Astronomische Nachrichten

Expedition aus der Königlichen Sternwarte bei Kiel.

Herausgeber: Prof. Dr. C. A. F. Peters.

Bd. 86.

No. 2043—44.

3 und 4.

Ephemerides of the Satellites of Saturn. 1875.

By A. Marth.

The rectangular coordinates of the five inner satellites and the apparent distances of Titan and Japetus are expressed in semi-diameters of the planet's equator and must be multiplied by $\frac{81''36}{\Delta}$, (Δ being Saturn's distance from the Earth), in order to be expressed in

seconds of arc. The angles of position „pos.“ are reckoned, in the usual way, from the circle of declination, but the coordinates x and y are referred to the axes of the ring, x being positive on the east-side of the minor axis and y positive on the north-side of the major axis.

At 20^h Greenwich Sidereal Time.

	Mimas.		Encel.		Tethys.		Dione.		Rhea.		Titan.		Japetus.	
	x	y	x	y	x	y	x	y	x	y	pos.	dist.	pos.	dist.
1875														
June 20	−0.4	−0.6	−2.6	+0.6	+2.9	+0.8	+2.2	+1.2	+4.7	+1.5	314 ⁰ 4	6.1	89 ⁰ 0	48.7
21	−1.5	−0.5	−2.8	−0.6	−3.5	−0.7	+3.1	−1.1	+8.3	−0.6	48.0	5.2	89.1	45.8
22	−2.4	−0.4	+3.3	−0.5	+4.1	+0.6	−6.2	+0.3	−1.7	−1.7	79.4	11.7	89.2	42.6
23	−3.0	−0.2	+1.8	+0.7	−4.5	−0.4	+5.2	+0.7	−8.9	0.0	88.5	17.3	89.2	39.2
24	−3.1	0.0	−3.8	+0.3	+4.8	+0.2	−0.6	−1.3	−1.6	+1.7	93.7	20.5	89.3	35.5
25	−2.9	+0.2	−0.8	−0.8	−5.0	−0.1	−4.4	+0.9	+8.4	+0.6	98.0	20.9	89.4	31.6
26	−2.2	+0.4	+4.0	0.0	+5.0	−0.1	+6.4	+0.1	+4.6	−1.5	102.8	18.3	89.6	27.5
27	−1.3	+0.6	−0.3	+0.8	−4.8	+0.3	−4.0	−1.0	−6.7	−1.2	110.4	13.4	89.8	24.3
28	−0.2	+0.6	−3.9	−0.2	+4.5	−0.4	−1.1	+1.2	−7.0	+1.1	130.0	7.2	90.1	18.9
29	+0.9	+0.6	+0.8	−0.8	−4.0	+0.6	+5.5	−0.7	+4.1	+1.6	211.2	4.6	90.6	14.4
30	+2.0	+0.5	+3.5	+0.4	+3.4	−0.7	−6.1	−0.4	+8.5	−0.5	255.0	10.2	91.5	9.8
July 1	+2.7	+0.3	−2.4	+0.6	−2.7	+0.8	+2.6	+1.2	−1.0	−1.8	266.5	15.9	94.	5.2
2	+3.1	+0.1	−2.9	−0.6	+1.9	−0.9	+2.7	−1.2	−8.9	−0.1	272.5	19.5	134.	0.7
3	+3.1	−0.1	+3.2	−0.5	−1.0	+1.0	−6.2	+0.4	−2.2	+1.7	277.2	20.2	262.	4.2
4	+2.6	−0.3	+2.0	+0.7	+0.2	−1.0	+5.4	+0.7	+8.1	+0.8	282.5	17.7	265.6	8.9
5	+1.9	−0.5	−3.7	+0.3	+0.7	+1.0	−0.9	−1.3	+5.2	−1.5	291.0	12.4	266.6	13.5
6	+0.8	−0.6	−1.0	−0.8	−1.6	−1.0	−4.1	+1.0	−6.2	−1.3	317.2	6.0	267.3	18.0
7	−0.3	−0.6	+4.0	−0.1	+2.4	+0.9	+6.4	0.0	−7.4	+1.0	49.6	5.5	267.6	22.4
8	−1.4	−0.6	−0.2	+0.8	−3.1	−0.8	−4.3	−1.0	+3.5	+1.7	79.5	12.0	267.8	26.7
9	−2.3	−0.4	−4.0	−0.1	+3.8	+0.7	−0.7	+1.3	+8.7	−0.4	88.5	17.5	268.0	30.9
10	−2.9	−0.2	+0.6	−0.8	−4.3	−0.5	+5.3	−0.7	−0.3	−1.8	93.8	20.6	268.1	34.9
11	−3.1	0.0	+3.6	+0.4	+4.7	+0.4	−6.2	−0.3	−8.8	−0.2	98.2	20.8	268.3	38.6
12	−2.9	+0.2	−2.2	+0.7	−4.9	−0.2	+2.9	+1.2	−2.9	+1.7	103.3	18.2	268.4	42.1
13	−2.3	+0.4	−3.0	−0.5	+5.0	0.0	+2.4	−1.2	+7.8	+0.9	111.3	13.2	268.4	45.4
14	−1.4	+0.6	+3.1	−0.5	−4.9	+0.2	−6.0	+0.4	+5.7	−1.4	132.6	7.0	268.5	48.5
15	−0.3	+0.6	+2.2	+0.7	+4.7	−0.4	+3.1	+1.1	−5.7	−1.4	214.4	4.8	268.6	51.2
16	+0.8	+0.6	−3.7	+0.3	−4.3	+0.5	−1.3	−1.3	−7.8	+0.9	255.2	10.5	268.7	53.6
17	+1.8	+0.5	−1.2	−0.8	+3.8	−0.7	−3.8	+1.1	+2.9	+1.7	266.5	16.2	268.8	55.7
18	+2.6	+0.4	+4.0	−0.1	−3.1	+0.8	+6.4	−0.1	+8.8	−0.3	272.6	19.6	268.8	57.5

