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 The MINOR PLANET CIRCULARS/MINOR PLANETS AND COMETS are published, on behalf of Commission 20 of the International Astronomical Union, usually in batches on the 1st of each month, by:
 Minor Planet Center
 Smithsonian Astrophysical Observatory
 Cambridge, MA 02138, U.S.A.
 TWX 710-320-6842 ASTROGRAM CAM ** Brian G. Marsden, Director
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EDITORIAL NOTICE.

The next MPCs will be published on or about Oct. 1. No MPCs will be issued in September.

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IDENTIFICATION CHANGES.

Continuation to MPC 6066.

Object	Date	UT	R. A. (1950)	Decl.	Old desig.	Mag.	Obs.
A916 WL	* 1916 11	26.96019	23 44 55.84	+02 43 45.8	843		029
1935 QL1	* 1935 08	21.98	22 31.9	-09 24	1935 QS		990
1941 DO	* 1941 02	26.94111	09 56 28.37	+09 18 00.4	1941 DB	14.8	024
1941 DP	* 1941 02	26.94111	09 58 40.68	+09 35 43.7	1941 DC	14.9	024
1947 KG	* 1947 05	16.849	16 05.4	-12 50	259	11.5	078
1947 KH	* 1947 05	18.59368	15 50 20	-11 49.6	259		377
1947 KH	1947 05	23.54474	15 46 01	-11 53.4	259		377
1949 GT	* 1949 04	01.0	13 37.3	+09 41	536	14.5	020
1950 KJ	* 1950 05	17.89977	16 51 05	-27 20.4	536	11.5	078
1950 YD	* 1950 12	30.78960	03 52 37.37	+15 53 08.7	488		983
1981 AD4	* 1981 01	01.38264	09 25 34.56	+18 15 18.1	1981 CQ	17.0	688
1981 AD4	1981 01	01.42431	09 25 33.35	+18 15 29.8	1981 CQ		688

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IDENTIFICATIONS.

The following list of identifications with numbered minor planets continues that on MPC 6066.

	Note		Note		Note
A906 YE = (2407)	1	A916 WD = (2407)	1	1938 UH1 = (2345)	2
1950 KE = (536)	3	1950 VJ = (2406)	4	1957 HW = (2346)	3
1977 FW1 = (2408)	2	1978 ES2 = (2406)	4		

Note 1: identification by C. M. Bardwell. 2: by P. Herget. 3: by B. G. Marsden. 4: by T. Urata.

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OBSERVATIONS OF COMETS.

Observations are published here for the following observatory codes:

- 097 Wise Observatory, Mitzpeh Ramon. Observer Y. Sheffer. Long. and Parallax 34.76, -367, -216 (see MPC 4766).
- 323 Perth Observatory, Bickley. Observer J. Johnston.

- 372 Geisei. Observer T. Seki.
 474 Mt. John University Observatory. Observer A. C. Gilmore. Measured by P. M. Kilmartin.
 509 Observatoire Antares, La Seyne sur Mer.
 675 Palomar Mountain Observatory. 1.2-m Schmidt. Measured by D. Owings and D. Donahue. Communicated by M. S. Burkhead.
 707 Chamberlin Observatory field station. Observer E. Everhart. Long. and parallax 254.56, -330, -270 (see MPC 4766).
 801 Oak Ridge Observatory. Observers R. E. McCrosky, C.-Y. Shao and G. Schwartz (assisted by C. M. Bardwell and B. G. Marsden).
 805 Cerro El Roble. Observers L. E. Gonzalez and C. Torres.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
Comet Sandage (1973 X)							
/1973 X	1974 04	23.4556	13 20 02.12	+47 00 23.2			675
/1973 X	1974 04	24.4549	13 18 06.74	+47 04 14.0			675
/1973 X	1974 04	25.5000	13 16 06.38	+47 07 53.8			675
Periodic Comet Gunn							
/1976 III	1978 10	28.25569	04 47 07.57	+21 47 14.2			801
Comet Bowell (1980b)							
/1980b	1981 05	23.13544	12 07 23.67	+01 15 28.0			801
/1980b	1981 06	06.14887	12 08 58.49	+01 00 14.0			801
Periodic Comet Tuttle							
/1980h	1980 11	11.14618	10 14 18.05	+31 37 23.1			509
/1980h	1980 11	11.17446	10 14 20.86	+31 35 00.8			509
/1980h	1980 11	11.19546	10 14 22.82	+31 33 10.7			509
/1980h	1980 11	14.15287	10 19 24.54	+26 57 40.5			509
/1980h	1980 11	14.20287	10 19 29.10	+26 52 49.2			509
/1980h	1980 11	19.15642	10 27 34.86	+17 53 43.4			509
/1980h	1980 11	20.19734	10 29 14.97	+15 47 38.4			509
/1980h	1980 11	23.18204	10 34 01.39	+09 21 06.3			509
/1980h	1980 11	28.15716	10 41 58.88	-02 33 56.9			509
/1980h	1980 11	29.12806	10 43 32.51	-05 00 15.3			509
/1980h	1981 05	02.39410	12 12 21.54	-80 44 12.8			474
/1980h	1981 05	02.42049	12 12 22.25	-80 43 32.3			474
Comet Meier (1980q)							
/1980q	1981 06	02.17292	12 40 39.55	+07 03 35.0			1 688
Comet Bradfield (1980t)							
/1980t	1981 06	29.29641	22 01 20.20	+16 31 17.2	18.5N	2	801
/1980t	1981 07	07.29499	21 50 12.78	+16 04 52.8		2	801
Periodic Comet Bus							
/1981b	1981 05	23.08895	11 39 24.45	+03 24 06.6			801
/1981b	1981 05	24.11951	11 40 11.23	+03 20 03.2			801
/1981b	1981 06	06.11803	11 51 56.23	+02 14 36.8		3	801
Comet Bus (1981d)							
/1981d	1981 05	02.50867	15 00 57.33	-05 44 01.1		4	474
/1981d	1981 05	02.52221	15 00 53.73	-05 43 53.3		4	474
/1981d	1981 05	03.62257	14 56 10.88	-05 32 24.9			474
/1981d	1981 05	03.63559	14 56 07.47	-05 32 15.3			474
/1981d	1981 05	27.13154	13 19 54.43	-01 44 23.2		1	801

Comet Gonzalez (1981g)

/1981g	1981 06 29.26389	00 08 28.40	-51 24 16.2	15 T	805
/1981g	1981 06 29.30972	00 08 30.32	-51 26 12.6		805
/1981g	1981 07 22.41453	00 17 46.4	-69 01 13	16 T	805
/1981g	1981 07 24.37194	00 17 16.07	-70 26 04.3	16 T	474
/1981g	1981 07 24.39442	00 17 15.64	-70 27 01.2		474
/1981g	1981 07 24.89861	00 17 03.52	-70 48 36.0	15 T	323

Periodic Comet Kearns-Kwee

/1981h	1981 06 29.77122	03 11 38.0	+25 14 43	18 T 5	372
/1981h	1981 07 13.04	03 37 15.3	+27 04 06		097
/1981h	1981 07 29.44375	04 09.38	+29 01.4	19 T	707

Periodic Comet Slaughter-Burnham

/1981i	1981 07 09.28863	00 50 42.84	+06 32 07.5	20 T	801
/1981i	1981 07 10.30329	00 51 38.22	+06 40 55.2		801
/1981i	1981 07 28.29563	01 05 47.44	+09 07 19.6	19.5T 6	801

Note 1: image very diffuse, measurement uncertain. 2: little, if any, coma.
 3: very weak image. 4: slightly trailed image. 5: single exposure. 6:
 image slightly diffuse, with condensation.

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OBSERVATIONS MADE AT ZIMMERWALD BY P. WILD.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
143	1981 04 21.87535	12 32 14.43	-18 34 15.9	14.2		026	
222	1980 12 09.96181	06 36 06.21	+23 49 59.1	15.5		026	
486	1981 03 26.90313	10 55 37.18	+27 35 43.3	14		026	
486	1981 03 27.90972	10 54 55.08	+27 36 30.7	14.2		026	
729	1981 03 27.93125	11 38 28.43	+26 11 17.8	14		026	
729	1981 04 21.83403	11 26 08.95	+27 02 05.7	14		026	
1286	1980 09 03.93750	21 05 10.17	-04 00 18.5	16.2		026	
1286	1980 09 04.90694	21 04 41.61	-04 06 50.2	16.2	1	026	
1396	1980 09 02.92708	23 26 11.13	-05 53 00.3	15.5		026	
1396	1980 09 04.94028	23 24 05.57	-06 00 23.5	15.5		026	
1482	1980 12 09.96181	06 33 04.51	+24 44 10.0	16.5		026	
1508	1981 03 27.93125	11 41 23.25	+21 40 18.8	14.5		026	
1508	1981 04 09.08542	11 25 02.48	+17 53 50.6	15	1	026	
1628	1980 08 07.94097	21 16 56.06	+03 53 29.6	15.8	2	026	
1628	1980 08 14.91319	21 11 58.96	+03 04 50.9	15.8		026	
1628	1980 08 17.92153	21 09 52.62	+02 41 45.8	15.2		026	
2001	1981 03 26.93611	09 08 01.10	+30 28 50.8	15.8		026	
2245	1981 03 26.93611	09 03 49.03	+31 28 42.9	17	1	026	
2292	1980 09 03.93750	21 08 46.75	-05 02 14.0	14.8		026	
2292	1980 09 04.90694	21 08 31.06	-05 16 24.6	14.2		026	
2292	1980 09 14.91250	21 07 20.73	-07 34 39.6	15.2		026	
2368	1980 09 03.90694	18 40 11.23	-12 24 40.0			026	

Note 1: weak image. 2: extrafocal image.

OBSERVATIONS MADE AT BERGEDORF. NEW MEASUREMENTS BY L. KOHOUTEK (ASSISTED BY M. DIECKVOSS) OF THE POSITIONS IN ASTRON. NACHR. 204, 197, 1917 AND 217, 287, 1923. COMMUNICATED BY L. D. SCHMADEL.

Object	Date	UT	R. A. (1950)	Decl.	Obs.
843	1916 09 30.85597	23 50 51.18	-01 32 48.5		029
843	1916 09 30.93371	23 50 46.18	-01 32 41.3		029
843	1916 10 03.02417	23 48 43.44	-01 29 34.6		029
843	1916 10 03.06087	23 48 41.37	-01 29 31.7		029
843	1916 10 16.76747	23 38 14.22	-00 59 12.3		029

843	1916	10	16.81248	23	38	12.44	-00	59	05.8	029
843	1916	10	18.89185	23	37	08.96	-00	52	43.7	029
843	1916	10	22.86983	23	35	33.26	-00	39	14.4	029
843	1916	10	22.94532	23	35	31.53	-00	38	59.0	029
843	1916	10	27.81253	23	34	22.22	-00	19	51.7	029
843	1916	10	31.88265	23	34	03.63	-00	01	40.3	029
843	1916	11	29.75635	23	47	07.57	+03	00	25.6	029
843	1916	11	29.81141	23	47	09.99	+03	00	48.3	029
843	1916	12	14.81793	00	02	09.14	+05	05	54.4	029

OBSERVATIONS MADE AT KLET BY A. MRKOS, Z. VAVROVA AND L. BROZEK.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	Obs.
85	1981	05	28.97116	16 37 49.36	-07 27 10.7	046
85	1981	05	28.98539	16 37 48.52	-07 27 04.7	046
563	1981	05	28.89656	14 17 22.59	-03 49 05.1	046
563	1981	05	28.91086	14 17 22.09	-03 49 05.7	046
814	1981	06	02.01802	16 56 55.84	-14 34 31.8	046
814	1981	06	02.03075	16 56 55.09	-14 34 33.6	046
1345	1981	05	31.94675	16 07 17.09	-06 27 21.4	046
1345	1981	05	31.96093	16 07 16.59	-06 27 20.6	046
1981 JZ	1981	05	31.90925	14 13 10.11	-06 54 18.9	046
1981 JZ	1981	05	31.92351	14 13 09.64	-06 54 20.5	046
1981 JZ	1981	06	01.94296	14 12 35.46	-06 57 58.9	046
1981 JZ	1981	06	01.95731	14 12 34.83	-06 58 02.9	046
1981 JZ	1981	06	02.88339	14 12 05.08	-07 01 24.3	046
1981 JZ	1981	06	02.89473	14 12 04.71	-07 01 24.9	046
1981 JZ	1981	06	05.89097	14 10 34.84	-07 12 59.7	046
1981 JZ	1981	06	05.90523	14 10 34.54	-07 12 58.1	046
1981 KE *	1981	05	28.89656	14 19 30.17	-04 08 19.9	17.0 046
1981 KE	1981	05	28.91086	14 19 29.20	-04 08 30.3	046
1981 KE	1981	05	31.90925	14 16 11.19	-04 54 40.2	046
1981 KE	1981	05	31.92351	14 16 10.18	-04 54 54.4	046
1981 KE	1981	06	01.94296	14 15 07.98	-05 10 35.3	046
1981 KE	1981	06	01.95731	14 15 06.95	-05 10 51.5	046
1981 KF *	1981	05	31.94675	16 06 19.49	-04 01 08.7	16.8 046
1981 KF	1981	05	31.96093	16 06 18.71	-04 01 04.5	046
1981 KF	1981	06	01.98480	16 05 20.94	-03 56 59.2	046
1981 KF	1981	06	01.99892	16 05 20.09	-03 56 56.7	046
1981 KF	1981	06	02.91169	16 04 29.42	-03 53 30.5	046
1981 KF	1981	06	02.92315	16 04 28.78	-03 53 26.7	046

OBSERVATIONS MADE AT KVISTABERG UNDER THE DIRECTION OF C.-I. LAGERKVIST.

Object	Date	UT	R. A. (1950)	Decl.	Obs.
1976 SZ9	1976	09	20.93878	00 04 15.10	-00 56 20.9 049
1976 SZ9	1976	09	20.95817	00 04 14.18	-00 56 24.5 049
1976 SZ9	1976	09	20.99418	00 04 12.46	-00 56 31.3 049
1976 SU10*	1976	09	20.93878	23 56 23.90	-00 46 56.3 049
1976 SU10	1976	09	20.95817	23 56 23.01	-00 47 10.3 049
1976 SU10	1976	09	20.99418	23 56 21.37	-00 47 36.3 049

OBSERVATIONS MADE AT TURKU. MEASURED BY M.-A. SNARE.

Object	Date	UT	R. A. (1950)	Decl.	N Obs.
1142	1942	04	17.90362	13 20 25.04	-05 24 55.3 062
1941 BR	1941	01	30.88749	09 09 30.17	+27 18 19.1 062
1941 BR	1941	01	30.92140	09 09 27.73	+27 18 24.2 062
1942 GE	1942	04	14.94302	13 08 59.23	-05 40 46.5 062
1942 GE	1942	04	14.97161	13 08 57.87	-05 40 34.0 062
1942 GE	1942	04	17.90362	13 06 24.39	-05 17 19.3 1 062

1943 DN	1943 02	26.97256	09 32	47.54	+26 35	27.0	062
1943 DN	1943 03	01.90750	09 30	14.50	+26 41	15.2	062
1943 DN	1943 03	12.84564	09 22	57.92	+26 42	43.5	062
1953 TJ	1953 10	13.93171	01 24	22.21	+19 26	12.2	062
1953 TJ	1953 11	02.84965	01 07	25.59	+17 07	21.9	2 062
1953 TJ	1953 11	12.91163	01 02	15.45	+15 52	44.3	3 062

Note 1: questionable, faint, hazy image. 2: near edge of plate. 3: difficult to measure.

OBSERVATIONS MADE AT THE CRIMEAN ASTROPHYSICAL OBSERVATORY BY T. M. SMIRNOVA. COMMUNICATED BY N. S. CHERNYKH.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
1967 RG1 *	1967 09	11.89378	23 02	25.56 -05 24	53.0	16.5	1 095
1967 RH1 *	1967 09	11.89378	23 09	35.69 -03 45	27.5	16.5	095
1967 RJ1 *	1967 09	11.89378	23 12	31.00 -02 35	45.0	16.5	2 095
1974 SJ	1967 09	11.89378	23 17	41.38 -04 40	57.3	17.0	1 095

Note 1: near edge of plate. 2: measurement uncertain.

OBSERVATIONS MADE AT ABASTUMAN OBSERVATORY BY R. I. KILADZE AND V. A. OSHCHEPKOVA. FROM BYULL. INST. TEOR. ASTRON. 14, 589, 1980.

Object	Date	UT	R. A. (1950)	Decl.	O - C	Mag.	Obs.
750	1978 06	06.80417	14 46	34.64 -14 32	57.2 0.1+ 2-		119
750	1978 06	06.84167	14 46	33.24 -14 32	55.6		119
1261	1978 06	06.80417	14 35	18.83 -14 15	04.2 0.1- 0		119
1261	1978 06	06.84167	14 35	17.84 -14 15	01.5		119
2069	1978 06	06.80417	14 41	01.55 -16 33	29.1	17.0	119
2069	1978 06	06.84167	14 41	00.24 -16 33	27.7		119
1978 LQ *	1978 06	06.80417	14 41	16.93 -15 51	53.8	16.5	119
1978 LQ	1978 06	06.84167	14 41	15.38 -15 51	59.0		119
1978 LR *	1978 06	06.80417	14 41	32.00 -16 29	16.6	17.0	119
1978 LR	1978 06	06.84167	14 41	30.83 -16 29	05.0		119
1978 LS *	1978 06	06.80417	14 45	01.08 -16 29	38.1	17.5	119
1978 LS	1978 06	06.84167	14 44	59.94 -16 29	34.4		119

OBSERVATIONS MADE AT GEISEI BY T. SEKI.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	Obs.
2396	1981 06	01.55316	11 01	39.56 +12 56	03.0	18 372
2396	1981 06	01.56701	11 01	40.45 +12 55	58.7	372
1981 JA	1981 06	01.58368	14 35	56.74 -12 50	03.4	17.5 372
1981 JA	1981 06	01.59618	14 35	56.30 -12 50	01.3	372

OBSERVATIONS MADE AT SYDNEY BY D. S. KING, N. R. LOMB, W. H. ROBERTSON AND K. P. SIMS. MEASURED BY J. CLOSE, D. TEALE, J. MANSON AND R. SKEERS.

Object	Date	UT	R. A. (1950)	Decl.	Obs.
2	1980 08	12.79088	02 29	03.55 -02 23	12.0 420
2	1980 08	18.77045	02 32	53.80 -03 29	19.1 420
2	1980 09	09.71955	02 41	01.46 -08 40	38.1 420
2	1980 09	15.70930	02 41	21.10 -10 22	12.1 420
2	1980 10	15.62331	02 30	05.22 -19 19	55.6 420
2	1980 10	28.57226	02 20	09.34 -22 33	48.6 420
2	1980 11	10.51908	02 09	40.69 -24 49	10.4 420
2	1980 12	08.44726	01 55	09.49 -25 55	09.0 420
3	1980 02	11.49123	07 02	35.52 +06 28	12.8 420
3	1980 02	19.46980	07 01	27.98 +07 48	49.1 420
3	1980 03	17.41383	07 11	43.16 +11 38	39.5 420
6	1980 09	09.75581	03 51	18.72 -00 11	16.0 420
6	1980 09	15.76100	03 56	59.57 -01 01	31.0 420
6	1980 10	08.69552	04 07	52.47 -04 46	26.4 420
6	1980 10	15.70191	04 07	23.09 -05 56	50.5 420

6	1980	10	29.63978	04	01	17.25	-07	57	12.1	420
6	1980	11	10.59985	03	51	49.07	-08	59	50.8	420
6	1980	11	27.54868	03	36	20.96	-08	54	28.1	420
6	1980	12	09.49897	03	27	29.38	-07	42	55.1	420
7	1980	10	28.45027	23	21	15.77	+05	52	09.5	420
7	1980	11	06.43572	23	23	11.75	+05	12	13.3	420
7	1980	11	11.42080	23	25	31.44	+04	57	34.5	420
18	1980	03	17.67743	13	58	20.38	-00	24	02.0	420
18	1980	04	22.57164	13	29	18.94	+04	15	00.8	420
18	1980	05	12.50371	13	14	03.65	+05	38	20.4	420
18	1980	06	05.42549	13	06	11.67	+05	31	49.6	420
40	1980	07	10.79617	00	27	52.44	-02	18	26.2	420
40	1980	07	17.79577	00	33	52.92	-02	00	29.8	420
40	1980	08	05.73687	00	44	29.26	-01	53	08.8	420
40	1980	08	11.72962	00	45	49.74	-02	04	24.6	420
40	1980	08	18.70216	00	46	01.19	-02	25	52.9	420
40	1980	09	08.64623	00	37	40.33	-04	16	10.0	420
40	1980	10	13.54299	00	07	12.82	-07	31	41.6	420
40	1980	10	28.47794	23	58	17.37	-07	50	08.1	420
40	1980	11	11.44916	23	55	49.94	-07	20	27.2	420
51	1980	10	08.73880	04	58	26.59	+10	59	00.4	420
51	1980	11	12.62971	04	47	51.69	+07	15	56.0	420
51	1980	11	27.58393	04	34	11.26	+05	57	20.8	420
51	1980	12	09.54420	04	22	14.04	+05	19	34.8	420
532	1980	10	15.66586	02	50	51.25	-07	12	33.9	420
532	1980	11	10.54646	02	29	19.86	-08	33	03.7	420
532	1980	12	09.45154	02	10	12.21	-07	31	50.1	420

OBSERVATIONS MADE AT MOUNT JOHN UNIVERSITY OBSERVATORY BY A. C. GILMORE AND
P. M. KILMARTIN (ASSISTED BY R. MC INTOSH).

Object	Date	UT	R. A. (1950)	Decl.	N	Obs.
2382	1981	05	01.43947	10 46 44.36	-30 22 49.4	474
2382	1981	05	01.46169	10 46 44.20	-30 22 30.6	474
1966 BA1	1981	05	01.61493	15 13 02.04	-35 15 13.8	474
1966 BA1	1981	05	01.63715	15 13 01.32	-35 15 12.2	474
1977 CA	1981	05	01.48475	10 59 58.40	-34 54 38.1	474
1977 CA	1981	05	01.49983	10 59 57.95	-34 54 34.2	474
1981 FD	1981	04	30.44578	12 06 10.73	-00 50 36.0	474
1981 FD	1981	04	30.52164	12 06 11.78	-00 50 55.3	474
1981 FD	1981	05	04.47558	12 07 22.28	-01 08 03.2	474
1981 FD	1981	05	04.50828	12 07 22.88	-01 08 12.8	474
1981 GD1	1981	05	03.38958	11 45 10.78	-01 28 05.4	474
1981 GD1	1981	05	03.50683	11 45 09.55	-01 27 43.5	474
1981 GF1	1981	04	30.47170	12 16 53.98	-08 56 35.8	1 474
1981 GF1	1981	04	30.54774	12 16 51.50	-08 56 22.6	474
1981 GF1	1981	05	03.42425	12 15 23.85	-08 48 25.4	1 474
1981 GF1	1981	05	03.53371	12 15 20.57	-08 48 08.5	1 474
1981 JV1 *	1981	05	03.42425	12 16 55.87	-09 02 21.0	474
1981 JV1	1981	05	03.53371	12 16 53.25	-09 01 53.2	474

Note 1: correction to MPC 6073.

OBSERVATIONS MADE AT MESCHEDE BY R. HEMPEL. COMMUNICATED BY L. D.
SCHMADEL.

Object	Date	UT	R. A. (1950)	Decl.	O - C	Obs.	
387	1981	06	12.91389	15 45 33.94	+08 33 35.7	0.1+ 0	519
387	1981	06	12.92153	15 45 33.68	+08 33 32.8	0.1+ 0	519
387	1981	06	12.92500	15 45 33.52	+08 33 30.6	0.1+ 0	519
387	1981	06	12.93333	15 45 33.16	+08 33 26.4	0.1+ 0	519

OBSERVATIONS MADE WITH THE 1.2-M SCHMIDT TELESCOPE AT PALOMAR.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
149	1981 06	09.42999	00 21 36.10	+02 20 26.7	15		1 675
149	1981 06	10.44666	00 23 11.35	+02 30 22.2			1 675
156	1960 09	24.47431	00 01 46.65	+13 19 16.1			2 675
156	1960 09	26.29514	00 00 19.35	+13 07 25.2			2 675
156	1960 09	29.34722	23 57 54.02	+12 46 52.2			2 675
247	1960 10	17.21390	23 28 06.21	+02 07 46.6			5 675
516	1960 09	24.27708	00 32 41.74	+16 58 34.6			2 675
516	1960 09	25.46250	00 31 35.16	+16 55 28.4			2 675
516	1960 09	26.24514	00 30 51.59	+16 53 19.4			2 675
516	1960 09	27.27569	00 29 53.61	+16 50 22.4			2 675
516	1960 09	28.34722	00 28 53.22	+16 47 06.8			2 675
516	1960 09	28.46181	00 28 46.54	+16 46 46.4			2 675
516	1960 09	29.47153	00 27 49.63	+16 43 33.6			2 675
958	1960 09	24.42500	00 59 54.85	+10 32 02.9			2 675
958	1960 09	26.34653	00 58 42.23	+10 27 35.4			2 675
958	1960 09	28.42778	00 57 21.47	+10 22 27.4			2 675
958	1960 09	29.42083	00 56 42.38	+10 19 53.8			2 675
973	1960 09	27.27569	00 29 14.01	+12 16 28.1			2 675
973	1960 09	28.34722	00 28 17.45	+12 15 39.3			2 675
973	1960 09	29.47153	00 27 17.76	+12 14 39.8			2 675
973	1960 10	22.12083	00 08 29.31	+11 38 01.4			2 675
973	1960 10	24.30972	00 06 58.05	+11 33 45.3			2 675
973	1960 10	26.37951	00 05 36.51	+11 29 47.9			2 675
1112	1960 10	17.23681	00 25 44.47	+17 29 32.9			2 675
1112	1960 10	22.17778	00 22 13.39	+17 03 49.7			2 675
1112	1960 10	22.29097	00 22 08.63	+17 03 14.5			2 675
1112	1960 10	24.21256	00 20 53.48	+16 52 57.2			2 675
1112	1960 10	24.30972	00 20 49.63	+16 52 26.4			2 675
1112	1960 10	25.20486	00 20 16.13	+16 47 36.6			2 675
1112	1960 10	25.32778	00 20 11.33	+16 46 58.1			2 675
1112	1960 10	26.28264	00 19 36.84	+16 41 46.8			2 675
1112	1960 10	26.37951	00 19 33.22	+16 41 17.6			2 675
2100	1981 07	09.43472	01 39 24.62	+57 29 31.1	18	4	675
2100	1981 07	09.45556	01 39 18.43	+57 29 29.3	18	4	675

Note 1: observer J. Gibson. 2: observer T. Gehrels, measures by C. J. van Houten and I. van Houten-Groeneveld, reductions by P. Herget. 3: correction to MPC 2348. 4: observer C. Kowal; beginning and end of trail; end poorly defined. 5 = 2 + 3.

OBSERVATIONS MADE AT LOWELL OBSERVATORY'S ANDERSON MESA STATION BY E. BOWELL AND B. A. SKIFF. MEASURED BY BOWELL.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
9	1981 06	05.25208	16 38 35.32	-22 43 40.8			688
9	1981 06	05.28611	16 38 32.94	-22 43 42.5			688
9	1981 06	05.34861	16 38 28.89	-22 43 40.6			688
27	1981 06	04.28611	15 37 31.79	-18 04 05.6		3	688
27	1981 06	04.32917	15 37 29.50	-18 03 57.7			688
27	1981 06	09.32083	15 33 07.74	-17 52 21.8			688
27	1981 06	09.33750	15 33 06.91	-17 52 20.0			688
27	1981 06	25.20417	15 22 53.44	-17 27 16.3			688
27	1981 06	25.27604	15 22 51.45	-17 27 11.9			688
49	1981 06	24.22083	17 16 27.34	-24 45 11.0			688
49	1981 06	24.28125	17 16 24.25	-24 45 05.7			688
50	1981 06	24.19931	14 11 24.57	-10 03 23.5			688
50	1981 06	24.26042	14 11 24.03	-10 03 23.0			688
60	1981 06	04.28611	15 35 33.16	-14 50 09.7			688
60	1981 06	04.32917	15 35 30.89	-14 50 02.2			688

60	1981 06 09.32083	15 31 27.45	-14 35 37.7	688
60	1981 06 09.33750	15 31 26.68	-14 35 35.7	688
60	1981 06 25.20417	15 22 07.85	-14 07 09.7	688
60	1981 06 25.27604	15 22 06.09	-14 07 05.1	688
121	1981 06 04.32917	15 42 55.09	-17 26 10.8	688
121	1981 06 09.32083	15 39 26.10	-17 23 05.7	688
121	1981 06 09.33750	15 39 25.40	-17 23 05.3	688
121	1981 06 25.27604	15 30 24.13	-17 20 04.3	688
167	1981 06 24.19931	14 11 13.38	-10 24 20.7	688
167	1981 06 24.26042	14 11 13.53	-10 24 23.6	688
184	1981 06 23.18403	14 52 25.33	-18 08 39.4	688
184	1981 06 23.28056	14 52 24.08	-18 08 32.0	688
212	1981 06 04.37153	20 05 01.80	-22 59 27.5	688
212	1981 06 04.41597	20 05 01.01	-22 59 29.2	688
212	1981 06 06.34306	20 04 27.00	-23 00 45.3	688
212	1981 06 06.39167	20 04 26.06	-23 00 47.9	688
212	1981 06 09.35833	20 03 24.01	-23 03 06.1	688
212	1981 06 09.38194	20 03 23.48	-23 03 07.3	688
212	1981 07 03.26597	19 49 00.04	-23 30 48.7	688
212	1981 07 03.30347	19 48 58.21	-23 30 51.7	688
213	1981 06 02.19444	13 27 10.61	+01 12 31.6	688
213	1981 06 02.25278	13 27 09.99	+01 12 23.9	688
213	1981 06 23.20903	13 29 28.91	-00 17 34.3	688
213	1981 06 23.23194	13 29 29.39	-00 17 42.3	688
261	1981 06 05.25208	16 49 06.87	-19 56 33.2	688
261	1981 06 05.34861	16 49 00.41	-19 56 32.8	688
270	1981 06 05.25208	16 55 42.50	-22 34 49.4	688
270	1981 06 05.34861	16 55 35.79	-22 34 30.4	688
281	1981 06 25.23056	16 09 12.90	-27 20 30.7	688
281	1981 06 25.29583	16 09 09.46	-27 20 22.6	688
307	1981 06 02.19444	13 22 11.37	-00 49 02.2	688
307	1981 06 02.25278	13 22 10.58	-00 49 06.5	688
307	1981 06 23.20903	13 22 07.84	-01 43 48.2	688
307	1981 06 23.23194	13 22 08.13	-01 43 53.7	688
395	1981 06 04.37153	20 01 17.92	-18 34 45.5	688
395	1981 06 04.41597	20 01 17.40	-18 34 42.4	688
395	1981 06 06.34306	20 00 53.47	-18 32 22.1	688
395	1981 06 06.39167	20 00 52.72	-18 32 18.7	688
395	1981 06 09.35833	20 00 03.37	-18 29 16.7	688
395	1981 06 09.38194	20 00 02.88	-18 29 16.0	688
395	1981 07 03.26597	19 45 41.70	-18 26 29.2	688
395	1981 07 03.30347	19 45 39.78	-18 26 30.7	688
430	1981 06 04.19653	14 46 14.66	-21 51 06.2	1 688
430	1981 06 04.24653	14 46 12.86	-21 50 47.9	688
461	1981 06 04.37153	19 43 13.82	-19 47 59.6	2 688
461	1981 06 04.41597	19 43 12.58	-19 48 01.3	688
462	1981 06 02.19444	13 10 24.27	-03 11 54.5	688
462	1981 06 02.25278	13 10 23.68	-03 11 57.3	688
462	1981 06 23.20903	13 12 03.51	-03 52 39.4	688
462	1981 06 23.23194	13 12 03.88	-03 52 43.4	688
468	1981 06 04.28611	15 42 50.15	-20 08 24.0	688
468	1981 06 04.32917	15 42 48.09	-20 08 17.6	688
468	1981 06 09.32083	15 39 04.35	-19 56 14.4	688
468	1981 06 09.33750	15 39 03.58	-19 56 12.0	688
468	1981 06 25.20417	15 29 36.83	-19 23 53.5	688
468	1981 06 25.27604	15 29 34.82	-19 23 46.2	688
513	1981 06 06.31875	20 22 14.40	-06 53 13.2	688
513	1981 06 06.36736	20 22 13.92	-06 53 07.4	688
519	1981 06 04.19653	14 44 22.63	-18 44 56.9	688

519	1981	06	04.24653	14	44	20.33	-18	44	55.8	688
519	1981	06	09.23681	14	40	54.17	-18	43	11.7	688
519	1981	06	23.18403	14	34	20.16	-18	46	31.4	688
579	1981	06	02.17292	12	41	38.54	+08	07	45.4	688
598	1981	06	04.37153	19	52	33.96	-23	51	57.4	688
598	1981	06	04.41597	19	52	33.29	-23	52	12.7	688
598	1981	06	06.34306	19	52	05.72	-24	02	50.8	688
598	1981	06	06.39167	19	52	04.90	-24	03	07.7	688
598	1981	06	09.35833	19	51	10.27	-24	20	19.0	688
598	1981	06	09.38194	19	51	09.76	-24	20	27.2	688
632	1981	06	25.23056	16	09	19.01	-25	00	27.8	688
632	1981	06	25.29583	16	09	16.91	-25	00	19.1	688
637	1981	06	05.25208	16	48	41.79	-22	51	37.3	688
637	1981	06	05.28611	16	48	39.86	-22	51	33.4	688
637	1981	06	05.34861	16	48	36.62	-22	51	28.2	688
644	1981	06	24.19931	14	02	38.60	-11	14	42.8	688
644	1981	06	24.26042	14	02	38.55	-11	14	43.1	688
646	1981	06	25.23056	16	17	27.43	-30	02	44.0	688
646	1981	06	25.29583	16	17	23.84	-30	02	18.6	688
657	1981	06	04.37153	20	03	55.08	-24	28	06.0	688
657	1981	06	04.41597	20	03	54.09	-24	28	04.0	688
657	1981	06	06.34306	20	03	09.92	-24	25	43.5	688
657	1981	06	06.39167	20	03	08.70	-24	25	40.6	688
657	1981	06	09.35833	20	01	47.76	-24	22	19.2	688
657	1981	06	09.38194	20	01	47.05	-24	22	18.1	688
657	1981	07	03.26597	19	43	04.54	-23	58	26.7	688
657	1981	07	03.30347	19	43	02.13	-23	58	24.5	688
659	1981	06	04.19653	14	58	20.54	-22	01	52.1	688
659	1981	06	04.24653	14	58	19.14	-22	01	45.5	688
674	1981	06	05.23333	16	14	32.98	-24	49	38.7	688
674	1981	06	05.26875	16	14	30.95	-24	49	40.1	688
771	1981	06	06.31875	20	05	52.06	-01	19	18.6	688
771	1981	06	06.36736	20	05	51.05	-01	19	04.4	688
788	1981	06	06.31875	20	21	25.60	-01	23	15.4	688
788	1981	06	06.36736	20	21	25.13	-01	23	06.7	688
808	1981	06	02.19444	13	21	16.40	-04	35	05.7	688
808	1981	06	02.25278	13	21	15.91	-04	35	03.5	688
808	1981	06	23.20903	13	23	28.84	-04	52	32.5	688
808	1981	06	23.23194	13	23	29.25	-04	52	35.3	688
821	1981	06	04.17222	14	42	25.90	-11	29	52.0	688
821	1981	06	04.22292	14	42	24.64	-11	29	40.9	688
822	1981	06	24.22083	17	22	32.35	-22	12	13.0	688
822	1981	06	24.28125	17	22	28.37	-22	12	09.4	688
907	1981	06	02.19444	13	15	33.40	-04	36	35.8	688
907	1981	06	02.25278	13	15	32.45	-04	36	58.7	688
913	1981	06	04.34792	17	20	35.88	-19	10	49.1	688
913	1981	06	04.39444	17	20	33.07	-19	10	59.8	688
919	1981	06	04.19653	14	53	00.93	-15	29	25.1	688
919	1981	06	04.24653	14	52	58.95	-15	29	10.3	688
919	1981	06	09.23681	14	50	12.72	-15	06	10.4	688
919	1981	06	09.28750	14	50	10.92	-15	05	55.2	688
919	1981	06	23.18403	14	45	14.43	-14	16	55.0	688
919	1981	06	23.28056	14	45	13.17	-14	16	38.9	688
940	1981	06	24.22083	17	10	48.95	-25	11	52.4	688
940	1981	06	24.28125	17	10	45.94	-25	11	54.9	688
960	1981	06	04.19653	14	55	26.91	-17	44	34.1	688
960	1981	06	04.24653	14	55	24.24	-17	44	18.7	688
960	1981	06	09.23681	14	51	53.11	-17	19	48.3	688
960	1981	06	09.28750	14	51	50.96	-17	19	34.8	688

