1870+	Gr.	AR.	Decl.	Bemerk.
3.78	(8.8)	$23^h 56^m 33^s.75$	$+7^\circ 33' 55''8$	f. Sophros.,
3.79	8.0	33.79	57.15	α Gew. $\frac{1}{2}$
3.76	9.2	23 58 52.76	+7 42 7.8	f. Sophros.
3.78	9.2	52.73	7.6	

Die 1. Columne der vorstehenden Beobachtungen giebt die Epoche; die 2. die Grösse (die eingeklammerten Zahlen sind wegen Wolken oder Dämmerung unsicher); die 3. und 4. mittlere AR. und Decl. für den Anfang des Beobachtungsjahres; die letzte enthält Bemerkungen über die beobachteten Objecte; die meisten sind Vergleichsterne für Planeten und den Cometen II. 1873, die sich zum Theil schon in den Astr. Nachr. (z. B. No. 1962 u. 1968) finden. Bei den Doppelsternen giebt die erste Zahl die Grösse, die zweite die bis auf halbe Secunden geschätzte Distanz, die dritte den geschätzten Pos.-Winkel des Begleiters. Die mit Σ bezeichneten sind Doppelsterne der Mens. micr., für welche sich in den Pos. med. genaue Oerter finden. Es war meine Absicht, für solche Doppelsterncomplexe des *Struve*'schen Cataloges, die zu der Kategorie von ε und δ Lyrae gehören, und bei denen je 2 Paare bis zu $\frac{1}{2}$ Grad gr. Kr. von einander abstehen, neuerdings genaue Positionen zu liefern, um durch Vergleichung mit den vor 40 — 50 Jahren durch *Struve* erhaltenen zur Erkenntniss der Eigenbewegung und damit zu einem Urtheil über die physische Zusammengehörigkeit solcher Complexe zu gelangen. Diese Arbeit, wie zum grössten Theil meine astronomische Thätigkeit, habe ich aufgeben und mich einer andern heterogenen Beschäftigung zuwenden müssen, die mir Verhältnisse persönlicher Natur zur unabweisbaren Pflicht machten.

Leipzig 1874, August 1.

R. Engelmann.

Madras Observations of Biela's Comet.

The two positions of *Biela*'s Comet observed here in December 1872 being of exceptional interest, I have deemed it advisable to give the particulars of each observation in much fuller detail than usual.

On the afternoon of Saturday, November 30th, Professor *Klinkerfues* of Gottingen favoured me with the very astonishing telegram:

„*Biela* touched Earth on 27th. Search near Theta Centauri." The two following mornings were cloudy, but a little before day break on the morning of Tuesday, November 3 civil reckoning, the sky being generally overcast and light rain falling overhead, so that the telescope had to he used peeping through the lower portion of the dome shutter, a brief break in the clouds, not over ten minutes in duration, enabled me to discover an object, so evidently cometary as at the first glance to induce me to slip in a reticle, and secure whatever comparisons were possible, before the fast closing fine break was gone and the comet perhaps lost for good. After few comparisons with an anonymous star, the sky was again overcast and sunrise fast approaching, but the motion in right ascension was conclusive enough. My recorded description was: „Bright, circular, about 45″ in diameter; a very decided nucleus, but no tail discernible in strong twilight and cloudy sky."

The actual comparisons and the resulting Madras mean time and apparent position of the comet were as follows:

Sidereal Clock Times.	$\not\leftarrow$ — * a in R. A.	$\not\leftarrow$ — * a in P. D.
$10^h 17^m 47^s.5$	+15s.5	+15′ 9″
18 36.2	+16.0	+15 24
19 51.0	+16.8	+15 24
21 51.7	+18.0	+15 9
Mean = 10 19 31.6	+16.57	+15 16.5
Correction + 2.0	Refraction + 0.12	+ 0.9
Stars reductions to apparent place	+ 0.76	+ 2.7
Mean place of * a (1872)	$14^h 6^m 55.21$	$124^\circ 30' 1.0$
Nov. 2 $17^h 31^m 1^s.3$	14 7 12.66	124 45 21.1
Log (Par. $\times \triangle$)	(9.7720n)	(0.6392n)

On the following morning, Wednesday the 4, civil reckoning, the clouds cleared away sufficiently to permit of the comet being refound. It was recorded, bright, round, and about 75″ in diameter. A short faint tail seen, about 7′.4 in length; its position angle from the comet being estimated at near 260°. Three comparison stars were employed, with the same reticle.