	Mimas.		Encel.		Tethys.		Dione.		Rhea.		Titan.		Japetus.	
	x	y	x	y	x	y	x	y	x	y	pos.	dist.	pos.	dist.
1878														
July 19	+3.1	+0.1	0.0	+0.8	+2.4	-0.9	-4.6	-0.9	+0.3	-1.8	277.5	20.1	268.9	58.9
20	+3.1	-0.1	-4.0	+0.1	-1.5	+1.0	-0.3	+1.3	-8.7	-0.4	283.0	17.5	269.0	60.0
21	+2.7	-0.3	+1.1	-0.8	+0.7	-1.0	+5.0	-0.8	-3.5	+1.7	292.1	12.2	269.1	60.7
22	+2.0	-0.5	+3.7	+0.3	+0.2	+1.0	-6.3	-0.2	+7.5	+1.0	320.8	5.8	269.1	61.0
23	+1.0	-0.6	-2.1	+0.7	-1.1	-1.0	+3.3	+1.1	+6.2	-1.3	51.4	5.9	269.2	61.0
24	-0.2	-0.7	-3.1	-0.5	+1.9	+1.0	+2.0	-1.3	-5.2	-1.5	79.6	12.3	269.3	60.6
25	-1.3	-0.6	+2.9	-0.6	-2.7	-0.9	-5.9	+0.5	-8.1	+0.8	88.6	17.7	269.4	59.8
26	-2.2	-0.5	+2.3	+0.7	+3.4	+0.8	+2.8	+1.2	+2.3	+1.8	94.0	20.7	269.5	58.7
27	-2.9	-0.3	-3.6	+0.4	-4.0	-0.6	-1.7	-1.3	+8.9	-0.1	98.6	20.7	269.6	57.1
28	-3.1	0.0	-1.3	-0.8	+4.5	+0.5	-3.5	+1.1	+1.0	-1.9	103.9	18.0	269.7	55.2
29	-3.1	+0.1	+3.9	-0.2	-4.8	-0.3	+6.3	-0.2	-8.6	-0.5	112.6	12.9	269.8	53.0
30	-2.4	+0.4	+0.3	+0.9	+5.0	+0.1	-4.9	-0.9	-4.1	+1.7	136.0	6.8	270.0	50.4
31	-1.6	+0.6	-4.0	+0.1	-5.0	+0.1	+0.1	+1.4	+7.1	+1.2	217.8	5.2	270.1	47.5
Aug. 1	-0.5	+0.7	+0.9	-0.8	+4.8	-0.3	+4.8	-0.9	+6.6	-1.3	255.5	10.9	270.3	44.2
2	+0.7	+0.7	+3.8	+0.3	-4.5	+0.5	-6.6	-0.2	-4.7	-1.6	266.6	16.5	270.5	40.7
3	+1.7	+0.6	-1.9	+0.8	+4.0	-0.6	+3.6	+1.1	-8.3	+0.7	272.8	19.7	270.8	36.9
4	+2.5	+0.4	-3.3	-0.5	-8.5	+0.8	+1.6	-1.3	+1.6	+1.9	277.9	20.1	271.1	32.9
5	+3.0	+0.2	+2.8	-0.6	+2.8	-0.9	-5.7	+0.6	+8.9	0.0	283.7	17.2	271.5	28.7
6	+3.1	-0.1	+2.5	+0.7	-2.0	+1.0	+2.4	+1.3	+1.6	-1.9	293.6	11.9	272.1	24.2
7	+2.8	-0.3	-3.5	+0.4	+4.8	-0.3	-2.1	-1.3	-8.3	-0.7	325.4	5.6	272.9	19.6
8	+2.1	-0.5	-1.5	-0.8	-0.3	+1.1	-3.1	+1.2	-4.6	+1.7	53.4	6.3	273.8	14.9
9	+1.1	-0.6	+3.9	-0.2	-0.6	-1.1	+6.3	-0.3	+6.7	+1.3	79.8	12.7	274.9	10.1
10	0.0	-0.7	+0.5	+0.9	+1.5	+1.0	-5.1	-0.8	+7.1	-1.2	88.8	18.0	284.	5.2
11	-1.1	-0.6	-4.0	0.0	-2.3	-1.0	+0.5	+1.4	-4.1	-1.7	94.3	20.8	356.	1.4
12	-2.1	-0.5	+0.6	-0.9	+3.0	+0.9	+4.5	-1.0	-8.6	+0.6	99.1	20.7	74.	5.1
13	-2.8	-0.3	+3.9	+0.3	-3.7	-0.7	-6.4	-0.1	+1.0	+2.0	104.7	17.7	81.4	9.9
14	-3.1	-0.1	-1.7	+0.8	+4.2	+0.6	+3.9	+1.1	+8.9	+0.1	114.1	12.6	84.1	14.7
15	-3.0	+0.2	-3.4	-0.5	-4.6	-0.4	+1.2	-1.4	+2.2	-1.9	140.2	6.6	85.5	19.4
16	-2.5	+0.4	+2.6	-0.7	+4.9	+0.2	-5.5	+0.7	-8.1	-0.8	221.1	5.6	86.4	24.1
17	-1.7	+0.6	+2.7	+0.7	-5.0	0.0	+6.1	+0.4	-5.2	+1.6	255.8	11.4	86.9	28.6
18	-0.6	+0.7	-3.4	+0.5	+4.9	-0.2	-2.5	-1.3	+6.2	+1.4	266.8	16.7	87.4	32.8
19	+0.5	+0.7	-1.7	-0.8	-4.7	+0.4	-2.8	+1.3	+7.4	-1.1	273.0	19.9	87.7	36.7
20	+1.6	+0.6	+3.8	-0.3	+4.3	-0.6	+6.2	-0.4	-3.5	-1.8	278.3	20.0	88.0	40.5
21	+2.5	+0.4	+0.7	+0.9	-3.8	+0.7	-5.3	-0.8	-8.7	+0.4	284.5	17.1	88.3	44.0
22	+3.0	+0.2	-4.0	0.0	+3.2	-0.9	+0.9	+1.4	+0.4	+2.0	295.2	11.6	88.5	47.1
23	+3.1	0.0	+0.4	-0.9	-2.5	+1.0	+4.2	-1.1	+8.8	+0.3	330.6	5.5	88.7	50.0
24	+2.9	-0.3	+3.9	+0.2	+1.7	-1.1	-6.4	0.0	+2.9	-1.9	55.2	6.7	88.9	52.5
25	+2.2	-0.5	-1.5	+0.8	-0.8	+1.1	+4.3	+1.1	-7.8	-1.0	80.0	13.1	89.0	54.6
26	+1.3	-0.7	-3.5	-0.5	-0.1	-1.1	+0.8	-1.4	-5.7	-1.6	88.9	18.2	89.2	56.3
27	+0.1	-0.7	+2.5	-0.7	+1.0	+1.1	-5.3	+0.8	+5.7	-1.6	94.6	20.8	89.4	57.7
28	-1.0	-0.7	+2.8	+0.7	-1.8	-1.1	+6.2	+0.4	+7.8	-1.0	99.6	20.5	89.6	58.7
29	-2.0	-0.6	-3.3	+0.5	+2.6	+1.0	-2.9	-1.3	-2.9	-1.9	105.6	17.5	89.7	59.3
30	-2.7	-0.4	-1.9	-0.8	-3.3	-0.9	-2.4	+1.4	-8.8	+0.3	115.7	12.3	89.9	59.5
31	-3.1	-0.1	+3.8	-0.3	+3.9	+0.7	+6.0	-0.5	-0.3	+2.1	144.5	6.4	90.0	59.3
Sept. 1	-3.1	+0.2	+0.9	+0.9	-4.4	-0.5	-5.6	-0.7	+8.7	+0.4	224.0	6.0	90.2	58.6
2	-2.6	+0.4	-4.0	+0.1	+4.8	+0.3	+1.3	+1.5	+3.5	-1.9	256.1	11.8	90.4	57.6
3	-1.8	+0.6	+0.2	-0.9	-5.0	+0.1	+3.9	-1.2	-7.5	-1.1	266.9	17.0	90.6	56.3
4	-0.8	+0.7	+4.0	+0.2	+5.0	-0.1	-6.4	+0.1	-6.2	+1.5	273.3	20.0	90.8	54.5