16.0

960	1981 06 23.18403	14 46 04.88	-16 29 00.1	688
960	1981 06 23.28056	14 46 03.63	-16 28 43.2	688
1052	1981 06 24.22083	17 23 28.09	-21 19 54.1	688
1052	1981 06 24.28125	17 23 23.81	-21 19 59.8	1 688
1071	1981 06 04.28611	15 25 38.65	-19 51 10.8	688
1071	1981 06 04.32917	15 25 36.62	-19 51 06.3	688
1071	1981 06 09.32083	15 21 51.60	-19 43 42.2	688
1071	1981 06 09.33750	15 21 50.82	-19 43 40.1	688
1100	1981 06 04.32917	15 43 04.73	-21 08 53.3	688
1100	1981 06 09.33750	15 39 13.04	-20 54 35.8	688
1114	1981 06 06.31875	20 04 39.58	-05 51 45.9	688
1114	1981 06 06.36736	20 04 38.80	-05 51 38.8	688
1128	1981 06 05.25208	16 55 33.12	-23 04 14.3	688
1128	1981 06 05.34861	16 55 27.54	-23 04 08.7	688
1137	1981 06 04.34792	17 27 55.82	-23 19 27.5	15.2 688
1137	1981 06 04.39444	17 27 52.90	-23 19 30.4	688
1137	1981 06 24.22083	17 07 09.82	-23 38 46.6	688
1137	1981 06 24.28125	17 07 06.08	-23 38 49.3	688
1143	1981 06 04.34792	17 29 15.20	-20 46 46.6	688
1143	1981 06 04.39444	17 29 13.77	-20 46 44.5	688
1143	1981 06 24.22083	17 18 57.55	-20 33 46.8	688
1143	1981 06 24.28125	17 18 55.69	-20 33 46.3	688
1186	1981 06 25.23056	16 09 06.12	-29 35 55.0	688
1186	1981 06 25.29583	16 09 03.29	-29 35 52.1	688
1243	1981 06 04.19653	14 37 03.20	-19 55 37.4	688
1243	1981 06 04.24653	14 37 01.69	-19 55 16.7	688
1243	1981 06 09.23681	14 34 54.57	-19 22 20.4	688
1243	1981 06 09.28750	14 34 53.37	-19 22 00.8	688
1243	1981 06 23.18403	14 31 47.45	-18 04 17.2	688
1243	1981 06 23.28056	14 31 46.95	-18 03 49.0	688
1247	1981 06 23.18403	14 54 27.96	-14 09 26.1	688
1247	1981 06 23.28056	14 54 26.55	-14 09 24.6	688
1289	1981 06 04.37153	20 09 18.84	-17 48 31.6	688
1289	1981 06 04.41597	20 09 18.47	-17 48 30.2	688
1331	1981 06 02.19444	13 03 41.52	-02 28 26.4	688
1331	1981 06 02.25278	13 03 41.11	-02 28 28.5	688
1407	1981 06 24.22083	17 07 36.22	-23 51 13.6	688
1407	1981 06 24.28125	17 07 32.61	-23 51 02.4	688
1412	1981 06 06.34306	20 00 13.87	-24 50 42.8	2 688
1412	1981 06 06.39167	20 00 12.88	-24 50 53.5	688
1412	1981 06 09.35833	19 59 06.00	-25 02 43.3	688
1412	1981 06 09.38194	19 59 05.24	-25 02 48.5	688
1438	1981 06 04.19653	14 43 58.91	-16 12 50.1	17.5 688
1438	1981 06 04.24653	14 43 57.23	-16 12 39.9	688
1438	1981 06 23.18403	14 36 06.87	-15 28 17.0	688
1439	1981 06 04.19653	14 46 07.26	-17 38 22.7	688
1439	1981 06 04.24653	14 46 05.56	-17 38 17.9	688
1439	1981 06 23.18403	14 39 33.41	-17 16 24.7	688
1439	1981 06 23.28056	14 39 32.28	-17 16 19.1	688
1497	1981 06 04.19653	14 47 32.03	-17 38 51.0	688
1497	1981 06 04.24653	14 47 30.02	-17 38 42.2	688
1497	1981 06 09.23681	14 44 45.69	-17 24 18.3	1 688
1497	1981 06 09.28750	14 44 43.95	-17 24 10.5	688
1536	1981 06 05.25208	16 40 26.50	-19 51 41.6	2 688
1536	1981 06 05.34861	16 40 19.81	-19 51 29.3	688
1569	1981 06 04.34792	17 16 59.19	-16 17 48.5	1 688
1569	1981 06 04.39444	17 16 56.85	-16 17 52.8	3 688
1636	1981 06 04.34792	17 13 25.47	-15 30 09.8	1 688
1636	1981 06 04.39444	17 13 22.39	-15 30 04.2	688

1704	1981 06 04.37153	19 57 47.68	-20 09 22.3	3	688
1704	1981 06 04.41597	19 57 48.86	-20 09 21.0	3	688
1704	1981 06 04.41597	19 57 46.86	-20 09 21.0		688
1704	1981 06 06.34306	19 57 11.34	-20 09 45.6		688
1704	1981 06 06.39167	19 57 10.35	-20 09 47.0		688
1704	1981 06 09.35833	19 56 00.87	-20 11 06.0		688
1704	1981 06 09.38194	19 56 00.44	-20 11 05.8	1	688
1704	1981 07 03.26597	19 37 19.76	-20 43 59.3	1	688
1704	1981 07 03.30347	19 37 17.30	-20 44 04.7		688
1741	1981 06 24.22083	17 29 18.86	-25 30 07.6		688
1741	1981 06 24.28125	17 29 15.44	-25 30 08.0		688
1778	1981 06 04.34792	17 33 31.38	-21 34 35.8		688
1778	1981 06 04.39444	17 33 29.10	-21 34 35.3		688
1778	1981 06 24.22083	17 16 59.21	-21 37 17.7		688
1778	1981 06 24.28125	17 16 56.27	-21 37 18.7		688
1805	1981 06 02.19444	13 11 10.26	-05 00 41.6		688
1805	1981 06 23.20903	13 15 25.41	-05 54 10.0		688
1805	1981 06 23.23194	13 15 26.08	-05 54 14.4		688
1841	1981 06 04.19653	14 37 47.13	-15 48 57.5		688
1841	1981 06 04.24653	14 37 45.65	-15 48 52.2		688
1841	1981 06 09.23681	14 35 34.10	-15 41 31.4		688
1841	1981 06 23.18403	14 31 58.44	-15 31 47.4		688
1841	1981 06 23.28056	14 31 57.80	-15 31 47.9		688
1879	1981 06 04.19653	14 41 22.28	-16 25 45.2		688
1879	1981 06 04.24653	14 41 19.95	-16 25 33.5		688
1882	1981 06 04.17222	14 38 10.30	-08 26 37.9		688
1882	1981 06 04.22292	14 38 08.83	-08 26 30.3		688
1950	1981 06 05.25208	16 54 05.89	-23 14 41.7	17.0	688
1950	1981 06 05.34861	16 53 58.86	-23 14 44.7		688
1976	1981 06 02.19444	13 11 29.43	-04 32 24.8		688
1976	1981 06 02.25278	13 11 29.64	-04 32 35.0		688
2005	1981 06 06.34306	19 49 57.86	-24 04 29.8		688
2005	1981 06 06.39167	19 49 56.57	-24 04 25.5	3	688
2144	1981 06 04.28611	15 46 04.16	-15 44 23.9		688
2144	1981 06 04.32917	15 46 02.19	-15 44 19.6		688
2144	1981 06 09.32083	15 42 15.99	-15 35 21.8		688
2144	1981 06 09.33750	15 42 15.15	-15 35 21.3		688
2144	1981 06 25.27604	15 32 53.80	-15 18 37.3		688
2158	1981 06 04.34792	17 27 40.98	-20 48 07.5		688
2158	1981 06 04.39444	17 27 38.62	-20 48 04.3		688
2158	1981 06 24.28125	17 11 11.41	-20 28 19.0		688
2163	1981 06 04.34792	17 32 18.69	-21 22 13.2	3	688
2163	1981 06 04.39444	17 32 16.49	-21 22 13.9		688
2163	1981 06 24.22083	17 15 47.50	-21 17 28.4		688
2163	1981 06 24.28125	17 15 44.68	-21 17 23.0	3	688
2182	1981 06 04.19653	14 49 05.81	-16 30 02.0		688
2182	1981 06 04.24653	14 49 04.09	-16 29 57.7		688
2182	1981 06 23.18403	14 42 49.42	-16 16 26.1		688
2182	1981 06 23.28056	14 42 48.76	-16 16 27.4		688
2191	1981 06 04.19653	14 47 26.63	-19 18 43.3		688
2191	1981 06 04.24653	14 47 24.75	-19 18 27.5		688
2209	1981 06 04.17222	14 49 31.03	-12 24 20.8		688
2209	1981 06 04.22292	14 49 29.20	-12 24 12.2		688
2217	1981 06 23.18403	14 46 48.27	-13 06 24.6		688
2217	1981 06 23.28056	14 46 47.10	-13 06 24.9		688
2228	1981 06 24.19931	14 15 33.93	-11 01 49.7	2	688
2228	1981 06 24.26042	14 15 33.70	-11 01 47.6		688
2233	1981 06 05.25208	16 38 18.22	-21 34 02.5		688
2233	1981 06 05.28611	16 38 16.03	-21 33 57.8		688

2233		1981	06	05.34861	16	38	11.85	-21	33	42.8		688	
2256		1981	06	04.34792	17	29	34.99	-22	50	01.3	1	688	
2256		1981	06	04.39444	17	29	32.57	-22	49	59.9		688	
2256		1981	06	24.22083	17	12	42.77	-22	37	13.9		688	
2256		1981	06	24.28125	17	12	39.71	-22	37	10.6		688	
2263		1981	06	02.19444	13	18	31.97	-02	32	39.0		688	
2263		1981	06	02.25278	13	18	30.96	-02	32	47.4		688	
2268		1981	06	06.34306	19	46	22.32	-22	15	12.9		688	
2268		1981	06	06.39167	19	46	21.30	-22	15	17.5		688	
2268		1981	06	09.35833	19	45	07.77	-22	21	33.9	1	688	
2295		1981	06	24.22083	17	30	12.89	-26	03	26.5	3	688	
2295		1981	06	24.28125	17	30	09.49	-26	03	25.1		688	
2376		1981	06	02.19444	13	16	47.86	-05	34	56.8	17.0	688	
2376		1981	06	02.25278	13	16	47.11	-05	34	58.3		688	
2378		1981	06	06.31875	20	03	34.19	-02	15	50.0	16.8	688	
2378		1981	06	06.36736	20	03	33.32	-02	15	43.0		688	
2387		1981	06	24.19931	14	12	26.78	-12	42	53.4		688	
2387		1981	06	24.26042	14	12	26.55	-12	43	00.6	1	688	
2388		1981	06	04.19653	14	43	20.26	-20	11	43.0	16.0	688	
2388		1981	06	04.24653	14	43	18.83	-20	11	33.1		688	
2388		1981	06	09.23681	14	41	34.00	-19	56	23.6	16.5	688	
2388		1981	06	09.28750	14	41	33.13	-19	56	13.9		688	
2388		1981	06	23.18403	14	41	07.65	-19	30	41.4		688	
2388		1981	06	23.28056	14	41	08.65	-19	30	34.8		688	
2411		1981	06	24.19931	14	11	54.08	-10	45	20.5	17.0	688	
2411		1981	06	24.26042	14	11	55.22	-10	45	30.4		688	
1934	CD	1981	06	06.34306	19	50	48.11	-22	11	50.7	17.5	688	
1934	CD	1981	06	06.39167	19	50	46.63	-22	11	38.8	2	688	
1934	CD	1981	06	09.35833	19	49	14.93	-22	04	43.1	17.2	688	
1934	CD	1981	06	09.38194	19	49	14.23	-22	04	40.7		688	
1934	CD	1981	07	03.26597	19	30	21.84	-21	10	28.6	17.0	688	
1934	CD	1981	07	03.30347	19	30	19.57	-21	10	25.1		688	
1941	SS	1981	06	04.19653	14	34	04.83	-16	52	18.3	17.2	688	
1941	SS	1981	06	04.24653	14	34	02.99	-16	52	00.2		688	
1968	UP	1981	06	05.25208	16	39	13.73	-24	44	29.9	17.0	688	
1968	UP	1981	06	05.28611	16	39	11.44	-24	44	30.5	3	688	
1968	UP	1981	06	05.34861	16	39	08.07	-24	44	23.4		688	
1968	UP	1981	06	25.23056	16	22	22.82	-24	13	25.0		688	
1968	UP	1981	06	25.29583	16	22	20.05	-24	13	18.2		688	
1974	KB	1981	06	06.34306	19	53	43.70	-25	15	28.8	17.2	2	688
1974	KB	1981	06	06.39167	19	53	42.88	-25	15	30.3		688	
1974	KB	1981	07	03.30347	19	34	15.87	-25	36	14.8	16.8	688	
1975	FW	1981	06	04.17222	14	28	30.44	-14	08	02.6	17.0	1	688
1975	FW	1981	06	04.22292	14	28	28.61	-14	08	06.9		688	
1976	JF2	1981	06	23.20903	13	27	11.65	+00	30	34.0	17.2	688	
1976	JF2	1981	06	23.23194	13	27	11.92	+00	30	25.2		688	
1976	KV	1981	06	04.28611	15	39	24.41	-18	01	02.2	16.0	688	
1976	KV	1981	06	04.32917	15	39	22.53	-18	00	47.9		688	
1976	KV	1981	06	09.32083	15	36	02.18	-17	32	18.8	15.8	688	
1976	KV	1981	06	09.33750	15	36	01.51	-17	32	15.8		688	
1976	KV	1981	06	25.20417	15	28	51.22	-16	19	06.8	16.5	688	
1976	KV	1981	06	25.27604	15	28	50.09	-16	18	52.8		688	
1977	QM3	1981	06	04.28611	15	47	06.85	-21	52	50.7	17.0	688	
1977	QM3	1981	06	04.32917	15	47	04.70	-21	52	32.0		688	
1977	QM3	1981	06	09.32083	15	43	08.35	-21	38	57.3	17.0	688	
1977	RC7	1981	06	24.19931	14	02	22.78	-09	42	38.2	17.2	688	
1977	RC7	1981	06	24.26042	14	02	23.03	-09	42	41.1		688	
1978	PB4	1981	06	04.37153	19	56	45.49	-24	51	03.6	17.2	688	
1978	PB4	1981	06	04.41597	19	56	44.57	-24	51	02.0		688	

1978 PB4	1981 07 03.26597	19 34 10.43	-24 46 41.1	16.8	688
1978 PB4	1981 07 03.30347	19 34 07.60	-24 46 41.5		688
1980 EC	1981 06 06.31875	20 17 09.37	-03 37 28.2	17.2	688
1980 EC	1981 06 06.36736	20 17 08.83	-03 37 24.8		688
1981 FN	1981 06 02.19444	13 13 02.29	-02 24 29.0	17.2	688
1981 FN	1981 06 02.25278	13 13 02.42	-02 24 50.5		688
1981 GJ	1981 06 02.19444	13 19 09.66	+01 06 10.0	15.8	688
1981 GJ	1981 06 02.25278	13 19 10.14	+01 06 14.1		688
1981 JM	1981 05 08.36528	14 46 12.03	-12 18 10.3	17.0	688
1981 JM	1981 06 04.22292	14 28 59.90	-11 10 25.0	17.5	688
1981 JN	1981 06 04.17222	14 34 44.28	-09 12 51.6	17.0	2 688
1981 JN	1981 06 04.22292	14 34 42.89	-09 12 34.2		2 688
1981 JP	1981 06 04.17222	14 32 48.28	-09 19 06.0	16.8	688
1981 JP	1981 06 04.22292	14 32 46.80	-09 19 06.4		688
1981 JQ	1981 06 04.19653	14 36 29.69	-18 57 28.2	16.8	688
1981 JQ	1981 06 04.24653	14 36 27.89	-18 57 25.0		688
1981 JR	1981 06 04.19653	14 56 26.42	-16 23 45.2	16.8	688
1981 JR	1981 06 04.24653	14 56 25.11	-16 23 32.8		2 688
1981 JR	1981 06 09.23681	14 54 33.57	-16 05 07.3	17.0	688
1981 JR	1981 06 09.28750	14 54 32.47	-16 04 57.0		1 688
1981 JR	1981 06 23.18403	14 50 38.58	-15 20 23.5	17.0	688
1981 JR	1981 06 23.28056	14 50 37.19	-15 20 07.2		688
1981 JX	1981 06 04.28611	15 35 12.03	-17 21 02.3	16.5	688
1981 JX	1981 06 04.32917	15 35 10.27	-17 20 56.9		688
1981 JX	1981 06 09.32083	15 31 47.07	-17 10 14.5	17.0	688
1981 JX	1981 06 09.33750	15 31 46.47	-17 10 10.9		688
1981 JX	1981 06 25.20417	15 23 45.15	-16 46 33.2	17.2	688
1981 JX	1981 06 25.27604	15 23 43.59	-16 46 28.8		688
1981 JY	1981 06 05.25208	16 44 13.15	-24 26 20.3	16.2	688
1981 JY	1981 06 05.28611	16 44 10.89	-24 26 31.0		688
1981 JY	1981 06 05.34861	16 44 06.64	-24 26 49.2		688
1981 JB1	1981 06 05.23333	16 15 39.72	-23 28 45.5	16.5	688
1981 JB1	1981 06 05.26875	16 15 37.69	-23 28 47.4		688
1981 LA *	1981 06 04.37153	20 05 14.09	-21 43 29.9	15.5	4 688
1981 LA	1981 06 04.41597	20 05 13.50	-21 44 14.6		688
1981 LA	1981 06 06.34306	20 04 49.32	-22 16 10.4	15.8	2 688
1981 LA	1981 06 06.39167	20 04 48.50	-22 16 56.6		688
1981 LA	1981 06 09.35833	20 03 52.75	-23 08 22.9	15.8	688
1981 LA	1981 06 09.38194	20 03 52.15	-23 08 48.5		688
1981 LA	1981 07 03.28715	19 43 08.68	-31 11 23.5	15.5	688
1981 LA	1981 07 03.31979	19 43 06.06	-31 12 05.8		688
1981 LC *	1981 06 04.34792	17 26 09.19	-21 25 46.0	16.0	4 688
1981 LC	1981 06 04.39444	17 26 06.52	-21 26 04.6		688
1981 LC	1981 06 24.22083	17 07 53.95	-23 40 32.2	16.2	688
1981 LC	1981 06 24.28125	17 07 50.74	-23 40 55.7		688
1981 LD *	1981 06 04.37153	19 48 54.63	-22 30 54.4	17.0	4 688
1981 LD	1981 06 04.41597	19 48 54.23	-22 31 03.2		688
1981 LD	1981 06 06.34306	19 48 36.28	-22 36 47.7	16.8	688
1981 LD	1981 06 06.39167	19 48 35.66	-22 36 57.0		688
1981 LD	1981 06 09.35833	19 47 53.57	-22 46 35.8	16.8	688
1981 LD	1981 06 09.38194	19 47 53.15	-22 46 40.6		688
1981 LD	1981 07 03.26597	19 32 29.81	-24 30 02.2	16.5	688
1981 LD	1981 07 03.30347	19 32 27.44	-24 30 14.6		688
1981 LE *	1981 06 04.37153	19 54 37.47	-22 07 05.8	17.0	7 688
1981 LE	1981 06 04.41597	19 54 36.71	-22 07 03.3		688
1981 LE	1981 06 06.34306	19 53 55.55	-22 05 53.7	17.0	2 688
1981 LE	1981 06 09.35833	19 52 42.12	-22 04 24.1	17.2	688
1981 LE	1981 06 09.38194	19 52 41.45	-22 04 23.0		688
1981 LE	1981 07 03.26597	19 37 16.82	-21 59 03.8	17.0	688

1981 LE		1981 07 03.30347	19 37 14.75	-21 59 04.6				688
1981 LF	*	1981 06 04.37153	20 08 24.84	-19 13 34.8		16.8	4	688
1981 LF		1981 06 04.41597	20 08 24.06	-19 13 27.3				688
1981 LF		1981 06 06.34306	20 07 51.05	-19 09 21.9		16.5		688
1981 LF		1981 06 06.39167	20 07 50.12	-19 09 15.9				688
1981 LF		1981 06 09.35833	20 06 49.00	-19 03 16.2		16.5		688
1981 LF		1981 06 09.38194	20 06 48.45	-19 03 14.4				688
1981 LF		1981 07 03.26597	19 52 28.45	-18 27 03.6		16.5		688
1981 LF		1981 07 03.30347	19 52 26.70	-18 27 01.7				688
1981 LG	*	1981 06 04.28611	15 36 25.53	-15 36 17.4		16.8	4	688
1981 LG		1981 06 04.32917	15 36 23.52	-15 36 11.4				688
1981 LG		1981 06 09.32083	15 32 59.01	-15 25 11.0		17.0		688
1981 LG		1981 06 09.33750	15 32 58.36	-15 25 08.3				688
1981 LH	*	1981 06 04.28611	15 37 53.29	-14 47 05.8		17.0	4	688
1981 LH		1981 06 04.32917	15 37 50.74	-14 47 13.0				688
1981 LJ	*	1981 06 04.28611	15 38 56.22	-16 16 42.8		16.8	4	688
1981 LJ		1981 06 04.32917	15 38 54.00	-16 16 39.3				688
1981 LJ		1981 06 09.32083	15 35 07.32	-16 09 19.3		16.8		688
1981 LJ		1981 06 09.33750	15 35 06.55	-16 09 18.6				688
1981 LJ		1981 06 25.20417	15 26 02.94	-15 58 00.6		17.2		688
1981 LJ		1981 06 25.27604	15 26 01.41	-15 58 00.1				688
1981 LK	*	1981 06 04.28611	15 44 15.61	-15 01 01.5		16.8	4	688
1981 LK		1981 06 04.32917	15 44 14.28	-15 01 04.2				688
1981 LK		1981 06 09.32083	15 41 37.85	-15 04 26.2		16.5		688
1981 LK		1981 06 09.33750	15 41 37.30	-15 04 27.0				688
1981 LL	*	1981 06 06.31875	20 27 49.68	-00 34 05.8		16.8	4	688
1981 LL		1981 06 06.36736	20 27 50.44	-00 34 03.0				688
1981 MA	*	1981 06 24.22083	17 22 42.41	-22 19 40.3		17.0	4	688
1981 MA		1981 06 24.28125	17 22 38.37	-22 19 26.6				688
1981 NA	*	1981 07 03.26597	19 40 50.83	-21 38 51.6		17.0	7	688
1981 NA		1981 07 03.30347	19 40 49.07	-21 39 28.1				688

Note 1: right ascension uncertain. 2: declination uncertain. 3 = 1 + 2.

4: discoverer Bowell. 7 = 3 + 4.

OBSERVATIONS MADE AT THE LUNAR AND PLANETARY LABORATORY'S CATALINA STATION
(CODE 693) AND AT THE STEWARD OBSERVATORY'S STATION ON KITT PEAK (CODE
691) UNDER THE DIRECTION OF E. ROEMER. MEASURED BY ROEMER AND C. D.
VESELY.

Object	Date	UT	R. A. (1950)		Decl.	Obs.
944	1976 11	24.24722	00 29	19.23	+27 45 40.8	693
944	1976 11	24.27014	00 29	17.58	+27 45 54.4	693
1050	1974 01	22.47778	12 03	25.81	-00 38 15.6	693
1293	1972 03	10.34728	12 08	37.00	-08 28 55.1	691
1293	1972 03	10.37257	12 08	35.59	-08 28 46.4	691
1293	1972 04	17.23912	11 34	36.79	-03 57 45.7	691
1293	1972 04	17.26696	11 34	35.65	-03 57 34.3	691
1297	1969 11	05.24086	03 12	17.25	+31 00 47.5	691
1297	1969 11	05.25828	03 12	16.25	+31 00 43.6	691
1311	1976 09	22.21597	23 05	.90	-00 57.4	693
1311	1976 09	22.23160	23 05	.88	-00 57.5	693
1422	1976 05	24.30903	17 20	57.82	-19 32 19.2	693
1566	1967 06	08.35351	20 58	22.10	-25 33 08.9	693
1566	1967 06	08.37851	20 58	16.45	-25 34 05.1	693
1566	1976 05	28.44508	21 25	00.99	-22 59 10.7	691
1566	1976 05	28.45613	21 24	59.98	-22 59 26.1	691
1610	1976 03	30.37778	13 18	55.52	-09 28 52.5	693
1610	1976 03	30.40417	13 18	53.84	-09 28 43.8	693
1620	1969 09	06.11672	20 04	.30	-13 12.2	693
1620	1969 10	07.18432	21 28	39.24	+08 17 59.7	691

1620	1969	10	07.18981	21	28	39.71	+08	18	03.1	691
1620	1969	11	08.08333	22	20	20.39	+11	31	29.3	693
1620	1969	11	08.09306	22	20	21.36	+11	31	32.2	693
1685	1967	05	13.34171	16	34	04.07	-32	48	28.9	693
1685	1967	05	13.36324	16	34	01.67	-32	48	23.2	693
1685	1967	06	07.25559	15	41	28.69	-28	54	25.3	693
1685	1967	06	07.27226	15	41	26.50	-28	54	11.4	693
1685	1967	06	08.21669	15	39	29.39	-28	41	12.7	693
1685	1968	04	28.24590	08	25	40.12	+06	53	39.9	693
1709	1976	04	26.40557	17	02	11.85	-32	55	44.8	693
1727	1968	06	26.25851	14	46	22.90	+18	25	37.4	693
1727	1968	06	26.28212	14	46	22.65	+18	25	14.2	693
1862	1975	12	04.39039	09	49	15.10	+22	17	26.8	691
1862	1975	12	04.43559	09	49	15.20	+22	17	39.2	691
1863	1975	10	04.10764	18	18	30.54	-32	48	23.5	693
1864	1971	03	28.30208	12	17	17.77	-01	25.2		693
1864	1971	03	28.33125	12	17	17.69	-01	25.2		693
1864	1975	12	30.52118	12	06	27.85	+17	39	05.6	691
1864	1976	03	25.30455	10	25	49.00	+25	18	41.8	691
1864	1976	03	25.32436	10	25	46.99	+25	18	38.8	691
1869	1973	11	21.36968	02	02	02.01	+11	51.3		691
1869	1973	11	21.37859	02	02	02.01	+11	51.3		691
1923	1975	11	02.15208	22	32	59.13	-08	30	39.6	693
1923	1975	11	02.19792	22	32	59.59	-08	30	31.3	693
1924	1975	11	03.48681	07	34	44.29	+25	20	08.2	693
1930	1975	12	25.40834	08	19	08.47	+28	27	15.4	693
1930	1975	12	25.42015	08	19	07.90	+28	27	16.2	693
1930	1976	03	05.26111	07	23	12.30	+26	55	40.0	693
1930	1976	03	05.29097	07	23	11.90	+26	55	33.5	693
1983	1976	11	23.38681	03	41	18	+29	20.6		693
1995	1974	06	19.38889	20	05	73	-35	02.5		693
1995	1974	06	19.41111	20	05	71	-35	02.6		693
2059	1976	11	25.31250	06	29	03.48	-03	29	25.2	693
2059	1976	11	25.33403	06	29	03.06	-03	29	42.8	693
2077	1976	06	27.27008	14	01	24	+03	02.8		691
1972 FE	1972	04	13.27292	11	33	31	+18	31.1		693
1972 FE	1972	04	13.30694	11	33	30	+18	31.6		693
1972 RB	1972	10	08.28542	00	36	78	-04	54.9		693
1972 RB	1972	10	08.30312	00	36	80	-04	54.9		693

OBSERVATIONS MADE AT THE LINCOLN LABORATORY ETS, NEW MEXICO, UNDER THE DIRECTION OF L. G. TAFF.

Object	Date	UT	R. A. (1950)	Decl.	Obs.	
24	1981	04	09.42957	12 48 35.39	-04 46 09.1	704
24	1981	04	09.45331	12 48 34.46	-04 46 01.8	704
24	1981	04	10.21760	12 48 00.78	-04 42 37.8	704
24	1981	04	11.23288	12 47 15.58	-04 38 09.0	704
50	1981	05	03.27240	14 42 35.00	-12 30 57.4	704
50	1981	05	03.31329	14 42 32.87	-12 30 47.3	704
50	1981	05	03.37313	14 42 29.60	-12 30 30.2	704
50	1981	05	05.42981	14 40 41.74	-12 21 11.5	704
50	1981	05	05.43170	14 40 41.63	-12 21 11.8	704
50	1981	05	07.20378	14 39 09.43	-12 13 12.7	704
50	1981	05	07.20804	14 39 09.23	-12 13 12.0	704
91	1981	05	03.36576	14 24 56.29	-16 08 01.2	704
91	1981	05	03.39921	14 24 54.40	-16 07 52.9	704
91	1981	05	05.28055	14 23 10.86	-16 00 30.1	704
91	1981	05	05.28164	14 23 10.83	-16 00 26.7	704
91	1981	05	05.36860	14 23 05.99	-16 00 09.0	704

91	1981	05	05.37122	14	23	05.80	-16	00	07.3	704
91	1981	05	07.21929	14	21	25.23	-15	52	53.7	704
91	1981	05	07.22168	14	21	25.13	-15	52	52.3	704
99	1981	04	10.35581	13	27	03.64	+01	01	34.2	704
99	1981	04	10.39989	13	27	00.86	+01	01	31.2	704
99	1981	04	11.25485	13	26	06.36	+01	00	06.9	704
167	1981	05	03.26297	14	35	50.98	-12	17	36.1	704
167	1981	05	03.30900	14	35	48.65	-12	17	22.6	704
167	1981	05	03.36947	14	35	45.59	-12	17	06.2	704
167	1981	05	05.22493	14	34	14.16	-12	09	01.3	704
167	1981	05	05.22601	14	34	14.03	-12	08	57.9	704
167	1981	05	05.36347	14	34	07.00	-12	08	25.1	704
167	1981	05	05.36485	14	34	06.94	-12	08	26.4	704
167	1981	05	07.19317	14	32	37.43	-12	00	29.3	704
177	1981	04	10.20410	12	47	32.01	-06	05	41.2	704
177	1981	04	10.27375	12	47	28.58	-06	05	21.5	704
177	1981	04	10.32325	12	47	26.01	-06	05	08.4	704
177	1981	04	11.23953	12	46	42.98	-06	00	49.3	704
184	1981	05	06.32004	15	21	35.86	-20	13	47.3	704
184	1981	05	06.32365	15	21	35.77	-20	13	49.3	704
184	1981	05	06.41149	15	21	31.16	-20	13	32.0	704
184	1981	05	07.25998	15	20	51.20	-20	11	13.0	704
277	1981	04	09.28063	13	12	42.31	-08	40	05.4	704
277	1981	04	09.34250	13	12	39.38	-08	39	45.7	704
277	1981	04	09.43564	13	12	34.64	-08	39	17.3	704
277	1981	04	10.26987	13	11	55.67	-08	35	05.5	704
277	1981	04	11.21113	13	11	11.91	-08	30	22.4	704
318	1981	04	10.35855	13	32	40.36	+00	56	58.0	704
318	1981	04	10.40451	13	32	38.40	+00	57	16.1	704
318	1981	04	11.26078	13	32	03.42	+01	02	46.0	704
393	1981	05	05.21977	14	23	10.63	-10	40	43.7	704
393	1981	05	05.22276	14	23	10.72	-10	40	39.7	704
393	1981	05	05.35654	14	23	03.64	-10	39	05.9	704
393	1981	05	05.36093	14	23	03.47	-10	39	00.9	704
393	1981	05	07.21338	14	21	32.46	-10	16	57.7	704
393	1981	05	07.21595	14	21	32.23	-10	17	01.0	704
401	1981	05	03.36189	14	37	01.54	-16	18	08.1	704
401	1981	05	03.39536	14	36	59.89	-16	18	02.7	704
401	1981	05	05.28706	14	35	31.04	-16	13	59.5	704
401	1981	05	05.31265	14	35	30.13	-16	13	55.8	704
401	1981	05	05.37537	14	35	27.01	-16	13	49.4	704
401	1981	05	05.37726	14	35	26.87	-16	13	50.7	704
401	1981	05	07.22577	14	34	00.53	-16	09	45.3	704
401	1981	05	07.22890	14	34	00.53	-16	09	45.7	704
448	1981	05	03.35760	14	39	28.69	-17	20	04.4	704
448	1981	05	03.39046	14	39	26.82	-17	20	00.9	704
448	1981	05	05.29793	14	37	45.17	-17	18	44.0	704
454	1981	04	10.26040	13	26	30.94	-06	52	26.3	704
454	1981	04	10.31933	13	26	27.61	-06	52	20.5	704
454	1981	04	10.36608	13	26	24.84	-06	52	13.2	704
454	1981	04	11.25052	13	25	35.24	-06	50	23.3	704
514	1981	04	09.33786	12	58	13.55	-12	00	39.9	704
514	1981	04	09.44130	12	58	08.76	-12	00	08.5	704
514	1981	04	10.20860	12	57	34.09	-11	56	18.8	704
514	1981	04	11.21573	12	56	48.61	-11	51	08.6	704
519	1981	05	06.32836	15	10	47.23	-19	03	03.3	704
519	1981	05	06.33106	15	10	46.87	-19	03	04.0	704
519	1981	05	06.41856	15	10	41.80	-19	03	01.3	704
519	1981	05	06.42101	15	10	41.70	-19	02	58.0	704

533	1981	04	09.39221	12	48	03.85	-02	28	39.8	704
533	1981	04	09.44620	12	48	01.55	-02	28	16.5	704
533	1981	04	10.21182	12	47	29.04	-02	23	09.5	704
533	1981	04	11.22156	12	46	45.99	-02	16	25.8	704
578	1981	04	10.25342	13	29	05.54	-07	59	13.9	704
578	1981	04	10.31480	13	29	02.14	-07	59	04.2	704
578	1981	04	10.36204	13	28	59.41	-07	58	53.8	704
578	1981	04	11.24438	13	28	11.11	-07	56	22.7	704
770	1981	04	09.41907	12	54	43.46	-01	58	22.9	704
770	1981	04	09.45034	12	54	41.53	-01	58	15.5	704
770	1981	04	10.21482	12	53	54.57	-01	54	52.0	704
770	1981	04	11.22848	12	52	52.22	-01	50	28.7	704
821	1981	05	05.34723	15	01	35.81	-14	17	44.1	704
821	1981	05	05.35046	15	01	35.77	-14	17	47.7	704
821	1981	05	05.43454	15	01	31.88	-14	17	11.3	704
821	1981	05	05.43798	15	01	31.75	-14	17	11.6	704
821	1981	05	07.24032	15	00	09.00	-14	04	58.3	704
821	1981	05	07.24290	15	00	08.77	-14	04	59.3	704
857	1981	05	06.37026	15	42	48.89	-14	30	59.3	704
857	1981	05	06.37476	15	42	48.70	-14	31	00.0	704
857	1981	05	06.42502	15	42	45.46	-14	30	54.3	704
857	1981	05	06.42744	15	42	45.33	-14	30	56.3	704
857	1981	05	07.26322	15	41	54.67	-14	29	43.3	704
857	1981	05	07.26576	15	41	54.66	-14	29	42.3	704
1981 JL	1981	05	05.29010	14	35	01.55	-14	52	21.0	704
1981 JL	1981	05	05.29140	14	35	01.25	-14	52	24.3	704
1981 JL	1981	05	06.26951	14	34	05.60	-14	49	42.7	704
1981 JL	1981	05	06.27467	14	34	05.47	-14	49	43.3	704
1981 JL	1981	05	06.36023	14	34	00.33	-14	49	30.7	704
1981 JL	1981	05	06.36521	14	34	00.13	-14	49	27.3	704
1981 JL	1981	05	07.27570	14	33	08.43	-14	46	59.0	704
1981 JL	1981	05	07.28225	14	33	08.00	-14	46	57.7	704

OBSERVATIONS MADE THE GOETHE LINK OBSERVATORY (CODE 760) AND AT THE
LEIDEN SOUTHERN STATION (CODE 076). MEASURED AND REDUCED AT INDIANA
UNIVERSITY.

