On the elements of the orbit of O Σ 387.

After projecting the observations of O Σ 387 on millimetric paper I drew curves through the series of points representing the angles and the distances respectively, and improved them until the angles and distances confirmed each other, except for the period preceeding 1858, when it was impossible to bring them both into satisfactory agreement. The distances observed before 1858 seem to be too large judging by the angles, which define the orbit better in this instance. The following is the result. The distances deduced from the angles are placed in parenthesis.

1845	120°2	0"52 (0"41)	1875	24°3	0"43
1850	105.6	0.54 (0.43)	1880	13.4	0.47
1855	92.2	0.49 (0.44)	1885	3.1	0.52
1860	79.8	0.44 (0.44)	1890	354.3	0.56
1865	65.5	0.41	1895	346.7	0.62
1870	47.8	0.41			

I now constructed four apparent ellipses as different inter se as possible. The resulting elements and ephemerides referred to 1900.0 were as follows:

Orbit	I	II	III	IV
Ω	135° 24'	129° 33'	128° 54'	110° 22'
γ	55 6	65 45	59 10	50 12
λ	77 3	75 18	55 58	354 45
e	0.542	0.600	0.280	0.393
P	75 ⁷ 79	90 ⁷	134 ⁷ 2	260 ⁷
T	1839	1838	1826	1849.24
a	0"51	0"66	0"67	0"89
1845	130°6 0"34	121°5 0"42	115°3 0"55	117°1 0"52
1850	110.0 0.40	107.3 0.46	105.2 0.53	105.4 0.52
1855	92.7 0.42	93.7 0.45	93.8 0.49	93.3 0.50
1860	75.9 0.42	78.8 0.43	80.4 0.45	79.9 0.47
1865	59.3 0.42	62.3 0.41	64.6 0.42	65.0 0.45
1870	43.3 0.44	45.0 0.41	47.2 0.41	48.5 0.43
1875	28.6 0.46	28.6 0.43	29.9 0.43	31.6 0.45
1880	15.5 0.49	14.4 0.47	14.5 0.46	15.8 0.47
1885	3.9 0.52	2.6 0.52	1.7 0.51	2.4 0.51
1890	353.3 0.54	352.8 0.57	351.5 0.57	351.3 0.57
1895	342.3 0.63	344.7 0.62	343.1 0.63	342.4 0.63

Orbits III and IV were constructed by aid of the distances not placed in parenthesis above. They represent the distances best. Orbits I and II, which were constructed by aid of the distances in parenthesis, represent the angles better than the distances. Orbits II and III are good, though II is decidedly the better. Orbits I and IV are bad, though I is decidedly the worse. This shows the utility of publishing mere diagrams of a number of apparent orbits laid through the points representing the positions of the companion at various epochs. The orbits may be good or bad; that can-

not be known till the observations (all the observations — not merely an extract) have been compared with ephemerides computed from every one of the apparent orbits.

Nine years ago Prof. Glasenapp computed this orbit and his elements show some rough similarity to the orbits given above e.g. $P = 110$ years, and also in the plane of the orbit ($\Omega = 151^\circ$, $\gamma = 44^\circ$). The eccentricity determined by Glasenapp is rather small for the period, while the eccentricity given above is rather large.

Observer	Epoch	θ_0	ϱ_0	$\theta_0 - \theta_2$	$\varrho_0 - \varrho_2$	$\theta_0 - \theta_3$	$\varrho_0 - \varrho_3$
O. Struve	1842.70	124°4	0"48	— 6°0	+ 0"12	+ 4°3	— 0"08
Mädler	43.39	118.3	0.53	— 9.3	+ 0.15	— 0.3	— 0.03
O. Struve	45.65	130.0	0.49	+ 10.3	+ 0.06	+ 15.7	— 0.06
Mädler	47.73	119.4	0.60	+ 5.8	+ 0.15	+ 9.3	+ 0.06
O. Struve	1851.63	104.4	0.48	+ 1.2	+ 0.02	+ 2.6	— 0.04
"	52.63	104.6	0.54	+ 4.2	+ 0.08	+ 5.0	+ 0.03
Dawes	53.75	90.2	(0.53)	— 7.3	+ 0.07	— 6.9	+ 0.03
Mädler	53.78	94.7	0.52	— 2.8	+ 0.06	— 2.4	+ 0.02
O. Struve	54.69	95.8	0.51	+ 0.9	+ 0.06	+ 0.9	+ 0.02
"	56.57	86.4	(0.52)	— 3.3	+ 0.08	— 3.9	+ 0.04
Secchi	56.83	91.9	0.30	+ 3.0	— 0.14	+ 2.4	— 0.18
O. Struve	59.62	77.8	0.51	— 2.2	+ 0.08	— 3.7	+ 0.06