		Mimas.		Encel.		Tethys.		Dione.		Rhea.		Titan.		Japetus.	
		x	y	x	y	x	y	x	y	x	y	pos.	dist.	pos.	dist.
1875															
Sept.	5	+0.4	+0.7	-1.3	+0.9	-4.9	+0.8	+4.5	+1.1	+5.2	+1.7	278.8	19.9	91.0	52.4
	6	+1.5	+0.7	-3.6	-0.4	+4.6	-0.3	+0.4	-1.5	+8.1	-0.9	285.3	16.8	91.5	50.0
	7	+2.4	+0.5	+2.3	-0.8	-4.2	+0.7	-5.1	+0.9	-2.3	-2.0	296.9	11.3	91.5	47.3
	8	+3.0	+0.3	+2.9	+0.6	+3.6	-0.8	+6.3	+0.3	-3.9	+0.2	335.6	5.4	91.8	44.2
	9	+3.1	0.0	-3.1	+0.6	-2.9	+1.0	-8.2	-1.3	-0.9	+2.1	56.7	7.2	92.2	40.9
	10	+2.9	-0.3	-2.1	-0.8	+2.1	-1.1	-2.0	+1.4	+8.6	+0.6	80.2	13.4	92.6	37.3
	11	+2.3	-0.5	+3.7	-0.4	-1.3	+1.1	+5.9	-0.6	+4.1	-1.9	89.1	18.4	93.1	33.5
	12	+1.4	-0.7	+1.0	+0.9	+0.4	-1.2	-5.7	-0.7	-7.1	-1.3	94.9	20.9	93.8	29.5
	13	+0.3	-0.7	-4.0	+0.1	+0.5	+1.2	+1.7	-1.5	-6.6	+1.4	100.1	20.4	94.7	25.4
	14	-0.8	-0.7	+0.1	-1.0	-1.3	-1.1	+3.5	-1.3	+4.7	+1.8	106.4	17.3	95.9	21.0
	15	-1.9	-0.6	+4.0	+0.1	+2.2	+1.1	-6.3	+0.2	+8.3	-0.8	117.2	12.0	97.5	16.6
	16	-2.6	-0.4	-1.2	+0.9	-2.9	-1.0	+4.8	+1.0	-1.6	-2.1	143.6	6.2	100.9	12.1
	17	-3.1	-0.1	-3.7	-0.4	+3.6	+0.8	0.0	-1.3	-8.9	0.0	226.3	6.4	108.	7.6
	18	-3.1	+0.1	+2.2	-0.8	-4.2	-0.7	-4.8	+1.0	-1.6	+2.1	256.4	12.2	133.	3.4
	19	-2.7	+0.4	+3.1	+0.6	+4.6	+0.5	+6.3	+0.2	+8.3	+0.8	267.1	17.3	233.	3.2
	20	-2.0	+0.6	-3.0	+0.6	-4.9	-0.3	-3.5	-1.3	+4.6	-1.8	273.5	20.0	251.	7.3
	21	-0.9	+0.7	-2.2	-0.8	+5.0	+0.1	-1.7	+1.5	-6.7	-1.4	279.2	19.9	258.5	11.8
	22	+0.2	+0.8	+3.6	-0.4	-5.0	+0.1	+5.7	-0.7	-7.1	+1.3	286.0	16.6	261.9	16.3
	23	+1.3	+0.7	+1.2	+0.9	+4.8	-0.4	-5.9	-0.6	+4.1	+1.9	298.3	11.0	263.8	20.7
	24	+2.2	+0.5	-4.0	+0.2	-4.4	+0.6	+2.0	+1.5	+8.6	-0.6	339.8	5.3	265.0	25.1
	25	+2.9	+0.3	-0.1	-1.0	+3.9	-0.7	+3.2	-1.3	-1.0	-2.1	57.9	7.5	265.9	29.3
	26	+3.1	0.0	+4.0	+0.1	-3.3	+0.9	-6.3	+0.3	-8.9	-0.2	80.4	13.7	266.6	33.3
	27	+3.0	-0.2	-1.0	+0.3	+2.6	-1.0	+5.0	+1.0	-2.3	+2.1	89.3	18.7	267.1	37.1
	28	+2.4	-0.5	-3.7	-0.4	-1.8	+1.1	-0.4	-1.5	+8.1	+0.9	95.1	20.9	267.5	40.7
	29	+1.6	-0.7	+2.2	-0.8	+1.0	-1.2	-4.6	+1.1	+5.2	-1.8	100.4	20.4	267.9	44.1
	30	+0.5	-0.8	+3.2	+0.6	-0.1	+1.2	+6.4	+0.1	-6.2	-1.6	107.0	17.1	268.2	47.3
Octbr.	1	-0.7	-0.7	-2.9	+0.7	-0.8	-1.2	-3.8	-1.2	-7.5	+1.2	113.4	11.8	268.5	50.2
	2	-1.7	-0.6	-2.4	-0.8	+1.6	+1.2	-1.3	+1.5	+3.5	+2.0	151.8	6.1	268.8	52.7
	3	-2.5	-0.5	+3.6	-0.5	-2.5	-1.1	+5.6	-0.8	+8.7	-0.5	227.9	6.7	269.0	54.9
	4	-3.0	-0.2	+1.4	+0.3	+3.2	+0.3	-6.0	-0.5	-0.3	-2.2	256.6	12.4	269.3	56.8
	5	-3.1	+0.1	-3.9	+0.2	-3.8	-0.8	+2.4	+1.5	-8.8	-0.3	267.2	17.4	269.5	58.4
	6	-2.8	+0.4	-0.3	-1.0	+4.3	+0.6	+2.9	-1.4	-2.9	+2.1	273.7	20.1	269.7	59.6
	7	-2.1	+0.6	+4.0	+0.1	-4.7	-0.4	-6.2	+0.4	+7.8	+1.1	279.5	19.8	269.9	60.5
	8	-1.1	+0.7	-0.8	+1.0	+4.9	+0.2	+5.3	+0.9	+5.8	-1.7	286.5	16.5	270.1	61.1
	9	0.0	+0.8	-3.8	-0.3	-5.0	0.0	-0.7	-1.6	-5.6	-1.7	229.3	10.9	270.3	61.2
	10	+1.1	+0.7	+1.9	-0.9	+4.9	-0.2	-4.3	+1.2	-7.8	+1.1	342.8	5.3	270.5	61.0
	11	+2.1	+0.6	+3.3	+0.6	-4.7	+0.4	+6.4	0.0	+2.8	+2.1	58.8	7.7	270.7	60.4
	12	+2.8	+0.4	-2.8	+0.7	+4.3	-0.6	-4.1	-1.2	+8.9	-0.3	80.6	13.9	270.9	59.5
	13	+3.1	+0.1	-2.5	-0.8	-3.8	+0.8	-1.0	+1.6	+0.4	-2.2	89.4	18.7	271.1	58.2
	14	+3.0	-0.2	+3.5	-0.5	+3.1	-1.0	+5.4	-0.8	-8.7	-0.5	95.3	20.9	271.3	56.5
	15	+2.6	-0.4	+1.5	+0.9	-2.4	+1.1	-6.1	-0.4	-3.6	+2.0	100.7	20.3	271.5	54.5
	16	+1.7	-0.6	-3.9	+0.2	+1.6	-1.2	+2.7	+1.4	+7.4	+1.2	107.4	17.0	271.8	52.1
	17	+0.7	-0.8	-0.4	-1.0	-0.7	+1.2	+2.6	-1.4	+6.3	-1.6	119.1	11.6	272.0	49.5
	18	-0.4	-0.8	+4.0	0.0	-0.2	-1.2	-6.1	+0.5	-5.1	-1.8	153.6	6.1	272.4	46.5
	19	-1.5	-0.7	-0.7	+1.0	+1.1	+1.2	+5.4	+0.8	-8.3	+0.9	229.0	6.8	272.8	43.2
	20	-2.4	-0.5	-3.8	-0.3	-1.9	-1.1	-1.1	-1.6	+2.1	+2.1	256.9	12.6	273.2	39.6
	21	-3.0	-0.3	+1.8	-0.9	+2.7	+1.0	-4.1	+1.2	+8.9	-0.1	267.3	17.5	273.7	35.8
	22	-3.1	0.0	+3.3	+0.6	-3.4	-0.9	+6.4	0.0	+1.2	-2.2	273.9	20.1	274.3	31.8