Object	Date	UT	R. A. (1950)			Decl.	N	Obs.		
452	1958	01	19.10350	06	32	41.35	+24	14	54.9	760
2346	1957	04	30.80585	14	44	49.74	-19	45	41.0	1 076
2346	1957	04	30.86580	14	44	46.81	-19	45	22.2	1 076
2380	1962	12	02.28119	04	08	45.86	+24	38	43.2	760
2384	1962	11	30.07633	03	12	11.70	+34	31	26.7	760
2384	1962	11	30.12321	03	12	08.77	+34	31	19.8	760
2410	1955	04	27.30983	15	24	57.93	-14	05	12.6	760
2410	1955	04	27.35150	15	24	55.74	-14	05	01.7	760
2411	1961	04	14.21804	13	42	28.44	-07	26	17.8	760
2411	1961	04	14.26873	13	42	25.81	-07	26	02.1	760
2411	1961	05	11.17497	13	19	21.83	-05	13	50.0	760
2411	1961	05	11.21733	13	19	20.19	-05	13	40.9	760
1952 RB	1952	09	13.13376	21	45	16.57	-14	15	35.3	760
1952 RB	1952	09	13.21014	21	45	13.80	-14	16	00.6	760
1952 SZ	1952	09	29.31738	01	37	02.26	+03	07	47.9	760
1952 SZ	1952	09	29.36601	01	36	59.72	+03	07	23.3	760
1952 UF	1952	10	21.39414	04	09	48.83	+07	14	18.6	760
1952 UB1	1952	10	24.20351	02	58	41.21	+26	31	33.6	760
1952 UB1	1952	10	24.27365	02	58	37.74	+26	31	18.0	760
1953 RF	1953	09	08.25521	23	59	55.63	-01	05	10.8	760
1953 RF	1953	09	08.29411	23	59	53.65	-01	05	16.9	760
1953 TA2	1953	10	09.15556	23	35	24.67	-02	31	24.8	760

1953 TA2	1953 10 09.20068	23 35 22.90	-02 31 29.6	760
1953 UO	1953 10 18.30416	01 43 15.94	+18 40 50.3	760
1953 UO	1953 10 18.34372	01 43 13.31	+18 40 45.6	760
1954 JK	1954 05 09.29942	15 47 24.50	-19 03 22.5	760
1954 JK	1954 05 09.33831	15 47 22.22	-19 03 07.8	760
1954 UF	1954 10 20.09176	00 09 48.96	-00 40 34.9	760
1954 UF	1954 10 20.13690	00 09 47.52	-00 40 37.2	760
1954 UO	1954 10 22.17160	01 27 09.59	+11 00 51.3	760
1954 UO	1954 10 22.21534	01 27 07.39	+11 00 36.8	760
1955 EM	1955 03 14.17838	09 41 27.11	+11 29 52.7	760
1955 EM	1955 03 14.21692	09 41 25.59	+11 30 08.0	760
1958 DN	1958 02 23.19453	08 53 06.59	+21 27 52.3	760
1958 DN	1958 02 23.23819	08 53 04.81	+21 27 57.8	760
1960 DE	1960 02 27.20199	10 30 55.36	+10 41 32.8	760
1960 DE	1960 02 27.25000	10 30 53.22	+10 41 53.1	760
1962 XJ1	1962 12 03.39127	05 29 06.97	+23 37 09.5	760
1962 XJ1	1962 12 03.43537	05 29 04.77	+23 37 13.0	760
1963 DL	1963 02 27.26208	10 33 22.11	+02 28 52.0	760
1963 DL	1963 02 27.30548	10 33 19.99	+02 29 05.9	760
1963 YB	1963 12 17.05694	04 23 12.10	+19 36 12.4	760
1963 YB	1963 12 17.12153	04 23 09.09	+19 36 08.4	760
1965 GB	1965 04 01.22569	12 49 55.19	+06 44 19.7	760
1965 GB	1965 04 01.26250	12 49 53.01	+06 44 26.4	760
1978 UJ	1958 01 19.10350	06 33 02.32	+24 10 44.2	760
1978 UJ	1958 01 19.14586	06 33 00.00	+24 10 46.7	760

Note 1: the approximate positions on MPC 1782 are somewhat in error.

OBSERVATIONS MADE AT THE OAK RIDGE OBSERVATORY BY R. E. MC CROSKY, C.-Y. SHAO, G. SCHWARTZ, E. FOGELIN AND V. TEMPELMAN (WITH ASSISTANCE FROM C. M. BARDWELL, D. W. E. GREEN AND B. G. MARSDEN).

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
863	1981 06 30.09733	13 50 48.36	+18 54 44.7				801
1176	1978 09 29.15343	22 03 00.95	-01 39 32.5				801
1964 TC2	1981 02 28.31201	12 27 08.84	-04 39 31.4				801
1972 LD1	1981 01 06.03317	01 24 09.33	-08 21 32.9			1	801
1972 NC	1981 04 08.26751	12 29 58.81	-09 54 05.5				801
1976 QV	1981 02 05.99424	03 31 21.43	+21 23 51.5				801
1976 YQ7	1981 01 03.01091	00 50 37.12	+06 07 56.0			1	801
1977 RB	1981 03 04.25546	08 35 13.45	+35 29 21.3				801
1978 GC	1980 02 12.03728	04 44 35.78	-09 42 12.0				801
1978 PF3	1981 04 08.08463	09 55 38.16	+11 45 23.0				801
1979 MF4	1981 02 01.18963	06 37 16.14	+20 49 36.4				801
1981 CW	1981 06 03.09855	11 32 22.40	+10 21 24.6		18		801
1981 CC1 *	1981 02 01.29274	09 32 37.06	+16 45 08.3		18		801
1981 FD	1981 04 23.13961	12 05 12.51	-00 24 52.1				801
1981 FD	1981 05 08.17444	12 08 52.68	-01 26 07.9				801
1981 FD	1981 06 01.09735	12 26 32.84	-03 59 40.4			1	801
4578 P-L	1980 12 05.28676	06 08 20.73	+16 30 22.1			2	801

Note 1: weak image. 2: poor seeing.

OBSERVATIONS MADE AT THE UNIVERSITY OF CHILE'S CERRO EL ROBLE STATION BY L. E. GONZALEZ. COMMUNICATED BY C. TORRES.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
620	1981 05 29.29861	15 02 20.10	-28 43 14.5		16		805
620	1981 05 29.34028	15 02 18.33	-28 43 07.7				805
620	1981 06 04.21875	14 56 48.84	-28 22 52.3				805
620	1981 06 04.19306	14 56 50.27	-28 22 59.7				805
870	1981 07 02.15625	20 19 34.43	-16 54 31.1		13.5		805
870	1981 07 02.21389	20 19 33.33	-16 54 54.3				805

1633		1981	07	02.15625	20	24	57.91	-19	24	50.3	16.3	805
1633		1981	07	02.21389	20	24	55.56	-19	25	01.0		805
1829		1981	07	02.15625	20	20	43.71	-19	26	08.5	16.5	805
1829		1981	07	02.21389	20	20	40.59	-19	26	10.6		805
2118		1981	06	04.19306	15	00	13.24	-26	37	28.6	17	805
2118		1981	06	04.21875	15	00	11.95	-26	37	21.4		805
2186		1981	07	02.15625	20	24	32.80	-18	39	40.0	17.4	805
2186		1981	07	02.21389	20	24	30.21	-18	39	48.4		805
2412		1981	05	29.34028	15	04	10.13	-28	48	19.8	16.5	805
2412		1981	06	04.21875	14	59	42.08	-28	12	09.5		805
2412		1981	06	04.19306	14	59	43.23	-28	12	20.6		805
1977	RZ6	1981	05	29.29861	15	11	31.55	-28	17	02.6	17	805
1977	RZ6	1981	05	29.34028	15	11	30.31	-28	16	57.6		805
1981	KA	1981	05	29.29861	15	04	39.67	-30	01	55.0	16	1 805
1981	KA	1981	05	29.34028	15	04	37.85	-30	01	54.3		1 805
1981	KA	1981	06	04.19306	14	59	21.96	-29	59	19.4	16.5	1 805
1981	KA	1981	06	04.21875	14	59	20.56	-29	59	19.0		805
1981	KB	1981	05	29.29861	15	14	11.53	-30	32	59.6	18	805
1981	KB	1981	05	29.34028	15	14	09.86	-30	32	52.5		805
1981	KC	* 1981	05	29.29861	15	11	37.94	-29	14	52.9	18	805
1981	KC	1981	05	29.34028	15	11	36.67	-29	14	41.0		805
1981	KD	* 1981	05	29.29861	15	16	18.90	-28	27	41.6	17.5	805
1981	KD	1981	05	29.34028	15	16	17.37	-28	27	29.0		805
1981	LB	* 1981	06	04.19306	14	48	50.45	-30	16	02.6	18	805
1981	LB	1981	06	04.21875	14	48	49.40	-30	15	52.4		805
1981	NB	* 1981	07	02.15625	20	13	25.10	-17	58	20.6	19.5	805
1981	NB	1981	07	02.21389	20	13	22.68	-17	58	14.3		805
1981	NC	* 1981	07	02.15625	20	13	56.51	-17	58	14.8	19.5	805
1981	NC	1981	07	02.21389	20	13	53.56	-17	58	08.0		805
1981	ND	* 1981	07	02.15625	20	14	40.78	-16	54	05.4	17.0	805
1981	ND	1981	07	02.21389	20	14	38.73	-16	54	12.7		805
1981	NE	* 1981	07	02.15625	20	15	23.19	-17	29	45.4		805
1981	NE	1981	07	02.21389	20	15	20.87	-17	29	47.2		805
1981	NF	* 1981	07	02.15625	20	15	36.63	-15	56	34.5	17.5	805
1981	NF	1981	07	02.21389	20	15	33.46	-15	56	20.5		805
1981	NG	* 1981	07	02.15625	20	15	43.64	-17	22	49.7	19.5	805
1981	NG	1981	07	02.21389	20	15	41.18	-17	22	49.6		805
1981	NH	* 1981	07	02.15625	20	15	58.06	-19	03	10.0	19.5	805
1981	NH	1981	07	02.21389	20	15	55.64	-19	03	16.0		805
1981	NJ	* 1981	07	02.15625	20	16	22.95	-19	38	07.9	18.5	805
1981	NJ	1981	07	02.21389	20	16	20.93	-19	38	26.3		805
1981	NK	* 1981	07	02.15625	20	16	29.76	-18	39	43.5	18.0	805
1981	NK	1981	07	02.21389	20	16	26.72	-18	39	32.7		805
1981	NL	* 1981	07	02.15625	20	17	26.75	-15	44	25.6	18.5	805
1981	NL	1981	07	02.21389	20	17	24.15	-15	44	15.9		805
1981	NM	* 1981	07	02.15625	20	17	40.29	-17	51	00.8	19.5	805
1981	NM	1981	07	02.21389	20	17	38.11	-17	51	07.9		805
1981	NN	* 1981	07	02.15625	20	19	23.78	-18	01	09.8	18.0	805
1981	NN	1981	07	02.21389	20	19	21.75	-18	01	16.8		805
1981	NO	* 1981	07	02.15625	20	19	31.84	-17	30	41.5	19.5	805
1981	NO	1981	07	02.21389	20	19	29.45	-17	30	55.4		805
1981	NP	* 1981	07	02.15625	20	20	21.06	-19	41	30.0	19.5	805
1981	NP	1981	07	02.21389	20	20	19.17	-19	41	42.4		805
1981	NQ	* 1981	07	02.15625	20	20	23.16	-17	05	16.1	18.5	805
1981	NQ	1981	07	02.21389	20	20	20.42	-17	05	26.3		805
1981	NR	* 1981	07	02.15625	20	20	46.25	-17	49	50.8	19.0	805
1981	NR	1981	07	02.21389	20	20	44.25	-17	50	24.1		805
1981	NS	* 1981	07	02.15625	20	21	08.08	-16	19	50.0	19.0	805
1981	NS	1981	07	02.21389	20	21	05.28	-16	19	59.2		805

1981 NT *	1981 07 02.15625	20 22 35.54	-18 58 34.8	19.0	805
1981 NT	1981 07 02.21389	20 22 32.57	-18 58 23.0		805
1981 NU *	1981 07 02.15625	20 23 07.43	-18 54 11.7	17.0	805
1981 NU	1981 07 02.21389	20 23 05.07	-18 54 24.5		805
1981 NV *	1981 07 02.15625	20 23 15.87	-16 44 03.7	19.5	805
1981 NV	1981 07 02.21389	20 23 13.42	-16 44 05.1		805
1981 NW *	1981 07 02.15625	20 23 24.72	-18 37 55.2	19.5	805
1981 NW	1981 07 02.21389	20 23 21.98	-18 38 12.6		805
1981 NX *	1981 07 02.15625	20 23 26.75	-19 29 23.9	16.3	805
1981 NX	1981 07 02.21389	20 23 24.09	-19 29 34.9		805
1981 NY *	1981 07 02.15625	20 23 49.62	-16 03 43.2	19.5	805
1981 NY	1981 07 02.21389	20 23 47.44	-16 03 38.7		805
1981 NZ *	1981 07 02.15625	20 24 21.75	-16 02 17.6	19.5	805
1981 NZ	1981 07 02.21389	20 24 19.18	-16 02 15.5		805
1981 NA1 *	1981 07 02.15625	20 25 17.24	-16 23 34.7	18.5	805
1981 NA1	1981 07 02.21389	20 25 14.88	-16 23 32.2		805
1981 NB1 *	1981 07 02.15625	20 25 31.20	-18 56 00.2	18.5	805
1981 NB1	1981 07 02.21389	20 25 28.91	-18 56 13.4		805
1981 NC1 *	1981 07 02.15625	20 26 14.09	-20 02 39.7	19.0	805
1981 NC1	1981 07 02.21389	20 26 11.06	-20 02 18.5		805
1981 ND1 *	1981 07 02.15625	20 26 14.93	-17 38 43.8	19.5	805
1981 ND1	1981 07 02.21389	20 26 12.65	-17 38 47.0		805
1981 NE1 *	1981 07 02.15625	20 27 00.64	-20 12 43.2	19.5	805
1981 NE1	1981 07 02.21389	20 26 57.96	-20 12 45.8		805
1981 NF1 *	1981 07 02.15625	20 27 02.18	-17 37 52.7	19.5	805
1981 NF1	1981 07 02.21389	20 26 59.71	-17 37 56.8		805
1981 NG1 *	1981 07 02.15625	20 27 05.52	-16 53 56.2	19.0	805
1981 NG1	1981 07 02.21389	20 27 03.53	-16 54 10.5		805
1981 NH1 *	1981 07 02.15625	20 27 15.23	-17 17 42.6	18.5	805
1981 NH1	1981 07 02.21389	20 27 12.76	-17 17 52.0		805
1981 NJ1 *	1981 07 02.15625	20 27 19.99	-18 37 29.7	19.5	805
1981 NJ1	1981 07 02.21389	20 27 17.96	-18 37 40.1		805
1981 NK1 *	1981 07 02.15625	20 29 53.08	-17 41 34.4	18.0	805
1981 NK1	1981 07 02.21389	20 29 50.85	-17 41 35.3		805
1981 NL1 *	1981 07 02.15625	20 31 08.17	-16 35 54.8	19.0	805
1981 NL1	1981 07 02.21389	20 31 06.36	-16 36 04.1		805

Note 1: these observations replace those on MPC 6076.

OBSERVATIONS MADE AT THE ESTACION ASTRONOMICA DE ALTURA EL LEONCITO OF OBSERVATORIO ASTRONOMICO FELIX AGUILAR BY M. R. CESCO, H. MIRA, G. SANCHEZ AND J. A. VICENTE (COORDINATED BY C. U. CESCO AND J. G. SANGUIN).

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
71	1975 09 02.02343	19 57 57.14	-23 35 38.4			1	808
146	1979 09 23.16368	00 10 38.04	-20 49 23.4		14.0		808
146	1979 09 23.19208	00 10 36.47	-20 49 30.5				808
207	1975 09 02.02343	19 57 00.06	-26 41 36.5			1	808
365	1979 07 20.21235	19 44 49.94	-02 32 43.9				808
365	1979 07 20.24628	19 44 48.16	-02 32 51.0				808
426	1975 09 02.02343	19 56 43.11	-21 43 41.6			1	808
427	1979 09 21.08603	21 49 41.76	-07 45 21.8				808
427	1979 09 21.12066	21 49 40.70	-07 45 26.9				808
485	1979 03 06.16261	11 27 25.15	-06 21 09.4				808
485	1979 03 06.20071	11 27 23.42	-06 20 45.8				808
485	1979 03 29.15175	11 11 32.38	-02 03 22.4				808
485	1979 03 29.18781	11 11 31.12	-02 02 59.2				808
494	1979 09 21.21624	23 56 57.20	-08 04 06.7				808
494	1979 09 21.24463	23 56 55.71	-08 04 12.2				808
502	1979 10 27.24364	04 13 48.42	-18 51 06.8				808
502	1979 10 27.27965	04 13 47.06	-18 51 26.7				808

556	1979	02	25.27168	12	08	58.46	-09	31	31.5		808
556	1979	02	25.30285	12	08	57.16	-09	31	29.1		808
556	1979	03	06.24710	12	02	10.76	-09	12	42.0		808
556	1979	03	06.27619	12	02	09.27	-09	12	36.7		808
556	1979	03	30.15733	11	40	32.88	-07	18	10.2		808
556	1979	03	30.19334	11	40	30.91	-07	17	57.7		808
612	1979	11	21.09989	03	43	56.37	+02	26	52.9		808
612	1979	11	21.13174	03	43	54.68	+02	26	40.0		808
628	1979	07	20.29026	21	33	05.90	-20	49	06.8		808
628	1979	07	20.32212	21	33	04.68	-20	49	24.7		808
628	1979	08	14.15516	21	13	24.70	-24	35	18.4		808
628	1979	08	14.18979	21	13	22.79	-24	35	35.3		808
640	1980	07	21.28858	21	36	06.13	+05	52	07.7		808
640	1980	07	21.32459	21	36	04.82	+05	52	10.5		808
737	1979	11	27.24176	06	22	22.76	+05	43	43.9		808
737	1979	11	27.26877	06	22	21.54	+05	43	38.0		808
869	1979	07	21.06521	15	44	40.08	-08	23	34.3	16.5	808
869	1979	07	21.09707	15	44	41.08	-08	23	48.1		808
902	1979	07	20.29026	21	43	54.30	-21	42	36.0		808
902	1979	07	20.32212	21	43	52.95	-21	42	40.7		808
949	1979	05	24.20489	18	10	25.40	-37	58	52.2		808
949	1979	05	24.23674	18	10	23.98	-37	58	54.4		808
949	1979	07	25.07195	17	20	13.47	-34	26	17.9		808
949	1979	07	25.10658	17	20	12.79	-34	26	05.2		808
1055	1979	03	29.05900	09	50	31.44	+14	53	58.6		808
1055	1979	03	29.09986	09	50	30.17	+14	54	07.0		808
1098	1979	03	06.16261	11	28	16.79	-05	11	42.2		808
1098	1979	03	06.20071	11	28	14.50	-05	11	39.9		808
1098	1979	03	08.18284	11	26	19.05	-05	08	48.6		808
1098	1979	03	08.22855	11	26	16.27	-05	08	43.4		808
1098	1979	03	29.15175	11	06	42.03	-04	20	53.6		808
1098	1979	03	29.18781	11	06	40.19	-04	20	47.7		808
1145	1979	08	21.05433	19	19	30.90	-29	09	35.2		808
1145	1979	08	21.09311	19	19	30.02	-29	09	24.4		808
1159	1979	02	25.18511	10	30	32.25	+14	42	14.9		808
1159	1979	02	25.22181	10	30	29.56	+14	42	17.2		808
1159	1979	03	29.05900	09	59	54.86	+14	15	28.1		808
1159	1979	03	29.09986	09	59	53.33	+14	15	22.1		808
1182	1979	05	24.20489	18	11	52.66	-38	03	14.6		808
1182	1979	05	24.23674	18	11	51.14	-38	03	19.9		808
1264	1979	11	27.24176	06	23	47.25	+04	32	49.8		808
1264	1979	11	27.26877	06	23	46.20	+04	32	37.5		808
1295	1979	04	30.15995	12	47	48.57	-04	00	08.9		808
1295	1979	04	30.18212	12	47	47.83	-04	00	04.1		808
1417	1979	07	20.29026	21	38	44.51	-21	49	39.2		808
1417	1979	07	20.32212	21	38	43.31	-21	49	52.0		808
1417	1979	08	14.15516	21	20	13.33	-24	24	15.8		808
1417	1979	08	14.18979	21	20	11.62	-24	24	26.8		808
1418	1979	02	05.28057	10	36	28.87	+14	09	33.9	16.5	808
1418	1979	02	05.32628	10	36	26.25	+14	09	45.1		808
1442	1979	07	21.14521	18	20	32.60	-21	39	50.6	16.0	808
1442	1979	07	21.18468	18	20	30.65	-21	39	53.7		808
1575	1979	03	06.06704	09	15	01.56	-21	45	07.8		808
1575	1979	03	06.10859	09	15	00.08	-21	44	23.3		808
1592	1979	10	25.11162	23	18	33.95	-25	17	01.0		808
1592	1979	10	25.14763	23	18	33.78	-25	16	48.0		808
1628	1979	05	24.11658	16	26	23.06	+03	43	01.6		808
1628	1979	05	24.15467	16	26	21.29	+03	43	11.5		808
1628	1979	06	02.04976	16	19	37.67	+04	17	03.9		808

1628		1979 06 02.08370	16 19 35.96	+04 17 09.5		808
1628		1980 07 21.28858	21 28 29.79	+05 18 38.8		808
1628		1980 07 21.32459	21 28 28.52	+05 18 31.5		808
1770		1979 08 21.05433	19 25 23.34	-30 01 05.3		808
1770		1979 08 21.09311	19 25 22.08	-30 01 01.8	2	808
1800		1979 09 21.21624	00 03 10.25	-09 32 53.0		808
1800		1979 09 21.24463	00 03 08.67	-09 33 06.0		808
1800		1979 10 26.10128	23 42 00.06	-11 44 35.3		808
1800		1979 10 26.13868	23 41 59.50	-11 44 32.8		808
1900		1979 03 29.15175	11 17 08.23	-07 26 33.2		808
1900		1979 03 29.18781	11 17 06.26	-07 26 19.8		808
1920		1979 09 23.23675	01 50 43.14	-35 51 11.9		808
1920		1979 09 23.26861	01 50 40.61	-35 51 15.9		808
1920		1979 10 25.21759	01 01 06.17	-31 30 34.2		808
1920		1979 10 25.25291	01 01 03.22	-31 29 54.6		808
1958		1979 02 05.28057	10 34 21.68	+13 01 13.6		808
1958		1979 02 05.32628	10 34 19.60	+13 01 20.8		808
1958		1979 02 22.19058	10 21 04.08	+13 45 36.0		808
1958		1979 02 22.22658	10 21 02.18	+13 45 41.8		808
1958		1979 02 25.18511	10 18 34.34	+13 53 05.6		808
1958		1979 02 25.22181	10 18 32.51	+13 53 10.4		808
1958		1979 03 29.05900	09 56 17.63	+14 35 56.9		808
1958		1979 03 29.09986	09 56 16.40	+14 35 56.6		808
2066		1975 09 02.02343	19 57 53.47	-22 24 19.3	1	808
2073		1979 04 06.25042	14 06 05.58	-08 42 27.7		808
2073		1979 04 06.28505	14 06 03.89	-08 42 18.9		808
2124		1979 07 20.13166	16 54 11.10	-33 14 47.9		808
2132		1979 07 20.29026	21 41 18.69	-21 03 13.6		808
2132		1979 07 20.32212	21 41 17.44	-21 03 24.3		808
2132		1979 08 14.15516	21 21 50.46	-23 20 10.8		808
2132		1979 08 14.18979	21 21 48.72	-23 20 15.7		808
2153		1979 02 22.19058	10 21 17.66	+12 08 48.5	16.3	808
2153		1979 02 22.22658	10 21 15.88	+12 08 58.7		808
2173		1979 07 20.21235	19 39 59.64	-01 58 28.3		808
2173		1979 07 20.24628	19 39 58.07	-01 58 37.8		808
2178		1975 09 02.02343	20 03 11.85	-25 03 26.3	1	808
2245		1979 09 23.16368	00 13 47.37	-20 42 48.1		808
2245		1979 09 23.19208	00 13 45.74	-20 42 55.2		808
2271		1979 04 06.25042	14 11 46.89	-08 04 58.3	15.8	808
2271		1979 04 06.28505	14 11 45.40	-08 04 48.1		808
2292		1980 07 21.28858	21 31 59.58	+04 09 04.6	15.0	808
2292		1980 07 21.32459	21 31 58.80	+04 08 51.2		808
2314		1979 04 30.15995	12 49 04.24	-03 28 42.4		808
2314		1979 04 30.18212	12 49 03.16	-03 28 42.3		808
2383		1975 09 02.02343	20 07 38.81	-25 14 31.4	1	808
1975 EE3		1979 12 13.24793	06 57 17.97	-25 20 14.9		808
1975 EE3		1979 12 13.27633	06 57 16.85	-25 20 34.5		808
1975 NY		1975 09 02.02343	20 01 55.06	-23 05 39.2	1	808
1975 QL		1975 09 02.02343	19 54 52.73	-25 56 51.9	1	808
1975 QO		1975 09 02.02343	20 05 21.64	-24 12 28.5	1	808
1975 QQ		1975 09 02.02343	20 10 42.42	-26 33 18.5	1	808
1976 ML		1976 07 01.03230	14 58 33.89	-18 56 10.5	1	808
1978 GC		1979 12 13.15582	05 13 52.99	-19 03 12.8		808
1978 GC		1979 12 13.19824	05 13 49.77	-19 03 16.8		808
1979 DT *		1979 02 22.19058	10 25 31.31	+13 43 19.0	17.3	808
1979 DT		1979 02 22.22658	10 25 29.39	+13 43 29.3		808
1979 DU *		1979 02 25.27168	12 12 21.19	-10 44 03.8		808
1979 DU		1979 02 25.30285	12 12 20.22	-10 43 57.4		808
1979 EB		1979 03 06.16261	11 29 06.68	-04 39 41.3	17.0 2	808

1979	EB		1979	03	06.20071	11	29	04.94	-04	39	28.6		2	808
1979	EB		1979	03	29.15175	11	13	11.39	-02	05	53.3			808
1979	EB		1979	03	29.18781	11	13	10.02	-02	05	38.0			808
1979	EE	*	1979	03	06.16261	11	23	46.76	-05	26	39.7	17.4		808
1979	EE		1979	03	06.20071	11	23	43.97	-05	26	44.5			808
1979	EE		1979	03	08.18284	11	21	30.80	-05	29	48.6			808
1979	EE		1979	03	08.22855	11	21	27.66	-05	29	51.3			808
1979	EE		1979	03	29.15175	11	00	05.30	-05	31	56.0	17.6		808
1979	EE		1979	03	29.18781	11	00	03.19	-05	31	53.8			808
1979	EF	*	1979	03	06.16261	11	33	00.64	-05	32	40.1	17.6		808
1979	EF		1979	03	06.20071	11	32	59.47	-05	32	36.2			808
1979	FO		1979	03	29.15175	11	11	28.48	-04	50	36.3	17.3		808
1979	FO		1979	03	29.18781	11	11	27.04	-04	50	23.2			808
1979	FR	*	1979	03	29.05900	09	54	00.47	+13	17	09.8	17.3		808
1979	FR		1979	03	29.09986	09	53	59.57	+13	17	14.1			808
1979	FS	*	1979	03	29.05900	09	59	04.44	+13	57	36.8	17.3	2	808
1979	FS		1979	03	29.09986	09	59	03.57	+13	57	39.3		2	808
1979	FT	*	1979	03	29.15175	11	01	18.30	-02	54	38.6	17.2		808
1979	FT		1979	03	29.18781	11	01	16.81	-02	54	31.2			808
1979	FU	*	1979	03	29.15175	11	01	29.73	-05	14	32.0			808
1979	FU		1979	03	29.18781	11	01	28.02	-05	14	18.5			808
1979	FV	*	1979	03	29.15175	11	01	48.26	-03	20	34.4	17.8	2	808
1979	FV		1979	03	29.18781	11	01	46.38	-03	20	25.6		2	808
1979	FW	*	1979	03	29.15175	11	13	00.51	-05	10	33.7	17.8	2	808
1979	FW		1979	03	29.18781	11	12	58.59	-05	10	24.0		2	808
1979	FX	*	1979	03	29.15175	11	14	19.01	-06	47	49.0	17.7		808
1979	FX		1979	03	29.18781	11	14	17.35	-06	47	40.4			808
1979	FY	*	1979	03	29.15175	11	16	20.42	-03	31	18.1	16.6		808
1979	FY		1979	03	29.18781	11	16	18.44	-03	31	09.4			808
1979	FZ	*	1979	03	29.15175	11	17	27.22	-04	19	10.5	18.0	2	808
1979	FZ		1979	03	29.18781	11	17	25.11	-04	19	06.0		2	808
1979	FA1	*	1979	03	29.15175	11	18	04.65	-05	26	04.8	17.8		808
1979	FA1		1979	03	29.18781	11	18	02.58	-05	25	58.5			808
1979	GP	*	1979	04	06.25042	13	59	41.51	-08	01	31.0	16.6		808
1979	GP		1979	04	06.28505	13	59	39.68	-08	01	25.3			808
1979	GQ	*	1979	04	06.25042	14	01	45.70	-09	10	26.9	17.2	2	808
1979	GQ		1979	04	06.28505	14	01	43.72	-09	10	20.6		2	808
1979	GR	*	1979	04	06.25042	14	01	52.41	-09	48	00.9	17.0		808
1979	GR		1979	04	06.28505	14	01	50.95	-09	47	54.1			808
1979	GS	*	1979	04	06.25042	14	03	42.82	-08	09	53.3	16.3		808
1979	GS		1979	04	06.28505	14	03	40.89	-08	09	49.4			808
1979	GT	*	1979	04	06.25042	14	04	15.80	-09	30	04.4	16.9		808
1979	GT		1979	04	06.28505	14	04	14.41	-09	29	56.9			808
1979	GU	*	1979	04	06.25042	14	04	16.96	-07	24	52.3	16.2		808
1979	GU		1979	04	06.28505	14	04	15.04	-07	24	48.0			808
1979	HM1	*	1979	04	30.15995	12	43	20.70	-03	15	53.0	15.7		808
1979	HM1		1979	04	30.18212	12	43	19.79	-03	15	50.7			808
1979	HN1	*	1979	04	30.15995	12	44	19.28	-02	11	12.8	17.3	2	808
1979	HN1		1979	04	30.18212	12	44	18.26	-02	11	03.8		2	808
1979	HO1	*	1979	04	30.15995	12	54	45.70	-03	12	13.7	16.0		808
1979	HO1		1979	04	30.18212	12	54	44.66	-03	12	11.7			808
1979	OS13*		1979	07	20.29026	21	41	10.89	-20	59	55.8	16.9		808
1979	OS13		1979	07	20.32212	21	41	10.06	-21	00	07.4			808
1979	OT13*		1979	07	25.07195	17	17	53.52	-35	29	11.2	16.8		808
1979	OT13		1979	07	25.10658	17	17	52.82	-35	29	02.9			808
1979	PE	*	1979	08	14.15516	21	15	18.49	-23	13	13.9		2	808
1979	PE		1979	08	14.18979	21	15	16.75	-23	13	28.7		2	808
1979	PF	*	1979	08	14.15516	21	15	59.73	-25	19	40.4	16.3		808
1979	PF		1979	08	14.18979	21	15	58.05	-25	20	03.5			808

1979 PG *	1979 08 14.15516	21 23 08.58	-23 18 12.5	16.3	808
1979 PG	1979 08 14.18979	21 23 06.45	-23 18 16.5		808
1979 PH *	1979 08 14.15516	21 25 42.80	-23 33 18.5		808
1979 PH	1979 08 14.18979	21 25 41.19	-23 33 30.4		808
1979 PJ *	1979 08 14.15516	21 27 13.85	-23 42 04.6	17.6	2 808
1979 PJ	1979 08 14.18979	21 27 11.64	-23 42 17.0		2 808
1979 SK1 *	1979 09 21.08603	21 43 26.10	-06 48 33.5	16.3	2 808
1979 SK1	1979 09 21.12066	21 43 24.93	-06 48 36.5		2 808
1979 SL1 *	1979 09 21.08603	21 52 02.05	-08 41 01.5	16.6	2 808
1979 SL1	1979 09 21.12066	21 52 01.00	-08 41 15.0		2 808
1979 SM1 *	1979 09 21.21624	23 58 11.69	-10 43 42.1	16.5	808
1979 SM1	1979 09 21.24463	23 58 09.94	-10 43 56.2		808
1979 SN1 *	1979 09 23.23675	01 57 09.35	-36 31 52.3	16.9	808
1979 SN1	1979 09 23.26861	01 57 08.76	-36 32 32.7		808
1979 UE2 *	1979 10 21.21624	00 05 04.06	-08 33 39.5	17.5	808
1979 UE2	1979 10 21.24463	00 05 02.65	-08 33 54.0		808

Note 1: correction to MPC 4909-4924. 2: bad image.

OBSERVATIONS MADE WITH THE 1-M SCHMIDT TELESCOPE AT THE EUROPEAN SOUTHERN
OBSERVATORY BY H.-E. SCHUSTER. MEASURED BY R. M. WEST.

Object	Date	UT	R. A. (1950)	Decl.	Mag.	N	Obs.
361	1981 05 28.07939	16 37 25.09	-35 04 24.7	16.0		809	
361	1981 05 28.10016	16 37 24.13	-35 04 25.1			809	
361	1981 06 09.19517	16 28 23.02	-34 57 47.1			809	
696	1981 05 28.07939	16 43 20.48	-35 23 24.8	15.5		809	
696	1981 05 28.10016	16 43 19.37	-35 23 22.4			809	
696	1981 06 03.09521	16 37 58.42	-35 08 05.6		1	809	
696	1981 06 09.19517	16 32 32.94	-34 48 38.8			809	
843	1981 05 28.07939	16 48 50.03	-37 03 03.3	17.0		809	
843	1981 05 28.10016	16 48 48.54	-37 03 07.8			809	
843	1981 06 03.09521	16 41 30.71	-37 16 30.1			809	
843	1981 06 04.25384	16 40 02.83	-37 18 00.8			809	
843	1981 06 09.19517	16 33 49.53	-37 20 28.2			809	
1981 KG *	1981 05 28.07939	16 43 39.71	-34 44 03.1	18.0	2	809	
1981 KG	1981 05 28.10016	16 43 38.16	-34 44 02.7			2 809	
1981 KH *	1981 05 28.07939	16 48 06.84	-34 52 09.1	17.0	2	809	
1981 KH	1981 05 28.10016	16 48 05.49	-34 52 08.7			2 809	
1981 KJ *	1981 05 28.07939	16 49 29.28	-36 49 28.9	18.0		809	
1981 KJ	1981 05 28.10016	16 49 28.01	-36 49 34.5			809	
1981 KJ	1981 06 03.09521	16 43 11.91	-37 11 29.0			809	
1981 KJ	1981 06 04.25384	16 41 57.55	-37 15 01.9			809	
1981 KJ	1981 06 09.19517	16 36 41.93	-37 27 37.2			809	

Note 1: near edge of plate. 2: ends of trail; sense of motion assumed.

OBSERVATIONS MADE WITH THE 1-M SCHMIDT TELESCOPE AT THE EUROPEAN SOUTHERN
OBSERVATORY BY C.-I. LAGERKVIST.