Observer	Epoch	θ_0	ϱ_0	$\theta_0 - \theta_2$	$\varrho_0 - \varrho_2$	$\theta_0 - \theta_3$	$\varrho_0 - \varrho_3$
O. Struve	1862.83	76°9	(0"57)	+ 7°1	+ 0"16	+ 4°9	+ 0"14
Dembowski	65.53	56.2	—	— 4.6	—	— 6.9	—
»	69.60	52.5	—	+ 5.8	—	+ 3.7	—
»	1870.56	52.5	—	+ 8.9	—	+ 6.9	—
»	71.57	39.6	—	— 0.6	—	— 2.5	—
»	72.55	26.6	—	— 10.2	—	— 12.0	—
»	73.73	23.1	—	— 9.7	—	— 11.2	—
»	74.57	20.7	0.55	— 9.6	+ 0.12	— 11.0	+ 0.13
»	75.41	22.0	0.34	— 5.5	— 0.09	— 6.6	— 0.08
Schiaparelli	75.57	23.2	0.38	— 3.7	— 0.06	— 4.7	— 0.05
Hall	76.76	20.8	0.48	— 2.7	+ 0.04	— 3.6	+ 0.04
Dembowski	77.59	16.2	0.49	— 5.0	+ 0.04	— 5.7	+ 0.05
Hall	78.72	17.9	0.48	+ 0.1	+ 0.02	— 0.4	+ 0.03
»	79.70	12.5	0.48	— 2.8	+ 0.01	— 3.0	+ 0.02
Schiaparelli	1880.68	11.3	0.40	— 1.5	— 0.08	— 1.5	— 0.07
Hall	81.61	10.6	0.53	+ 0.1	+ 0.04	+ 0.3	+ 0.05
Hough	82.69	8.5	0.48	+ 0.6	— 0.02	+ 1.0	— 0.01
Hall	82.70	11.4	0.44	+ 3.5	— 0.06	+ 3.9	— 0.05
Engelmann	83.13	5.5	0.40	— 1.3	— 0.10	— 1.0	— 0.09
Hall	83.63	8.9	0.54	+ 3.3	+ 0.03	+ 3.9	+ 0.04
Schiaparelli	83.64	7.9	0.48	+ 2.3	— 0.03	+ 2.9	— 0.02
Hall	84.69	6.1	0.56	+ 2.7	+ 0.04	+ 3.6	+ 0.05
»	85.74	3.5	0.53	+ 2.4	0.00	+ 3.3	+ 0.01
Engelmann	85.89	358.3	0.62	— 2.5	+ 0.09	— 1.5	+ 0.10
Tarrant	86.52	0.9	0.45	+ 1.3	— 0.09	+ 2.4	— 0.08
Perrotin	86.58	0.6	0.64	+ 1.2	+ 0.10	+ 2.3	+ 0.11
Hall	86.62	4.7	0.54	+ 5.3	0.00	+ 6.4	+ 0.01
H. Struve	86.76	357.0	(0.50)	— 2.1	— 0.04	— 1.0	— 0.04
Schiaparelli	87.55	357.8	0.57	+ 0.2	+ 0.02	+ 1.4	+ 0.02
Hall	88.73	356.3	0.54	+ 1.0	— 0.02	+ 2.3	— 0.02
H. Struve	88.76	354.6	0.55	— 0.7	— 0.01	+ 0.6	— 0.01
Schiaparelli	88.82	357.8	0.52	+ 2.6	— 0.04	+ 3.9	— 0.04
Tarrant	89.44	351.9	0.58	— 2.1	+ 0.02	— 0.9	+ 0.02
Hall	89.66	358.3	0.53	+ 4.7	— 0.04	+ 6.0	— 0.04
Schiaparelli	89.87	353.7	0.54	+ 0.5	— 0.03	+ 1.8	— 0.03
Bigourdan	1890.52	354.9	—	+ 2.8	—	+ 4.1	—
Hall	90.62	355.9	0.58	+ 4.0	0.00	+ 5.3	0.00
Schiaparelli	90.94	353.8	0.56	+ 2.5	— 0.02	+ 3.7	— 0.02
Bigourdan	91.62	352.7	0.56	+ 2.7	— 0.03	+ 4.1	— 0.03
Tarrant	91.64	349.9	0.54	— 0.1	— 0.05	+ 1.3	— 0.05
Comstock	92.62	353.0	0.57	+ 4.7	— 0.03	+ 6.1	— 0.03
Bigourdan	92.64	352.1	0.65	+ 3.8	+ 0.05	+ 5.2	+ 0.05
Schiaparelli	92.92	350.1	0.50	+ 2.2	— 0.10	+ 3.6	— 0.10
»	93.78	349.2	0.8	+ 2.7	+ 0.19	+ 4.1	+ 0.19
Comstock	93.80	348.0	0.52	+ 1.5	— 0.09	+ 3.0	— 0.09
Bigourdan	94.72	343.3	0.70	— 1.8	+ 0.08	— 0.3	+ 0.07
Schiaparelli	94.77	349.0	0.6	+ 3.9	— 0.02	+ 5.4	— 0.03
Comstock	95.72	346.7	0.55	+ 3.1	— 0.07	+ 4.7	— 0.08
Schiaparelli	95.88	345.1	0.61	+ 1.7	— 0.01	+ 3.3	— 0.03
Comstock	96.66	343.5	0.59	+ 1.2	— 0.04	+ 2.9	— 0.06
Hussey	96.74	344.6	0.46	+ 2.4	— 0.17	+ 4.1	— 0.19
Schiaparelli	96.77	342.5	0.65	+ 0.4	+ 0.02	+ 2.0	0.00
Doberck	1897.71	342.3	0.76	+ 1.5	+ 0.12	+ 3.2	+ 0.10

I submit that it has been proved that this system revolves in an orbit considerably inclined to the plane of vision in a period between 90 years and 150 years, and probably about 100 years.

Hongkong Observatory, 1898 July 10.

W. Doberck.