	Mimas.		Encel.		Tethys.		Dione.		Rhea.		Titan.		Japetus.	
1875	x	y	x	y	x	y	x	y	x	y	pos.	dist.	pos.	dist.
Octb.23	-2.9	+0.3	-2.7	+0.7	+4.0	+0.7	-4.4	-1.2	-8.5	-0.7	279 ^o 6	19.8	275 ^o 1	27.6
24	-2.3	+0.5	-2.6	-0.8	-4.5	-0.6	-0.7	+1.6	-4.3	+1.9	286.7	16.4	276.2	23.2
25	-1.4	+0.7	+3.4	-0.5	+4.8	+0.4	+5.2	-0.9	+6.9	+1.4	299.7	10.8	277.9	18.7
26	-0.2	+0.8	+1.6	+0.9	-5.0	-0.1	-6.2	-0.4	+6.8	-1.4	344.2	5.3	280.6	14.0
27	+0.9	+0.7	-3.9	+0.3	+5.0	-0.1	+3.0	+1.4	-4.4	-1.9	59.3	7.8	286.0	9.4
28	+1.9	+0.6	-0.6	-1.0	-4.8	+0.3	+2.3	-1.5	-8.4	+0.7	80.7	14.0	302.	4.9
29	+2.7	+0.4	+4.0	0.0	+4.6	-0.5	-6.0	+0.5	+1.3	+2.2	89.5	18.7	16.	2.6
30	+3.1	+0.1	-0.6	+1.0	-4.1	+0.7	+5.6	+0.8	+8.9	+0.1	95.3	20.9	66.	6.1
31	+3.1	-0.1	-3.9	-0.3	+3.6	-0.9	-1.4	-1.5	+1.9	-2.1	100.7	20.3	76.9	10.7
Novbr.1	+2.7	-0.4	+1.6	-0.9	-2.9	+1.0	-3.8	+1.3	-8.2	-0.9	107.4	16.9	81.2	15.4
2	+1.9	-0.6	+3.4	+0.5	+2.2	-1.1	+6.4	-0.1	-4.9	+1.8	119.2	11.6	83.5	19.9
3	+0.9	-0.7	-2.6	+0.8	-1.3	+1.2	-4.6	-1.1	+6.4	+1.5	154.0	6.0	85.0	24.4
4	-0.2	-0.8	-2.7	-0.7	+0.5	-1.2	-0.3	+1.6	+7.3	-1.3	229.4	6.8	85.9	28.7
5	-1.3	-0.7	+3.3	-0.5	+0.4	+1.2	+5.0	-1.0	-3.7	-2.0	257.0	12.6	86.7	32.9
6	-2.2	-0.5	+1.8	+0.9	-1.3	-1.2	-6.3	-0.3	-8.7	+0.5	267.4	17.5	87.3	36.8
7	-2.9	-0.3	-3.8	+0.3	+2.1	+1.1	+3.2	+1.4	+0.6	+2.2	273.9	20.1	87.8	40.5
8	-3.1	0.0	-0.7	-1.0	-2.9	-1.0	+2.0	-1.5	+8.9	+0.3	279.6	19.8	88.2	43.9
9	-3.0	+0.2	+4.0	0.0	+3.6	+0.9	-5.9	+0.6	+2.7	-2.1	286.6	16.4	88.5	47.0
10	-2.4	+0.5	-0.4	+1.0	-4.1	-0.7	+5.7	+0.7	-7.9	-1.0	299.5	10.8	88.8	49.8
11	-1.6	+0.7	-3.9	-0.2	+4.5	+0.5	-1.6	-1.5	-5.6	+1.7	343.9	5.2	89.0	52.3
12	-0.5	+0.8	+1.5	-0.9	-4.8	-0.3	-3.6	+1.3	+5.8	+1.6	59.5	7.8	89.3	34.4
13	+0.6	+0.7	+3.5	+0.5	+5.0	+0.1	+6.3	-0.2	+7.7	-1.1	80.8	14.0	89.5	56.1
14	+1.7	+0.6	-2.5	+0.8	-5.0	+0.1	-4.8	-1.0	-3.0	-2.0	89.5	18.7	89.7	57.5
15	+2.5	+0.5	-2.8	-0.7	+4.8	-0.3	-0.1	1.5	-8.8	+0.3	95.3	20.9	89.9	58.5
16	+3.0	+0.2	+3.3	-0.6	-4.5	+0.5	+4.9	1.0	6.2 +2.2		100.6	20.3	90.1	59.1
17	+3.1	-0.1	+1.9	+0.9	+4.0	-0.7	-6.3	-0.2	+8.7	+0.4	107.2	17.0	90.3	59.4
18	+2.8	-0.3	-3.8	+0.3	-3.4	+0.9	+3.5	+1.3	+3.4	-2.0	118.7	11.6	90.4	59.3
19	+2.1	-0.6	-0.8	-1.0	+2.7	-1.0	+1.8	-1.5	-7.5	-1.2	152.8	6.0	90.6	58.8
20	+1.2	-0.7	+4.0	-0.1	-2.0	+1.1	-5.8	+0.7	-6.2	+1.6	229.2	6.7	90.8	57.9
21	+0.1	-0.8	-0.3	+1.0	+1.1	-1.2	+5.8	+0.6	+5.2	+1.7	257.1	12.5	91.0	56.7
22	-1.0	-0.7	-3.9	-0.2	-0.3	+1.2	-1.9	-1.5	+8.1	-0.9	266.4	17.5	91.1	55.1
23	-2.0	-0.6	+1.4	-0.9	-0.6	-1.2	-3.4	+1.3	-2.3	-2.1	273.8	20.1	91.3	53.2
24	-2.8	-0.4	+3.5	+0.5	+1.5	+1.1	+6.3	-0.3	-8.9	+0.1	279.4	19.8	91.5	50.9
25	-3.1	-0.1	-2.4	+0.8	-2.3	-1.1	-4.9	-1.0	-1.0	+2.1	286.2	16.5	91.8	48.3
26	-3.1	+0.2	-2.8	-0.7	+3.0	+0.9	+0.2	+1.5	+8.5	+0.6	298.7	10.8	92.0	45.5
27	-2.6	+0.4	+3.2	-0.6	-3.7	-0.8	+4.7	-1.0	+4.2	-1.9	341.8	5.2	92.3	42.3
28	-1.8	+0.6	+1.9	+0.8	+4.2	+0.6	-6.4	-0.2	-7.0	-1.3	59.3	7.6	92.6	39.0
29	-0.8	+0.7	-3.8	+0.3	-4.6	-0.5	+3.7	+1.2	-6.7	+1.4	80.9	13.8	93.0	35.4
30	+0.4	+0.7	-1.0	-0.9	+4.9	+0.2	+1.5	-1.5	+4.5	+1.8	89.5	18.6	93.5	31.6
Decbr.1	+1.4	+0.7	+4.0	-0.1	-5.0	0.0	-5.7	+0.7	+8.4	-0.7	95.1	20.9	94.1	27.6
2	+2.3	+0.5	-0.2	+1.0	+4.9	-0.2	+5.9	+0.6	-1.4	-2.1	100.3	20.3	95.0	23.4
3	+2.9	+0.3	-3.9	-0.2	-4.7	+0.4	-2.1	-1.4	-8.9	0.0	106.6	17.1	96.2	19.1
4	+3.1	0.0	+1.4	-0.9	+4.4	-0.6	-3.1	+1.3	-1.8	+2.1	117.6	11.7	98.1	14.8
5	+2.9	-0.3	+3.6	+0.4	-3.9	+0.7	+6.3	-0.3	+8.3	+0.8	150.1	6.0	101.6	10.4
6	+2.3	-0.5	-2.4	+0.8	+3.3	-0.9	-5.1	-0.9	+4.9	-1.8	228.4	6.4	110.	6.0
7	+1.5	-0.6	-2.9	-0.6	-2.6	+1.0	+0.4	+1.5	-6.5	-1.4	257.1	12.3	154.	2.3
8	+0.4	-0.7	+3.2	-0.6	+1.8	-1.1	+4.5	-1.1	-7.3	+1.2	267.4	17.3	240.	4.1
9	-0.8	-0.7	+2.0	+0.8	-1.0	+1.1	-6.4	-0.1	+3.8	+1.9	273.7	20.1	256.1	8.4

By means of the data supplied in the following tables the coordinates of the five inner satellites may be found for any time within the limits of the ephemerides. The first table gives, for 20^h Gr. Sid Time of every 5th day, the longitudes of the five satellites in their orbits

reckoned from the points, which are in superior conjunction with the planet's centre, and it gives also in the last column the sine of the Earth's latitude above the plane of the ring.

20 ^h Gr.Sd.T.	Mimas.	Enceladus.	Tethys.	Dione.	Rhea.	b
June 20	188 ^o 36	320 ^o 65	35 ^o 06	20 ^o 19	31 ^o 99	0.1959
25	293.39	1905 ^o 03	266.14	656 ^o 06	397 ^o 52	.1971
30	38.43	.04	137.25	.08	69.51	.1987
July 5	143.50	.07	8.39	.11	107.06	.1987
10	248.58	.08	239.55	.14	144.63	.2005
15	353.68	.10	110.73	.16	182.23	.2026
20	98.79	.11	341.93	.18	219.86	.2049
25	203.91	.12	213.14	.20	257.51	.2073
30	309.03	.12	84.37	.21	295.18	.2099
Aug. 4	54.16	.13	315.60	.23	302.86	.2127
9	159.28	.12	186.84	.23	10.55	.2155
14	264.38	.10	58.07	.24	48.26	.2184
19	9.47	.09	289.30	.23	85.97	.2213
24	114.55	.08	160.52	.22	123.67	.2242
29	219.60	.05	31.72	.22	161.37	.2270
Sept. 3	324.62	1905.02	262.90	.20	199.06	.2298
8	69.61	1904.99	134.06	.18	236.73	.2324
13	174.57	.96	5.19	.16	274.38	.2348
18	279.49	.92	236.30	.13	312.01	.2371
23	24.36	.87	107.36	.11	349.62	.2392
28	129.19	.83	338.39	.06	27.20	.2410
Oct. 3	233.98	.79	209.39	.03	64.74	.2426
8	338.74	.76	80.35	51.00	102.25	.2439
13	83.46	.72	311.27	950.96	139.73	.2449
18	188.13	.67	182.15	.92	177.17	.2456
23	292.73	.60	52.97	.88	214.56	.2461
28	37.28	.55	283.75	.82	251.91	.2462
Nov. 2	141.80	.52	154.49	.78	289.22	.2460
7	246.29	.49	25.20	.74	326.49	.2455
12	350.72	.43	255.86	.71	3.73	.2446
17	95.13	.41	126.49	.66	40.93	.2435
22	199.50	.37	357.08	.63	78.08	.2420
27	303.83	.33	227.64	.59	115.20	.2403
Dec. 2	48.13	.30	98.17	.56	152.28	.2383
7	152.41	1904.28	328.66	.53	189.33	.2360
		226.18	1309.64	950.49	397.02	0.2335
				3.86	226.35	

These values are to be interpolated for the times, for which the coordinates are required, and the resulting longitudes are then the arguments of the tables on the next page, which furnish the coordinates x and (y) , x corresponding to the sine and (y) to the cosine of the argument. The values of (y) multiplied by the factor b of the previous table give then the required coordinates y .