Object	Date	UT	R. A. (1950)	Decl.	Obs.
172	1980 03 23.16250	11 16 22.40	-02 18 44.4	809	
189	1980 03 23.16250	11 31 53.58	-01 02 10.4	809	
189	1980 03 23.19306	11 31 52.03	-01 01 58.0	809	
577	1980 03 23.16250	11 21 48.04	+00 39 23.7	809	
800	1980 03 23.19306	11 39 46.66	-02 10 46.2	809	
985	1980 03 23.16250	11 12 05.93	-00 46 59.1	809	
1020	1980 03 23.19306	11 50 43.92	+00 51 46.7	809	
1045	1980 03 16.16493	11 38 03.57	+01 53 14.7	809	
1045	1980 03 16.16910	11 38 03.36	+01 53 15.7	809	
1045	1980 03 16.35729	11 37 52.08	+01 54 25.9	809	
1045	1980 03 16.36146	11 37 51.86	+01 54 27.2	809	
1045	1980 03 17.06979	11 37 11.69	+01 58 51.1	809	

1045	1980	03	17.07396	11	37	11.42	+01	58	52.8	809
1045	1980	03	17.26007	11	37	00.33	+02	00	01.5	809
1045	1980	03	17.26424	11	37	00.08	+02	00	03.7	809
1045	1980	03	23.16250	11	31	29.31	+02	35	50.4	809
1045	1980	03	23.19306	11	31	27.59	+02	35	59.8	809
1077	1980	03	16.16493	11	36	01.63	+01	15	50.4	809
1077	1980	03	16.16910	11	36	01.42	+01	15	51.4	809
1077	1980	03	16.35729	11	35	50.19	+01	16	42.3	809
1077	1980	03	16.36146	11	35	49.95	+01	16	43.9	809
1077	1980	03	17.06979	11	35	09.32	+01	19	56.7	809
1077	1980	03	17.07396	11	35	09.05	+01	19	57.9	809
1077	1980	03	17.26007	11	34	57.98	+01	20	49.3	809
1077	1980	03	17.26424	11	34	57.73	+01	20	50.3	809
1077	1980	03	23.16250	11	29	20.78	+01	47	27.2	809
1279	1980	03	23.16250	11	29	28.56	-00	45	35.0	809
1292	1980	03	23.19306	11	33	41.35	-01	08	15.4	809
1350	1980	03	16.16493	11	43	14.60	+04	32	53.2	809
1350	1980	03	16.16910	11	43	14.38	+04	32	54.5	809
1350	1980	03	16.35729	11	43	05.25	+04	34	00.6	809
1350	1980	03	16.36146	11	43	05.04	+04	34	01.9	809
1350	1980	03	17.06979	11	42	32.34	+04	38	03.6	809
1350	1980	03	17.07396	11	42	32.09	+04	38	04.7	809
1350	1980	03	17.26007	11	42	23.10	+04	39	10.5	809
1350	1980	03	17.26424	11	42	22.88	+04	39	11.0	809
1481	1980	03	16.16493	11	28	00.35	+03	35	24.8	809
1481	1980	03	16.16910	11	28	00.13	+03	35	25.4	809
1481	1980	03	16.35729	11	27	50.96	+03	36	10.9	809
1481	1980	03	16.36146	11	27	50.71	+03	36	12.4	809
1638	1980	03	16.16493	11	35	31.02	+02	26	11.6	809
1638	1980	03	16.16910	11	35	30.87	+02	26	12.7	809
1638	1980	03	16.35729	11	35	20.98	+02	27	15.1	809
1638	1980	03	16.36146	11	35	20.78	+02	27	16.5	809
1638	1980	03	17.06979	11	34	45.21	+02	31	12.6	809
1638	1980	03	17.07396	11	34	44.93	+02	31	14.5	809
1638	1980	03	17.26007	11	34	35.21	+02	32	15.9	809
1638	1980	03	17.26424	11	34	34.98	+02	32	17.3	809
1662	1980	03	23.19306	11	42	13.62	-01	13	55.2	809
1762	1980	03	16.16910	11	46	59.53	+02	23	21.1	809
1762	1980	03	16.16493	11	46	59.70	+02	23	20.0	809
1762	1980	03	16.35729	11	46	50.47	+02	24	26.5	809
1762	1980	03	16.36146	11	46	50.26	+02	24	27.6	809
1762	1980	03	17.06979	11	46	17.52	+02	28	31.1	809
1762	1980	03	17.07396	11	46	17.35	+02	28	32.8	809
1762	1980	03	17.26007	11	46	08.35	+02	29	36.4	809
1762	1980	03	17.26424	11	46	08.16	+02	29	37.7	809
1774	1980	03	23.19306	11	51	45.10	+01	07	16.4	809
1955	1980	03	16.16493	11	35	47.36	+00	59	17.6	809
1955	1980	03	16.16910	11	35	47.17	+00	59	18.7	809
1955	1980	03	16.35729	11	35	37.82	+01	00	17.8	809
1955	1980	03	16.36146	11	35	37.61	+01	00	18.5	809
1955	1980	03	17.06979	11	35	03.98	+01	04	01.0	809
1955	1980	03	17.07396	11	35	03.77	+01	04	02.1	809
1955	1980	03	17.26007	11	34	54.56	+01	05	00.6	809
1955	1980	03	17.26424	11	34	54.33	+01	05	02.3	809
1955	1980	03	23.16250	11	30	15.72	+01	35	38.8	809
1991	1980	03	23.16250	11	23	32.64	-01	00	06.2	809
2025	1980	03	23.16250	11	11	46.14	+00	59	18.4	809
2057	1980	03	23.19306	11	50	07.93	+01	41	23.2	809
2240	1980	03	23.19306	11	45	20.50	+02	48	12.7	809

2256		1980	03	23.19306	11	50	51.60	+01	38	19.1	809
1977	PY1	1980	03	23.16250	11	24	32.47	-01	41	19.2	809
1980	FA	1980	03	16.16493	11	47	57.63	+01	47	28.4	809
1980	FA	1980	03	16.16910	11	47	57.44	+01	47	28.9	809
1980	FA	1980	03	16.35729	11	47	48.27	+01	48	34.0	809
1980	FA	1980	03	16.36146	11	47	48.05	+01	48	35.1	809
1980	FA	1980	03	17.06979	11	47	15.09	+01	52	39.7	809
1980	FA	1980	03	17.07396	11	47	14.92	+01	52	40.6	809
1980	FA	1980	03	17.26007	11	47	05.82	+01	53	45.1	809
1980	FA	1980	03	17.26424	11	47	05.65	+01	53	46.2	809
1980	FA	1980	03	23.19306	11	42	27.95	+02	27	30.4	809
1980	FB	1980	03	16.16493	11	47	59.69	+02	46	20.6	809
1980	FB	1980	03	16.16910	11	47	59.53	+02	46	21.7	809
1980	FB	1980	03	16.35729	11	47	50.72	+02	47	12.7	809
1980	FB	1980	03	16.36146	11	47	50.53	+02	47	13.7	809
1980	FB	1980	03	17.06979	11	47	18.84	+02	50	23.9	809
1980	FB	1980	03	17.07396	11	47	18.69	+02	50	24.8	809
1980	FB	1980	03	17.26007	11	47	09.94	+02	51	15.0	809
1980	FB	1980	03	17.26424	11	47	09.78	+02	51	15.4	809
1980	FD	1980	03	23.19306	11	48	25.48	+01	16	28.0	809
1980	FG	* 1980	03	16.16493	11	28	05.79	+03	01	57.2	809
1980	FG	1980	03	16.16910	11	28	05.60	+03	01	58.3	809
1980	FG	1980	03	16.35729	11	27	56.42	+03	02	51.6	809
1980	FG	1980	03	16.36146	11	27	56.14	+03	02	53.2	809
1980	FG	1980	03	17.06979	11	27	22.89	+03	06	14.6	809
1980	FG	1980	03	17.07396	11	27	22.63	+03	06	16.3	809
1980	FG	1980	03	17.26007	11	27	13.55	+03	07	08.2	809
1980	FG	1980	03	17.26424	11	27	13.39	+03	07	09.4	809
1980	FH	* 1980	03	16.16493	11	28	08.52	+03	14	12.1	809
1980	FH	1980	03	16.16910	11	28	08.22	+03	14	14.0	809
1980	FH	1980	03	16.35729	11	27	58.13	+03	15	24.4	809
1980	FH	1980	03	16.36146	11	27	57.96	+03	15	26.9	809
1980	FJ	* 1980	03	16.16493	11	28	11.19	+04	48	34.1	809
1980	FJ	1980	03	16.16910	11	28	10.97	+04	48	38.2	809
1980	FK	* 1980	03	16.16493	11	28	16.23	+03	55	18.8	809
1980	FK	1980	03	16.16910	11	28	16.02	+03	55	19.7	809
1980	FK	1980	03	16.35729	11	28	03.86	+03	56	12.6	809
1980	FK	1980	03	16.36146	11	28	03.59	+03	56	14.4	809
1980	FK	1980	03	17.06979	11	27	20.34	+03	59	31.9	809
1980	FK	1980	03	17.07396	11	27	20.03	+03	59	33.7	809
1980	FK	1980	03	17.26007	11	27	08.12	+04	00	24.9	809
1980	FK	1980	03	17.26424	11	27	07.93	+04	00	24.9	809
1980	FL	* 1980	03	16.16493	11	28	20.05	+03	22	28.3	809
1980	FL	1980	03	16.16910	11	28	19.84	+03	22	30.3	809
1980	FL	1980	03	16.35729	11	28	09.47	+03	24	12.5	809
1980	FL	1980	03	16.36146	11	28	09.22	+03	24	14.8	809
1980	FL	1980	03	17.06979	11	27	32.77	+03	30	37.9	809
1980	FL	1980	03	17.07396	11	27	32.50	+03	30	40.9	809
1980	FL	1980	03	17.26007	11	27	22.25	+03	32	20.8	809
1980	FL	1980	03	17.26424	11	27	22.07	+03	32	22.6	809
1980	FM	* 1980	03	16.16493	11	28	36.91	+00	55	03.1	809
1980	FM	1980	03	16.16910	11	28	36.69	+00	55	04.3	809
1980	FM	1980	03	16.35729	11	28	25.66	+00	56	08.6	809
1980	FM	1980	03	16.36146	11	28	25.45	+00	56	10.9	809
1980	FM	1980	03	17.06979	11	27	45.65	+01	00	13.4	809
1980	FM	1980	03	17.07396	11	27	45.45	+01	00	14.5	809
1980	FM	1980	03	17.26007	11	27	34.51	+01	01	18.9	809
1980	FM	1980	03	17.26424	11	27	34.30	+01	01	19.5	809
1980	FN	* 1980	03	16.16493	11	29	02.74	+02	17	37.2	809

1980 FN	1980 03	16.16910	11 29	02.46	+02 17	37.9	809
1980 FN	1980 03	17.06979	11 28	11.11	+02 21	12.7	809
1980 FN	1980 03	17.07396	11 28	10.83	+02 21	13.4	809
1980 FN	1980 03	17.26007	11 27	59.76	+02 21	58.2	809
1980 FN	1980 03	17.26424	11 27	59.60	+02 21	58.8	809
1980 FO *	1980 03	16.16493	11 29	06.85	+00 08	20.4	809
1980 FO	1980 03	16.16910	11 29	06.61	+00 08	21.0	809
1980 FO	1980 03	16.35729	11 28	54.77	+00 09	01.7	809
1980 FO	1980 03	16.36146	11 28	54.53	+00 09	02.4	809
1980 FO	1980 03	17.06979	11 28	13.16	+00 11	33.4	809
1980 FO	1980 03	17.07396	11 28	12.93	+00 11	33.9	809
1980 FO	1980 03	17.26007	11 28	01.30	+00 12	13.6	809
1980 FO	1980 03	17.26424	11 28	01.08	+00 12	13.8	809
1980 FO	1980 03	23.16250	11 22	25.25	+00 32	50.7	809
1980 FP *	1980 03	16.16493	11 29	06.87	+04 03	39.8	809
1980 FP	1980 03	16.16910	11 29	06.64	+04 03	40.9	809
1980 FP	1980 03	16.35729	11 28	56.62	+04 04	17.5	809
1980 FP	1980 03	16.36146	11 28	56.42	+04 04	18.7	809
1980 FP	1980 03	17.06979	11 28	20.08	+04 06	36.7	809
1980 FP	1980 03	17.07396	11 28	19.82	+04 06	38.0	809
1980 FP	1980 03	17.26007	11 28	09.90	+04 07	13.8	809
1980 FP	1980 03	17.26424	11 28	09.78	+04 07	14.2	809
1980 FQ *	1980 03	16.16493	11 29	33.39	+04 11	05.6	809
1980 FQ	1980 03	16.16910	11 29	33.17	+04 11	07.6	809
1980 FQ	1980 03	16.35729	11 29	22.75	+04 12	32.6	809
1980 FQ	1980 03	16.36146	11 29	22.52	+04 12	35.5	809
1980 FQ	1980 03	17.06979	11 28	45.16	+04 17	56.5	809
1980 FQ	1980 03	17.07396	11 28	44.93	+04 17	58.2	809
1980 FQ	1980 03	17.26007	11 28	34.63	+04 19	22.4	809
1980 FQ	1980 03	17.26424	11 28	34.47	+04 19	23.5	809
1980 FR *	1980 03	16.16493	11 29	36.17	+03 59	40.5	809
1980 FR	1980 03	16.16910	11 29	36.00	+03 59	41.8	809
1980 FR	1980 03	16.35729	11 29	25.05	+04 00	37.7	809
1980 FR	1980 03	16.36146	11 29	24.85	+04 00	39.4	809
1980 FR	1980 03	17.06979	11 28	46.47	+04 04	08.4	809
1980 FR	1980 03	17.07396	11 28	46.25	+04 04	09.2	809
1980 FR	1980 03	17.26007	11 28	35.52	+04 05	03.8	809
1980 FR	1980 03	17.26424	11 28	35.34	+04 05	04.2	809
1980 FS *	1980 03	16.16493	11 29	38.90	+03 49	23.1	809
1980 FS	1980 03	16.16910	11 29	38.72	+03 49	24.7	809
1980 FS	1980 03	16.35729	11 29	30.10	+03 51	06.2	809
1980 FS	1980 03	16.36146	11 29	29.90	+03 51	08.6	809
1980 FT *	1980 03	16.16493	11 29	54.13	+01 37	57.4	809
1980 FT	1980 03	16.16910	11 29	53.91	+01 37	59.0	809
1980 FT	1980 03	16.35729	11 29	43.46	+01 39	02.0	809
1980 FT	1980 03	16.36146	11 29	43.21	+01 39	03.1	809
1980 FT	1980 03	17.06979	11 29	06.14	+01 42	58.3	809
1980 FT	1980 03	17.07396	11 29	05.79	+01 42	59.5	809
1980 FT	1980 03	17.26007	11 28	55.50	+01 44	01.6	809
1980 FT	1980 03	17.26424	11 28	55.33	+01 44	02.8	809
1980 FU *	1980 03	16.16493	11 29	56.04	+00 43	16.4	809
1980 FU	1980 03	16.16910	11 29	55.79	+00 43	16.9	809
1980 FU	1980 03	16.35729	11 29	43.03	+00 43	40.9	809
1980 FU	1980 03	16.36146	11 29	42.76	+00 43	41.5	809
1980 FU	1980 03	17.06979	11 28	57.34	+00 45	13.4	809
1980 FU	1980 03	17.07396	11 28	57.06	+00 45	13.6	809
1980 FU	1980 03	17.26007	11 28	44.43	+00 45	37.5	809
1980 FU	1980 03	17.26424	11 28	44.19	+00 45	37.6	809
1980 FU	1980 03	23.16250	11 22	27.79	+00 58	14.9	809

1980 FV	*	1980 03	16.16493	11 30	00.53	+01 30	31.8	809
1980 FV		1980 03	16.16910	11 30	00.31	+01 30	32.9	809
1980 FV		1980 03	16.35729	11 29	48.04	+01 31	24.5	809
1980 FV		1980 03	16.36146	11 29	47.76	+01 31	25.8	809
1980 FV		1980 03	17.06979	11 29	03.84	+01 34	39.8	809
1980 FV		1980 03	17.07396	11 29	03.56	+01 34	40.7	809
1980 FV		1980 03	17.26007	11 28	51.48	+01 35	31.8	809
1980 FV		1980 03	17.26424	11 28	51.22	+01 35	33.0	809
1980 FV		1980 03	23.16250	11 22	47.60	+02 02	07.6	809
1980 FW	*	1980 03	16.16493	11 30	11.69	+00 49	58.9	809
1980 FW		1980 03	16.16910	11 30	11.51	+00 50	01.6	809
1980 FW		1980 03	16.35729	11 30	02.06	+00 51	59.9	809
1980 FW		1980 03	16.36146	11 30	01.90	+00 52	02.1	809
1980 FX	*	1980 03	16.16493	11 30	27.96	+00 12	57.9	809
1980 FX		1980 03	16.16910	11 30	27.79	+00 12	59.1	809
1980 FX		1980 03	16.35729	11 30	19.55	+00 14	03.3	809
1980 FX		1980 03	16.36146	11 30	19.40	+00 14	04.1	809
1980 FX		1980 03	17.06979	11 29	49.56	+00 18	03.5	809
1980 FX		1980 03	17.07396	11 29	49.43	+00 18	04.0	809
1980 FX		1980 03	17.26007	11 29	41.28	+00 19	08.1	809
1980 FX		1980 03	17.26424	11 29	41.14	+00 19	08.6	809
1980 FY	*	1980 03	16.16493	11 30	37.40	+01 02	04.3	809
1980 FY		1980 03	16.16910	11 30	37.15	+01 02	05.5	809
1980 FY		1980 03	16.35729	11 30	25.02	+01 03	08.5	809
1980 FY		1980 03	16.36146	11 30	24.71	+01 03	09.2	809
1980 FY		1980 03	17.06979	11 29	41.58	+01 07	07.1	809
1980 FY		1980 03	17.07396	11 29	41.30	+01 07	07.9	809
1980 FY		1980 03	17.26007	11 29	29.28	+01 08	10.5	809
1980 FY		1980 03	17.26424	11 29	29.04	+01 08	11.5	809
1980 FY		1980 03	23.16250	11 23	32.43	+01 40	48.0	809
1980 FZ	*	1980 03	16.16493	11 30	40.90	+00 30	57.9	809
1980 FZ		1980 03	16.16910	11 30	40.68	+00 30	59.1	809
1980 FZ		1980 03	16.35729	11 30	30.93	+00 32	11.3	809
1980 FZ		1980 03	16.36146	11 30	30.59	+00 32	13.5	809
1980 FZ		1980 03	17.06979	11 29	55.14	+00 36	42.6	809
1980 FZ		1980 03	17.07396	11 29	54.87	+00 36	44.1	809
1980 FZ		1980 03	17.26007	11 29	45.25	+00 37	55.6	809
1980 FZ		1980 03	17.26424	11 29	45.04	+00 37	56.9	809
1980 FA1	*	1980 03	16.16493	11 31	08.46	+01 57	26.3	809
1980 FA1		1980 03	16.16910	11 31	08.27	+01 57	26.8	809
1980 FA1		1980 03	16.35729	11 30	56.32	+01 57	59.7	809
1980 FA1		1980 03	16.36146	11 30	55.96	+01 58	00.1	809
1980 FA1		1980 03	17.06979	11 30	13.26	+02 00	02.7	809
1980 FA1		1980 03	17.07396	11 30	12.87	+02 00	04.1	809
1980 FA1		1980 03	17.26007	11 30	01.10	+02 00	35.7	809
1980 FA1		1980 03	17.26424	11 30	00.88	+02 00	36.3	809
1980 FA1		1980 03	23.16250	11 24	10.71	+02 16	59.0	809
1980 FB1	*	1980 03	16.16493	11 31	11.99	+00 22	21.4	809
1980 FB1		1980 03	16.16910	11 31	11.78	+00 22	23.0	809
1980 FB1		1980 03	16.35729	11 31	01.14	+00 23	41.3	809
1980 FB1		1980 03	16.36146	11 31	00.93	+00 23	42.1	809
1980 FB1		1980 03	17.06979	11 30	22.69	+00 28	34.9	809
1980 FB1		1980 03	17.07396	11 30	22.49	+00 28	37.9	809
1980 FB1		1980 03	17.26007	11 30	12.00	+00 29	54.7	809
1980 FB1		1980 03	17.26424	11 30	11.75	+00 29	56.3	809
1980 FC1	*	1980 03	16.16493	11 31	12.06	+04 15	24.4	809
1980 FC1		1980 03	16.16910	11 31	11.81	+04 15	25.7	809
1980 FC1		1980 03	16.35729	11 31	01.24	+04 16	49.9	809
1980 FC1		1980 03	16.36146	11 31	01.04	+04 16	52.1	809

1980 FC1	1980 03 17.06979	11 30 23.92	+04 22 09.0	809
1980 FC1	1980 03 17.07396	11 30 23.70	+04 22 09.8	809
1980 FC1	1980 03 17.26007	11 30 13.20	+04 23 34.0	809
1980 FC1	1980 03 17.26424	11 30 12.98	+04 23 34.0	809
1980 FD1 *	1980 03 16.16493	11 31 41.35	+01 52 10.7	809
1980 FD1	1980 03 16.16910	11 31 41.10	+01 52 12.7	809
1980 FD1	1980 03 16.35729	11 31 30.05	+01 53 38.4	809
1980 FD1	1980 03 16.36146	11 31 29.76	+01 53 40.2	809
1980 FD1	1980 03 17.06979	11 30 50.82	+01 59 06.5	809
1980 FD1	1980 03 17.07396	11 30 50.56	+01 59 08.5	809
1980 FD1	1980 03 17.26007	11 30 39.61	+02 00 34.0	809
1980 FD1	1980 03 17.26424	11 30 39.36	+02 00 35.7	809
1980 FE1 *	1980 03 16.16493	11 31 43.79	+02 12 46.0	809
1980 FE1	1980 03 16.16910	11 31 43.64	+02 12 47.3	809
1980 FE1	1980 03 16.35729	11 31 35.24	+02 14 12.6	809
1980 FE1	1980 03 16.36146	11 31 35.04	+02 14 14.8	809
1980 FE1	1980 03 17.06979	11 31 04.86	+02 19 35.5	809
1980 FE1	1980 03 17.07396	11 31 04.65	+02 19 37.5	809
1980 FE1	1980 03 17.26007	11 30 56.30	+02 21 02.1	809
1980 FE1	1980 03 17.26424	11 30 56.10	+02 21 03.5	809
1980 FF1 *	1980 03 16.16493	11 31 52.50	+00 03 42.6	809
1980 FF1	1980 03 16.16910	11 31 52.33	+00 03 44.8	809
1980 FF1	1980 03 16.35729	11 31 43.21	+00 05 39.0	809
1980 FF1	1980 03 16.36146	11 31 42.99	+00 05 40.9	809
1980 FF1	1980 03 17.06979	11 31 10.50	+00 12 50.7	809
1980 FF1	1980 03 17.07396	11 31 10.28	+00 12 52.5	809
1980 FF1	1980 03 17.26007	11 31 01.31	+00 14 45.5	809
1980 FF1	1980 03 17.26424	11 31 01.14	+00 14 47.4	809
1980 FG1 *	1980 03 16.16493	11 32 17.82	+01 27 36.3	809
1980 FG1	1980 03 16.16910	11 32 17.71	+01 27 38.0	809
1980 FG1	1980 03 16.35729	11 32 08.10	+01 29 03.9	809
1980 FG1	1980 03 16.36146	11 32 07.94	+01 29 06.1	809
1980 FH1 *	1980 03 16.16493	11 32 29.03	-00 07 11.7	809
1980 FH1	1980 03 16.16910	11 32 28.82	-00 07 12.5	809
1980 FH1	1980 03 16.35729	11 32 17.76	-00 07 01.6	809
1980 FH1	1980 03 16.36146	11 32 17.50	-00 07 02.5	809
1980 FH1	1980 03 17.06979	11 31 37.62	-00 06 25.0	809
1980 FH1	1980 03 17.07396	11 31 37.39	-00 06 24.8	809
1980 FH1	1980 03 17.26007	11 31 26.46	-00 06 14.7	809
1980 FH1	1980 03 17.26424	11 31 26.20	-00 06 15.0	809
1980 FH1	1980 03 23.16250	11 25 57.13	-00 00 57.0	809
1980 FJ1 *	1980 03 16.16493	11 32 30.09	+02 32 34.8	809
1980 FJ1	1980 03 16.16910	11 32 29.88	+02 32 35.1	809
1980 FJ1	1980 03 16.35729	11 32 20.54	+02 32 55.7	809
1980 FJ1	1980 03 16.36146	11 32 20.30	+02 32 56.1	809
1980 FJ1	1980 03 17.06979	11 31 46.05	+02 34 15.9	809
1980 FJ1	1980 03 17.07396	11 31 45.80	+02 34 16.8	809
1980 FJ1	1980 03 17.26007	11 31 36.54	+02 34 37.0	809
1980 FJ1	1980 03 17.26424	11 31 36.36	+02 34 38.0	809
1980 FJ1	1980 03 23.16250	11 26 52.22	+02 45 23.1	809
1980 FK1 *	1980 03 16.16493	11 32 31.43	+01 29 36.6	809
1980 FK1	1980 03 16.16910	11 32 31.20	+01 29 37.7	809
1980 FK1	1980 03 16.35729	11 32 20.51	+01 30 35.5	809
1980 FK1	1980 03 16.36146	11 32 20.30	+01 30 37.0	809
1980 FK1	1980 03 17.06979	11 31 41.72	+01 34 15.1	809
1980 FK1	1980 03 17.07396	11 31 41.45	+01 34 16.1	809
1980 FK1	1980 03 17.26007	11 31 30.98	+01 35 12.8	809
1980 FK1	1980 03 17.26424	11 31 30.73	+01 35 14.9	809
1980 FK1	1980 03 23.16250	11 26 14.19	+02 04 58.2	809

1980	FL1	*	1980	03	16.16493	11	32	49.65	+04	45	43.0	809
1980	FL1		1980	03	16.16910	11	32	49.42	+04	45	43.7	809
1980	FL1		1980	03	16.35729	11	32	38.99	+04	46	39.1	809
1980	FL1		1980	03	16.36146	11	32	38.79	+04	46	40.7	809
1980	FL1		1980	03	17.06979	11	32	01.66	+04	50	02.9	809
1980	FL1		1980	03	17.07396	11	32	01.40	+04	50	03.7	809
1980	FL1		1980	03	17.26007	11	31	51.09	+04	50	59.0	809
1980	FL1		1980	03	17.26424	11	31	50.90	+04	50	59.2	809
1980	FM1	*	1980	03	16.16493	11	32	58.37	+03	40	50.9	809
1980	FM1		1980	03	16.16910	11	32	58.17	+03	40	51.4	809
1980	FM1		1980	03	16.35729	11	32	49.97	+03	41	40.2	809
1980	FM1		1980	03	16.36146	11	32	49.79	+03	41	41.0	809
1980	FM1		1980	03	17.06979	11	32	19.81	+03	44	42.3	809
1980	FM1		1980	03	17.07396	11	32	19.67	+03	44	43.5	809
1980	FM1		1980	03	17.26007	11	32	11.55	+03	45	31.4	809
1980	FM1		1980	03	17.26424	11	32	11.43	+03	45	32.3	809
1980	FN1	*	1980	03	16.16493	11	33	03.73	+03	56	37.4	809
1980	FN1		1980	03	16.16910	11	33	03.50	+03	56	38.5	809
1980	FN1		1980	03	16.35729	11	32	52.04	+03	57	49.2	809
1980	FN1		1980	03	16.36146	11	32	51.77	+03	57	50.9	809
1980	FN1		1980	03	17.06979	11	32	10.98	+04	02	15.3	809
1980	FN1		1980	03	17.07396	11	32	10.69	+04	02	16.7	809
1980	FN1		1980	03	17.26007	11	31	59.37	+04	03	26.5	809
1980	FN1		1980	03	17.26424	11	31	59.15	+04	03	27.7	809
1980	FO1	*	1980	03	16.16493	11	33	30.34	+01	34	05.8	809
1980	FO1		1980	03	16.16910	11	33	30.20	+01	34	06.7	809
1980	FO1		1980	03	16.35729	11	33	20.90	+01	35	01.8	809
1980	FO1		1980	03	16.36146	11	33	20.71	+01	35	02.3	809
1980	FO1		1980	03	17.06979	11	32	47.30	+01	38	28.8	809
1980	FO1		1980	03	17.07396	11	32	47.05	+01	38	29.5	809
1980	FO1		1980	03	17.26007	11	32	37.92	+01	39	23.7	809
1980	FO1		1980	03	17.26424	11	32	37.70	+01	39	25.3	809
1980	FO1		1980	03	23.16250	11	28	01.43	+02	07	42.0	809
1980	FP1	*	1980	03	16.16493	11	33	30.90	+02	39	26.9	809
1980	FP1		1980	03	16.16910	11	33	30.71	+02	39	28.5	809
1980	FP1		1980	03	16.35729	11	33	21.55	+02	40	30.7	809
1980	FP1		1980	03	16.36146	11	33	21.33	+02	40	32.0	809
1980	FP1		1980	03	17.06979	11	32	48.43	+02	44	30.5	809
1980	FP1		1980	03	17.07396	11	32	48.18	+02	44	31.9	809
1980	FP1		1980	03	17.26007	11	32	39.22	+02	45	33.5	809
1980	FP1		1980	03	17.26424	11	32	39.04	+02	45	35.1	809
1980	FQ1	*	1980	03	16.16493	11	33	31.85	+00	08	53.8	809
1980	FQ1		1980	03	16.16910	11	33	31.70	+00	08	55.3	809
1980	FQ1		1980	03	16.35729	11	33	23.31	+00	10	21.4	809
1980	FQ1		1980	03	16.36146	11	33	23.19	+00	10	23.3	809
1980	FQ1		1980	03	17.06979	11	32	53.08	+00	15	48.9	809
1980	FQ1		1980	03	17.07396	11	32	52.93	+00	15	49.5	809
1980	FQ1		1980	03	17.26007	11	32	44.71	+00	17	13.9	809
1980	FQ1		1980	03	17.26424	11	32	44.49	+00	17	16.3	809
1980	FQ1		1980	03	23.16250	11	28	36.22	+01	02	03.1	809
1980	FR1	*	1980	03	16.16493	11	33	37.64	+00	12	12.5	809
1980	FR1		1980	03	16.16910	11	33	37.47	+00	12	12.8	809
1980	FR1		1980	03	16.35729	11	33	28.81	+00	12	59.7	809
1980	FR1		1980	03	16.36146	11	33	28.59	+00	12	59.9	809
1980	FR1		1980	03	17.06979	11	32	57.14	+00	15	54.1	809
1980	FR1		1980	03	17.07396	11	32	56.95	+00	15	54.8	809
1980	FR1		1980	03	17.26007	11	32	48.40	+00	16	40.7	809
1980	FR1		1980	03	17.26424	11	32	48.18	+00	16	41.5	809
1980	FR1		1980	03	23.16250	11	28	28.19	+00	40	46.2	809

1980	FS1	*	1980	03	16.16493	11	33	42.79	+00	09	03.5	809
1980	FS1		1980	03	16.16910	11	33	42.57	+00	09	05.1	809
1980	FS1		1980	03	16.35729	11	33	31.51	+00	10	40.4	809
1980	FS1		1980	03	16.36146	11	33	31.31	+00	10	42.1	809
1980	FS1		1980	03	17.06979	11	32	52.04	+00	16	41.2	809
1980	FS1		1980	03	17.07396	11	32	51.77	+00	16	42.5	809
1980	FS1		1980	03	17.26007	11	32	40.83	+00	18	18.5	809
1980	FS1		1980	03	17.26424	11	32	40.56	+00	18	20.0	809
1980	FS1		1980	03	23.16250	11	27	12.73	+01	08	28.5	809
1980	FT1	*	1980	03	16.16493	11	33	46.05	+03	01	46.7	809
1980	FT1		1980	03	16.16910	11	33	45.88	+03	01	48.0	809
1980	FT1		1980	03	16.35729	11	33	37.14	+03	02	45.5	809
1980	FT1		1980	03	16.36146	11	33	36.95	+03	02	46.5	809
1980	FT1		1980	03	17.06979	11	33	05.59	+03	06	25.1	809
1980	FT1		1980	03	17.07396	11	33	05.35	+03	06	26.2	809
1980	FT1		1980	03	17.26007	11	32	56.77	+03	07	23.6	809
1980	FT1		1980	03	17.26424	11	32	56.57	+03	07	24.5	809
1980	FU1	*	1980	03	16.16493	11	33	52.82	+00	09	44.4	809
1980	FU1		1980	03	16.16910	11	33	52.58	+00	09	45.4	809
1980	FU1		1980	03	16.35729	11	33	41.71	+00	10	36.2	809
1980	FU1		1980	03	16.36146	11	33	41.43	+00	10	36.2	809
1980	FU1		1980	03	17.26007	11	32	52.00	+00	14	37.6	809
1980	FU1		1980	03	17.26424	11	32	51.81	+00	14	39.0	809
1980	FV1	*	1980	03	16.16493	11	34	15.45	+02	15	16.5	809
1980	FV1		1980	03	16.16910	11	34	15.26	+02	15	17.0	809
1980	FV1		1980	03	16.35729	11	34	05.61	+02	15	49.2	809
1980	FV1		1980	03	16.36146	11	34	05.39	+02	15	49.4	809
1980	FV1		1980	03	17.06979	11	33	30.39	+02	17	49.8	809
1980	FV1		1980	03	17.07396	11	33	30.14	+02	17	51.1	809
1980	FV1		1980	03	17.26007	11	33	20.64	+02	18	21.9	809
1980	FV1		1980	03	17.26424	11	33	20.41	+02	18	23.0	809
1980	FV1		1980	03	23.16250	11	28	31.03	+02	34	43.4	809
1980	FW1	*	1980	03	16.16493	11	34	25.11	+00	57	55.0	809
1980	FW1		1980	03	16.16910	11	34	24.90	+00	57	55.9	809
1980	FW1		1980	03	16.35729	11	34	13.71	+00	58	51.8	809
1980	FW1		1980	03	16.36146	11	34	13.52	+00	58	52.7	809
1980	FW1		1980	03	17.06979	11	33	34.00	+01	02	22.4	809
1980	FW1		1980	03	17.07396	11	33	33.78	+01	02	24.2	809
1980	FW1		1980	03	17.26007	11	33	22.78	+01	03	19.5	809
1980	FW1		1980	03	17.26424	11	33	22.57	+01	03	20.5	809
1980	FW1		1980	03	23.16250	11	27	58.41	+01	32	01.6	809
1980	FX1	*	1980	03	16.16493	11	34	30.56	+01	00	28.7	809
1980	FX1		1980	03	16.16910	11	34	30.40	+01	00	30.8	809
1980	FX1		1980	03	16.35729	11	34	22.74	+01	02	03.3	809
1980	FX1		1980	03	16.36146	11	34	22.52	+01	02	06.0	809
1980	FY1	*	1980	03	16.16493	11	34	53.74	+03	48	08.9	809
1980	FY1		1980	03	16.16910	11	34	53.49	+03	48	09.5	809
1980	FY1		1980	03	16.35729	11	34	42.17	+03	48	31.2	809
1980	FY1		1980	03	16.36146	11	34	41.91	+03	48	31.6	809
1980	FY1		1980	03	17.06979	11	34	01.03	+03	49	53.7	809
1980	FY1		1980	03	17.07396	11	34	00.77	+03	49	54.9	809
1980	FY1		1980	03	17.26007	11	33	49.59	+03	50	15.4	809
1980	FY1		1980	03	17.26424	11	33	49.35	+03	50	16.5	809
1980	FZ1	*	1980	03	16.16493	11	34	58.62	+03	42	00.2	809
1980	FZ1		1980	03	16.16910	11	34	58.41	+03	42	01.5	809
1980	FZ1		1980	03	16.35729	11	34	48.29	+03	43	26.1	809
1980	FZ1		1980	03	16.36146	11	34	48.12	+03	43	28.0	809
1980	FZ1		1980	03	17.06979	11	34	11.80	+03	48	44.9	809
1980	FZ1		1980	03	17.07396	11	34	11.53	+03	48	47.3	809