Sidereal Clock Times.	☄ — * *b* in R. A.	☄ — * *b* in P. D.
9h 56m 41s.2	— 41s.9	+ 6′ 38″
58 46.0	— 40.7	+ 6 54
10 0 43.3	— 39.4	+ 6 54
2 41.7	— 38.3	+ 6 38
4 51.3	— 36.9	+ 6 54
10 44.2	— 32.8	+ 6 54
24 42.0	— 24.0	+ 6 54
Mean = 10 5 35.7	— 36.29	+ 6 49.4
Correction + 1.5	Refraction + 0.09	+ 0.5
Stars reductions to apparent place	+ 0.76	+ 3.0
Star *b* for 1872.0	14h 22m 30.55	124° 57′ 44.6
Dec. 3 17h 13m 11s.3	14 21 55.11	125 4 37.5
Log (Par. × △)	(9.8045*n*)	(0.5833*n*)

The comparison with stars *c* and *d* wery only two each:

Sidereal Clock Times.	☄ — * *c*		☄ — * *d*	
10h 10m 44s.2	— 7m 58s.0	+ 6′ 59″	— 9m 9s.7	+ 2′ 25″
24 42.0	— 7 49.9	+ 6 54	— 9 1.0	+ 2 25
Mean = 10 17 43.1	— 7 53.95	+ 6 56.5	— 9 5.15	+ 2 25.0
Correction + 1.5	Refraction + 0.07	+ 0.5	+ 0.03	+ 0.2
Stars reductions to apparent place	+ 0.75	+ 3.1	+ 0.74	+ 3.1
Mean places of *c* and *d*	14h 29m 55.85	124°57′ 39.7	14h 31m 7.14	125° 2′ 16.6
Dec. 3 17h 25m 16s.7	14 22 2.72	125 4 39.8	14 22 2.73	125 4 44.9
Log (Par. × △)	(9.7927*n*)	(0.6090*n*)	(9.7927*n*)	(0.6090*n*)

The next three mornings were quite overcast, and afterwards the comet would rise in daylight and could not therefore be observed.

The comparison star positions, all determined here, were as per following list:

Date.	Mag.	Mean RA. 1872	Mean PD. 1872
Star *a*	Precessions and Secular Variations.	+3s.555 +0s.030	+17″06 —0.28
1873 April 16	8.7	14h 6m55s.15	124°29′ 59″0
17	9.0	6 55.20	30 0.3
21	9.3	6 55.10	30 1.2
22	9.5	6 55.26	30 1.8
24	9.3	6 55.35	30 1.8
Star *b*	—	+3.617 +0.031	+16.30 —0.32
1873 April 17	9.5	14 22 30.57	124 57 44.6
18	9.3	22 30.56	57 44.6
21	9.5	22 30.58	57 44.3
22	9.7	22 30.48	57 45.0
24	9.5	22 30.57	57.44.6

Date.	Mag.	Mean RA. 1872	Mean PD. 1872
Star *c*	Precessions and Secular Variations.	+3s.638 +0s.031	+15″95 —0″33
1863 May 15	7.8	14h29m55s.75	124°57′ 38″4
1864 May 24	8.0	29 55.88	57 39.2
1867 June 5	7.7	29 56.02	57 40.4
7	7.0	29 55.83	57 40.7
10	7.9	29 55.76	57 39.6
Star *d*	—	+3.646 +0.031	+15.85 —0.33
1873 April 18	7.5	14 31 7.20	125 2 16.3
21	7.0	31 7.31	2 17.1
22	7.5	31 7.13	2 16.0
24	8.0	31 7.07	2 17.5
25	7.7	31 6.97	2 16.2

Madras Observatory, 1874, July 1.