It is to be remarked, that three Washington ob-

servations of Mimas, made by Prof. *Newcomb* on Sept. 2, 26, and Oct. 15, 1874, do not accord with the assumed longitudes on which the ephemeris of the satellite in Nr. 1999 depends, but seem to indicate an error amounting to nearly $\frac{1}{10}$ day's motion. As a preliminary revision has failed to show the source of any such error in my computations and as at present I do not know, how to account for the discrepancy, I have thought it better not to make any alteration in this

year's ephemeris of Mimas, but merely to point out, that, according to the Washington observations, the predicted places may have to be considered, as valid, not for 20^h, but for about 22^h 4 Greenwich Sider. Time. It is to be hoped, that the coming months will yield

a sufficient number of perfectly trustworthy observations, excluding any possible doubt of the real Mimas having been observed, so that the existing uncertainty may be traced to its source and may at least not reappear in next year's ephemeris.

	Mimas.		Encel.		Tethys.		Dione.		Rhea.		
°	x	(y)	x	(y)	x	(y)	x	(y)	x	(y)	°
0	0.00	3.14	0.00	4.03	0.00	4.99	0.00	6.40	0.00	8.93	90
1	.05	3.14	.07	4.03	.09	4.99	.11	6.39	.16	8.93	89
2	.11	3.14	.14	4.03	.17	4.99	.22	6.39	.31	8.93	88
3	.17	3.14	.21	4.03	.26	4.99	.33	6.39	.47	8.92	87
4	.22	3.13	.28	4.02	.35	4.98	.45	6.38	.62	8.91	86
5	.27	3.13	.35	4.02	.44	4.97	.56	6.37	.78	8.90	85
6	.33	3.12	.42	4.01	.52	4.97	.67	6.36	0.93	8.88	84
7	.38	3.12	.49	4.00	.61	4.96	.78	6.35	1.09	8.87	83
8	.44	3.11	.56	3.99	.69	4.94	0.89	6.33	1.24	8.84	82
9	.49	3.10	.63	3.98	.78	4.93	1.00	6.32	1.40	8.82	81
10	0.55	3.09	0.70	3.97	0.87	4.92	1.11	6.30	1.55	8.80	80
11	.60	3.08	.77	3.96	0.95	4.90	1.22	6.28	1.70	8.77	79
12	.65	3.07	.84	3.94	1.04	4.88	1.33	6.26	1.86	8.74	78
13	.71	3.06	.91	3.93	1.12	4.86	1.44	6.23	2.01	8.70	77
14	.76	3.05	0.98	3.91	1.21	4.84	1.55	6.21	2.16	8.67	76
15	.81	3.03	1.04	3.89	1.29	4.82	1.66	6.18	2.31	8.63	75
16	.87	3.02	1.11	3.88	1.38	4.80	1.76	6.15	2.46	8.59	74
17	.92	3.00	1.18	3.86	1.46	4.77	1.87	6.12	2.61	8.54	73
18	0.97	2.99	1.25	3.83	1.54	4.75	1.98	6.08	2.76	8.49	72
19	1.02	2.97	1.31	3.81	1.63	4.72	2.08	6.05	2.91	8.45	71
20	1.07	2.95	1.38	3.79	1.71	4.69	2.19	6.01	3.05	8.39	70
21	1.13	2.93	1.44	3.76	1.79	4.66	2.29	5.97	3.20	8.34	69
22	1.18	2.91	1.51	3.74	1.87	4.63	2.40	5.93	3.35	8.28	68
23	1.23	2.89	1.58	3.71	1.95	4.60	2.50	5.89	3.49	8.22	67
24	1.28	2.87	1.64	3.68	2.03	4.56	2.60	5.84	3.63	8.16	66
25	1.33	2.85	1.70	3.65	2.11	4.52	2.70	5.80	3.77	8.10	65
26	1.38	2.82	1.77	3.62	2.19	4.49	2.80	5.75	3.92	8.03	64
27	1.43	2.80	1.83	3.59	2.27	4.45	2.90	5.70	4.06	7.96	63
28	1.48	2.77	1.89	3.56	2.34	4.41	3.00	5.65	4.19	7.87	62
29	1.52	2.75	1.95	3.53	2.42	4.37	3.10	5.59	4.33	7.81	61
30	1.57	2.72	2.02	3.49	2.50	4.32	3.20	5.54	4.47	7.74	60
31	1.62	2.69	2.08	3.46	2.57	4.28	3.29	5.48	4.60	7.66	59
32	1.66	2.66	2.14	3.42	2.65	4.23	3.39	5.42	4.73	7.57	58
33	1.71	2.63	2.20	3.38	2.72	4.19	3.48	5.36	4.86	7.49	57
34	1.76	2.60	2.25	3.34	2.79	4.14	3.58	5.30	4.99	7.40	56
35	1.80	2.57	2.31	3.30	2.86	4.09	3.67	5.24	5.12	7.32	55
36	1.85	2.54	2.37	3.26	2.93	4.04	3.76	5.17	5.25	7.23	54
37	1.89	2.51	2.43	3.21	3.00	3.99	3.85	5.11	5.38	7.13	53
38	1.93	2.48	2.48	3.18	3.07	3.93	3.94	5.04	5.50	7.04	52
39	1.98	2.44	2.54	3.13	3.14	3.88	4.02	4.97	5.62	6.94	51
40	2.02	2.41	2.59	3.09	3.21	3.82	4.11	4.90	5.74	6.84	50
41	2.06	2.37	2.65	3.04	3.28	3.77	4.20	4.83	5.86	6.74	49
42	2.10	2.33	2.70	3.00	3.34	3.71	4.28	4.75	5.98	6.64	48

	Mimas.		Encel.		Tethys.		Dione.		Rhea.		
°	x	(y)	x	(y)	x	(y)	x	(y)	x	(y)	°
43	2.14	2.30	2.75	2.35	3.40	3.65	4.36	4.68	6.09	6.53	47
44	2.18	2.26	2.80	2.90	3.47	3.59	4.44	4.60	6.20	6.43	46
45	2.22	2.22	2.85	2.85	3.53	3.53	4.52	4.52	6.32	6.32	45
	(y)	x	(y)	x	(y)	x	(y)	x	(y)	x	

The predicted places of Enceladus, Tethys, Dione, Rhea and Titan are likely to be found substantially correct for observatory purposes.

In the case of Japetus, the uncertainty of the ephemeris, owing to the great want of proper observations, is not inconsiderable, but practically it is not likely to cause any inconvenience, except near the conjunctions of the satellite with the planet. In looking over the ephemeris, astronomers will at once perceive the great importance of observing Japetus during the present apparition and it is to be hoped, that those observers, who have suitable instruments at their disposal, will not neglect any opportunities for securing series of thoroughly trustworthy observations, especially about the times of the conjunctions and greatest elongations. The following rectangular coordinates furnish the places of the satellite on the days preceding and following the conjunctions, it being understood, that it is uncertain, to what time of the day (within several hours of 20^h Gr. Sid. T.) they really refer.

1875	Infer. conj.		Super. conj.	
	x	y	x	y
June 30	+ 9.78	+0.89	Aug. 9	-10.05 +0.01
July 1	+ 5.18	+0.24	10	- 5.18 +0.68
2	+ 0.54	-0.41	11	- 0.27 +1.34
3	- 4.10	-1.07	12	+ 4.64 +1.99
4	- 8.72	-1.71	13	+ 9.52 +2.63
Sept. 17	+ 7.42	-1.45	Oct. 27	- 9.23 +1.47
18	+ 2.76	-2.04	28	- 4.42 +2.05
19	- 1.90	-2.62	29	+ 0.42 +2.61
20	- 6.56	-3.19	30	+ 5.25 +3.15
Dec. 5	+10.32	-0.85	31	+10.05 +3.68
6	+ 5.81	-1.39	Oct. 30 ? 19 ^h 5	Gr. Sid. T.
7	+ 1.27	-1.93	Middle of eclipse.	
8	- 3.27	-2.46	Decb. 8 ? 6 ^h Gr. Sid. T.	
9	- 7.81	-2.97	Transit of shadow.	

Ephemeris of Japetus from June 4 to 19.

20 ^h G. Sid. T.	pos.	dist.	pos.	dist.
June 4	88°7	46.5	June 10	88°8 58.5
5	88.7	49.4	11	88.8 59.2
6	88.7	51.9	12	88.8 59.6
7	88.7	54.1	13	88.8 59.5
8	88.7	56.0	14	88.8 59.0
9	88.8	57.4	15	88.9 58.2

20 ^h G. Sid. T.	pos.	dist.	pos.	dist.
June 16	88°9	57.0	June 18	89°0 53.5
17	88.9	55.4	19	89.0 51.2

Though Hyperion has now been known for already more than a quarter of a century, it is not feasible at present to give an ephemeris with any confidence. Without continued series of trustworthy observations (in case measures of distance should prove too uncertain or difficult, it will be preferable not to lose time over them, but to devote all the available time to measuring angles of position) the investigation of the intricate motions of Hyperion must remain a hopeless groping in the dark.