1980	FA2	*	1980	03	16.16493	11	35	05.36	+03	37	52.2	809
1980	FA2		1980	03	16.16910	11	35	05.19	+03	37	54.2	809
1980	FB2	*	1980	03	16.16493	11	35	06.80	+03	44	49.8	809
1980	FB2		1980	03	16.16910	11	35	06.60	+03	44	51.6	809
1980	FB2		1980	03	16.35729	11	34	56.56	+03	46	25.9	809
1980	FB2		1980	03	16.36146	11	34	56.33	+03	46	27.5	809
1980	FB2		1980	03	17.06979	11	34	20.31	+03	52	21.2	809
1980	FB2		1980	03	17.07396	11	34	20.07	+03	52	23.3	809
1980	FB2		1980	03	17.26007	11	34	10.13	+03	53	55.3	809
1980	FB2		1980	03	17.26424	11	34	09.94	+03	53	57.4	809
1980	FC2	*	1980	03	16.16493	11	35	25.37	-00	03	20.3	809
1980	FC2		1980	03	16.16910	11	35	25.11	-00	03	19.7	809
1980	FC2		1980	03	16.35729	11	35	14.32	-00	02	08.2	809
1980	FC2		1980	03	16.36146	11	35	14.14	-00	02	07.8	809
1980	FC2		1980	03	17.06979	11	34	35.19	+00	02	21.9	809
1980	FC2		1980	03	17.07396	11	34	34.92	+00	02	21.8	809
1980	FC2		1980	03	17.26007	11	34	24.23	+00	03	32.6	809
1980	FC2		1980	03	17.26424	11	34	24.01	+00	03	33.3	809
1980	FD2	*	1980	03	16.16493	11	35	46.91	+04	15	13.8	809
1980	FD2		1980	03	16.16910	11	35	46.63	+04	15	13.6	809
1980	FD2		1980	03	16.35729	11	35	34.15	+04	15	13.8	809
1980	FD2		1980	03	16.36146	11	35	33.94	+04	15	13.8	809
1980	FD2		1980	03	17.06979	11	34	48.99	+04	15	11.9	809
1980	FD2		1980	03	17.07396	11	34	48.73	+04	15	11.9	809
1980	FD2		1980	03	17.26007	11	34	36.41	+04	15	12.0	809
1980	FD2		1980	03	17.26424	11	34	36.20	+04	15	12.2	809
1980	FE2	*	1980	03	16.16493	11	35	49.57	-00	11	27.5	809
1980	FE2		1980	03	16.16910	11	35	49.36	-00	11	27.3	809
1980	FE2		1980	03	16.35729	11	35	39.49	-00	10	53.9	809
1980	FE2		1980	03	16.36146	11	35	39.26	-00	10	53.3	809
1980	FE2		1980	03	17.06979	11	35	03.39	-00	08	46.3	809
1980	FE2		1980	03	17.07396	11	35	03.18	-00	08	46.2	809
1980	FE2		1980	03	17.26007	11	34	53.43	-00	08	12.2	809
1980	FE2		1980	03	17.26424	11	34	53.20	-00	08	11.5	809
1980	FE2		1980	03	23.16250	11	29	54.12	+00	09	34.3	809
1980	FF2	*	1980	03	16.16493	11	35	51.20	+01	47	05.5	809
1980	FF2		1980	03	16.16910	11	35	51.03	+01	47	07.4	809
1980	FF2		1980	03	16.35729	11	35	40.71	+01	49	03.7	809
1980	FF2		1980	03	16.36146	11	35	40.51	+01	49	06.3	809
1980	FF2		1980	03	17.06979	11	35	04.55	+01	56	25.3	809
1980	FF2		1980	03	17.07396	11	35	04.24	+01	56	27.8	809
1980	FF2		1980	03	17.26007	11	34	54.13	+01	58	22.9	809
1980	FF2		1980	03	17.26424	11	34	53.91	+01	58	24.9	809
1980	FG2	*	1980	03	16.16493	11	35	55.81	+03	38	00.4	809
1980	FG2		1980	03	16.16910	11	35	55.53	+03	38	01.0	809
1980	FG2		1980	03	16.35729	11	35	43.58	+03	38	20.3	809
1980	FG2		1980	03	16.36146	11	35	43.32	+03	38	20.5	809
1980	FG2		1980	03	17.06979	11	35	00.15	+03	39	33.3	809
1980	FG2		1980	03	17.07396	11	34	59.93	+03	39	33.3	809
1980	FG2		1980	03	17.26007	11	34	48.07	+03	39	51.3	809
1980	FG2		1980	03	17.26424	11	34	47.84	+03	39	52.0	809
1980	FH2	*	1980	03	16.16493	11	36	24.40	-00	23	37.9	809
1980	FH2		1980	03	16.16910	11	36	24.18	-00	23	37.5	809
1980	FH2		1980	03	16.35729	11	36	12.58	-00	22	42.7	809
1980	FH2		1980	03	16.36146	11	36	12.37	-00	22	41.6	809
1980	FH2		1980	03	17.06979	11	35	30.79	-00	19	13.1	809
1980	FH2		1980	03	17.07396	11	35	30.52	-00	19	12.3	809
1980	FH2		1980	03	17.26007	11	35	19.06	-00	18	17.3	809
1980	FH2		1980	03	17.26424	11	35	18.81	-00	18	16.1	809

1980	FH2		1980	03	23.16250	11	29	32.87	+00	10	49.7	809
1980	FJ2	*	1980	03	16.16493	11	36	55.88	+04	12	43.1	809
1980	FJ2		1980	03	16.16910	11	36	55.66	+04	12	44.1	809
1980	FJ2		1980	03	16.35729	11	36	44.67	+04	13	36.4	809
1980	FJ2		1980	03	16.36146	11	36	44.43	+04	13	38.0	809
1980	FJ2		1980	03	17.06979	11	36	04.64	+04	16	55.0	809
1980	FJ2		1980	03	17.07396	11	36	04.44	+04	16	54.2	809
1980	FJ2		1980	03	17.26007	11	35	53.57	+04	17	47.2	809
1980	FJ2		1980	03	17.26424	11	35	53.40	+04	17	47.6	809
1980	FK2	*	1980	03	16.16493	11	36	58.27	+04	43	56.8	809
1980	FK2		1980	03	16.16910	11	36	58.12	+04	43	57.5	809
1980	FK2		1980	03	16.35729	11	36	49.34	+04	45	04.8	809
1980	FK2		1980	03	16.36146	11	36	49.14	+04	45	06.3	809
1980	FK2		1980	03	17.06979	11	36	18.44	+04	49	11.1	809
1980	FK2		1980	03	17.07396	11	36	18.21	+04	49	12.2	809
1980	FK2		1980	03	17.26007	11	36	09.60	+04	50	18.2	809
1980	FK2		1980	03	17.26424	11	36	09.41	+04	50	18.7	809
1980	FL2	*	1980	03	16.16493	11	37	04.92	+01	18	46.8	809
1980	FL2		1980	03	16.16910	11	37	04.79	+01	18	47.9	809
1980	FL2		1980	03	16.35729	11	36	56.75	+01	20	10.7	809
1980	FL2		1980	03	16.36146	11	36	56.58	+01	20	12.1	809
1980	FL2		1980	03	17.06979	11	36	27.63	+01	25	21.5	809
1980	FL2		1980	03	17.07396	11	36	27.47	+01	25	23.1	809
1980	FL2		1980	03	17.26007	11	36	19.50	+01	26	44.3	809
1980	FL2		1980	03	17.26424	11	36	19.31	+01	26	45.6	809
1980	FL2		1980	03	23.19306	11	32	17.49	+02	09	39.0	809
1980	FM2	*	1980	03	16.16493	11	37	19.33	+01	20	25.3	809
1980	FM2		1980	03	16.16910	11	37	19.03	+01	20	23.8	809
1980	FN2	*	1980	03	16.16493	11	37	28.75	+00	48	07.3	809
1980	FN2		1980	03	16.16910	11	37	28.58	+00	48	08.5	809
1980	FN2		1980	03	16.35729	11	37	16.71	+00	49	36.5	809
1980	FN2		1980	03	16.36146	11	37	16.51	+00	49	37.8	809
1980	FN2		1980	03	17.06979	11	36	34.25	+00	55	07.5	809
1980	FN2		1980	03	17.07396	11	36	34.05	+00	55	09.5	809
1980	FN2		1980	03	17.26007	11	36	22.40	+00	56	35.8	809
1980	FN2		1980	03	17.26424	11	36	22.09	+00	56	38.0	809
1980	FO2	*	1980	03	16.16493	11	37	39.46	+00	07	14.3	809
1980	FO2		1980	03	16.16910	11	37	39.14	+00	07	14.9	809
1980	FO2		1980	03	16.35729	11	37	27.27	+00	08	22.3	809
1980	FO2		1980	03	16.36146	11	37	27.05	+00	08	25.0	809
1980	FO2		1980	03	17.06979	11	36	44.54	+00	12	37.6	809
1980	FO2		1980	03	17.07396	11	36	44.30	+00	12	38.7	809
1980	FO2		1980	03	17.26007	11	36	32.52	+00	13	45.5	809
1980	FO2		1980	03	17.26424	11	36	32.31	+00	13	47.1	809
1980	FP2	*	1980	03	16.16493	11	37	58.79	+01	13	14.0	809
1980	FP2		1980	03	16.16910	11	37	58.59	+01	13	15.9	809
1980	FP2		1980	03	17.06979	11	37	07.07	+01	18	25.3	809
1980	FP2		1980	03	17.07396	11	37	06.89	+01	18	27.0	809
1980	FP2		1980	03	17.26007	11	36	55.90	+01	19	31.3	809
1980	FP2		1980	03	17.26424	11	36	55.67	+01	19	32.4	809
1980	FP2		1980	03	23.19306	11	31	22.50	+01	53	05.1	809
1980	FQ2	*	1980	03	16.16493	11	38	06.10	+03	15	17.3	809
1980	FQ2		1980	03	16.16910	11	38	05.95	+03	15	19.3	809
1980	FQ2		1980	03	16.35729	11	37	57.27	+03	17	28.0	809
1980	FQ2		1980	03	16.36146	11	37	57.10	+03	17	31.4	809
1980	FQ2		1980	03	17.06979	11	37	26.54	+03	25	36.2	809
1980	FQ2		1980	03	17.07396	11	37	26.31	+03	25	39.5	809
1980	FQ2		1980	03	17.26007	11	37	17.78	+03	27	45.4	809
1980	FQ2		1980	03	17.26424	11	37	17.58	+03	27	48.4	809

1980	FR2	*	1980	03	16.16493	11	38	20.70	+01	20	38.7	809
1980	FR2		1980	03	16.16910	11	38	20.52	+01	20	39.6	809
1980	FR2		1980	03	16.35729	11	38	10.53	+01	22	06.5	809
1980	FR2		1980	03	16.36146	11	38	10.31	+01	22	08.2	809
1980	FR2		1980	03	17.06979	11	37	34.49	+01	27	32.5	809
1980	FR2		1980	03	17.07396	11	37	34.22	+01	27	34.2	809
1980	FR2		1980	03	17.26007	11	37	24.39	+01	28	58.8	809
1980	FR2		1980	03	17.26424	11	37	24.18	+01	29	01.0	809
1980	FR2		1980	03	23.19306	11	32	27.09	+02	13	32.1	809
1980	FS2	*	1980	03	16.16493	11	38	47.76	+02	16	42.6	809
1980	FS2		1980	03	16.16910	11	38	47.53	+02	16	44.8	809
1980	FS2		1980	03	16.35729	11	38	36.15	+02	18	23.1	809
1980	FS2		1980	03	16.36146	11	38	35.94	+02	18	25.0	809
1980	FS2		1980	03	17.06979	11	37	55.28	+02	24	37.9	809
1980	FS2		1980	03	17.07396	11	37	54.99	+02	24	40.6	809
1980	FS2		1980	03	17.26007	11	37	43.71	+02	26	17.8	809
1980	FS2		1980	03	17.26424	11	37	43.57	+02	26	19.1	809
1980	FT2	*	1980	03	16.16493	11	38	52.97	+00	37	52.3	809
1980	FT2		1980	03	16.16910	11	38	52.86	+00	37	54.4	809
1980	FT2		1980	03	16.35729	11	38	44.57	+00	39	19.5	809
1980	FT2		1980	03	16.36146	11	38	44.35	+00	39	21.7	809
1980	FT2		1980	03	17.06979	11	38	14.66	+00	44	42.7	809
1980	FT2		1980	03	17.07396	11	38	14.48	+00	44	44.3	809
1980	FT2		1980	03	17.26007	11	38	06.34	+00	46	08.7	809
1980	FT2		1980	03	17.26424	11	38	06.17	+00	46	11.5	809
1980	FU2	*	1980	03	16.16493	11	39	13.57	+03	45	10.2	809
1980	FU2		1980	03	16.16910	11	39	13.36	+03	45	11.8	809
1980	FU2		1980	03	16.35729	11	39	01.93	+03	46	01.5	809
1980	FU2		1980	03	16.36146	11	39	01.71	+03	46	02.3	809
1980	FU2		1980	03	17.06979	11	38	21.30	+03	49	10.0	809
1980	FU2		1980	03	17.07396	11	38	20.96	+03	49	11.6	809
1980	FU2		1980	03	17.26007	11	38	09.77	+03	50	00.5	809
1980	FU2		1980	03	17.26424	11	38	09.53	+03	50	01.8	809
1980	FV2	*	1980	03	16.16493	11	39	40.88	+02	36	16.9	809
1980	FV2		1980	03	16.16910	11	39	40.66	+02	36	17.0	809
1980	FV2		1980	03	16.35729	11	39	29.19	+02	36	41.6	809
1980	FV2		1980	03	16.36146	11	39	28.93	+02	36	42.0	809
1980	FV2		1980	03	17.06979	11	38	47.31	+02	38	17.0	809
1980	FV2		1980	03	17.07396	11	38	47.02	+02	38	18.2	809
1980	FV2		1980	03	17.26007	11	38	35.67	+02	38	42.4	809
1980	FV2		1980	03	17.26424	11	38	35.43	+02	38	43.5	809
1980	FV2		1980	03	23.19306	11	32	44.98	+02	51	33.8	809
1980	FW2	*	1980	03	16.16493	11	39	44.55	+02	10	30.8	809
1980	FW2		1980	03	16.16910	11	39	44.40	+02	10	31.8	809
1980	FW2		1980	03	16.35729	11	39	35.66	+02	11	25.1	809
1980	FW2		1980	03	16.36146	11	39	35.45	+02	11	26.8	809
1980	FW2		1980	03	17.06979	11	39	03.87	+02	14	49.0	809
1980	FW2		1980	03	17.07396	11	39	03.62	+02	14	51.1	809
1980	FW2		1980	03	17.26007	11	38	55.01	+02	15	43.8	809
1980	FW2		1980	03	17.26424	11	38	54.84	+02	15	44.8	809
1980	FW2		1980	03	23.19306	11	34	29.27	+02	43	44.9	809
1980	FX2	*	1980	03	16.16493	11	39	55.91	+04	12	53.8	809
1980	FX2		1980	03	16.16910	11	39	55.69	+04	12	54.5	809
1980	FX2		1980	03	16.35729	11	39	44.86	+04	13	26.6	809
1980	FX2		1980	03	16.36146	11	39	44.62	+04	13	27.9	809
1980	FX2		1980	03	17.06979	11	39	05.70	+04	15	28.8	809
1980	FX2		1980	03	17.07396	11	39	05.47	+04	15	29.3	809
1980	FX2		1980	03	17.26007	11	38	54.79	+04	16	01.4	809
1980	FX2		1980	03	17.26424	11	38	54.52	+04	16	01.8	809

1980	FY2	*	1980	03	16.16493	11	40	13.64	+02	18	18.2	809
1980	FY2		1980	03	16.16910	11	40	13.48	+02	18	18.7	809
1980	FY2		1980	03	16.35729	11	40	04.34	+02	19	12.4	809
1980	FY2		1980	03	16.36146	11	40	04.18	+02	19	14.7	809
1980	FY2		1980	03	17.06979	11	39	31.35	+02	22	38.3	809
1980	FY2		1980	03	17.07396	11	39	31.16	+02	22	40.1	809
1980	FY2		1980	03	17.26007	11	39	22.12	+02	23	32.5	809
1980	FY2		1980	03	17.26424	11	39	21.97	+02	23	34.0	809
1980	FY2		1980	03	23.19306	11	34	47.84	+02	51	30.2	809
1980	FZ2	*	1980	03	16.16493	11	40	18.82	+00	54	54.2	809
1980	FZ2		1980	03	16.16910	11	40	18.65	+00	54	56.1	809
1980	FZ2		1980	03	16.35729	11	40	10.77	+00	56	36.5	809
1980	FZ2		1980	03	16.36146	11	40	10.60	+00	56	37.7	809
1980	FZ2		1980	03	17.06979	11	39	42.21	+01	02	57.6	809
1980	FZ2		1980	03	17.07396	11	39	42.04	+01	02	59.7	809
1980	FZ2		1980	03	17.26007	11	39	34.19	+01	04	39.8	809
1980	FZ2		1980	03	17.26424	11	39	34.11	+01	04	42.1	809
1980	FZ2		1980	03	23.19306	11	35	35.32	+01	57	39.4	809
1980	FA3	*	1980	03	16.16493	11	40	25.21	+03	19	26.7	809
1980	FA3		1980	03	16.16910	11	40	25.02	+03	19	28.4	809
1980	FA3		1980	03	16.35729	11	40	14.39	+03	20	47.6	809
1980	FA3		1980	03	16.36146	11	40	14.25	+03	20	49.5	809
1980	FA3		1980	03	17.06979	11	39	36.56	+03	25	48.2	809
1980	FA3		1980	03	17.07396	11	39	36.28	+03	25	50.0	809
1980	FA3		1980	03	17.26007	11	39	25.88	+03	27	07.9	809
1980	FA3		1980	03	17.26424	11	39	25.63	+03	27	09.6	809
1980	FB3	*	1980	03	16.16493	11	40	31.81	+04	10	37.3	809
1980	FB3		1980	03	16.16910	11	40	31.58	+04	10	38.3	809
1980	FB3		1980	03	16.35729	11	40	20.03	+04	11	47.5	809
1980	FB3		1980	03	16.36146	11	40	19.84	+04	11	48.0	809
1980	FB3		1980	03	17.06979	11	39	38.86	+04	16	00.6	809
1980	FB3		1980	03	17.07396	11	39	38.53	+04	16	04.1	809
1980	FB3		1980	03	17.26007	11	39	27.21	+04	17	10.5	809
1980	FB3		1980	03	17.26424	11	39	26.92	+04	17	11.7	809
1980	FC3	*	1980	03	16.16493	11	40	42.22	-00	09	52.2	809
1980	FC3		1980	03	16.16910	11	40	42.07	-00	09	51.2	809
1980	FC3		1980	03	16.35729	11	40	33.92	-00	08	34.0	809
1980	FC3		1980	03	16.36146	11	40	33.80	-00	08	31.0	809
1980	FC3		1980	03	17.06979	11	40	04.30	-00	03	34.5	809
1980	FC3		1980	03	17.07396	11	40	04.10	-00	03	32.7	809
1980	FC3		1980	03	17.26007	11	39	56.06	-00	02	14.6	809
1980	FC3		1980	03	17.26424	11	39	55.89	-00	02	14.1	809
1980	FD3	*	1980	03	16.16493	11	40	50.18	+00	47	31.1	809
1980	FD3		1980	03	16.16910	11	40	49.98	+00	47	31.8	809
1980	FD3		1980	03	16.35729	11	40	38.72	+00	48	25.3	809
1980	FD3		1980	03	16.36146	11	40	38.48	+00	48	26.3	809
1980	FD3		1980	03	17.06979	11	39	58.58	+00	51	49.7	809
1980	FD3		1980	03	17.07396	11	39	58.34	+00	51	51.0	809
1980	FD3		1980	03	17.26007	11	39	47.21	+00	52	44.2	809
1980	FD3		1980	03	17.26424	11	39	47.01	+00	52	45.4	809
1980	FD3		1980	03	23.19306	11	34	11.15	+01	21	07.2	809
1980	FE3	*	1980	03	16.16493	11	41	14.50	+01	50	29.9	809
1980	FE3		1980	03	16.16910	11	41	14.34	+01	50	30.9	809
1980	FE3		1980	03	16.35729	11	41	05.43	+01	51	24.7	809
1980	FE3		1980	03	16.36146	11	41	05.16	+01	51	25.8	809
1980	FE3		1980	03	23.19306	11	35	56.57	+02	23	26.4	809
1980	FF3	*	1980	03	16.16493	11	41	26.01	+00	58	41.6	809
1980	FF3		1980	03	16.16910	11	41	25.77	+00	58	42.1	809
1980	FF3		1980	03	17.06979	11	40	33.46	+01	01	03.6	809

1980	FF3	1980	03	17.07396	11	40	33.24	+01	01	05.0	809
1980	FF3	1980	03	17.26007	11	40	21.98	+01	01	34.3	809
1980	FF3	1980	03	17.26424	11	40	21.77	+01	01	34.5	809
1980	FF3	1980	03	23.19306	11	34	38.17	+01	17	11.4	809
1980	FG3	* 1980	03	16.16493	11	41	33.46	+03	25	17.5	809
1980	FG3	1980	03	16.16910	11	41	33.23	+03	25	19.2	809
1980	FG3	1980	03	16.35729	11	41	22.60	+03	26	34.7	809
1980	FG3	1980	03	16.36146	11	41	22.42	+03	26	36.1	809
1980	FG3	1980	03	17.06979	11	40	44.53	+03	31	21.0	809
1980	FG3	1980	03	17.07396	11	40	44.30	+03	31	22.9	809
1980	FG3	1980	03	17.26007	11	40	33.83	+03	32	36.6	809
1980	FG3	1980	03	17.26424	11	40	33.56	+03	32	38.1	809
1980	FH3	* 1980	03	16.16493	11	41	39.92	+00	54	59.0	809
1980	FH3	1980	03	16.16910	11	41	39.78	+00	55	00.7	809
1980	FH3	1980	03	16.35729	11	41	31.39	+00	56	20.2	809
1980	FH3	1980	03	16.36146	11	41	31.25	+00	56	22.0	809
1980	FH3	1980	03	17.06979	11	41	01.20	+01	01	21.8	809
1980	FH3	1980	03	17.07396	11	41	00.98	+01	01	24.0	809
1980	FH3	1980	03	17.26007	11	40	52.72	+01	02	42.9	809
1980	FH3	1980	03	17.26424	11	40	52.54	+01	02	44.4	809
1980	FH3	1980	03	23.19306	11	36	40.94	+01	44	24.5	809
1980	FJ3	* 1980	03	16.16493	11	41	41.10	+03	58	47.8	809
1980	FJ3	1980	03	16.16910	11	41	40.84	+03	58	49.4	809
1980	FJ3	1980	03	16.35729	11	41	29.43	+04	00	04.5	809
1980	FJ3	1980	03	16.36146	11	41	29.23	+04	00	05.8	809
1980	FJ3	1980	03	17.06979	11	40	48.24	+04	04	47.8	809
1980	FJ3	1980	03	17.07396	11	40	47.96	+04	04	49.6	809
1980	FJ3	1980	03	17.26007	11	40	36.69	+04	06	04.8	809
1980	FJ3	1980	03	17.26424	11	40	36.46	+04	06	05.1	809
1980	FK3	* 1980	03	16.16493	11	41	44.71	+00	10	42.4	809
1980	FK3	1980	03	16.16910	11	41	44.47	+00	10	43.7	809
1980	FK3	1980	03	16.35729	11	41	33.06	+00	11	41.5	809
1980	FK3	1980	03	16.36146	11	41	32.85	+00	11	41.8	809
1980	FK3	1980	03	17.06979	11	40	52.49	+00	15	18.8	809
1980	FK3	1980	03	17.07396	11	40	52.20	+00	15	20.7	809
1980	FK3	1980	03	23.19306	11	35	02.44	+00	46	32.0	809
1980	FL3	* 1980	03	16.16493	11	41	46.98	+00	13	10.6	809
1980	FL3	1980	03	16.16910	11	41	46.83	+00	13	12.1	809
1980	FL3	1980	03	16.35729	11	41	38.13	+00	14	57.8	809
1980	FL3	1980	03	16.36146	11	41	37.94	+00	14	59.5	809
1980	FL3	1980	03	17.06979	11	41	07.21	+00	21	36.9	809
1980	FL3	1980	03	17.07396	11	41	07.01	+00	21	39.7	809
1980	FL3	1980	03	17.26007	11	40	58.41	+00	23	24.2	809
1980	FL3	1980	03	17.26424	11	40	58.22	+00	23	25.7	809
1980	FL3	1980	03	23.19306	11	36	39.67	+01	18	51.1	809
1980	FM3	* 1980	03	16.16493	11	42	20.77	+04	02	15.5	809
1980	FM3	1980	03	16.16910	11	42	20.57	+04	02	17.1	809
1980	FN3	* 1980	03	16.16493	11	42	27.14	+01	32	18.7	809
1980	FN3	1980	03	16.16910	11	42	26.90	+01	32	20.3	809
1980	FN3	1980	03	16.35729	11	42	15.64	+01	33	49.8	809
1980	FN3	1980	03	16.36146	11	42	15.42	+01	33	51.7	809
1980	FN3	1980	03	17.06979	11	41	34.77	+01	39	30.4	809
1980	FN3	1980	03	17.07396	11	41	34.54	+01	39	32.5	809
1980	FN3	1980	03	17.26007	11	41	23.37	+01	41	01.3	809
1980	FN3	1980	03	17.26424	11	41	23.13	+01	41	03.1	809
1980	FN3	1980	03	23.19306	11	35	41.32	+02	28	01.0	809
1980	FO3	* 1980	03	16.16493	11	42	31.51	+02	19	00.8	809
1980	FO3	1980	03	16.16910	11	42	31.38	+02	19	01.4	809
1980	FO3	1980	03	16.35729	11	42	22.99	+02	19	33.3	809

1980	FO3	1980	03	16.36146	11	42	22.82	+02	19	34.1	809	
1980	FO3	1980	03	17.06979	11	41	52.32	+02	21	36.1	809	
1980	FO3	1980	03	17.07396	11	41	52.10	+02	21	37.2	809	
1980	FO3	1980	03	17.26007	11	41	43.86	+02	22	08.4	809	
1980	FO3	1980	03	17.26424	11	41	43.68	+02	22	09.5	809	
1980	FO3	1980	03	23.19306	11	37	28.42	+02	38	51.2	809	
1980	FP3	*	1980	03	16.16493	11	42	35.84	+01	53	42.1	809
1980	FP3	1980	03	16.16910	11	42	35.66	+01	53	43.3	809	
1980	FP3	1980	03	16.35729	11	42	25.15	+01	54	58.2	809	
1980	FP3	1980	03	16.36146	11	42	24.90	+01	54	59.3	809	
1980	FP3	1980	03	17.06979	11	41	48.24	+01	59	38.3	809	
1980	FP3	1980	03	17.07396	11	41	47.87	+01	59	40.0	809	
1980	FQ3	*	1980	03	16.16493	11	42	37.46	+00	48	56.5	809
1980	FQ3	1980	03	16.16910	11	42	37.28	+00	48	57.1	809	
1980	FQ3	1980	03	16.35729	11	42	27.06	+00	49	21.0	809	
1980	FQ3	1980	03	16.36146	11	42	26.82	+00	49	22.1	809	
1980	FQ3	1980	03	23.19306	11	36	27.47	+01	04	21.8	809	
1980	FR3	*	1980	03	16.16493	11	42	43.70	+04	22	29.7	809
1980	FR3	1980	03	16.16910	11	42	43.50	+04	22	31.8	809	
1980	FR3	1980	03	17.06979	11	41	57.82	+04	29	40.2	809	
1980	FR3	1980	03	17.07396	11	41	57.66	+04	29	42.6	809	
1980	FR3	1980	03	17.26007	11	41	47.59	+04	31	12.0	809	
1980	FR3	1980	03	17.26424	11	41	47.41	+04	31	13.4	809	
1980	FS3	*	1980	03	16.16493	11	42	57.52	+01	12	27.3	809
1980	FS3	1980	03	16.16910	11	42	57.33	+01	12	27.7	809	
1980	FS3	1980	03	16.35729	11	42	47.88	+01	13	01.3	809	
1980	FS3	1980	03	16.36146	11	42	47.67	+01	13	01.5	809	
1980	FS3	1980	03	17.06979	11	42	13.26	+01	15	06.4	809	
1980	FS3	1980	03	17.07396	11	42	13.05	+01	15	07.4	809	
1980	FS3	1980	03	17.26007	11	42	03.66	+01	15	40.3	809	
1980	FS3	1980	03	17.26424	11	42	03.52	+01	15	40.4	809	
1980	FS3	1980	03	23.19306	11	37	15.17	+01	33	00.5	809	
1980	FT3	*	1980	03	16.16493	11	43	29.22	-00	20	12.6	809
1980	FT3	1980	03	16.16910	11	43	28.99	-00	20	11.2	809	
1980	FT3	1980	03	16.35729	11	43	17.70	-00	18	52.8	809	
1980	FT3	1980	03	16.36146	11	43	17.45	-00	18	51.9	809	
1980	FT3	1980	03	17.06979	11	42	36.85	-00	13	55.4	809	
1980	FT3	1980	03	17.07396	11	42	36.57	-00	13	53.1	809	
1980	FT3	1980	03	17.26007	11	42	25.44	-00	12	35.6	809	
1980	FT3	1980	03	17.26424	11	42	25.19	-00	12	34.6	809	
1980	FT3	1980	03	23.19306	11	36	43.45	+00	28	51.3	809	
1980	FU3	*	1980	03	16.16493	11	43	36.72	+03	41	14.3	809
1980	FU3	1980	03	16.16910	11	43	36.51	+03	41	15.5	809	
1980	FU3	1980	03	16.35729	11	43	25.94	+03	42	41.8	809	
1980	FU3	1980	03	16.36146	11	43	25.75	+03	42	43.4	809	
1980	FU3	1980	03	17.06979	11	42	47.58	+03	48	06.5	809	
1980	FU3	1980	03	17.07396	11	42	47.35	+03	48	08.4	809	
1980	FU3	1980	03	17.26007	11	42	36.85	+03	49	33.8	809	
1980	FU3	1980	03	17.26424	11	42	36.65	+03	49	35.0	809	
1980	FV3	*	1980	03	16.16493	11	43	51.15	+04	06	28.1	809
1980	FV3	1980	03	16.16910	11	43	50.83	+04	06	30.4	809	
1980	FV3	1980	03	16.35729	11	43	40.00	+04	07	48.7	809	
1980	FV3	1980	03	16.36146	11	43	39.79	+04	07	49.9	809	
1980	FV3	1980	03	17.06979	11	43	01.06	+04	12	40.9	809	
1980	FV3	1980	03	17.07396	11	43	00.76	+04	12	43.0	809	
1980	FV3	1980	03	17.26007	11	42	49.96	+04	14	00.6	809	
1980	FV3	1980	03	17.26424	11	42	49.77	+04	14	01.6	809	
1980	FW3	*	1980	03	16.16493	11	44	01.76	+02	56	50.5	809
1980	FW3	1980	03	16.16910	11	44	01.54	+02	56	51.8	809	

1980 FW3	1980 03 16.35729	11 43 50.20	+02 57 48.3	809
1980 FW3	1980 03 16.36146	11 43 50.04	+02 57 49.7	809
1980 FW3	1980 03 17.06979	11 43 09.09	+03 01 23.3	809
1980 FW3	1980 03 17.07396	11 43 08.79	+03 01 24.3	809
1980 FW3	1980 03 17.26007	11 42 57.61	+03 02 19.8	809
1980 FW3	1980 03 17.26424	11 42 57.45	+03 02 20.4	809
1980 FX3 *	1980 03 16.16493	11 44 02.11	+01 48 48.8	809
1980 FX3	1980 03 16.16910	11 44 01.86	+01 48 49.5	809
1980 FX3	1980 03 16.35729	11 43 50.18	+01 49 27.6	809
1980 FX3	1980 03 16.36146	11 43 49.94	+01 49 28.0	809
1980 FX3	1980 03 17.06979	11 43 08.09	+01 51 49.9	809
1980 FX3	1980 03 17.07396	11 43 07.76	+01 51 51.0	809
1980 FX3	1980 03 17.26007	11 42 56.28	+01 52 28.3	809
1980 FX3	1980 03 17.26424	11 42 56.01	+01 52 29.4	809
1980 FX3	1980 03 23.19306	11 37 06.08	+02 11 47.8	809
1980 FY3 *	1980 03 16.16493	11 44 03.28	+02 12 54.4	809
1980 FY3	1980 03 16.16910	11 44 03.10	+02 12 56.3	809
1980 FY3	1980 03 16.35729	11 43 54.00	+02 14 49.2	809
1980 FY3	1980 03 16.36146	11 43 53.82	+02 14 50.1	809
1980 FY3	1980 03 17.06979	11 43 21.95	+02 21 49.8	809
1980 FY3	1980 03 17.07396	11 43 21.73	+02 21 52.9	809
1980 FY3	1980 03 17.26007	11 43 12.74	+02 23 42.5	809
1980 FY3	1980 03 17.26424	11 43 12.60	+02 23 44.9	809
1980 FZ3 *	1980 03 16.16493	11 44 09.34	+00 09 57.0	809
1980 FZ3	1980 03 16.16910	11 44 09.14	+00 09 57.6	809
1980 FZ3	1980 03 16.35729	11 43 55.91	+00 10 30.2	809
1980 FZ3	1980 03 16.36146	11 43 55.62	+00 10 31.0	809
1980 FZ3	1980 03 17.06979	11 43 08.38	+00 12 37.4	809
1980 FZ3	1980 03 17.07396	11 43 08.07	+00 12 38.7	809
1980 FZ3	1980 03 17.26007	11 42 55.08	+00 13 12.0	809
1980 FZ3	1980 03 17.26424	11 42 54.79	+00 13 12.1	809
1980 FZ3	1980 03 23.19306	11 36 22.14	+00 30 42.0	809
1980 FA4 *	1980 03 16.16493	11 44 18.10	+03 27 49.6	809
1980 FA4	1980 03 16.16910	11 44 17.85	+03 27 50.4	809
1980 FA4	1980 03 16.35729	11 44 05.46	+03 28 27.7	809
1980 FA4	1980 03 16.36146	11 44 05.22	+03 28 28.1	809
1980 FA4	1980 03 17.06979	11 43 21.26	+03 30 47.1	809
1980 FA4	1980 03 17.07396	11 43 20.94	+03 30 47.7	809
1980 FA4	1980 03 17.26007	11 43 08.70	+03 31 24.4	809
1980 FA4	1980 03 17.26424	11 43 08.39	+03 31 25.0	809
1980 FB4 *	1980 03 16.16493	11 44 21.35	+04 15 16.8	809
1980 FB4	1980 03 16.16910	11 44 21.02	+04 15 19.4	809
1980 FB4	1980 03 16.35729	11 44 08.70	+04 17 01.9	809
1980 FB4	1980 03 16.36146	11 44 08.49	+04 17 04.2	809
1980 FB4	1980 03 17.06979	11 43 24.35	+04 23 27.2	809
1980 FB4	1980 03 17.07396	11 43 24.00	+04 23 30.4	809
1980 FB4	1980 03 17.26007	11 43 11.78	+04 25 12.5	809
1980 FB4	1980 03 17.26424	11 43 11.55	+04 25 13.3	809
1980 FC4 *	1980 03 16.16493	11 44 24.03	+01 59 45.5	809
1980 FC4	1980 03 16.16910	11 44 23.89	+01 59 46.3	809
1980 FC4	1980 03 16.35729	11 44 14.46	+02 00 41.1	809
1980 FC4	1980 03 16.36146	11 44 14.22	+02 00 42.2	809
1980 FC4	1980 03 17.06979	11 43 40.15	+02 04 07.1	809
1980 FC4	1980 03 17.07396	11 43 39.89	+02 04 08.5	809
1980 FC4	1980 03 17.26007	11 43 30.57	+02 05 02.4	809
1980 FC4	1980 03 17.26424	11 43 30.38	+02 05 03.4	809
1980 FC4	1980 03 23.19306	11 38 44.61	+02 33 14.7	809
1980 FD4 *	1980 03 16.16493	11 44 32.37	+02 37 43.3	809
1980 FD4	1980 03 16.16910	11 44 32.18	+02 37 45.3	809

1980	FD4	1980	03	16.35729	11	44	23.47	+02	39	18.4	809	
1980	FD4	1980	03	16.36146	11	44	23.25	+02	39	20.5	809	
1980	FD4	1980	03	17.06979	11	43	51.64	+02	45	10.8	809	
1980	FD4	1980	03	17.07396	11	43	51.43	+02	45	12.6	809	
1980	FD4	1980	03	17.26007	11	43	42.78	+02	46	44.3	809	
1980	FD4	1980	03	17.26424	11	43	42.62	+02	46	45.8	809	
1980	FE4	*	1980	03	16.16493	11	44	56.03	+03	27	40.3	809
1980	FE4	1980	03	16.16910	11	44	55.85	+03	27	42.3	809	
1980	FE4	1980	03	16.35729	11	44	47.41	+03	29	10.6	809	
1980	FE4	1980	03	16.36146	11	44	47.23	+03	29	12.8	809	
1980	FF4	*	1980	03	16.16493	11	45	10.69	+01	08	47.8	809
1980	FF4	1980	03	16.16910	11	45	10.44	+01	08	49.1	809	
1980	FF4	1980	03	16.35729	11	44	58.72	+01	09	46.0	809	
1980	FF4	1980	03	16.36146	11	44	58.49	+01	09	47.4	809	
1980	FF4	1980	03	17.06979	11	44	16.76	+01	13	23.6	809	
1980	FF4	1980	03	17.07396	11	44	16.52	+01	13	23.8	809	
1980	FF4	1980	03	17.26007	11	44	04.95	+01	14	20.8	809	
1980	FF4	1980	03	17.26424	11	44	04.74	+01	14	21.7	809	
1980	FG4	*	1980	03	16.16493	11	45	12.24	+00	19	34.9	809
1980	FG4	1980	03	16.16910	11	45	11.90	+00	19	33.8	809	
1980	FG4	1980	03	16.35729	11	44	53.52	+00	18	25.4	809	
1980	FG4	1980	03	16.36146	11	44	53.08	+00	18	23.7	809	
1980	FG4	1980	03	17.06979	11	43	46.33	+00	14	10.8	809	
1980	FG4	1980	03	17.07396	11	43	45.94	+00	14	09.9	809	
1980	FG4	1980	03	17.26007	11	43	27.86	+00	13	03.4	809	
1980	FG4	1980	03	17.26424	11	43	27.46	+00	13	01.5	809	
1980	FG4	1980	03	23.19306	11	34	21.06	-00	21	16.8	809	
1980	FH4	*	1980	03	16.16493	11	45	15.82	+01	28	20.0	809
1980	FH4	1980	03	16.16910	11	45	15.60	+01	28	21.6	809	
1980	FH4	1980	03	16.35729	11	45	04.35	+01	29	39.2	809	
1980	FH4	1980	03	16.36146	11	45	04.16	+01	29	40.5	809	
1980	FH4	1980	03	17.06979	11	44	24.28	+01	34	33.1	809	
1980	FH4	1980	03	17.07396	11	44	24.06	+01	34	34.1	809	
1980	FH4	1980	03	17.26007	11	44	12.89	+01	35	51.7	809	
1980	FH4	1980	03	17.26424	11	44	12.66	+01	35	53.2	809	
1980	FH4	1980	03	23.19306	11	38	33.00	+02	16	43.2	809	
1980	FJ4	*	1980	03	16.16493	11	45	22.15	+04	45	32.2	809
1980	FJ4	1980	03	16.16910	11	45	21.84	+04	45	33.8	809	
1980	FJ4	1980	03	16.35729	11	45	11.12	+04	46	34.5	809	
1980	FJ4	1980	03	16.36146	11	45	10.87	+04	46	36.3	809	
1980	FJ4	1980	03	17.06979	11	44	32.31	+04	50	18.9	809	
1980	FJ4	1980	03	17.07396	11	44	32.00	+04	50	19.6	809	
1980	FJ4	1980	03	17.26007	11	44	21.44	+04	51	21.3	809	
1980	FJ4	1980	03	17.26424	11	44	21.22	+04	51	21.1	809	
1980	FK4	*	1980	03	16.16493	11	45	26.18	+01	08	20.0	809
1980	FK4	1980	03	16.16910	11	45	26.00	+01	08	22.3	809	
1980	FK4	1980	03	16.35729	11	45	17.59	+01	10	19.9	809	
1980	FK4	1980	03	16.36146	11	45	17.32	+01	10	22.2	809	
1980	FK4	1980	03	17.06979	11	44	47.97	+01	17	44.5	809	
1980	FK4	1980	03	17.07396	11	44	47.78	+01	17	46.7	809	
1980	FK4	1980	03	17.26007	11	44	39.43	+01	19	43.1	809	
1980	FK4	1980	03	17.26424	11	44	39.30	+01	19	44.9	809	
1980	FK4	1980	03	23.19306	11	40	32.08	+02	20	43.0	809	
1980	FL4	*	1980	03	16.16493	11	45	27.23	+00	07	47.3	809
1980	FL4	1980	03	16.16910	11	45	27.07	+00	07	49.2	809	
1980	FL4	1980	03	16.35729	11	45	17.89	+00	09	25.2	809	
1980	FL4	1980	03	16.36146	11	45	17.70	+00	09	27.3	809	
1980	FL4	1980	03	17.06979	11	44	45.04	+00	15	30.4	809	
1980	FL4	1980	03	17.07396	11	44	44.80	+00	15	32.8	809	

