0.115 \\ " " " &= 0.290 + 0.115 = 0^r.405 = 4''03(4). \end{aligned}$$

II. Measures of the diameter of the Nucleus by measures of double distance: i. e. illuminated wires placed outside the nucleus at a distance estimated equal to 2 × diameter of the nucleus.

$$\begin{aligned} 2 \times \text{diameter} &= 1^r.22 \\ " " " &= 1.13 \\ " " " &= 1.14 \\ \text{diameter} &= 0^r.598 = 5''95(4) \end{aligned}$$

In all these measures the diameters were measured in the direction $p = 150^\circ(1)$ [at random] the nucleus not being elongated, but round.

Diameter of Nucleus.

$$\begin{aligned} \text{From single distances; diam.} &= 4''03(3) \\ " \text{ double } " &= 5.95(3) \\ &= 4.99(6) \end{aligned}$$

All these somewhat unsatisfactory, the result from single distances being the best.

Diameter of the Coma.

[Measured in the parallel; i. e. diameters in R.A.]

Preceding radius, $p = 270^\circ$; $s = 54''52(1)$

Following " $p = 90^\circ$; $s = 54''81(1)$

14^h40^m M. T. Comet just visible to the naked eye [Horrigan]. 15^h Moon just setting and twilight coming on.

$\frac{1}{3}$ smaller than a setting made just before but not verified, and therefore little dependence is to be placed upon it.

April 22 1877. Measures of the diameter of the nucleus [mag. power 175].

I. Measures made by placing two wires feebly illuminated with red light just inside the nucleus, so that the outer edges of the illuminated wires co-incide with the nucleus. Thickness of illuminated wire = 0^r.115 (4) = 1''14.

1877 April 23. Measures of Diameter of Nucleus.

$$\begin{aligned} \text{Diameter} &= 0^r.36 \text{ (from single distance)} \\ " &= 0.44 \text{ (from double distance)} \\ " &= 0.39 " " " \\ " &= 0.32 " " " \\ " &= 0.37 " " " \\ " &= 0^r.376 = 3''74(5) \end{aligned}$$

mag. power 175. These measures more satisfactory than those of April 22.

On several occasions a low power negative eye-piece (field = 25'2, mag. power = 155 diameters) was used for the examination of the comet, but the seeing was not good enough to verify the existence of the two tails suspected by Winnecke.

During these observations an opportunity was sought to observe the brightest part of this comet passing over a tolerably bright star. It was intended in such a case to replace the micrometer with a simple, spectroscopic eye-piece (without a slit) which would give the stars spectrum only, and to note the changes (if any) in the brightness of this spectrum caused by the passage of the comet over the star. No opportunity offered for making this interesting experiment. *Edward S. Holden.*