It is in the power of all observers, whose telescopes are sufficiently powerful to show Saturn's satellites fairly, to make valuable contributions towards our better knowledge of their motions by observing the times of the conjunctions of the satellites with the centre of the planet or the times of their passing in the direction of the minor axis of the ring. These observations require neither a first rate micrometer, nor a very firm mounting of the telescope, nor even a very exact knowledge of the clock-error, but demand merely patience and ordinary ability in estimating positions. The following list of the approximate times of the conjunctions will allow observers to be prepared for their chances and it is hoped, they will not let slip this year's favourable opportunities. The given times are expressed as fractions of the Greenw. Sider. hour, the dates being changed at mean noon. In the case of the inner satellites, the differences between the predicted approximate times and the real times of the conjunctions are not likely to exceed a quarter of an hour.

I should have been glad to add a list of all the stars near the track of Saturn, which might be mistaken for satellites, but have not had any opportunity for making the needed observations. Will not some observer be good enough, to prepare such a list for next year's track of Saturn? The computed conjunctions of Saturn with stars on July 14 and July 20 depend on the positions of the planet, given in the Naut. Alm., and on the places of the stars given in *Weisse's* catalogue.

Conjunctions of the satellites with the centre of Saturn.

1875. Greenw. Sider. Time. $x = 0.0$.

	y		y
June 20 10 ^h 3	Rh. +1.8	July 7 9 ^h 2	Titan +4.0
15.6	Te. +1.0	16.4	Te. +1.0
16.3	Di. +1.3	8 12.3	Di. -1.3
21 10.0	Titan +3.8	13.0	Rh. +1.8
14.3	Te. -1.0	15.1	Te. -1.9
1.2	Di. -1.3	9 13.8	Te. +1.0
22 13.0	Te. +1.0	21.2	Di. +1.3
16.7	Rh. -1.8	10 12.5	Te. -1.0
23 10.2	Di. +1.3	19.3	Rh. -1.8
11.7	Te. -1.0	6.1	Di. -1.3
24 10.4	Te. +1.0	11 11.2	Te. +1.0
19.1	Di. -1.3	12 9.9	Te. -1.0
23.0	Rh. +1.8	15.1	Di. +1.3
25 9.1	Te. -1.0	1.6	Rh. +1.8
4.0	Di. +1.3	13 8.6	Te. +1.9
26 7.8	Te. +1.0	0.0	Di. -1.3
5.4	Rh. -1.8	7.3	Te. -1.0
27 6.6	Te. -1.0	14 6.0	Te. +1.0
12.9	Di. -1.3	21.0 σ of h in AR.	
5.3	Te. +1.0	with *W.B. 21, 1153	
28 21.8	Di. +1.3	25''4 north	
4.0	Te. -1.0	15 8.0	Rh. -1.8
29 11.7	Rh. -1.8	8.9	Di. +1.3
14.2	Titan -4.1	13.2	Titan -4.2
2.7	Te. +1.0	4.7	Te. -1.0
30 6.8	Di. -1.3	16 17.8	Di. -1.3
1.4	Te. -1.0	3.4	Te. +1.0
July 1 15.7	Di. +1.3	17 14.3	Rh. +1.8
18.0	Rh. -1.8	2.2	Te. -1.0
0.1	Te. +1.0	2.7	Di. +1.3
2 ? 11. Japetus in		18 0.9	Te. +1.0
conj. w. foll. edge		19 11.6	Di. -1.3
of ring -0.2		20.6	Rh. -1.8
22.8	Te. -1.0	23.6	Te. -1.0
0.6	Di. -1.3	20 20.6	Di. +1.3
3 ? 11. Japetus in		22.3	Te. +1.0
conj. w. prec. edge		7.0 σ of h in AR.	
-0.8		with *W.B. 21, 1126	
21.5	Te. +1.0	*19''5 south	
0.3	Rh. +1.8	21 21.0	Te. -1.0
4 9.5	Di. +1.3	2.9	Rh. +1.9
20.2	Te. -1.0	5.5	Di. -1.3
5 18.5	Di. -1.3	22 19.7	Te. +1.0
18.9	Te. +1.0	23 8.1	Titan +4.1
6.7	Rh. -1.8	14.4	Di. +1.3
6 17.7	Te. -1.0	18.4	Te. -1.0
3.4	Di. +1.3	24 9.2	Rh. -1.9

	y		y
July 24 17 ^h 1	Te. +1.0	Aug. 14 12 ^h 7	Te. +1.1
23.3	Di. -1.3	13.1	Di. +1.4
25 15.8	Te. -1.0	15 11.4	Te. -1.1
8.2	Di. +1.3	22.0	Di. -1.4
26 14.5	Te. +1.1	0.4	Rh. -2.0
15.6	Rh. +1.9	16 10.1	Te. +1.1
27 13.2	Te. -1.1	10.5	Titan -4.6
17.1	Di. -1.3	6.9	Di. +1.4
28 11.9	Te. +1.1	8.8	Te. -1.1
21.9	Rh. -1.9	17 6.7	Rh. +2.0
2.1	Di. +1.4	7.5	Te. +1.1
29 10.6	Te. -1.1	18 15.8	Di. -1.4
30 9.4	Te. +1.1	6.2	Te. -1.1
11.0	Di. -1.4	19 0.7	Di. +1.4
4.2	Rh. +1.9	4.9	Te. +1.1
8.1	Te. -1.1	20 13.0	Rh. -2.0
31 11.9	Titan -4.4	3.6	Te. -1.1
19.9	Di. +1.4	9.6	Di. -1.4
6.8	Te. +1.1	21 19.1	Encel. +0.9
Aug. 1 4.8	Di. -1.4	close to the ball	
5.5	Te. -1.1	2.3	Te. +1.1
2 10.5	Rh. -1.9	22 11.6	En. -0.9
4.2	Te. +1.1	18.5	Di. +1.4
3 13.7	Di. +1.4	19.3	Rh. +2.0
2.9	Te. +1.1	1.0	Te. -1.1
4 16.8	Rh. +1.9	4.1	En. +0.9
22.6	Di. -1.4	23 20.6	En. -0.9
1.6	Te. +1.1	23.7	Te. +1.1
5 0.3	Te. -1.1	3.5	Di. -1.4
7.6	Di. +1.4	5.4	Titan +4.5
6 23.0	Te. +1.1	24 13.1	En. +0.9
23.1	Rh. -1.9	22.5	Te. -1.1
7 16.5	Di. -1.4	1.6	Rh. -2.0
21.7	Te. -1.1	5.5	En. -0.9
6.8	Titan +4.3	25 12.4	Di. +1.5
8 20.4	Te. +1.1	21.2	Te. +1.1
1.4	Di. +1.4	22.0	En. +0.9
5.4	Rh. +1.9	26 14.5	En. -0.9
9 19.1	Te. -1.1	19.9	Te. -1.1
10 10.3	Di. -1.4	21 3	Di. -1.5
17.8	Te. +1.1	7.0	En. +0.9
11 11.8	Rh. -2.0	7.9	Rh. +2.0
16.6	Te. -1.1	27 18.6	Te. +1.1
19.2	Di. +1.4	23.5	En. -0.9
? 21. Japetus +1.4		6.2	Di. +1.5
12 15.2	Te. +1.1	28 16.0	En. +0.9
4.1	Di. -1.4	17.3	Te. -1.1
13 14.0	Te. -1.1	8.4	En. -0.9
18.1	Rh. +2.0	29 14.2	Rh. -2.1