1980	FL4	1980	03	17.26007	11	44	35.82	+00	17	07.4	809
1980	FL4	1980	03	17.26424	11	44	35.61	+00	17	09.0	809
1980	FL4	1980	03	23.19306	11	39	59.90	+01	07	50.2	809
1980	FM4 *	1980	03	16.16493	11	45	45.64	+00	04	15.1	809
1980	FM4	1980	03	16.16910	11	45	45.45	+00	04	16.1	809
1980	FM4	1980	03	16.35729	11	45	36.21	+00	04	49.1	809
1980	FM4	1980	03	16.36146	11	45	36.00	+00	04	50.2	809
1980	FM4	1980	03	17.06979	11	45	02.41	+00	06	57.1	809
1980	FM4	1980	03	17.07396	11	45	02.19	+00	06	58.7	809
1980	FM4	1980	03	17.26007	11	44	53.04	+00	07	33.0	809
1980	FM4	1980	03	17.26424	11	44	52.87	+00	07	32.9	809
1980	FM4	1980	03	23.19306	11	40	10.82	+00	25	20.4	809
1980	FN4 *	1980	03	16.16493	11	46	03.43	+01	52	01.5	809
1980	FN4	1980	03	16.16910	11	46	03.21	+01	52	02.3	809
1980	FN4	1980	03	16.35729	11	45	52.41	+01	53	19.8	809
1980	FN4	1980	03	16.36146	11	45	52.13	+01	53	19.8	809
1980	FN4	1980	03	17.06979	11	45	13.57	+01	58	06.0	809
1980	FN4	1980	03	17.07396	11	45	13.31	+01	58	07.5	809
1980	FN4	1980	03	17.26007	11	45	02.62	+01	59	22.7	809
1980	FN4	1980	03	17.26424	11	45	02.39	+01	59	24.0	809
1980	FN4	1980	03	23.19306	11	39	40.30	+02	38	24.4	809
1980	FO4 *	1980	03	16.16493	11	46	04.30	+03	09	22.6	809
1980	FO4	1980	03	16.16910	11	46	04.10	+03	09	23.8	809
1980	FO4	1980	03	16.35729	11	45	54.30	+03	10	03.3	809
1980	FO4	1980	03	16.36146	11	45	54.04	+03	10	04.5	809
1980	FO4	1980	03	17.06979	11	45	18.60	+03	12	33.0	809
1980	FO4	1980	03	17.07396	11	45	18.40	+03	12	33.3	809
1980	FO4	1980	03	17.26007	11	45	08.70	+03	13	13.5	809
1980	FO4	1980	03	17.26424	11	45	08.48	+03	13	13.7	809
1980	FP4 *	1980	03	16.16493	11	46	11.80	+03	07	40.0	809
1980	FP4	1980	03	16.16910	11	46	11.45	+03	07	41.1	809
1980	FP4	1980	03	16.35729	11	46	00.55	+03	08	38.7	809
1980	FP4	1980	03	16.36146	11	46	00.31	+03	08	39.7	809
1980	FP4	1980	03	17.06979	11	45	21.08	+03	12	16.5	809
1980	FP4	1980	03	17.07396	11	45	20.79	+03	12	17.7	809
1980	FP4	1980	03	17.26007	11	45	09.93	+03	13	14.9	809
1980	FP4	1980	03	17.26424	11	45	09.70	+03	13	15.8	809
1980	FQ4 *	1980	03	16.16493	11	46	28.28	+02	31	58.3	809
1980	FQ4	1980	03	16.16910	11	46	28.07	+02	32	00.1	809
1980	FQ4	1980	03	16.35729	11	46	17.53	+02	33	36.4	809
1980	FQ4	1980	03	16.36146	11	46	17.35	+02	33	38.5	809
1980	FQ4	1980	03	17.06979	11	45	40.38	+02	39	40.0	809
1980	FQ4	1980	03	17.07396	11	45	40.05	+02	39	41.8	809
1980	FQ4	1980	03	17.26007	11	45	29.64	+02	41	17.2	809
1980	FQ4	1980	03	17.26424	11	45	29.43	+02	41	18.6	809
1980	FR4 *	1980	03	16.16493	11	46	30.56	+01	12	27.9	809
1980	FR4	1980	03	16.16910	11	46	30.30	+01	12	30.7	809
1980	FR4	1980	03	16.35729	11	46	20.35	+01	14	18.1	809
1980	FR4	1980	03	16.36146	11	46	20.09	+01	14	20.6	809
1980	FR4	1980	03	17.06979	11	45	44.71	+01	21	06.6	809
1980	FR4	1980	03	17.07396	11	45	44.51	+01	21	09.1	809
1980	FR4	1980	03	17.26007	11	45	34.60	+01	22	55.8	809
1980	FR4	1980	03	17.26424	11	45	34.36	+01	22	58.0	809
1980	FR4	1980	03	23.19306	11	40	34.51	+02	19	30.1	809
1980	FS4 *	1980	03	16.16493	11	46	57.76	+00	33	34.9	809
1980	FS4	1980	03	16.16910	11	46	57.61	+00	33	36.4	809
1980	FS4	1980	03	16.35729	11	46	49.08	+00	35	14.8	809
1980	FS4	1980	03	16.36146	11	46	48.89	+00	35	16.2	809
1980	FS4	1980	03	17.06979	11	46	18.33	+00	41	24.5	809

1980 FS4	1980 03 17.07396	11 46 18.08	+00 41 26.1	809
1980 FS4	1980 03 23.19306	11 41 52.53	+01 34 08.9	809
1980 FT4 *	1980 03 16.16493	11 46 59.32	+00 12 11.4	809
1980 FT4	1980 03 16.16910	11 46 59.06	+00 12 12.8	809
1980 FT4	1980 03 17.06979	11 46 09.92	+00 18 02.8	809
1980 FT4	1980 03 17.07396	11 46 09.71	+00 18 04.3	809
1980 FT4	1980 03 17.26007	11 45 59.19	+00 19 18.2	809
1980 FT4	1980 03 17.26424	11 45 58.96	+00 19 18.4	809
1980 FU4 *	1980 03 16.16493	11 47 11.18	+02 29 45.1	809
1980 FU4	1980 03 16.16910	11 47 10.96	+02 29 46.2	809
1980 FU4	1980 03 16.35729	11 47 00.62	+02 30 33.9	809
1980 FU4	1980 03 16.36146	11 47 00.39	+02 30 34.0	809
1980 FU4	1980 03 17.06979	11 46 23.17	+02 33 28.1	809
1980 FU4	1980 03 17.07396	11 46 23.05	+02 33 28.2	809
1980 FV4 *	1980 03 16.16493	11 47 13.29	+02 54 39.0	809
1980 FV4	1980 03 16.16910	11 47 13.11	+02 54 38.9	809
1980 FV4	1980 03 16.35729	11 47 04.06	+02 55 18.4	809
1980 FV4	1980 03 16.36146	11 47 03.83	+02 55 18.0	809
1980 FV4	1980 03 17.06979	11 46 31.02	+02 57 40.2	809
1980 FV4	1980 03 17.07396	11 46 30.78	+02 57 39.8	809
1980 FV4	1980 03 17.26007	11 46 21.86	+02 58 18.0	809
1980 FV4	1980 03 17.26424	11 46 21.70	+02 58 18.6	809
1980 FW4 *	1980 03 16.16493	11 47 16.63	+04 39 03.8	809
1980 FW4	1980 03 16.16910	11 47 16.40	+04 39 07.0	809
1980 FW4	1980 03 16.35729	11 47 07.31	+04 41 03.2	809
1980 FW4	1980 03 16.36146	11 47 07.09	+04 41 05.4	809
1980 FW4	1980 03 17.06979	11 46 35.74	+04 48 14.6	809
1980 FW4	1980 03 17.07396	11 46 35.51	+04 48 16.8	809
1980 FW4	1980 03 17.26007	11 46 26.58	+04 50 13.3	809
1980 FW4	1980 03 17.26424	11 46 26.34	+04 50 13.6	809
1980 FX4 *	1980 03 16.16493	11 47 18.50	+04 24 29.1	809
1980 FX4	1980 03 16.16910	11 47 18.25	+04 24 30.9	809
1980 FX4	1980 03 16.35729	11 47 07.86	+04 25 27.9	809
1980 FX4	1980 03 16.36146	11 47 07.61	+04 25 28.9	809
1980 FX4	1980 03 17.06979	11 46 30.32	+04 28 57.3	809
1980 FX4	1980 03 17.07396	11 46 30.11	+04 28 57.5	809
1980 FX4	1980 03 17.26007	11 46 19.84	+04 29 55.6	809
1980 FX4	1980 03 17.26424	11 46 19.55	+04 29 55.1	809
1980 FY4 *	1980 03 16.16493	11 47 44.27	-00 09 04.7	809
1980 FY4	1980 03 16.16910	11 47 44.02	-00 09 02.3	809
1980 FY4	1980 03 16.35729	11 47 33.50	-00 07 35.9	809
1980 FY4	1980 03 16.36146	11 47 33.19	-00 07 34.7	809
1980 FY4	1980 03 17.06979	11 46 55.21	-00 02 07.5	809
1980 FY4	1980 03 17.07396	11 46 54.95	-00 02 05.2	809
1980 FY4	1980 03 17.26007	11 46 44.53	-00 00 38.2	809
1980 FY4	1980 03 17.26424	11 46 44.29	-00 00 38.3	809
1980 FY4	1980 03 23.19306	11 41 23.39	+00 45 05.8	809
1980 FZ4 *	1980 03 16.16493	11 47 54.50	+01 52 55.5	809
1980 FZ4	1980 03 16.16910	11 47 54.31	+01 52 55.5	809
1980 FZ4	1980 03 16.35729	11 47 46.10	+01 53 51.1	809
1980 FZ4	1980 03 16.36146	11 47 45.96	+01 53 51.6	809
1980 FZ4	1980 03 23.19306	11 42 58.32	+02 26 40.1	809
1980 FA5 *	1980 03 16.16493	11 47 56.29	+03 32 49.1	809
1980 FA5	1980 03 16.16910	11 47 56.02	+03 32 50.3	809
1980 FA5	1980 03 16.35729	11 47 45.41	+03 33 33.6	809
1980 FA5	1980 03 16.36146	11 47 45.14	+03 33 34.5	809
1980 FA5	1980 03 17.06979	11 47 06.86	+03 36 16.8	809
1980 FA5	1980 03 17.07396	11 47 06.67	+03 36 17.7	809
1980 FA5	1980 03 17.26007	11 46 56.13	+03 37 01.1	809

1980	FA5		1980	03	17.26424	11	46	55.86	+03	37	01.2	809
1980	FB5	*	1980	03	16.16493	11	48	05.54	+03	20	40.1	809
1980	FB5		1980	03	16.16910	11	48	05.35	+03	20	41.6	809
1980	FB5		1980	03	16.35729	11	47	57.14	+03	21	38.4	809
1980	FB5		1980	03	16.36146	11	47	56.95	+03	21	39.3	809
1980	FB5		1980	03	17.06979	11	47	27.09	+03	25	10.3	809
1980	FB5		1980	03	17.07396	11	47	26.98	+03	25	10.9	809
1980	FB5		1980	03	17.26007	11	47	18.78	+03	26	06.7	809
1980	FB5		1980	03	17.26424	11	47	18.61	+03	26	07.1	809
1980	FC5	*	1980	03	16.16493	11	48	14.33	+00	54	22.0	809
1980	FC5		1980	03	16.16910	11	48	14.13	+00	54	26.5	809
1980	FC5		1980	03	16.35729	11	48	04.28	+00	57	34.7	809
1980	FC5		1980	03	16.36146	11	48	04.05	+00	57	37.7	809
1980	FC5		1980	03	17.06979	11	47	28.97	+01	09	25.4	809
1980	FC5		1980	03	17.07396	11	47	28.78	+01	09	29.0	809
1980	FC5		1980	03	17.26007	11	47	18.97	+01	12	36.0	809
1980	FC5		1980	03	17.26424	11	47	18.76	+01	12	39.6	809
1980	FC5		1980	03	23.19306	11	42	17.55	+02	52	31.5	809
1980	FD5	*	1980	03	16.16493	11	48	30.04	+04	18	42.8	809
1980	FD5		1980	03	16.16910	11	48	29.75	+04	18	44.5	809
1980	FD5		1980	03	16.35729	11	48	18.41	+04	19	40.5	809
1980	FD5		1980	03	16.36146	11	48	18.10	+04	19	41.5	809
1980	FD5		1980	03	17.06979	11	47	37.68	+04	23	08.0	809
1980	FD5		1980	03	17.07396	11	47	37.41	+04	23	08.4	809
1980	FD5		1980	03	17.26007	11	47	26.14	+04	24	06.4	809
1980	FD5		1980	03	17.26424	11	47	25.85	+04	24	05.6	809
1980	FE5	*	1980	03	16.16493	11	48	36.48	+04	37	50.9	809
1980	FE5		1980	03	16.16910	11	48	36.25	+04	37	52.6	809
1980	FE5		1980	03	16.35729	11	48	27.32	+04	39	14.9	809
1980	FE5		1980	03	16.36146	11	48	27.10	+04	39	16.7	809
1980	FE5		1980	03	17.06979	11	47	55.66	+04	44	15.8	809
1980	FE5		1980	03	17.07396	11	47	55.34	+04	44	15.6	809
1980	FE5		1980	03	17.26007	11	47	46.56	+04	45	38.3	809
1980	FE5		1980	03	17.26424	11	47	46.40	+04	45	37.8	809
1980	FF5	*	1980	03	16.16493	11	48	50.77	+01	31	58.5	809
1980	FF5		1980	03	16.16910	11	48	50.56	+01	32	00.2	809
1980	FG5	*	1980	03	16.16493	11	48	50.82	-00	07	54.6	809
1980	FG5		1980	03	16.16910	11	48	50.59	-00	07	52.5	809
1980	FG5		1980	03	16.35729	11	48	40.95	-00	06	05.1	809
1980	FG5		1980	03	16.36146	11	48	40.64	-00	06	03.5	809
1980	FH5	*	1980	03	16.16493	11	49	02.78	+00	08	07.6	809
1980	FH5		1980	03	16.16910	11	49	02.53	+00	08	07.5	809
1980	FH5		1980	03	16.35729	11	48	50.16	+00	08	19.6	809
1980	FH5		1980	03	16.36146	11	48	49.81	+00	08	19.6	809
1980	FH5		1980	03	17.06979	11	48	04.91	+00	09	08.1	809
1980	FH5		1980	03	17.07396	11	48	04.70	+00	09	08.2	809
1980	FH5		1980	03	17.26007	11	47	52.39	+00	09	21.3	809
1980	FH5		1980	03	17.26424	11	47	52.10	+00	09	20.7	809
1980	FH5		1980	03	23.19306	11	41	36.40	+00	16	03.8	809
1980	FJ5	*	1980	03	16.16493	11	49	04.20	-00	07	43.8	809
1980	FJ5		1980	03	16.16910	11	49	04.02	-00	07	41.7	809
1980	FJ5		1980	03	16.35729	11	48	55.68	-00	05	32.0	809
1980	FJ5		1980	03	16.36146	11	48	55.42	-00	05	30.2	809
1980	FK5	*	1980	03	16.35729	11	41	45.31	-00	20	46.6	809
1980	FK5		1980	03	16.36146	11	41	45.05	-00	20	46.6	809
1980	FK5		1980	03	17.06979	11	41	01.82	-00	19	17.3	809
1980	FK5		1980	03	17.07396	11	41	01.48	-00	19	16.1	809
1980	FK5		1980	03	17.26007	11	40	49.55	-00	18	51.9	809
1980	FK5		1980	03	17.26424	11	40	49.30	-00	18	52.5	809

1980	FK5	1980	03	23.19306	11	34	47.05	-00	06	13.0	809
1980	FL5	* 1980	03	16.35729	11	46	10.45	+00	34	14.3	809
1980	FL5	1980	03	16.36146	11	46	10.22	+00	34	15.8	809
1980	FL5	1980	03	17.06979	11	45	34.04	+00	38	52.4	809
1980	FL5	1980	03	17.07396	11	45	33.83	+00	38	54.7	809
1980	FL5	1980	03	17.26007	11	45	23.88	+00	40	07.3	809
1980	FL5	1980	03	17.26424	11	45	23.65	+00	40	08.5	809
1980	FM5	* 1980	03	23.16250	11	12	42.15	-01	36	07.3	809
1980	FN5	* 1980	03	23.16250	11	13	55.97	-00	59	47.5	809
1980	FO5	* 1980	03	23.16250	11	14	24.34	+02	17	18.1	809
1980	FP5	* 1980	03	23.16250	11	14	26.65	-00	32	49.4	809
1980	FQ5	* 1980	03	23.16250	11	14	35.31	+00	53	26.3	809
1980	FR5	* 1980	03	23.16250	11	14	42.42	-02	03	44.2	809
1980	FS5	* 1980	03	23.16250	11	14	51.05	-00	37	01.0	809
1980	FT5	* 1980	03	23.16250	11	15	11.11	-01	56	00.8	809
1980	FU5	* 1980	03	23.16250	11	15	28.93	+00	17	58.4	809
1980	FV5	* 1980	03	23.16250	11	15	29.39	+02	47	17.8	809
1980	FW5	* 1980	03	23.16250	11	16	21.17	+01	34	18.6	809
1980	FX5	* 1980	03	23.16250	11	17	45.84	-00	10	40.0	809
1980	FY5	* 1980	03	23.16250	11	17	52.13	+01	46	45.7	809
1980	FZ5	* 1980	03	23.16250	11	17	57.36	-01	25	13.7	809
1980	FA6	* 1980	03	23.16250	11	18	12.19	-01	41	59.1	809
1980	FB6	* 1980	03	23.16250	11	18	30.02	-01	10	45.3	809
1980	FC6	* 1980	03	23.16250	11	18	36.59	+02	08	30.0	809
1980	FD6	* 1980	03	23.16250	11	19	01.84	+02	39	33.2	809
1980	FE6	* 1980	03	23.16250	11	19	17.75	-00	55	37.5	809
1980	FF6	* 1980	03	23.16250	11	19	24.84	-01	15	23.8	809
1980	FG6	* 1980	03	23.16250	11	19	47.38	-01	12	12.8	809
1980	FH6	* 1980	03	23.16250	11	20	13.08	-01	41	12.6	809
1980	FJ6	* 1980	03	23.16250	11	21	46.83	+01	04	24.8	809
1980	FK6	* 1980	03	23.16250	11	22	21.07	+00	12	00.2	809
1980	FL6	* 1980	03	23.16250	11	22	50.58	-00	05	45.2	809
1980	FM6	* 1980	03	23.16250	11	23	18.40	-01	49	34.1	809
1980	FN6	* 1980	03	23.16250	11	26	20.87	+00	28	20.5	809
1980	FO6	* 1980	03	23.16250	11	28	02.41	-00	34	19.0	809
1980	FP6	* 1980	03	23.16250	11	28	41.87	-01	15	48.5	809
1980	FQ6	* 1980	03	23.16250	11	28	51.14	-01	16	11.1	809
1980	FR6	* 1980	03	23.16250	11	28	59.90	-01	27	50.3	809
1980	FS6	* 1980	03	23.16250	11	29	06.89	-00	30	13.2	809
1980	FT6	* 1980	03	23.16250	11	29	14.81	-00	06	35.1	809
1980	FU6	* 1980	03	23.16250	11	30	03.06	-00	02	01.3	809
1980	FV6	* 1980	03	23.16250	11	30	49.62	+00	00	32.5	809
1980	FW6	* 1980	03	23.16250	11	31	19.08	-02	04	24.8	809
1980	FW6	1980	03	23.19306	11	31	17.24	-02	04	13.4	809
1980	FX6	* 1980	03	23.16250	11	31	24.17	+01	52	55.4	809
1980	FY6	* 1980	03	23.16250	11	31	54.27	-00	26	50.0	809
1980	FY6	1980	03	23.19306	11	31	52.90	-00	26	44.4	809
1980	FZ6	* 1980	03	23.19306	11	32	43.03	-01	14	29.3	809
1980	FA7	* 1980	03	23.19306	11	32	45.33	-01	14	06.1	809
1980	FB7	* 1980	03	23.19306	11	33	41.75	-02	13	49.3	809
1980	FC7	* 1980	03	23.19306	11	33	55.67	-01	08	45.9	809
1980	FD7	* 1980	03	23.19306	11	34	07.89	+00	11	23.9	809
1980	FE7	* 1980	03	23.19306	11	34	44.92	-00	24	06.2	809
1980	FF7	* 1980	03	23.19306	11	35	03.26	-01	02	09.2	809
1980	FG7	* 1980	03	23.19306	11	35	48.63	-01	41	30.1	809
1980	FH7	* 1980	03	23.19306	11	36	43.54	-01	42	54.3	809
1980	FJ7	* 1980	03	23.19306	11	36	50.59	-00	16	32.9	809
1980	FK7	* 1980	03	23.19306	11	37	39.15	-01	39	46.4	809
1980	FL7	* 1980	03	23.19306	11	38	14.22	-00	27	03.2	809

1980 FM7 *	1980 03 23.19306	11 39 14.33	+00 08 47.4	809
1980 FN7 *	1980 03 23.19306	11 39 34.81	-00 27 48.2	809
1980 FO7 *	1980 03 23.19306	11 39 53.09	-01 47 56.1	809
1980 FP7 *	1980 03 23.19306	11 40 21.32	-00 06 19.0	809
1980 FQ7 *	1980 03 23.19306	11 40 48.28	+01 15 31.8	809
1980 FR7 *	1980 03 23.19306	11 41 37.44	+00 05 07.2	809
1980 FS7 *	1980 03 23.19306	11 41 45.81	-02 07 33.9	809
1980 FT7 *	1980 03 23.19306	11 42 26.72	-01 28 52.2	809
1980 FU7 *	1980 03 23.19306	11 42 27.33	+02 27 14.1	809
1980 FV7 *	1980 03 23.19306	11 42 30.04	-01 24 06.2	809
1980 FW7 *	1980 03 23.19306	11 42 36.89	-00 40 47.6	809
1980 FX7 *	1980 03 23.19306	11 42 53.79	-00 34 35.2	809
1980 FY7 *	1980 03 23.19306	11 43 09.59	+00 59 20.9	809
1980 FZ7 *	1980 03 23.19306	11 43 46.25	+02 45 46.3	809
1980 FA8 *	1980 03 23.19306	11 43 58.06	+02 52 42.2	809
1980 FB8 *	1980 03 23.19306	11 44 43.33	+01 13 44.0	809
1980 FC8 *	1980 03 23.19306	11 44 54.14	+02 16 10.7	809
1980 FD8 *	1980 03 23.19306	11 45 07.18	+01 51 04.3	809
1980 FE8 *	1980 03 23.19306	11 45 21.41	-00 47 59.4	809
1980 FF8 *	1980 03 23.19306	11 45 22.00	+00 42 42.2	809
1980 FG8 *	1980 03 23.19306	11 46 14.00	+02 20 33.5	809
1980 FH8 *	1980 03 23.19306	11 47 11.56	-01 41 31.3	809
1980 FJ8 *	1980 03 23.19306	11 47 14.73	-01 59 50.5	809
1980 FK8 *	1980 03 23.19306	11 47 15.60	-00 41 27.3	809
1980 FL8 *	1980 03 23.19306	11 47 26.99	-01 18 23.3	809
1980 FM8 *	1980 03 23.19306	11 47 29.50	-00 10 31.4	809
1980 FN8 *	1980 03 23.19306	11 47 30.03	-00 07 13.9	809
1980 FO8 *	1980 03 23.19306	11 48 01.36	+00 11 03.7	809
1980 FP8 *	1980 03 23.19306	11 48 24.48	+01 27 50.5	809
1980 FQ8 *	1980 03 23.19306	11 48 33.56	-00 22 00.3	809
1980 FR8 *	1980 03 23.19306	11 49 36.11	+00 58 23.3	809
1980 FS8 *	1980 03 23.19306	11 49 41.53	-01 48 37.3	809
1980 FT8 *	1980 03 23.19306	11 49 43.21	+02 10 35.8	809
1980 FU8 *	1980 03 23.19306	11 49 58.29	-01 12 57.2	809
1980 FV8 *	1980 03 23.19306	11 49 59.55	+01 50 49.1	809
1980 FW8 *	1980 03 23.19306	11 50 08.60	-00 19 47.9	809
1980 FX8 *	1980 03 23.19306	11 50 09.44	+01 30 07.3	809
1980 FY8 *	1980 03 23.19306	11 50 27.82	+02 03 11.3	809
1980 FZ8 *	1980 03 23.19306	11 50 50.77	+02 01 05.5	809
1980 FA9 *	1980 03 23.19306	11 52 09.26	+02 05 41.6	809
6066 P-L	1980 03 23.16250	11 23 57.37	-01 57 42.4	809

OBSERVATION MADE AT NANTUCKET. COMMUNICATED BY E. P. BELSERENE.

Object	Date	UT	R. A. (1950)	Decl.	N Obs.
541	1980 10	11.08484	00 06 16.63	+10 26 59.3	1 811

Note 1: observatory code 811, Long. and Parallax 289.90, -321, -280 (see MPC 4766).

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ORBITAL ELEMENTS OF ONE-OPPOSITION MINOR PLANETS.

The orbit computers and authors of double designations are B = C. M. Bardwell, E = E. Bowell, M = B. G. Marsden, P = O. Kippes, S = L. D. Schmadel. For further information see MPC 5833.

Planet	B(1,0)	Epoch	M	Peri.	Node	Incl.	e	a	Arc	O	N	C
1976 SZ9	14.0	760919	339.65	19.84	12.85	3.28	0.2449	3.1620	10	9	B	
1978 WM14		781128	358.87	210.57	207.26	6.18	0.1832	3.2217	38	8	1	M

1979	EB	12.5	790328	145.39	178.95	204.22	9.52	0.1062	3.0153	23	8	1	M
1979	EE	15.5	790328	37.16	151.40	327.82	12.22	0.2377	2.5587	23	6		M
1980	FA	15.5	800322	2.98	12.09	161.27	0.96	0.2005	2.7319	7	0		M
1980	FD	13.5	800322	66.42	272.19	178.80	15.33	0.1871	2.8289	7	5	2	M
1980	FO		800322	37.78	149.33	332.12	3.90	0.1989	2.3085	7	9		M
1980	FU		800322	319.99	241.88	343.73	6.87	0.1162	2.2954	7	9		B
1980	FV		800322	187.36	5.49	344.37	6.27	0.2123	2.2251	7	9	2	M
1980	FY		800322	307.00	273.19	320.13	1.86	0.0462	2.1582	7	9		M
1980	FA1		800322	50.64	124.88	348.18	5.99	0.1225	2.3932	7	9	2	M
1980	FH1		800322	350.92	207.56	343.04	7.84	0.2081	2.7632	7	9		M
1980	FJ1		800322	184.35	358.82	352.59	21.64	0.2692	3.1558	7	9		M
1980	FO1		800322	347.79	243.55	306.74	1.02	0.0966	2.9523	7	9		B
1980	FQ1		800322	123.30	218.05	183.19	10.98	0.1203	2.9681	7	9		B
1980	FR1		800322	17.76	195.24	321.95	3.13	0.0118	3.2310	7	9	2	M
1980	FS1		800322	293.33	65.10	193.98	4.04	0.1440	2.2565	7	9		M
1980	FV1		800322	8.33	174.35	351.36	7.10	0.0615	3.0805	7	9	2	M
1980	FW1		800322	43.40	152.10	328.22	2.03	0.1410	2.4028	7	9		M
1980	FE2		800322	261.03	310.14	343.83	9.24	0.1779	2.9950	7	9		B
1980	FH2		800322	255.21	322.15	326.38	3.30	0.0664	2.3402	7	9		M
1980	FL2		800322	279.46	80.87	178.92	9.55	0.0326	3.1462	7	9		M
1980	FR2		800322	95.58	238.76	180.97	5.35	0.1900	2.5551	7	9		M
1980	FV2		800322	262.47	299.07	355.74	12.54	0.2004	2.6899	7	9		M
1980	FW2		800322	252.36	305.80	353.04	0.39	0.1526	3.1080	7	9		M
1980	FY2		800322	61.91	106.17	2.29	0.77	0.0537	3.0072	7	9		M
1980	FZ2		800322	287.67	88.02	177.95	15.37	0.1534	3.1788	7	9		M
1980	FD3		800322	327.76	239.53	337.71	2.12	0.1131	2.3890	7	9		M
1980	FF3		800322	307.77	253.83	350.86	7.19	0.1535	2.6482	7	7		B
1980	FH3		800322	46.36	306.63	180.48	7.32	0.0352	3.0453	7	9		M
1980	FK3		800322	13.22	194.80	327.07	1.84	0.0822	2.3078	7	7		B
1980	FL3		800322	347.70	11.07	181.75	8.76	0.1199	2.7478	7	9		M
1980	FN3		800322	210.97	157.40	178.01	4.41	0.2041	2.2054	7	9		M
1980	FO3		800322	152.45	16.64	356.56	11.63	0.2422	3.3416	7	9		M
1980	FS3		800322	175.08	6.84	353.25	10.41	0.1477	3.0128	7	9		M
1980	FT3		800322	199.41	133.49	209.57	2.18	0.1661	2.2461	7	9		M
1980	FX3		800322	72.45	98.77	355.91	6.07	0.0881	2.4600	7	9		M
1980	FZ3		800322	81.64	87.20	349.77	7.42	0.1655	2.2431	7	9		M
1980	FC4		800322	0.95	171.32	4.43	1.17	0.0318	2.8878	7	9	2	M
1980	FG4		800322	45.11	93.94	354.82	29.92	0.3959	2.7753	7	9		B
1980	FH4		800322	303.45	73.84	179.11	1.04	0.1763	2.3106	7	9		M
1980	FK4		800322	19.05	332.03	177.26	8.68	0.1939	2.6987	7	9		M
1980	FL4		800322	262.78	98.57	181.53	8.83	0.0491	2.6730	7	9		M
1980	FM4		800322	155.40	24.78	350.80	9.99	0.1537	3.0787	7	9		M
1980	FN4		800322	71.95	279.40	167.99	1.39	0.1578	2.4204	7	9		B
1980	FR4		800322	314.35	52.82	177.04	6.70	0.0749	2.3656	7	9		M
1980	FS4		800322	43.62	304.40	179.28	9.12	0.1169	2.8757	7	7	2	B
1980	FY4		800322	191.46	162.75	186.38	4.99	0.1510	2.3364	7	9		B
1980	FC5		800322	289.09	102.76	176.74	22.15	0.2668	2.3879	7	9		B
1980	FH5		800322	82.77	83.90	354.15	13.54	0.1503	2.5858	7	9		M
1980	FK5		800322	24.33	162.68	347.13	8.04	0.0652	2.4568	7	7		B
1981	GD1	15.0	810426	67.62	237.78	226.24	3.58	0.1600	3.0664	30	8		M
1981	JM	13.3	810516	50.46	27.26	136.65	2.33	0.1197	3.1094	32	5		E
1981	JN	13.3	810516	77.22	274.56	215.76	13.45	0.1747	2.6350	32	6		E
1981	JR	10.0	810516	136.41	219.81	230.49	21.21	0.0416	5.2056	51	8		M
1981	JZ	12.5	810516	319.99	208.74	58.90	17.54	0.0798	3.2082	28	0		B
1981	KE	15.0	810605	94.85	59.64	59.59	27.60	0.1533	1.9651	4	6		B
1981	KF	14.0	810605	87.54	304.90	190.85	11.87	0.2025	2.3067	2	6		B
1981	KJ	14.5	810715	335.52	260.62	35.88	15.25	0.1429	3.1317	12	5		S
1981	LA	13.4	810605	146.13	31.96	95.89	24.89	0.0669	1.8909	29	8		E

1981 LD 13.9 810605 296.54 279.38 85.62 4.16 0.2101 2.3920 29 8 E
 1981 LF 11.8 810605 261.11 112.30 283.42 11.65 0.0887 3.1550 29 8 E
 1981 LJ 13.0 810605 282.40 225.55 105.45 3.00 0.0972 2.8944 21 6 E
 Note 1: double designation 1978 WM14 = 1978 UG2 (P), 1979 EB = 1979 FP (M).
 2: e assumed.

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ORBITAL ELEMENTS BY P. HERGET, UNIVERSITY OF CINCINNATI.

(168) Sibylla

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	309.03549		(1950.0)	P	Q
n	0.15848787	Peri.	165.09378	+0.97735555	-0.20841180
a	3.38172804	Node	207.01920	+0.18494974	+0.92543074
e	0.04732599	Incl.	4.62294	+0.10280913	+0.31645291

From 87 observations at 29 oppositions 1902-1980, mean residual 4".3.

(211) Isolda

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	45.15051		(1950.0)	P	Q
n	0.18518572	Peri.	172.26569	+0.24201917	-0.96796770
a	3.04834689	Node	263.71070	+0.88652441	+0.24859470
e	0.15218143	Incl.	3.85473	+0.39433637	+0.03520212

From 76 observations at 30 oppositions 1902-1979, mean residual 3".5.

(250) Bettina

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	331.45204		(1950.0)	P	Q
n	0.17620017	Peri.	66.50211	-0.01058041	-0.99561160
a	3.15112152	Node	24.65560	+0.81668392	-0.06225920
e	0.12697283	Incl.	12.87885	+0.57698823	+0.06986642

From 77 observations at 27 oppositions 1914-1980, mean residual 3".0.

(259) Aletheia

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	47.33429		(1950.0)	P	Q
n	0.17677219	Peri.	159.16939	-0.39234257	+0.90799308
a	3.14432006	Node	87.34225	-0.86804576	-0.29567365
e	0.11308113	Incl.	10.73788	-0.30424308	-0.31803915

From 59 observations at 20 oppositions 1904-1980, mean residual 2".6.

(409) Aspasia

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	89.39455		(1950.0)	P	Q
n	0.23822753	Peri.	354.05230	-0.55534111	+0.81358717
a	2.57716014	Node	242.09240	-0.75469997	-0.58004906
e	0.06863630	Incl.	11.24035	-0.34932004	-0.04023676

From 117 observations at 28 oppositions 1902-1976, mean residual 2".5.

(488) Kreusa

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	106.03821		(1950.0)	P	Q
n	0.17680004	Peri.	70.44607	-0.88765977	-0.41544260
a	3.14398978	Node	84.58388	+0.31082946	-0.85884026
e	0.18021478	Incl.	11.51096	+0.33977222	-0.29966789

From 98 observations at 26 oppositions 1901-1980, mean residual 4".0.

(536) Merapi

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	171.97877		(1950.0)		P		Q
n	0.15052775	Peri.	300.53513		+0.95797232		+0.02736847
a	3.49992172	Node	59.31708		+0.13429931		+0.83681867
e	0.09500316	Incl.	19.39237		-0.25348120		+0.54679564

From 71 observations at 21 oppositions 1913-1980, mean residual 2".3.