N. R. Pogson,
Government Astronomer.

New Elements and an Ephemeris of Aethra (132), by Professor James C. Watson.

Communicated by Prof. *J. H. C. Coffin*, Supt. American Ephemeris and Nautical Almanac.

The elements of Aethra (132) published by me in the Berliner Astr. Jahrbuch for 1876 were derived from a very small number of observations, viz: from the observations at Ann Arbor June 13, 14, 15 and 18, and July 5. I have since received through the kindness of M. *Stephan* the Marseilles observations of this planet extending from June 17 to July 3, the planet having been observed there on each night during this interval. I have derived new places of the comparison stars for these observations and by a comparison of them as well as the An Arbor observations with an ephemeris computed from the elements already published I have obtained the following normal places:

Wash. m. T.	app. α	app. δ	No. of obs.	C. — 0.	
1873 June 14.5	258°57′55″1	—21°41′59″0	5	+ 0″8	+1″4
20.5	257 16 33.1	—20 39 11.3	11	+ 4.0	—8.4
27.5	255 32 1.2	—19 30 24.1	8	—20 6	—1.8
July 13.5	254 17 3.5	—18 36 31.6	5	— 3.5	+1.9

From these normal places the following elements have been derived:

Epoch = 1873 June 20.5 Wash. m. T.

M = 66°22′58″22

π = 152 10 52.40 } Ecliptic and mean
Ω = 259 43 31.20 } Eq. 1873.0
i = 24 59 40.08 }

φ = 22 27 19.04

$log\ a$ = 0.4151354

$log\ \mu$ = 2.9273055

μ = 845″8698.

These elements represent the normal places in the following manner:

Date.	C. — 0. $\Delta\alpha$	$\Delta\delta$
1873 June 14	0″0	+ 0″1
20	0.0	+ 2.0
27	+ 0.3	— 0.8
July 3	+ 0.1	+ 0.1

These elements differ very much from those determined from the few observations June 13 — 18 and July 5, but since they are based upon four normals derived from observations continously during the whole period from June 13 to July 5 it is probable that they will give the place of the planet near enough for finding it at its present opposition.

From the above elements the following ephemeris has been derived:

12h Wash.	(132) α	(132) δ	Log Δ
1874 Aug. 1	21h12m41s	+15°42′.5	0.42859
2	21 11 48	15 42.4	
3	21 10 55	15 42.1	
4	21 10 2	15 41.5	
5	21 9 9	15 40.8	0.42720
6	21 8 15	+15 39.8	

12h Washington.	(132) α	(132) δ	Log Δ
1874 Aug. 7	21h 7m22s	+15°38′.7	
8	21 6 28	15 37.3	
9	21 5 35	15 35.7	0.42649
10	21 4 41	15 33.9	
11	21 3 48	15 31.9	
12	21 2 55	15 29.7	
13	21 2 2	15 27.4	0.42644
14	21 1 9	15 24.8	
15	21 0 17	15 22.1	
16	20 59 25	15 19.1	
17	20 58 33	15 16.1	0.42710
18	20 57 42	15 12.8	
19	20 56 51	15 9.4	
20	20 56 1	15 5.9	
21	20 55 12	15 2.0	0.42843
22	20 54 23	14 58.0	
23	20 53 34	14 53.9	
24	20 52 46	14 49.5	
25	20 51 59	14 44.9	0.43041
26	20 51 13	14 40.4	
27	20 50 28	14 35.7	
28	20 49 42	14 30.8	
29	20 48 57	14 25.8	0.43304
30	20 48 14	14 20.7	
31	20 47 32	14 15.4	
Sept. 1	20 46 50	14 10.1	
2	20 46 8	14 4.6	0 43627
3	20 45 28	13 59.1	
4	20 44 49	13 53.4	
5	20 44 11	13 47.6	
6	20 43 34	13 41.7	0.44008
7	20 42 58	13 35.8	
8	20 42 23	13 29.8	
9	20 41 50	+13 23.7	