Aug. 29	15 ^h 1	Di.	-1.5	Sept. 10	9 ^h 7	En.	+1.0	Sept. 23	5 ^h 2	Te.	-1.2	Octbr. 6	1 ^h 0	Di.	-1.6
	16.0	Te.	+1.1		11 21.9	Te.	+1.2		10.9	En.	-1.0		1.8	Rh.	+2.2
	0.9	En.	+0.9		2.1	En.	-1.0		24 16.6	Di.	+1.5		11.1	Te.	-1.2
30	14.7	Te.	-1.1		4.2	Rh.	-2.1		3.1	Titan	+4.7		12.1	En.	+1.0
	17.4	En.	-0.9		8.3	Di.	-1.5		3.4	En.	+1.0	7	4.6	En.	-1.0
	0.0	Di.	+1.5	12	18.6	En.	+1.0		3.9	Te.	+1.2		9.9	Te.	+1.2
	9.9	En.	+0.9		20.6	Te.	-1.2	25	18.1	Rh.	-2.2		9.9	Di.	+1.6
31	13.4	Te.	+1.2		11.1	En.	-1.0		19.8	En.	-1.0	8	21.1	En.	+1.0
	20.6	Rh.	+2.1	13	17.2	Di.	+1.5		1.5	Di.	-1.5		8.2	Rh.	-2.2
	2.4	En.	-0.9		19.3	Te.	+1.2		2.6	Te.	-1.2		8.6	Te.	-1.2
	9.0	Titan	-4.8		3.6	En.	+1.0		12.3	En.	+1.0	9	13.6	En.	-1.0
	9.0	Di.	-1.5		10.5	Rh.	+2.1		26 1.3	Te.	+1.3		18.8	Di.	-1.6
Sept. 1	12.1	Te.	-1.2	14	18.1	Te.	-1.2		4.8	En.	-1.0		6.1	En.	+1.0
	18.9	En.	+0.9		20.1	En.	-1.0		10.5	Di.	+1.5		7.3	Te.	+1.2
2	10.8	Te.	+1.2		2.2	Di.	-1.5		27 21.3	En.	+1.0	10	22.6	En.	-1.0
	11.4	En.	-0.9	15	12.6	En.	+1.0		0.0	Te.	-1.2		2.3	Titan	+4.8
	17.9	Di.	+1.5		16.8	Te.	+1.2		0.5	Rh.	+2.2		3.7	Di.	+1.6
	2.9	Rh.	-2.1		5.0	En.	-1.0		28 13.8	En.	-1.0		6.0	Te.	-1.2
	3.8	En.	+0.9		11.1	Di.	+1.5		19.4	Di.	-1.6	11	14.5	Rh.	+2.2
	9.5	Te.	-1.2	16	15.5	Te.	-1.2		22.7	Te.	+1.2		15.0	En.	+1.0
3	20.3	En.	-0.9		16.8	Rh.	-2.1		6.3	En.	+1.0		4.7	Te.	+1.2
	2.8	Di.	-1.5		21.5	En.	+1.0		29 21.4	Te.	-1.2		7.5	En.	-1.0
	8.2	Te.	+1.2		7.7	Titan	-4.9		22.8	En.	-1.0		12.7	Di.	-1.6
4	12.8	En.	+0.9	17	14.0	En.	-1.0		4.3	Di.	+1.6	12	0.0	En.	+1.0
	5.3	En.	-0.9		14.2	Te.	+1.2		6.8	Rh.	-2.2		3.4	Te.	-1.2
	7.0	Te.	+1.2		20.0	Di.	-1.5		30 15.3	En.	+1.0	13	16.5	En.	-1.0
	9.2	Rh.	+2.1		6.5	En.	+1.0		20.2	Te.	+1.2		20.9	Rh.	-2.2
5	11.7	Di.	+1.5	18	12.9	Te.	-1.2		7.7	En.	-1.0		21.6	Di.	+1.6
	21.8	En.	+0.9		23.0	En.	-1.0	Octbr. 1	13.2	Di.	-1.6		2.1	Te.	+1.2
	5.7	Te.	+1.2		23.1	Rh.	+2.1		18.8	Te.	-1.2		9.0	En.	+1.0
6	14.3	En.	-0.9		4.9	Di.	+1.5		0.2	En.	+1.0	14	0.9	Te.	-1.2
	20.6	Di.	-1.5		? 10. Japetus	-2.4			2 13.1	Rh.	+2.2		1.5	En.	-1.0
	4.4	Te.	-1.2		11.6	Te.	+1.2		16.7	En.	-1.0		6.5	Di.	-1.6
	6.7	En.	+0.9	19	15.5	En.	+1.0		17.6	Te.	+1.2	15	18.0	En.	+1.0
7	15.5	Rh.	-2.1		8.0	En.	-1.0		22.2	Di.	+1.6		23.6	Te.	+1.2
	23.2	En.	-0.9		10.3	Te.	-1.2		6.8	Titan	-5.0		3.2	Rh.	+2.2
	3.1	Te.	+1.2	20	13.8	Di.	-1.5		9.2	En.	+1.0		10.5	En.	-1.0
	5.6	Di.	+1.5		0.4	En.	+1.0		3 16.3	Te.	-1.2	16	15.5	Di.	+1.6
8	15.7	En.	+0.9		5.5	Rh.	-2.1		1.7	En.	-1.0		22.3	Te.	-1.2
	1.8	Te.	-1.2		9.0	Te.	+1.2		7.1	Di.	-1.6		2.9	En.	+1.0
	4.2	Titan	+4.6	21	16.9	En.	-1.0		4 15.0	Te.	+1.2	17	19.4	En.	-1.0
	8.2	En.	-0.9		22.8	Di.	+1.5		18.2	En.	+1.0		21.0	Te.	+1.2
9	14.5	Di.	-1.5		7.7	Te.	-1.2		19.5	Rh.	-2.2		0.4	Di.	-1.6
	21.8	Rh.	+2.1		9.4	En.	+1.0		10.7	En.	-1.0		9.6	Rh.	-2.2
	0.5	Te.	+1.2	22	1.9	En.	-1.0	5	13.7	Te.	-1.2		11.9	En.	+1.0
	0.7	En.	+0.9		6.5	Te.	+1.2		16.0	Di.	+1.6	18	19.7	Te.	-1.2
10	17.2	En.	-1.0		7.7	Di.	-1.5		3.2	En.	+1.0		4.4	En.	-1.0
	23.2	Te.	-1.2		11.8	Rh.	+2.2		12.4	Te.	+1.2		6.1	Titan	-5.1
	23.4	Di.	+1.5	23	18.4	En.	+1.0		6 19.6	En.	-1.0		9.3	Di.	+1.6

		y			y		
Octbr. 19	18 ^b 4	Te.	+1.2	Octbr. 31	1 ^b 8	Te.	-1.2
	20.9	En.	+1.0		5.7	En.	+1.0
	13.4	En.	-1.0	Nowbr. 1	22.2	En.	-1.0
20	15.9	Rh.	+2.2		0.5	Te.	+1.2
	17.2	Te.	-1.2		2.7	Di.	+1.6
	18.3	Di.	-1.6		14.7	En.	+1.0
	5.9	En.	+1.0	2	23.2	Te.	-1.2
21	15.9	Te.	+1.2		6.1	Rh.	+2.2
	22.4	En.	-1.0		7.2	En.	-1.0
	8.2	Di.	+1.6		11.6	Di.	-1.6
22	14.6	Te.	-1.2	3	21.9	Te.	+1.2
	14.9	En.	+1.0		23.7	En.	+1.0
	22.3	Rh.	-2.2		6.0	Titan	-5.1
	7.3	En.	-1.0	4	16.2	En.	-1.0
	12.1	Di.	-1.6		20.6	Di.	+1.6
	13.3	Te.	+1.2		20.7	Te.	-1.2
23	23.8	En.	+1.0		8.6	En.	+1.0
	12.0	Te.	-1.2		12.5	Rh.	-2.2
24	16.3	En.	-1.0	5	19.4	Te.	+1.2
	21.1	Di.	+1.6		1.1	En.	-1.0
	4.6	Rh.	+2.2		5.5	Di.	-1.6
	8.8	En.	+1.0	6	17.6	En.	+1.0
	10.7	Te.	+1.2		18.1	Te.	+1.2
25	1.3	En.	-1.0		10.1	En.	-1.0
	6.0	Di.	-1.6		14.5	Di.	+1.6
	9.5	Te.	-1.2	7	16.8	Te.	+1.2
26	17.8	En.	+1.0		18.9	Rh.	-2.2
	2.0	Titan	+4.8		2.6	En.	+1.0
	8.2	Te.	+1.2	8	15.5	Te.	-1.2
	11.0	Rh.	-2.2		19.1	En.	-1.0
	10.3	En.	-1.0		23.4	Di.	-1.6
27	14.9	Di.	+1.6		11.6	En.	+1.0
	2.8	En.	+1.0		14.3	Te.	+1.2
	6.9	Te.	-1.2	9	1.3	Rh.	+2.2
28	19.3	En.	-1.0		4.1	En.	-1.0
	23.9	Di.	-1.6		8.3	Di.	+1.6
	5.6	Te.	+1.2		13.0	Te.	-1.2
	11.7	En.	+1.0	10	20.6	En.	+1.0
29	17.4	Rh.	+2.2		11.7	Te.	+1.2
	? 22.	Japetus	+2.7		13.1	En.	-1.0
	4.2	En.	-1.0	11	17.3	Di.	-1.6
	4.3	Te.	-1.2		2.0	Titan	+4.8
	8.8	Di.	+1.6		5.6	En.	+1.0
30?	19	Japetus	eclipse		7.6	Rh.	+2.2
	20.7	En.	+1.0		10.4	Te.	-1.2
	8.1	Te.	+1.2	12	22.0	En.	-1.0
	12.2	En.	-1.0		2.2	Di.	+1.6
31	17.8	Di.	-1.6		9.1	Te.	+1.2
	22.7	Rh.	-2.2		14.5	En.	+1.0