(617) Patroclus

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	145.05651		(1950.0)		P		Q
n	0.08234108	Peri.	306.36345		+0.94445755		+0.20169471
a	5.23268969	Node	43.74759		+0.00165644		+0.78657834
e	0.13917502	Incl.	22.03802		-0.32862925		+0.58362124

From 54 observations at 25 oppositions 1906-1980, mean residual 3".2.

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ORBITAL ELEMENTS BY L. D. SCHMADEL, ASTRONOMISCHES RECHEN-INSTITUT.

(843) Nicolaia

The 1981 observations were made as the result of a prediction by L. D. Schmadel. The identification (843) = 1971 SY (MPC 3573) is invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	325.60941		(1950.0)		P		Q
n	0.28645017	Peri.	316.31436		+0.76732983		+0.64118501
a	2.2791347	Node	3.84052		-0.54346728		+0.65795815
e	0.2087545	Incl.	7.99170		-0.34036487		+0.39493400
P	3.44	B(1,0)	15.0				

Residuals in seconds of arc

160920	024	(18.7-)	0.2-	161018	029	0.8+	0.5+	161214	029	0.0	0.3-
160930	029	1.5+	0.7+	161022	029	1.5+	0.3+	810528	809	0.3-	0.0
160930	029	0.9-	1.3+	161022	029	0.2+	0.8-	810528	809	0.1-	0.4-
161002	029	0.9-	0.8+	161027	029	0.3-	0.4-	810603	809	0.1+	0.2-
161002	029	0.5+	0.2+	161031	029	0.9-	0.9-	810604	809	0.1+	0.0
161016	029	1.2+	0.7-	161129	029	2.4+	2.5+	810609	809	0.2+	0.5+
161016	029	2.1-	2.1-	161129	029	1.9-	0.3-				

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ORBITAL ELEMENTS BY L. K. KRISTENSEN, INSTITUTE OF PHYSICS, AARHUS.

(2414)* 1931 UG = 1971 QX = 1971 SE = 1977 RP4

Discovered 1931 Oct. 18 by K. Reinmuth at Heidelberg.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	204.15389		(1950.0)		P		Q
n	0.17163709	Peri.	51.38102		+0.66338499		-0.74811933
a	3.2067267	Node	356.92482		+0.56547712		+0.51471386
e	0.1174294	Incl.	16.70651		+0.49005713		+0.41879244
P	5.74	B(1,0)	12.1				

Residuals in seconds of arc

311018	024	9.9+	2.7+	311113	024	2.6-	0.5-	710921	808	1.0+	1.5+
311020	024	9.9+	3.2-	320129	024	5.0+	1.4+	710921	808	0.2+	1.0+
310022	024	(14.2-	2.9-)	330126	024	0.6+	1.1+	770909	095	1.3+	1.1+
311108	024	2.1-	0.5-	710819	095	2.1+	1.1+				

ORBITAL ELEMENTS BY S. NAKANO, SUMOTO, AND T. URATA, SHIMIZU, JAPAN.

The following orbital elements are from NOC 1208 and 1211-1214. The identifications are by T. Urata unless otherwise stated.

(2415)* 1978 UJ = 1961 XO = 1965 WB = 1974 VG1 = 1976 GF = 1980 DJ
= 1981 JV

Discovered 1978 Oct. 28 by H. L. Giclas at the Anderson Mesa station of the Lowell Observatory. The 1958 observations were identified at the Indiana University on the basis of a prediction by T. Urata.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	317.66200		(1950.0)		P		Q
n	0.22728417	Peri.	205.89005		+0.42770238		+0.90296943
a	2.6592342	Node	89.45556		-0.82192412		+0.40757304
e	0.0357445	Incl.	2.37485		-0.37618002		+0.13612649
P	4.34	B(1,0)	13.1				

Residuals in seconds of arc (or two decimals in units of degrees)

580119	760	1.1+	1.5+	780928	095	0.8+	1.3+	800219	046	1.0-	2.0-	
580119	760	0.4+	0.6+	781004	095	0.6+	2.7+	800220	046	0.9+	1.2-	
611207	760(0.03+	0.01-)X		781028	688	0.4-	0.1+	Y	800220	046	1.1+	1.2-
651120	760(0.03+	0.01+)X		800214	046	0.1+	0.2+		800221	046	0.2+	2.2-
741112	095	1.4-	0.4+	800214	046	0.6-	1.1-		800222	046	0.3-	1.1-
741117	095	3.8-	0.7+	800215	046	2.7-	1.0+		810505	688(16.8+	7.4-)	
760401	095	1.3+	5.4+	800215	046	2.5+	0.4-		810505	688(17.8+	8.5-)	
760404	095	0.3+	5.9+	800219	046	1.0+	2.8-					

(2416)* 1979 OF13 = A916 PA = 1930 DA = 1931 KG = 1969 VH = 1974 RR1
= 1975 VQ5 = 1977 DZ1

Discovered 1979 July 31 by N. S. Chernykh at the Crimean Astrophysical Observatory. The identifications 1979 OF13 = A916 PA = 1930 DA = 1931 KG are by S. Nakano.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	206.06308		(1950.0)		P		Q
n	0.18861027	Peri.	102.75541		-0.31256179		+0.94511361
a	3.0113356	Node	148.51525		-0.92681308		-0.28146679
e	0.0482622	Incl.	10.50401		-0.20814091		-0.16594191
P	5.23	B(1,0)	12.2				

Residuals in seconds of arc (or two decimals in units of degrees)

160801	029(0.03+	0.00+)X		691105	095	1.4-	0.3-	770219	381	0.7-	1.0+
300221	024	1.3-	2.0-	740914	095	2.4+	1.2+	770219	381	0.6-	0.8+
300302	024	2.7+	3.1-	751103	095	3.6-	1.9-	790731	095	0.4-	1.5-
300321	024	2.8-	1.5-	751112	095	3.5+	0.8+	790819	095	0.9-	0.7-
310521	690(0.03+	0.02+)X		770218	381	1.3+	0.6+	790827	095	0.4-	2.0-
310523	690(33.2+	43.4-)X		770218	381	0.6+	0.1-	790924	095	1.4+	1.0-

1970 AF1 = 1970 AK1 = 1970 CB = 1957 HU = 1967 GH = 1978 PF4

The triple designation 1970 AF1 = 1970 AK1 = 1970 CB is by C. M. Bardwell (MPC 4637). The identification 1970 AF1 = 1972 VE1 is invalid (NOC 1035).

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	87.71070		(1950.0)		P		Q
n	0.29241424	Peri.	316.48338		-0.97136515		+0.21559957
a	2.2480428	Node	236.22348		-0.17143961		-0.92694411
e	0.0947673	Incl.	6.89816		-0.16449381		-0.30706911
P	3.37	B(1,0)	13.0				

Residuals in seconds of arc

570430	076(22.8-	72.3-)X		700109	805	0.1+	0.3+	700207	805	0.3+	0.5+
670406	805	0.1+	0.2+	700207	805	0.3-	1.1-	780809	095	0.1-	0.3+
700108	805	0.7-	0.7+	700207	805	0.6+	0.2-				

1975 WO1 = 1972 JU

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	15.38038		(1950.0)		P		Q
n	0.17634003	Peri.	342.14208		+0.55072079		-0.80643694
a	3.1494616	Node	73.92551		+0.79051727		+0.42111265
e	0.2427372	Incl.	12.94932		+0.26793479		+0.41511876
P	5.59	B(1,0)	12.0				

Residuals in seconds of arc

720512	095	2.0-	4.5-	751223	330	1.0+	0.6+	801126	372	2.2+	0.4-
751126	330	1.1-	2.9-	760101	330	0.7+	1.2+	801129	879	0.6+	0.8-
751129	330	0.9-	1.0-	780506	095	0.4-	0.4+	801129	879	1.2-	1.6-
751202	330	0.5+	0.8+	801126	372	0.3+	0.4-				

1981 JA = 1975 EZ2 = 1975 EQ3

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	19.02140		(1950.0)		P		Q
n	0.17713081	Peri.	75.03488		-0.80253699		+0.59636958
a	3.1400809	Node	141.57133		-0.55713486		-0.73916314
e	0.1238335	Incl.	1.53636		-0.21338961		-0.31301945
P	5.56	B(1,0)	13.5				

Residuals in seconds of arc

750308	095	0.8-	0.8-	810504	879	0.5+	1.3-	810601	372	0.5+	0.3+
750314	095	0.9+	1.0+	810504	879	0.2-	0.9-	810601	372	0.2-	0.9+
810430	372	0.3-	0.7-	810507	372	1.0+	1.6-			Y	
810430	372	0.6-	1.3+	810507	372	0.8-	1.8+			Y	

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ORBITAL ELEMENTS BY G. SITARSKI, POLISH ACADEMY OF SCIENCES.

Periodic Comet Grigg-Skjellerup

Epoch 1982 May 31.0 ET = JDE 2445120.5

T 1982 May 14.99466 ET

q	0.9892448		(1950.0)		P		Q
n	0.19363792	Peri.	359.32823		-0.84798649		+0.49306043
a	2.9589829	Node	212.63242		-0.48456035		-0.86985207
e	0.6656808	Incl.	21.13661		-0.21475607		+0.01577253

From 76 observations 1947-1977 (with variable secular deceleration), mean residual 2".6.

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ORBITAL ELEMENTS BY B. G. MARSDEN, SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

The identifications are by B. G. Marsden unless otherwise stated.

Comet Bowell (1980b)

Epoch 1982 Mar. 12.0 ET = JDE 2445040.5

T 1982 Mar. 12.34480 ET

q	3.3643030		(1950.0)		P		Q
z	-0.0169617	Peri.	134.86812		-0.35905735		+0.93293835
+/-0.0000307		Node	114.07279		-0.86424364		-0.32161828
e	1.0570643	Incl.	1.66511		-0.35236450		-0.16182621

From 62 observations 1980 Feb.11-1981 June 6, mean residual 1".3.

Comet Panther (1980u)

Epoch 1981 Feb. 5.0 ET = JDE 2444640.5

T 1981 Jan. 27.31385 ET

q	1.6571545	(1950.0)	P	Q	
z	+0.0008894	Peri.	105.59941	-0.17663076	-0.86140337
	+/-0.0000582	Node	331.30304	-0.16230558	+0.50269424
e	0.9985261	Incl.	82.63964	+0.97080300	-0.07268236

From 99 observations 1980 Oct. 9-1981 Apr. 25, mean residual 1".1.

Periodic Comet Bus (1981b)

T 1981 June 11.35645 ET

q	2.1825723	(1950.0)	P	Q	
n	0.15112559	Peri.	24.64460	-0.89748216	+0.44104912
a	3.4906853	Node	181.52781	-0.41173349	-0.83879705
e	0.3747439	Incl.	2.57825	-0.15811799	-0.31921023
P	6.52				

From 18 observations 1981 Feb. 9-June 6.

Comet Bus (1981d)

T 1981 July 30.67615 ET

q	2.4585995	(1950.0)	P	Q	
		Peri.	189.80587	-0.96751343	-0.21541877
		Node	23.55306	-0.20365932	+0.97423336
e	1.0	Incl.	160.66021	-0.14980200	+0.06681390

From 19 observations 1981 Apr. 26-May 27.

(2417)* 1964 CD = 1958 DN = 1976 GT1 = 1981 AK

Discovered 1964 Feb. 15 at the Goethe Link Observatory, Indiana University. The identifications 1964 CD = 1976 GT1 = 1981 AK are by T. Urata. The identification 1976 GT1 = 1981 AK was independently found by B. G. Marsden.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	38.96772	(1950.0)	P	Q	
n	0.17162745	Peri.	19.63254	-0.24292835	-0.96855357
a	3.2068468	Node	84.45573	+0.88257854	-0.24368126
e	0.2019592	Incl.	3.09603	+0.40254308	-0.05023379
P	5.74	B(1,0)	13.0		

Residuals in seconds of arc

580223	760	2.6+	1.3+	640307	760	2.3-	0.8-	810108	381	1.9-	1.3+
580223	760	1.8+	0.4+	760401	095	1.3-	2.3+	810108	381	1.1-	1.5+
640215	760	2.6-	0.0	760404	095	1.2+	0.2-	810130	688	0.9+	1.0+
640215	760	1.0-	0.6-	760502	095	0.9+	0.3-	810130	688	1.5+	1.7+
640306	760	1.4+	1.7-	810103	688	0.5-	0.2+				
640306	760	3.4+	0.5-	810103	688	0.0	0.6+				

(2418)* 1971 UV = 1973 DJ = 1976 SR6 = 1979 KV

Discovered 1971 Oct. 26 by L. Kohoutek at Bergedorf. The key identification 1971 UV = 1979 KV was found independently by O. Kippes.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	260.01674	(1950.0)	P	Q	
n	0.17969635	Peri.	32.07396	+0.44791192	-0.89399637
a	3.1101157	Node	31.32100	+0.81528124	+0.40286365
e	0.1753993	Incl.	1.32914	+0.36700328	+0.19614118
P	5.48	B(1,0)	13.5		

Residuals in seconds of arc

711026	029	0.3+	0.4-	711119	029	1.4+	0.2+	790521	809	0.2-	0.3-
711027	029	1.2-	0.3-	730227	029	0.7+	0.8+	790523	809	0.6-	0.8-
711030	029	0.0	1.2+	730227	029	0.5-	0.7+	790523	809	0.1-	0.2-
711110	029	0.9-	0.1-	760925	095	0.3-	0.1-	790524	809	0.5-	0.5-
711110	029	0.9+	0.5-	790519	809	0.4-	0.4-				

(2419)* 1974 SJ = 1952 HS2 = 1955 EM = 1976 GJ

Discovered 1974 Sept. 19 by N. S. Chernykh at the Crimean Astrophysical Observatory. The key identification 1974 SJ = 1976 GJ is by T. Urata (NOC 1140). The 1967 observation was identified by N. S. Chernykh on the basis of a prediction by B. G. Marsden (see MPC 5840). The identification 1974 SJ = 1955 EM was independently found by P. Herget.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M 282.78226		(1950.0)		P	Q
n 0.28327821	Peri.	260.03361	+0.37799961	-0.92550031	
a 2.2961166	Node	167.67555	+0.88703961	+0.35469743	
e 0.0921209	Incl.	6.39641	+0.26509813	+0.13281154	
P 3.48	B(1,0)	14.5			

Residuals in seconds of arc

520426	711	0.1+	0.4+	Y	740921	808	0.2-	0.2+	741019	808	0.5+	1.8+
550314	760	0.9+	0.2+		740921	808	1.8+	2.5+	741019	808	0.1+	1.7+
550314	760	1.2-	0.3-		740921	095	0.3-	6.3-	760401	095	0.5+	1.2+
670911	095	0.9-	1.4+		741010	808	0.3-	0.7+	760404	095	0.5-	0.9+
740919	095	2.3-	1.4-		741010	808	0.4+	0.8+				

(2420)* 1975 TN = 1979 QF

Discovered 1975 Oct. 3 by N. S. Chernykh at the Crimean Astrophysical Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M 122.32071		(1950.0)		P	Q
n 0.24034403	Peri.	196.62688	+0.74863662	-0.65414999	
a 2.5620080	Node	205.24235	+0.63340084	+0.75375613	
e 0.1314905	Incl.	14.64896	+0.19582282	+0.06276524	
P 4.10	B(1,0)	14.0			

Residuals in seconds of arc

751003	095	0.4-	2.5+		790917	046	(1.1-	3.9-)	791015	046	0.4+	1.1-	Y
751101	095	1.1-	0.3+		790917	552	2.1-	1.3+	791015	046	0.4+	0.0	
751106	095	0.3-	3.1-		790917	552	2.4-	1.5+	791018	552	2.1-	1.8+	
751108	095	1.7+	0.5+		790918	552	(5.4-	1.2-)	791018	552	1.5-	0.5+	
790829	552	0.6+	0.8+		790918	552	0.5+	0.8+	791019	046	0.8-	0.2-	
790829	552	0.8+	1.1+		790919	046	1.8-	1.7-	791019	046	0.7-	0.6-	
790829	046	0.2-	0.8-		790919	046	0.3+	0.9-	791020	046	0.7-	1.1-	
790829	046	0.9+	0.0		790926	046	1.4+	1.1-	791020	046	0.1-	0.1-	
790912	046	3.0+	0.0		790926	046	0.6+	1.1-	791022	688	(1.2-	5.0-)	Y
790912	046	0.2+	0.8-		790926	552	0.0	0.1+	810202	474	0.1-	0.7+	
790916	046	0.0	0.7-		790926	552	(9.1-	1.2-)	810202	474	2.5-	0.3+	
790916	046	2.0+	0.7+		790927	552	0.1-	1.3+	810402	474	2.2+	1.2+	
790916	552	1.2+	1.5+		790927	552	1.1-	0.4+	810402	474	1.1+	0.9-	
790916	552	(3.3+	0.6+)		791015	688	0.6+	1.0-					

(2421)* 1979 UD = 1962 XJ1 = 1971 HH

Discovered 1979 Oct. 17 by E. Bowell at the Anderson Mesa station of the Lowell Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	164.78149		(1950.0)		P		Q
n	0.16977229	Peri.	262.87001	+0.92740890		+0.33216324	
a	3.2301660	Node	77.61476	-0.23390579		+0.87381043	
e	0.0633662	Incl.	10.14194	-0.29189177		+0.35513787	
P	5.81	B(1,0)	12.0				

Residuals in seconds of arc

621203	760	1.3-	2.0+	801204	688	1.4+	1.5-	810130	046	0.7-	0.4-
621203	760	0.5+	0.7+	801212	688	0.6+	0.5-	810130	046	0.9-	0.3+
710420	095	0.2+	0.6+	801212	688	1.8+	1.6-	810131	046	0.2-	1.0+
791017	688	0.0	1.3-	801230	688	0.9+	0.3+	810131	046	2.7-	0.8+
791028	688	0.8+	0.1+	801230	688	0.9+	1.3-	810325	688	0.4+	1.8-
791122	688	1.3-	1.1+	810109	688	0.3-	0.0	810325	688	0.6-	0.3+
791207	688	1.1+	1.5-	810129	046	1.4-	0.2+				
801204	688	2.0+	1.0-	810129	046	1.1-	0.1-				

1938 DW1 = 1970 WM1 = 1975 FG = 1979 MW

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	279.13667		(1950.0)		P		Q
n	0.29256775	Peri.	287.62524	-0.91494169		+0.39494749	
a	2.2472563	Node	275.70304	-0.33134927		-0.85258953	
e	0.0845142	Incl.	4.78796	-0.23041129		-0.34220982	
P	3.37	B(1,0)	14.5				

Residuals in seconds of arc

380224	024	1.4+	0.9-	380319	024	0.5+	1.5+	790622	805	0.1-	3.3+
380225	024	1.1+	0.5+	701123	033	0.8-	1.3-	790622	805	2.0+	1.1+
380305	024	0.8-	0.6+	750317	095	1.5+	4.1-	790625	805	0.3-	2.1+

1965 UB1 = 1978 SG5

The identification is by O. Kippes.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	301.96546		(1950.0)		P		Q
n	0.30368158	Peri.	15.52587	+0.89098605		-0.45335640	
a	2.1920878	Node	11.52857	+0.40225289		+0.76293988	
e	0.2136613	Incl.	7.10948	+0.21056228		+0.46085867	
P	3.25	B(1,0)	15.5				

Residuals in seconds of arc

651016	330	0.3+	2.6-	651024	330	0.2+	1.7+	781003	095	0.4-	0.6+
651020	330	0.5+	0.9-	780927	095	0.4+	0.2-	781007	095	0.7-	2.1+

1975 BX = 1980 UK

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	226.88461		(1950.0)		P		Q
n	0.26656392	Peri.	71.49904	-0.88275970		+0.33514597	
a	2.3911272	Node	126.72271	-0.39595606		-0.90792956	
e	0.2201871	Incl.	24.25419	+0.25289149		-0.25167656	
P	3.70	B(1,0)	14.5				

Residuals in seconds of arc

750116	330	0.1-	3.3-	750122	330	0.3-	0.4+	801030	809	0.4-	0.4+
750118	095	(5.8-	20.4-)	750211	330	0.2-	0.6-	801101	809	0.4+	0.4-
750118	330	0.5+	3.3+	750307	330	0.1+	0.2+	801102	809	0.0	0.0

1976 GZ2 = 1981 AS

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	17.51324		(1950.0)		P		Q
n	0.17706108	Peri.	52.32801	-0.90083668		-0.43201465	
a	3.1409053	Node	102.03963	+0.38315056		-0.83775003	
e	0.1298079	Incl.	2.52514	+0.20417868		-0.33397340	
P	5.57	B(1,0)	13.0				

Residuals in seconds of arc

760401	095	5.4+	2.3+	760404	095	4.8-	2.3-	810110	688	0.1-	0.7-
760402	095	2.4-	2.0-	760502	095	2.0+	1.8+	810114	688	0.7+	0.7-
760404	095	(9.6+	1.6+)	810110	688	2.1-	1.4+	810114	688	1.7+	0.4+

1977 EB2 = 1981 JL

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	1.97371		(1950.0)	P	Q
n	0.25731215	Peri.	197.93964	-0.43626028	+0.89924946
a	2.4481051	Node	46.20880	-0.81999156	-0.38263641
e	0.1392240	Incl.	2.54491	-0.37052773	-0.21199005
P	3.83	B(1,0)	15.0		

Residuals in seconds of arc

770313	095	2.8-	1.1-	810505	704	1.1+	1.0+	810506	704	2.0+	0.3+
770322	095	0.8+	0.6+	810505	704	2.1-	2.5-	810507	704	2.2-	1.9+
770325	095	1.8+	0.6+	810506	704	1.4-	0.6+	810507	704	2.8-	2.1+
810503	688	1.6+	0.0	810506	704	1.2+	0.8-	810602	688	0.3+	0.4-
810503	688	2.0+	0.1-	810506	704	0.7+	2.2-	810602	688	0.6-	0.2+

1977 TB1 = 1948 RG1 = 1948 TC = 1976 JP9

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	15.24386		(1950.0)	P	Q
n	0.27247245	Peri.	34.96941	+0.94621721	-0.32338078
a	2.3564335	Node	343.88934	+0.28809795	+0.85610451
e	0.2356331	Incl.	2.04306	+0.14721604	+0.40312520
P	3.62	B(1,0)	16.0		

Residuals in seconds of arc

480910	094(39.2-	6.8+)	X	771010	095	1.1-	5.9+	771103	026	1.5-	0.4+
481008	062	0.3-	0.7+	771012	026	2.2+	1.7-	771103	026	0.6-	2.1+
481008	062	0.2+	0.4-	771013	026	4.7+	2.0-	771109	026	0.8-	1.2-
760502	809	0.2+	0.6+	771018	026	1.7-	1.1-	771110	026	0.2-	1.5-
770911	095	0.2-	0.7-	771019	026	1.5-	0.7-	771216	801	0.7+	0.7+

1979 DE = 1969 BD = 1971 QC

The identification 1979 DE = 1971 QC is by E. Bowell.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	197.75127		(1950.0)	P	Q
n	0.20026202	Peri.	358.36383	-0.65779298	-0.70899554
a	2.8933736	Node	132.66951	+0.69488110	-0.70147583
e	0.1660222	Incl.	20.22843	+0.29060050	+0.07250508
P	4.92	B(1,0)	12.0		

Residuals in seconds of arc

690120	095	0.0	3.7-	790323	688	0.4+	0.6-	790502	801	0.9-	0.3-
710816	095	0.0	3.0-	790401	688	1.0+	1.2-	790523	801	0.6-	0.2+
790228	688	1.5+	2.3+	790501	801	0.8-	1.0+	790615	801	0.4+	0.7-
790304	688	1.6-	1.4+	790502	688	0.5+	1.9-				

1979 TH = 1969 TK6 = 1981 AD4 = 1981 CD

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	227.72873		(1950.0)	P	Q
n	0.29140571	Peri.	208.79316	+0.65894665	+0.74682212
a	2.2532266	Node	102.57815	-0.67127791	+0.63767266
e	0.1966137	Incl.	5.27324	-0.33937484	+0.18875990
P	3.38	B(1,0)	13.5		

Residuals in seconds of arc

691015	095	0.9+	2.0-	791026	330	1.0+	1.0+	810202	046	0.7-	0.3+
791010	330	0.2-	1.2-	810101	688	2.3-	1.0+	810209	046	0.3+	0.6+
791015	330	1.5-	2.1+	810101	688	0.9+	0.2+	810209	046	3.7+	2.0-
791019	330	0.4-	0.1+	810202	046	1.7-	1.5+				

1980 EC = 1976 HL

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	72.47636		(1950.0)		P		Q
n	0.22938712	Peri.	52.56075		-0.84962682		+0.51971749
a	2.6429618	Node	158.30423		-0.52704867		-0.83068150
e	0.1112145	Incl.	14.02650		-0.01881416		-0.19965466
P	4.30	B(1,0)	13.5				

Residuals in seconds of arc

760423	095	0.1+	3.7+	800314	688	0.2-	0.1+	800414	688	3.1-	2.4-
800313	688	0.2-	0.3+	800316	688	1.0-	0.2-	810606	688	1.1+	1.4-
800313	688	0.6-	1.2+	800316	688	0.7-	0.5+	810606	688	0.2-	1.8-
800314	688	1.1+	0.2-	800321	688	0.2+	0.3-				

1980 PG = 1980 SA = 1941 DC = 1941 DO = 1941 FE = 1978 GP

The double designation 1980 PG = 1980 SA is by E. Bowell (MPC 5638).

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	358.69169		(1950.0)		P		Q
n	0.21419989	Peri.	95.15190		+0.48563889		-0.85879559
a	2.7664580	Node	324.26407		+0.64956234		+0.47943774
e	0.1064113	Incl.	16.22318		+0.58499883		+0.18058127
P	4.60	B(1,0)	13.0				

Residuals in seconds of arc

410220	024	2.8-	1.1-	800717	688	0.4-	0.1-	800917	688	1.6+	0.2-
410226	024	3.7+	3.5+	800806	688	2.6-	0.4+	801002	688	0.6+	0.7+
410318	024	2.5+	2.2+	800806	688	2.1-	3.3+	801004	688	0.2+	1.2+
780407	095	0.8-	1.2-	800907	688	1.0+	1.4-				
800717	688	1.3-	0.0	800917	688	0.1+	0.4-				

1980 RB = 1969 TH3

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	85.25760		(1950.0)		P		Q
n	0.26598259	Peri.	223.97839		+0.87820161		+0.47125504
a	2.3946099	Node	107.74144		-0.41167289		+0.83176142
e	0.3057852	Incl.	4.92297		-0.24348995		+0.29341374
P	3.71	B(1,0)	15.0				

Residuals in seconds of arc

691009	095	0.2-	0.5+	800904	688	1.0-	0.9-	801002	688	0.3-	0.4-
800717	688	0.4-	0.4-	800904	688	0.1+	0.5-				
800806	688	0.4-	1.6+	800907	688	2.2+	1.2+				

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ORBITAL ELEMENTS BY C. M. BARDWELL, SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

The identifications are by C. M. Bardwell unless otherwise stated.

(2422)* 1968 HK1 = 1943 GU = 1975 GB

Discovered 1968 Apr. 28 by T. Smirnova at the Crimean Astrophysical Observatory. The key identification 1968 HK1 = 1975 GB is by E. Bowell (MPC 4780). The identification 1968 HK1 = 1943 GU is by O. Kippes.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	264.61180		(1950.0)		P		Q
n	0.27732264	Peri.	51.35803		-0.85517366		+0.51688743
a	2.3288732	Node	159.67486		-0.50347467		-0.81051675
e	0.1972213	Incl.	6.41344		-0.12325283		-0.27548135
P	3.55	B(1,0)	15.0				

Residuals in seconds of arc

430327	062	0.4-	0.4-	680526	095	2.5-	0.6-	790723	801	2.0+	0.3-
430327	062	0.4+	1.7+	750406	414	0.1-	0.4-	790724	675	1.1-	0.9+
430403	062	1.3+	2.5+	750406	414	0.9+	1.2-	790724	413	0.2-	1.2-
430403	062	1.5-	1.6+	750407	414	0.1-	0.2+	790725	675	1.4-	0.7+
430407	062	3.1+	1.3-	750407	414	1.0-	0.1+	790726	801	0.9+	0.3+
680427	095	1.0-	0.3-	750407	414	0.3-	0.7-	790726	675	0.4+	0.4+
680428	095	2.8+	0.8-	750407	414	1.2-	1.1-	790728	413	1.4-	2.1-

(2423)* 1972 NC = 1972 PB = 1956 VC

Discovered 1972 July 14 by L. Zhuravleva at the Crimean Astrophysical Observatory. The double designation 1972 NC = 1972 PB was found by T. Urata (NOC 977).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	257.63009		(1950.0)	P	Q
n	0.30429686	Peri.	79.77004	+0.96153614	+0.26548825
a	2.1891275	Node	264.80765	-0.27147225	+0.87943951
e	0.2824385	Incl.	4.05693	-0.04184568	+0.39509762
P	3.24	B(1,0)	15.0		

Residuals in seconds of arc

561103	760	0.2+	0.9+	720816	095	1.6+	1.1-	810404	474	(0.3-	6.8+)
561103	760	0.1+	0.4+	720818	095	1.3-	1.0-	810405	474	0.8-	1.0+
561108	760	0.3-	1.3-	721101	095	2.8-	2.4-	810405	474	1.4-	1.4+
561108	012	0.1+	0.2+	791212	801	0.5+	0.4+	810408	801	0.6+	2.4-
720714	095	0.8+	0.8+	791215	801	1.0+	0.3+				
720803	095	0.6+	2.9+	810404	474	(0.1-	6.9+)				

(2424)* 1973 UT5 = A924 AA = 1930 XU = 1964 GA = 1976 QA2 = 1976 SF10 = 1980 TW1

Discovered 1973 Oct. 27 at Tautenburg. The suggested double designations A924 AA = A924 CA or A924 CB (BZ 6, 9) are invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	332.76794		(1950.0)	P	Q
n	0.27371471	Peri.	92.15792	-0.52494489	-0.84762361
a	2.3492936	Node	29.91242	+0.70625160	-0.48444005
e	0.1348978	Incl.	8.91124	+0.47501741	-0.21645337
P	3.60	B(1,0)	14.0		

Residuals in seconds of arc (or two decimals in units of degrees)

240107	024	0.6+	2.1+	731028	033	0.0	0.8+	760820	808	1.3-	0.7-
301213	690	2.6+	2.4-	731031	033	1.0-	1.0+	760823	808	0.7+	1.1-
301214	690	0.6-	2.5-	731101	033	2.5-	1.2+	760823	808	0.2-	1.0-
301216	690	0.7+	2.7-	731102	033	0.1-	0.7+	760916	808	1.4+	0.2+
640411	760(0.04-	0.00+)	X	731103	033	0.1-	0.7+	760916	808	0.0	1.3+
731027	033	0.3-	1.2+	760820	808	0.4+	2.5-	801005	809	0.5+	0.5+

(2425)* 1975 FW = 1950 LU = 1955 HF = 1962 WV = 1965 GB = 1969 AL

Discovered 1975 Mar. 17 at the Purple Mountain Observatory. The key identification 1975 FW = 1955 HF is by E. Bowell (MPC 5649). All of the identifications were independently found by T. Urata (NOC 1154).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	311.87405		(1950.0)	P	Q
n	0.18946595	Peri.	243.03422	+0.41804212	+0.89598593
a	3.0022621	Node	52.48223	-0.75199546	+0.43384900
e	0.0895464	Incl.	10.88892	-0.50965048	+0.09478531
P	5.20	B(1,0)	13.0		

Residuals in seconds of arc

500615	760	2.8+	1.1+	650401	760	0.5+	1.6+	810503	688	0.7-	1.5-
550427	760	1.3-	2.7+	690115	095	4.1+	1.5+	810503	688	0.1-	1.5-
550427	760	0.7+	0.0	750317	330	0.8-	2.7-	810504	879	0.6-	0.6+
550518	760	0.4-	1.7+	750401	330	1.0-	1.5+	810504	879	0.7-	0.0
550518	760	0.2+	1.6+	750403	330	4.6-	1.2-	810508	688	0.4-	0.6-
621126	760	1.2-	0.1-	750411	330	0.3+	0.4+	810508	688	1.4-	0.8-
621126	760	0.9-	0.1-	810430	372	1.8-	2.3-	810604	688	1.3+	0.9+
650401	760	4.7+	1.4+	810430	372	0.1-	0.8-	810604	688	1.3+	0.6-

(2426)* 1976 KV = 1953 XQ = 1958 VA1 = 1962 QE = 1968 UK3 = 1970 CA
= 1971 KK

Discovered 1976 May 26 by N. S. Chernykh at the Crimean Astrophysical Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	11.89296		(1950.0)		P		Q
n	0.19859651	Peri.	1.32066		-0.52427262		+0.84252003
a	2.9095220	Node	237.07426		-0.78258895		-0.53396520
e	0.1161518	Incl.	8.47366		-0.33569740		-0.07100117
P	4.96	B(1,0)	12.5				

Residuals in seconds of arc

531202	024	0.2+	2.0-	760526	095	0.2-	0.9-	760629	808	1.2-	0.1+
581111	760	1.9-	0.9-	760529	808	0.7-	0.1+	760629	808	0.7-	0.1-
581111	760	0.1+	0.9-	760529	808	1.0-	0.8+	810504	879	0.4-	0.9+
620829	760	2.1+	0.2+	760529	095	2.9-	2.0+	810504	879	1.3+	0.2+
620829	760	0.4+	0.3-	760602	808	0.8-	0.4+	810604	688	0.4+	0.9-
681026	095	0.8-	2.4+	760602	808	0.5-	0.2+	810604	688	0.9+	1.9-
700202	805	1.7+	0.3-	760606	808	0.1-	0.3+	810609	688	0.9+	0.5+
700204	805	0.1+	1.1-	760619	808	0.0	0.4-	810609	688	0.6+	2.1-
700204	805	0.2+	1.0-	760619	808	0.0	0.4-	810625	688	1.0-	0.8-
700204	805	1.2-	1.1-	760626	808	0.2+	0.9-	810625	688	0.9+	2.6-
710524	095	3.1+	3.4+	760626	808	1.0-	1.2-				

(2427)* 1976 YQ7 = 1953 VG = 1953 XS = 1971 TP

Discovered 1976 Dec. 20 by N. S. Chernykh at the Crimean Astrophysical Observatory. The key identification 1976 YQ7 = 1971 TP was found independently by E. Bowell and T. Urata (MPC 4781).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	43.46464		(1950.0)		P		Q
n	0.21735863	Peri.	169.87041		+0.79479656		-0.60452489
a	2.7395851	Node	227.46140		+0.55157935		+0.75625329
e	0.1658894	Incl.	4.15352		+0.25309809		+0.25026108
P	4.53	B(1,0)	14.0				

Residuals in seconds of arc (or two decimals in units of degrees)

531110	094(29.8+ 22.6-)X	711021	095	1.5+	0.3+	800911	801	1.8-	0.3-		
531202	024	1.0-	0.4-	761220	095	2.7-	1.6+	810103	801	0.3+	2.0-
531209	210(0.05- 0.01-)X	770113	095	2.0+	0.5-						
711010	095	0.8+	1.5+	770120	095	1.0+	0.1-				

(2428)* 1977 RZ6 = 1937 RM = 1966 VM = 1971 SN = 1974 DM1

Discovered 1977 Sept. 11 by N. S. Chernykh at the Crimean Astrophysical Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	250.78194		(1950.0)		P		Q
n	0.17443502	Peri.	354.23467		+0.99860930		-0.04688177
a	3.1723439	Node	8.56462		+0.05248029		+0.84032504
e	0.0776412	Incl.	9.31912		+0.00502927		+0.54005178
P	5.65	B(1,0)	12.5				

Residuals in seconds of arc

370905	078(43.6+ 36.9-)X	770921	095	0.1-	0.2-	810509	808	0.5-	0.3-		
661112	095	0.4-	0.2-	771010	095	2.0+	1.7+	810509	808	1.6-	0.0
710916	808	0.1+	0.8+	810408	808	0.5+	3.7-	810529	805	5.1-	1.2+
740216	095	0.8+	0.6+	810408	808	0.3+	0.9+	810529	805	5.6+	0.0
770911	095	2.0-	1.2-	810411	808	0.8+	2.5+				
770918	095	0.2-	0.0	810411	808	(2.7+	8.3-)				

(2429)* 1977 TZ = A915 TB

Discovered 1977 Oct. 12 by P. Wild at Zimmerwald. The identification (1508) = A915 TB (Veroff. Astron. Rechen-Inst. No. 9) is invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	308.79246		(1950.0)		P		Q
n	0.23896870	Peri.	29.14068		+0.68935751		-0.72013550
a	2.5718287	Node	17.67817		+0.60424999		+0.51168944
e	0.1028976	Incl.	15.01717		+0.39958500		+0.46859233
P	4.12	B(1,0)	14.0				