		y			y		
Nowbr. 13	7 ^b 0	En.	-1.0	Nowbr. 26	19 ^b 7	Di.	+1.5
	7.9	Te.	-1.2		8.4	En.	+1.0
	11.2	Di.	-1.6		14.0	Te.	-1.2
	14.0	Rh.	-2.2	27	0.9	En.	-1.0
14	23.5	En.	+1.0		2.5	Titan	+4.7
	6.6	Te.	+1.2		4.4	Rh.	-2.1
15	16.0	En.	-1.0		4.6	Di.	-1.5
	20.1	Di.	+1.6		12.7	Te.	+1.2
	5.3	Te.	-1.2	28	17.4	En.	+1.0
	8.5	En.	+1.0		9.9	En.	-1.0
16	20.4	Rh.	+2.2		11.4	Te.	-1.2
	1.0	En.	-1.0		13.6	Di.	+1.5
	4.0	Te.	+1.2	29	2.3	En.	+1.0
	5.1	Di.	-1.5		10.2	Te.	+1.2
17	17.5	En.	+1.0		10.8	Rh.	+2.1
	2.8	Te.	-1.2	30	18.8	En.	-1.0
	10.0	En.	-1.0		22.5	Di.	-1.5
	14.0	Di.	+1.5		8.9	Te.	-1.2
18	1.5	Te.	+1.2		11.3	En.	+1.0
	2.5	En.	+1.0	Decbr. 1	3.8	En.	-1.0
	2.8	Rh.	-2.2		7.5	Di.	+1.5
19	19.0	En.	-1.0		7.6	Te.	+1.2
	23.0	Di.	-1.5	2	17.2	Rh.	-2.1
	0.2	Te.	-1.2		20.3	En.	+1.0
	6.3	Titan	-5.0		6.3	Te.	-1.2
	11.5	En.	+1.0		12.8	En.	-1.0
20	22.9	Te.	+1.2		16.4	Di.	-1.5
	3.9	En.	-1.0	3	5.1	Te.	+1.2
	7.9	Di.	+1.5		5.3	En.	+0.9
	9.2	Rh.	+2.2	4	21.8	En.	-0.9
21	20.4	En.	+1.0		23.6	Rh.	+2.1
	21.7	Te.	-1.2		1.4	Di.	+1.5
	12.9	En.	-1.0		3.8	Te.	-1.2
22	16.8	Di.	-1.5		14.3	En.	+0.9
	20.4	Te.	+1.2	5	2.5	Te.	+1.2
	5.4	En.	+1.0		6.8	En.	-0.9
	15.6	Rh.	-2.1		7.0	Titan	-4.8
23	19.1	Te.	-1.2		10.3	Di.	-1.5
	21.9	En.	-1.0	6	23.3	En.	+0.9
	1.8	Di.	+1.5		1.2	Te.	-1.2
	14.4	En.	+1.0		6.0	Rh.	-2.1
24	17.8	Te.	+1.2		15.8	En.	-0.9
	6.9	En.	-1.0	7	19.3	Di.	+1.5
	10.7	Di.	-1.5		0.0	Te.	+1.2
25	16.5	Te.	-1.2		23.3	Japetus	-2.1
	22.0	Rh.	+2.1		8.3	En.	+0.9
	23.4	En.	+1.0	8	21.7	Te.	-1.2
	15.3	Te.	+1.2		0.8	En.	-0.9
	15.9	En.	-1.0		4.2	Di.	-1.5

Decbr. 8 ?6 ^h shadow of Ja-	Decbr. 8 12 ^h 4 Rh.	y +2.1	Decbr. 9 21 ^h 4 Te.	y +1.2	Decbr. 9 13 ^h 2 Di.	y +1.5
petus on disk.	9 17.2 En.	+0.9	9.7 En.	-0.9		
4 Barkham Terrace, London. S. E.						A. Marth.

Auffindung neuer, ausgezeichneteter Fixstern-Spectra vom III. und IV. Secchi'schen Typus.

Nr. 4.

(Fortsetzung und Schluss zu Astr. Nachr. Nr. 2009, 16 und 32.)

B. D. + 0.2499; W. IX. 268.

* 7 mg. hellorange mit Spectrum III. Breite Banden; ein sehr schönes und scharf ausgeprägtes Exemplar.

B. D. + 1.2694; W. XII. 277; Lm.; Schj. 2 Cat. 145.

* 8 mg. mit höchst interessantem Spectrum vom IV. Typus, das in seiner charakteristischen Zerrissenheit specielles Studium erfordert. Es ist so hell, dass es sich bei Mondschein untersuchen lässt, besteht fast nur aus rothen und gelben Strahlen, bricht im Grün plötzlich ab, und alle stärker brechbaren Strahlen sind total absorbiert: Fragment eines Sternspectrums. — Die auffällige Färbung des Sterns bemerkte *Bessel* zuerst im Jahre 1823.

B. D. + 2.2560; B. A. C. 4254; Piazz; W. XII. 513.

* 7 mg. farblos. Columnen durch alle Farben, schön getrennt und ganz dunkel, etwa wie π Leonis. Typus III.

B. D. + 2.3296; W. XVII. 209.

* 7.8 mg. hellröthlich mit äusserst brillantem Spectrum III. Zahlreiche und tiefdunkle Banden durchweg.

B. D. + 5.2634; W. XII. 378; Schj. Nr. 148.

* 8 mg. Stark markirtes Zonenspectrum III; schwarze Intersticien. Die auffallend rothe Farbe des * kannte ich seit 10 Jahren, Spectrum neu.

B. D. + 5.4190; LL. 37019; W. XIX. 668.

* 7.4 mg. farblos. Superbes Spectrum des III. Typus, gehört zu den vorzüglichsten der Gattung. Die stereotypen Banden breit und dunkel durch die ganze Erstreckung.

B. D. + 6.2369; 56 Leonis. B. A. C. 3750.

* 7 mg. farblos. Spectrum ausgezeichnete Säulen, dunkel und breit durch alle Farben, Typus III.

B. D. + 8.2301; 29 π Leonis. B. A. C. 3415; R. 3032.

* gelblich. Nette Columnen in allen Regionen, besonders scharf doch im Roth und Orange.

B. D. + 8.2352; 1 ω Virginis. B. A. C. 3954.

* 6 mg. gelblich. Prachtvolles Spectrum III mit breiten, tiefdunkeln Zwischenräumen durchweg. Ebenso vollständig disrupt, wie 72 Leon., δ Virg. u. A.

B. D. + 8.3141; 47 Serpentis. B. A. C. 5366 etc.

* 6 mg. goldgelb. Brillantes Spectrum, Typus III, durchaus normal.

B. D. + 9.2351; 44 Leonis. B. A. C. 3561.

* 6.7 mg. hellgelb. Columnadenspectrum III. Banden durchweg, obgleich die Intervalle nicht grade breit.

B. D. + 9.3153; B. A. C. 5369; Br. etc.

* 7 mg. goldgelb. Vorzügliches Spectrum, Typus III; die Trennungen offenbar noch etwas breiter, als beim nahen 47 Serpent. (siehe oben).

B. D. + 12.2096; var. R. Leonis; B. A. C. 3345.

Schf. 2 Cat. Nr. 52; Schj. Nr. 123.

1875, Mai 6. 8.6 mg. auffällig roth. Das bisher unbekannte Spectrum gehört zum III. Typus mit breiten, scharf gezeichneten Zonen. Es gleicht bei dieser Grösse des * dem des *Rosse'schen* Scarlet-Star Schj. 148. Ende Mai als * 7 mg. constatirt. Von *Secchi* (Mem. sec. pag. 42) im März 1868 nicht richtig erkannt wegen Lichtschwäche.

B. D. + 13.1737; B. A. C. 2537.

* 7 mg. hellorange. Säulenspectrum des Typus III, gleicht sehr dem des nahen * LL. 14961.

B. D. + 14.3179; B. A. C. 5749; Br. etc.

* 5.6 mg. farblos. Vortreffliches Columnenspectrum III mit starken, dunkeln Bändern; normal.

B. D. + 16.2564; 5 ν Bootis. B. A. C. 4615;

Schf. Nr. 11*; Schj. Nr. 162.

Dies noch etwas zweifelhafte Spectrum (vgl. *Secchi* mem. sec. pag. 48) gehört unbedingt zum III. Typus,