Residuals in seconds of arc

151010	024(10.3+ 6.4+)	771017	095	1.6+	2.8-	780210	801	0.3-	0.7+		
151014	024	5.4-	6.9+	771019	026	0.3-	0.9+	790228	801	(3.3-	12.3+)
770919	095	0.1+	0.1+	771020	026	0.3+	1.5+	790324	801	0.7+	0.9+
770922	095	2.3+	3.7-	771101	330	2.5-	0.9-	790424	801	0.1+	0.8+
771007	095	1.3-	0.5-	771105	026	0.1+	0.5+	800710	474	0.4+	0.5+
771012	026	1.8+	0.9-	771108	330	1.3-	1.4-	800710	474	0.0	0.4-
771013	026	1.8+	0.7-	771110	026	0.0	1.2+				
771013	095	2.2+	1.1-	771111	026	0.6-	1.6+				

(2430)* 1977 VC

Discovered 1977 Nov. 8 by E. Helin and E. Shoemaker at Palomar.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	40.23980		(1950.0)		P		Q
n	0.27143821	Peri.	309.23539		+0.95022027		+0.12897607
a	2.3624107	Node	45.49908		+0.07943473		+0.77994428
e	0.2159054	Incl.	23.43236		-0.30128320		+0.61241496
P	3.63	B(1,0)	13.5				

Residuals in seconds of arc

771108	675	1.6-	1.0+	771116	690	1.0+	2.6-	780313	801	(16.4+	4.2+)
771109	675	4.5-	3.6+	771117	801	1.8+	0.4-	790228	801	0.2-	0.4-
771110	675	0.7-	0.9+	771117	675	1.5+	0.9+	790324	801	1.8-	0.0
771110	690	0.6+	3.5-	771207	675	0.9+	1.0+	790421	801	1.2+	1.1+
771110	675	0.4-	0.3+	771211	801	0.1+	0.5+	790518	801	0.5+	0.3-
771112	801	0.9+	0.9+	780112	801	(0.3+	5.6-)	800709	474	0.0	0.0
771113	690	1.1+	3.3-	780204	801	0.4+	3.2+	800709	474	0.9+	1.0+
771116	675	0.5-	0.2-	780206	801	1.8-	0.1-				

(2431)* 1978 PF3 = 1948 RZ = 1948 RL1 = 1948 TB = 1951 EK = 1974 SX4 = 1974 WL1

Discovered 1978 Aug. 8 by N. S. Chernykh at the Crimean Astrophysical Observatory. The triple designation 1948 RZ = 1948 RL1 = 1948 TB is by O. Kippes (MPC 600; NAZ 12, 22).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	257.72148		(1950.0)		P		Q
n	0.22854401	Peri.	338.29821		+0.60468014		+0.79601934
a	2.6494526	Node	328.88920		-0.72288381		+0.53440953
e	0.2787070	Incl.	2.96675		-0.33436646		+0.28418245
P	4.31	B(1,0)	13.5				

Residuals in seconds of arc (or two decimals in units of degrees)

480914	094(60.7+ 26.1-)X	740926	095	1.3+	1.8+	810228	809	1.1+	0.6-
480929	020(0.13+ 0.02+)X	741118	330	2.0-	1.3-	810228	809	1.1+	0.4-
481002	020(0.11+ 0.04+)X	780808	095	0.3+	0.2+	810301	809	1.1-	0.3+
481008	062 0.6+ 1.3+	780903	095	1.4-	1.3+	810301	809	0.7-	0.2+
481008	062 0.2- 1.1-	780926	095	0.5+	0.8-	810301	809	0.1-	0.2+
481008	062 1.5+ 0.8+	780928	095	0.0	1.0+	810408	801	1.1+	2.3+
481009	020(0.08+ 0.00+)X	781002	095	0.1+	1.0-				
510313	024 1.3- 0.6+	810228	809	0.8+	0.6-				

(2432)* 1981 FA = 1941 BR = 1952 DW = 1961 TK = 1972 TP4 = 1972 VN

Discovered 1981 Mar. 30 by E. Bowell at the Anderson Mesa Station of the Lowell Observatory. The identifications 1981 FA = 1941 BR = 1972 TP4 are by P. Herget.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M 112.81377		(1950.0)		P	Q
n 0.27325044	Peri.	80.26260		+0.03835409	-0.99914301
a 2.3519539	Node	7.59132		+0.86435298	+0.02535656
e 0.1134369	Incl.	6.76570		+0.50142086	+0.03271542
P 3.61	B(1,0)	14.0			

Residuals in seconds of arc

410130	062	1.9+	0.5+	611007	760	0.5+	1.0-	810401	688	0.9+	0.1+
410130	062	1.6+	0.6+	721005	095	1.3+	2.3-	810401	688	0.9-	0.2-
520224	711	2.9-	3.9+ Y	721108	095	1.2-	0.6-	810405	688	0.7-	1.3-
520227	760	2.6+	0.1+	721112	095	0.1+	1.1+	810405	688	0.1-	0.3-
520227	760	1.2-	2.0-	810330	688	0.2+	0.5-	810409	688	0.9-	0.9-
611007	760	0.5+	0.4-	810330	688	0.3-	1.4-	810409	688	0.4+	0.1-

(2433)* 1981 GJ = 1939 KA = 1960 KA = 1969 QF = 1974 VZ1 = 1978 SG6
= 1978 UL

Discovered 1981 Apr. 5 by E. Bowell at the Anderson Mesa Station of the Lowell Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M 346.58522		(1950.0)		P	Q
n 0.23384821	Peri.	69.05412		-0.22103299	+0.97491752
a 2.6092360	Node	188.30638		-0.94835838	-0.22109637
e 0.2166562	Incl.	10.40111		-0.22750996	-0.02553879
P 4.21	B(1,0)	13.0			

Residuals in seconds of arc (or two decimals in units of degrees)

390516	029(0.06+ 0.02-)X	741115	095	0.8-	4.3-	810410	688	0.2-	1.0+
390519	029(0.06+ 0.04+)X	780928	095	2.6-	0.6+	810503	688	0.8+	2.5-
390523	029(70.0+ 20.8-)X	781028	688	4.0+	4.4- Y	810503	688	0.0	1.0-
600523	760 0.0 1.3-	810405	688	0.0	0.2+	810602	688	1.1-	2.2-
600523	760 0.7- 2.2-	810405	688	0.1-	0.8+	810602	688	1.1-	1.1-
690821	095 0.4+ 0.5+	810410	688	0.2-	0.3+				

(2434)* 1981 KA = 1932 HC = 1955 VC = 1959 GU = 1966 VP = 1973 AK2
= 1977 TV3

Discovered 1981 May 27 by A. C. Gilmore and P. M. Kilmartin at the Mt. John University Observatory.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M 311.41154		(1950.0)		P	Q
n 0.18151281	Peri.	285.06835		+0.65808782	+0.74267525
a 3.0893317	Node	27.34918		-0.54451036	+0.58308729
e 0.1590096	Incl.	15.64737		-0.52002777	+0.32930637
P 5.43	B(1,0)	12.0			

Residuals in seconds of arc

320424	024	1.2-	1.0-	810411	808	(4.9+	2.5-)	810529	805	(5.1+	0.1+)	
551107	760	(17.2+	62.4+)	X	810411	808	1.5-	2.5+	810530	474	(6.1-	0.6+)
590416	760	(62.4-	67.8-)	X	810507	808	0.1-	0.8-	810530	474	(8.6-	0.3+)
661113	095	0.1+	2.1+	810507	808	0.3+	0.7-	810603	474	1.0+	0.3+	
730102	095	0.9-	1.7+	810509	808	0.1-	0.4-	810603	474	0.4+	0.2+	
771010	095	0.5+	1.5-	810509	808	0.5+	0.5-	810604	805	0.7+	0.9+	
771012	330	0.3-	1.2-	810527	474	0.1-	1.0+	810604	805	0.1+	0.1+	
810408	808	1.5+	1.9-	810527	474	0.7+	1.0+					
810408	808	0.4+	0.4-	810529	805	2.3-	0.4+					

(2435)* 4578 P-L = 1973 QK

Discovered 1960 Sept. 24 by C. J. van Houten and I. van Houten-Groeneveld on Palomar Schmidt plates taken by T. Gehrels. The identification is by E. Bowell (MPC 5323).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	141.41956		(1950.0)		P		Q
n	0.30145471	Peri.	183.01680		+0.96671412		+0.25498087
a	2.2028656	Node	162.16735		-0.23326251		+0.91232578
e	0.2054612	Incl.	3.96576		-0.10513047		+0.32038480
P	3.27	B(1,0)	16.0				

Residuals in seconds of arc

600924	675	1.0-	0.5+	601022	675	0.4+	1.6-	730905	095	0.2+	0.3-
600926	675	0.3-	0.9+	601025	675	0.7+	0.6-	801205	801	0.5-	1.1-
600927	675	0.8-	1.1+	601026	675	0.9+	0.9-	810111	801	0.4+	1.3+
600928	675	0.1-	0.9+	730827	095	0.8+	2.8-				
601017	675	0.7+	0.3+	730831	095	0.6-	2.5+				

(2436)* 6066 P-L = 1963 DL = 1978 YA1

Discovered 1960 Sept. 24 by C. J. van Houten and I. van Houten-Groeneveld on Palomar Schmidt plates taken by T. Gehrels. The identification 6066 P-L = 1963 DL was found independently by P. Herget.

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	91.25924		(1950.0)		P		Q
n	0.17539434	Peri.	292.73693		-0.97086187		-0.23259545
a	3.1607659	Node	233.86009		+0.23759419		-0.90289841
e	0.1216770	Incl.	4.09550		+0.03124482		-0.36148832
P	5.62	B(1,0)	13.5				

Residuals in seconds of arc

600924	675	0.5-	0.8-	601022	675	0.6+	0.6-	781222	095	0.8+	0.3+
600925	675	0.7+	0.6+	601024	675	1.1+	0.5-	781231	095	0.8-	0.2+
600926	675	0.2-	0.5+	601026	675	0.2-	0.9-	800323	809	0.6-	1.3-
600928	675	0.6+	0.3+	630227	760	0.5+	0.9-				
601017	675	1.5-	0.8-	630227	760	0.6-	0.5+				

1942 TJ = 1948 TO1 = 1981 LE

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	261.56415		(1950.0)		P		Q
n	0.17372587	Peri.	114.02574		+0.69943927		-0.70113515
a	3.1809774	Node	290.83121		+0.58994285		+0.67582421
e	0.1437202	Incl.	8.52453		+0.40342550		+0.22731284
P	5.67	B(1,0)	12.0				

Residuals in seconds of arc

420908	062	0.2+	1.0+	481010	012	0.1-	0.4+	810609	688	0.2+	0.5-
420911	062	1.0-	0.5-	810604	688	1.3-	1.1-	810609	688	0.1-	0.0
421003	062	1.3+	0.3-	810604	688	1.3+	0.1-	810703	688	2.0+	0.6+
421011	062	0.3-	0.4-	810606	688	1.3-	1.4+	810703	688	0.8-	0.4-

1972 RV3 = 1965 UN1

The identification is by E. Bowell (MPC 5276).

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	180.01092		(1950.0)		P		Q
n	0.27696257	Peri.	235.56634		+0.97939236		+0.19494301
a	2.3308958	Node	113.14215		-0.16128225		+0.91226095
e	0.2037796	Incl.	3.29176		-0.12156747		+0.36024599
P	3.56	B(1,0)	15.5				

Residuals in seconds of arc

651018	330	0.7+	1.1+	720909	095	0.6-	0.6-	790819	095	1.1+	1.9+
651021	330	1.0-	0.0	721007	095	0.5-	1.4-				
720906	095	1.6+	0.2-	790731	095	1.8-	0.7-				

1973 SJ4 = 1978 UX1

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	217.05328		(1950.0)		P		Q
n	0.20478167	Peri.	148.35580		+0.93401691		-0.35169274
a	2.8506432	Node	232.36446		+0.30900191		+0.88339753
e	0.2554650	Incl.	4.53732		+0.17924905		+0.30971119
P	4.81	B(1,0)	13.5				

Residuals in seconds of arc

730926	095	0.8+	0.2-	781030	330	0.1+	0.5-	781127	330	1.0-	1.9-
731002	095	0.0	1.1+	781103	330	1.5+	1.5-	781130	330	1.4-	0.8+
731026	095	1.8-	1.9+	781107	330	1.1+	0.7+	800222	801	0.7+	1.8+

1975 EE3 = 1934 VY = 1954 JD = 1976 SA2

The key identification 1975 EE3 = 1976 SA2 is by E. Bowell (MPC 4644).

Epoch 1981 July 15.0 ET = JDE 2444800.5

M	206.35651		(1950.0)		P		Q
n	0.37506747	Peri.	283.71227		-0.27004481		-0.96273967
a	1.9042755	Node	182.12375		+0.96283302		-0.26992747
e	0.1380533	Incl.	22.91109		+0.00532637		-0.01647685
P	2.63	B(1,0)	14.0				

Residuals in seconds of arc

341103	078	0.7-	3.6-	750317	095	0.6+	2.8+	791213	808	0.5-	0.8+
540506	760(12.0+	66.4+)X		760924	095	2.0+	1.4-	791213	808	0.1-	0.9+
750312	095	0.9-	5.1-	760928	095	4.2+	4.8+				
750315	095	0.1+	0.4-	760928	095	5.9-	3.4-				

1975 VD2 = 1958 RA = 1958 RK = 1964 TL = 1964 VT = 1977 BG

The double designations 1958 RA = 1958 RK (MPC 1968) and 1964 TL = 1964 VT (MPC 2808) are by O. Kippes.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	57.63553		(1950.0)		P		Q
n	0.17690447	Peri.	229.80097		+0.68454858		+0.72775409
a	3.1427587	Node	83.45259		-0.65526430		+0.63958095
e	0.1719925	Incl.	2.42516		-0.31940874		+0.24760895
P	5.57	B(1,0)	12.0				

Residuals in seconds of arc (or two decimals in units of degrees)

580912	024	0.1-	0.3-	751102	095	0.0	1.2+	751128	381	0.7+	0.7-
580914	760(23.0+	20.2-)X		751107	095	0.3-	1.1+	751128	381	0.6+	0.9-
641004	760(0.05-	0.00+)X		751109	381	1.5-	0.1-	770120	095	0.1+	0.2-
641106	760(45.8-	62.7-)X		751109	381	1.2+	0.1-				

1975 VF2 = 1977 DV4

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	4.26808		(1950.0)		P		Q
n	0.21639502	Peri.	60.06967	-0.59812838			-0.79883839
a	2.7477175	Node	66.80477	+0.70912553			-0.56478716
e	0.1895856	Incl.	3.99442	+0.37334089			-0.20705719
P	4.55	B(1,0)	13.5				

Residuals in seconds of arc

751102	095	0.3+	1.5+	751126	381	0.9-	0.3+	770218	381	0.1+	0.0
751107	095	0.8+	0.1-	751126	381	0.7+	0.9+	770218	381	0.9+	0.3-
751109	381	1.6-	0.2+	751128	381	1.5+	0.3+	770219	381	0.6-	0.3+
751109	381	0.8-	0.9-	751128	381	0.1+	2.4-	770219	381	0.3-	0.1+

1976 QF1 = 1979 DC

The identification 4841 P-L = 1976 QF1 (JASA 3) is invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	335.01088		(1950.0)		P		Q
n	0.17979073	Peri.	322.56027	+0.85903729			+0.51175569
a	3.1090333	Node	6.69556	-0.43938051			+0.74981516
e	0.0894005	Incl.	6.24869	-0.26267795			+0.41938447
P	5.48	B(1,0)	13.5				

Residuals in seconds of arc

760826	095	0.3-	0.3-	760928	095	0.7+	1.9-	790219	695	1.1+	0.9+
760924	095	1.5-	0.8-	790218	695	0.2+	0.1+	790220	695	0.5-	1.8-
760928	095	1.3+	3.1+	790218	695	0.5+	0.4-	790301	801	1.2-	0.5+

1976 YU3 = 1979 OU12

The identification 1976 YU3 = 1971 PA (NOC 1053) is invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	21.98493		(1950.0)		P		Q
n	0.23174796	Peri.	241.53114	-0.12734039			-0.99119561
a	2.6249818	Node	215.84190	+0.93026236			-0.10666576
e	0.1920478	Incl.	3.55151	+0.34408772			-0.07844538
P	4.25	B(1,0)	14.5				

Residuals in seconds of arc

761216	095	0.2+	1.5-	770113	095	1.2+	0.3+	790726	675	0.7-	1.0+
761220	095	2.0-	0.1-	770120	095	1.0+	1.4+	790727	675	0.5+	0.1+

1978 QW2 = A906 QF = 1963 TJ

The key identification 1978 QW2 = 1963 TJ is by P. Herget.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	273.42961		(1950.0)		P		Q
n	0.26045721	Peri.	347.63516	+0.96415707			+0.26532243
a	2.4283577	Node	356.97589	-0.23961039			+0.86698131
e	0.1780309	Incl.	2.46752	-0.11396496			+0.42183814
P	3.78	B(1,0)	14.5				

Residuals in seconds of arc

060822	024	1.1-	1.5+	631016	760	4.1-	1.1+	780927	095	2.8-	2.3-
631013	760	0.3+	0.5-	780831	095	1.7+	0.2+	781005	095	0.6-	0.8-
631013	760	2.2+	0.0	780905	095	1.4+	0.5+	781008	095	0.3+	0.5+
631016	760	1.0+	1.7+	780926	095	0.1+	2.0-				

1978 RF = 1974 SL4 = 1980 FK1

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	223.77327		(1950.0)		P		Q
n	0.24183408	Peri.	65.77151	+0.75236026			-0.65843382
a	2.5514785	Node	335.39330	+0.58512688			+0.68222414
e	0.2731419	Incl.	2.81758	+0.30262281			+0.31786022
P	4.08	B(1,0)	15.0				

Residuals in seconds of arc

740925	095	1.8-	1.3+	781004	095	2.3+	1.4+	800317	809	0.3+	0.4+
780901	095	2.0-	1.4+	781005	095	2.1+	1.7-	800317	809	0.2-	0.1+
780905	095	2.2-	0.9+	781008	095	1.3+	0.5-	800317	809	0.5+	0.5-
780907	095	0.0	0.3+	800316	809	0.2+	0.7+	800317	809	0.3+	0.4+
780926	095	0.6-	0.1-	800316	809	0.3+	0.6+	800323	809	0.9+	0.7+
780928	095	1.1+	1.4+	800316	809	0.2-	0.4+				
781002	095	1.9+	0.6-	800316	809	0.2+	0.6+				

1978 RJ2 = 1978 RN1 = 1978 RR4 = 1980 FP2

The triple designation 1978 RJ2 = 1978 RN1 = 1978 RR4 was found by
N. S. Chernykh (MPC 5835).

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M 253.89376		(1950.0)		P		Q
n	0.26861395	Peri.	66.68525	+0.83098047		-0.55612919
a	2.3789457	Node	327.09846	+0.50060402		+0.75840715
e	0.2148702	Incl.	1.46088	+0.24262537		+0.33991014
P	3.67	B(1,0)	16.0			

Residuals in seconds of arc

780901	095	0.2-	2.1+	781004	095	0.4-	0.3+	800317	809	0.6+	0.2+
780905	095	0.1+	0.9-	781009	095	0.4-	0.5-	800317	809	0.4+	0.5+
780907	095	0.8-	0.2-	800316	809	0.9-	0.3+	800317	809	0.6+	0.2+
780912	095	0.7-	0.1-	800316	809	0.2-	0.7+	800323	809	1.1+	0.7+
780928	095	1.0+	1.1+	800317	809	0.4-	0.0				

1979 MF4 = 1972 LO

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M 201.04961		(1950.0)		P		Q
n	0.28819347	Peri.	182.49620	+0.63462654		+0.76901163
a	2.2699389	Node	126.90797	-0.70734187		+0.61793291
e	0.1707856	Incl.	5.49851	-0.31131434		+0.16364604
P	3.42	B(1,0)	15.0			

Residuals in seconds of arc

720606	095	0.2-	1.5-	790724	675	0.7+	1.3+	790823	675	1.8-	1.9-
790623	413	0.1-	0.9+	790724	413	0.1-	1.2-	810201	801	0.0	0.9+
790624	413	0.3-	1.2+	790725	675	1.2+	0.8+				
790625	413	0.3-	1.4+	790727	675	0.0	0.4-				

1980 PV = 1977 UL

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M 169.29592		(1950.0)		P		Q
n	0.18786915	Peri.	285.18224	-0.87241656		+0.46483826
a	3.0192560	Node	282.71709	-0.36747656		-0.82757712
e	0.0342112	Incl.	8.90775	-0.32225816		-0.31470858
P	5.25	B(1,0)	13.0			

Residuals in seconds of arc

771016	809	0.1+	0.1+	800806	046	1.0-	0.4-	800817	046	1.5+	0.3+
771017	809	0.8-	0.6+	800807	046	0.4+	0.4-	800818	046	0.1-	0.6+
771020	809	0.5+	0.8-	800807	046	0.6+	0.0	800818	046	0.2+	0.7-
800806	046	0.2-	0.3+	800817	046	1.4-	1.2+				

1981 JP = 1978 NS1

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M 342.41078		(1950.0)		P		Q
n	0.29773651	Peri.	150.27473	+0.13376522		+0.99016680
a	2.2211720	Node	127.38223	-0.91905593		+0.13940325
e	0.1699746	Incl.	2.95377	-0.37073312		+0.01168090
P	3.31	B(1,0)	14.5			

Residuals in seconds of arc

780704	095	0.0	1.1-	810503	688	0.7-	1.7-	810604	688	0.6-	0.3+
780708	095	0.0	0.9+	810508	688	0.5+	1.9+	810604	688	1.0+	0.5+
810503	688	0.5-	1.8-	810508	688	0.3+	1.1+				

1981 JX = 1958 DX = 1972 TP2 = 1978 UK2 = 1978 WX14

The double designation 1978 UK2 = 1978 WX14 was found independently by O. Kippes. The identification 1972 TP2 = 1975 BD (NOC 1053) is invalid.

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	105.37154		(1950.0)		P		Q
n	0.17909259	Peri.	333.10503		-0.64193591		-0.76670504
a	3.1171079	Node	156.82779		+0.70752136		-0.59684368
e	0.1189115	Incl.	1.31598		+0.29551955		-0.23651850
P	5.50	B(1,0)	12.5				

Residuals in seconds of arc (or two decimals in units of degrees)

580224	760	(0.04-	0.00+)X	781107	330	1.5+	1.1-	810609	688	0.7-	1.1-
721005	095	3.9-	7.2-	781130	330	0.7-	0.3+	810609	688	0.2+	0.4+
721013	095	4.3+	4.3+	810505	688	0.9-	0.2+	810625	688	0.4-	0.5-
721028	095	1.2-	4.6+	810505	688	1.3-	1.2-	810625	688	0.5+	0.2-
781029	330	1.4+	2.0-	810604	688	0.1-	0.5-				
781103	330	1.1-	0.2-	810604	688	1.8+	1.0-				

2563 P-L = 1978 WA6

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	325.17254		(1950.0)		P		Q
n	0.17241360	Peri.	110.97127		-0.15666178		+0.98753814
a	3.1970976	Node	150.00332		-0.91690272		-0.13977158
e	0.1500335	Incl.	1.72124		-0.36707831		-0.07233481
P	5.72	B(1,0)	13.5				

Residuals in seconds of arc

600924	675	0.3+	0.2-	600929	675	0.3+	0.7-	601026	675	0.1-	0.2+
600926	675	0.0	0.5+	601022	675	0.7-	0.1+	781129	675	0.1-	0.6-
600928	675	0.8-	0.5-	601025	675	1.0+	0.3+	781130	675	0.2+	0.1-

4579 P-L = 1980 FJ3

Epoch 1981 July 15.0 ET = JDE 2444800.5 (J-P)

M	17.75624		(1950.0)		P		Q
n	0.28207540	Peri.	194.90217		+0.67259454		+0.73971683
a	2.3026439	Node	117.37034		-0.67648619		+0.62604485
e	0.2106067	Incl.	1.34669		-0.29997169		+0.24675261
P	3.49	B(1,0)	16.0				

Residuals in seconds of arc

600924	675	0.3+	0.8-	601025	675	0.2-	0.5-	800317	809	0.3+	0.2-
600926	675	0.9-	0.2+	601026	675	0.2-	0.2-	800317	809	0.2-	0.1-
600927	675	0.1+	0.4+	800316	809	0.4+	0.1+	800317	809	0.4-	1.1+
600928	675	0.4+	0.6+	800316	809	0.3+	0.0	800317	809	0.0	0.3-
601017	675	0.8-	0.3-	800316	809	0.6-	0.2+				
601022	675	0.7-	0.2-	800316	809	0.1+	0.1-				

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NEW NAMES OF MINOR PLANETS.

(1979) Sakharov = 2006 P-L

Discovered 1960 Sept. 24 by C. J. van Houten and I. van Houten-Groeneveld on Palomar Schmidt plates taken by T. Gehrels.

Named in honor of Academician Andrej Dmitrievich Sakharov, distinguished physicist and mathematician -- and a courageous individual.

(2029) Binomi = 1969 RB

Discovered 1969 Sept. 11 by P. Wild at Zimmerwald.

This minor planet, five ahead of (2034) Bernoulli, is named for the mythical inventor of mathematical formulae. It seems that a student, on being asked when Binomi lived, credited him with having been a contemporary of Newton, a response that became notorious around the university. A few years later another student, on being asked when Bernoulli lived, immediately answered: "I'm not going to fall into that trap; it is well known that the man never existed!"

(2213) Meeus = 1935 S01

Discovered 1935 Sept. 24 by E. Delporte at Uccle.

Named in honor of the Belgian amateur astronomer and professional meteorologist Jean Meeus, among whose numerous contributions to astronomy are the original 1963 edition of "Tables des Petites Planetes" and improved and updated versions of Oppolzer's canon of eclipses. His other writings range from dynamical studies of long-term motions of Apollo objects, through examinations of geometrical configurations of the planets, to the debunking of the idea that there exist observations of faint natural satellites of the earth. Name proposed by E. Bowell, who made the key identification for this planet, and also by J. U. Gunter, following a suggestion by E. Fogelin.

(2223) Sarpedon = 1977 TL3

Discovered 1977 Oct. 4 at the Purple Mountain Observatory.

One of the leaders of the Lycians, Sarpedon was killed by Patroclus in the Trojan War. At the command of Zeus, his body was seized by Apollo and returned to Lycia.

(2260) Neoptolemus = 1975 WM1

Discovered 1975 Nov. 26 at the Purple Mountain Observatory.

The son of Achilles and Deidameia, Neoptolemus was brought to Troy by Odysseus in the last year of the Trojan War. He has one of the warriors in the wooden horse and was responsible for the death of Priam.

(2305) King = 1980 RJ1

Discovered 1980 Sept. 12 at the Harvard College Observatory's Agassiz Station.

Named in memory of Martin Luther King (1929-1968), the American civil rights leader who worked to bring about social, political and economic equality for blacks by peaceful means. A Baptist minister who received the 1964 Nobel peace prize, he preached 'non-violent resistance' to achieve full civil rights for all.

(2356) Hirons = 1979 UJ

Discovered 1979 Oct. 17 by E. Bowell at the Anderson Mesa station of the Lowell Observatory.

Named in honor of the discoverer's parents-in-law, Charles and Ann Hirons.

(2357) Phereclos = 1981 AC

Discovered 1981 Jan. 1 by E. Bowell at the Anderson Mesa Station of the Lowell Observatory.

This Trojan planet is named for the skilled craftsman and builder of the ships that took Paris to Sparta. Phereclos was killed in battle by Meriones.

(2359) Debehogne = 1931 TV

Discovered 1931 Oct. 5 by K. Reinmuth at Heidelberg.

Named in honor of Henri Debehogne, astronomer at the Royal Observatory, Uccle, noted for his astrometric work on comets and minor planets. In recent years he has trained and collaborated with several astronomers in South America, and it was during one of these collaborations that he rediscovered this minor planet in 1979. Name proposed by E. Bowell, who made the identification.

(2363) Cebriones = 1977 TJ3

Discovered 1977 Oct. 4 at the Purple Mountain Observatory.

This Trojan planet is named for the charioteer of Hektor, wounded in the conflict between Hektor and Patroclus that led to the latter's death.

(2368) Beltrovata = 1977 RA

Discovered 1977 Sept. 4 by P. Wild at Zimmerwald.

This Amor object shares the name given by the Zurich-born writer Gottfried Keller to his friend Betty Tendering. Keller's novel "Der Grune Heinrich" contains a comparable character in Dortchen Schonfund.

(2383) Bradley = 1981 GN

Discovered 1981 Apr. 5 by E. Bowell at the Anderson Mesa Station of the Lowell Observatory.

Named in honor of Martin and Maud Bradley, friends of the discoverer.

(2392) Jonathan Murray = 1979 MN1

Discovered 1979 June 25 by E. F. Helin and S. J. Bus at Siding Spring Observatory.

Named for Jonathan Murray, the young son of Bruce and Suzanne Murray, longtime friends of the discoverers. The planet was discovered a few weeks before his birth on 1979 July 19.

(2409) Chapman = 1979 UG

Discovered 1979 Oct. 17 by E. Bowell at the Anderson Mesa station of the Lowell Observatory.

Named in honor of Clark R. Chapman, planetary astronomer at the Planetary Science Institute in Tucson. He has made outstanding contributions to our understanding of asteroid compositions and physical processes, particularly surface mineralogical identification, taxonomy and collisional evolution.

(2410) Morrison = 1981 AF

Discovered 1981 Jan. 3 by E. Bowell at the Anderson Mesa station of the Lowell Observatory.

Named in honor of David Morrison, astronomer at the University of Hawaii, Honolulu. His research into the infrared radiometric properties of asteroids has been fundamental in revealing the diversity of asteroid surface albedos and compositions. He has also worked on the definition of a taxonomic system for asteroids and on the distribution of the various taxonomic types in the main belt.

(2411) Zellner = 1981 JK

Discovered 1981 May 3 by E. Bowell at the Anderson Mesa station of the Lowell Observatory.

Named in honor of Benjamin H. Zellner, astronomer at the University of Arizona, Tucson. He brought to fruition the polarimetric-photometric method of albedo and diameter determination for asteroids. He has also helped define a taxonomic system for asteroids and has investigated in detail the distribution of the various taxonomic types in the main belt.

(2414) Vibeke = 1931 UG

Discovered 1931 Oct. 18 by K. Reinmuth at Heidelberg.

Named by L. K. Kristensen, who made the identifications involving this planet, in honor of his daughter.

(2434) Bateson = 1981 KA

Discovered 1981 May 27 by A. C. Gilmore and P. M. Kilmartin at the Mount John University Observatory.

Named in honor of Frank Maine Bateson, director of the Variable Star section of the Royal Astronomical Society of New Zealand since 1928. He led the site survey of New Zealand that resulted in the establishment of the Mount John University Observatory and was astronomer-in-charge there until 1968. Dr. Bateson and his wife Doris continue to support and encourage astronomy in New Zealand.

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EPHEMERIDES.

Comet Panther (1980u)

Date		R. A. (1950)		Decl.	Delta	r	Elements MPC 6194		ml
ET							Elong.	Phase	
1981 10 03		10 31.02	-06 03.7		4.274	3.452	30.7	8.5	14.5
1981 10 13		10 35.95	-08 16.6						
1981 10 23		10 39.98	-10 29.5		4.259	3.641	46.1	11.4	14.8
1981 11 02		10 42.94	-12 42.1						
1981 11 12		10 44.67	-14 54.1		4.181	3.828	62.6	13.3	14.9
1981 11 22		10 44.99	-17 04.5						
1981 12 02		10 43.71	-19 12.2		4.066	4.015	80.0	14.0	15.1
1981 12 12		10 40.64	-21 15.0						
1981 12 22		10 35.68	-23 10.4		3.947	4.200	98.1	13.4	15.2
1982 01 01		10 28.76	-24 55.0						
1982 01 11		10 19.97	-26 25.0		3.863	4.384	116.0	11.6	15.4
1982 01 21		10 09.57	-27 36.6						
1982 01 31		09 57.99	-28 26.7		3.857	4.566	131.2	9.4	15.5
1982 02 10		09 45.86	-28 53.8						
1982 02 20		09 33.86	-28 58.3		3.958	4.746	138.8	7.9	15.8
1982 03 02		09 22.64	-28 42.7						
1982 03 12		09 12.77	-28 11.1		4.174	4.926	134.9	8.2	16.0
1982 03 22		09 04.58	-27 28.8						
1982 04 01		08 58.26	-26 40.7		4.491	5.103	122.9	9.5	16.3
1982 04 11		08 53.81	-25 51.4						
1982 04 21		08 51.12	-25 04.5		4.880	5.279	108.1	10.4	16.7
1982 05 01		08 50.05	-24 22.8						
1982 05 11		08 50.39	-23 48.2		5.305	5.453	93.1	10.7	17.0
1982 05 21		08 51.92	-23 21.6						
1982 05 31		08 54.48	-23 03.9		5.735	5.626	78.8	10.2	17.3
1982 06 10		08 57.86	-22 55.3						
1982 06 20		09 01.91	-22 55.8		6.143	5.797	65.6	9.2	17.6
1982 06 30		09 06.47	-23 05.1						
1982 07 10		09 11.42	-23 23.2		6.508	5.967	54.0	7.9	17.8
1982 07 20		09 16.63	-23 49.4						
1982 07 30		09 21.99	-24 23.6		6.815	6.135	44.7	6.7	18.0

Comet Bus (1981d)

Date		R. A. (1950)		Decl.	Delta	r	Elements MPC 6194		ml
ET							Elong.	Phase	
1981 10 23		11 37.18	-07 35.2		3.410	2.625	32.5	11.7	17.9
1981 11 02		11 35.15	-08 31.4						
1981 11 12		11 31.60	-09 27.0		3.191	2.708	52.7	16.9	17.8
1981 11 22		11 26.05	-10 20.7						

1981 12 02	11 17.90	-11 10.1	2.893	2.804	75.0	19.9	17.8
1981 12 12	11 06.48	-11 52.0					
1981 12 22	10 51.15	-12 21.4	2.574	2.911	100.0	19.4	17.7
1982 01 01	10 31.40	-12 31.5					
1982 01 11	10 07.21	-12 14.3	2.324	3.028	127.8	14.9	17.6
1982 01 21	09 39.42	-11 23.1					
1982 01 31	09 09.81	-09 56.7	2.249	3.153	152.0	8.4	17.7
1982 02 10	08 40.83	-08 02.0					
1982 02 20	08 14.72	-05 52.7	2.415	3.285	146.5	9.6	18.1
1982 03 02	07 52.86	-03 42.6					
1982 03 12	07 35.68	-01 41.9	2.786	3.422	122.3	14.2	18.6
1982 03 22	07 22.90	+00 04.2					
1982 04 01	07 13.93	+01 34.4	3.273	3.564	98.7	16.1	19.1
1982 04 11	07 08.11	+02 49.3					
1982 04 21	07 04.80	+03 50.4	3.791	3.709	77.7	15.3	19.6

Periodic Comet Schwassmann-Wachmann 1

Elements MPC 4830

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	m2
1981 10 23		11 29.95	-02 09.8	7.103	6.319	35.4	5.2	(19.8)
1981 11 02		11 35.63	-02 56.2					
1981 11 12		11 40.86	-03 40.8	6.878	6.320	52.2	7.1	(19.7)
1981 11 22		11 45.53	-04 22.9					
1981 12 02		11 49.54	-05 02.0	6.594	6.321	69.8	8.4	(19.6)
1981 12 12		11 52.81	-05 37.3					
1981 12 22		11 55.25	-06 08.1	6.275	6.322	88.3	8.9	(19.5)
1982 01 01		11 56.76	-06 33.8					
1982 01 11		11 57.30	-06 53.6	5.954	6.323	107.7	8.5	(19.4)
1982 01 21		11 56.82	-07 07.0					
1982 01 31		11 55.35	-07 13.7	5.668	6.324	128.2	7.0	(19.3)
1982 02 10		11 52.95	-07 13.4					
1982 02 20		11 49.74	-07 06.3	5.455	6.325	149.2	4.6	(19.2)
1982 03 02		11 45.90	-06 53.1					
1982 03 12		11 41.67	-06 34.8	5.347	6.325	169.0	1.7	(19.2)
1982 03 22		11 37.32	-06 12.8					
1982 04 01		11 33.12	-05 48.7	5.361	6.326	163.6	2.6	(19.2)
1982 04 11		11 29.35	-05 24.4					
1982 04 21		11 26.20	-05 01.5	5.491	6.326	143.4	5.4	(19.2)
1982 05 01		11 23.86	-04 41.7					
1982 05 11		11 22.43	-04 26.1	5.716	6.326	123.2	7.7	(19.3)
1982 05 21		11 21.96	-04 15.7					
1982 05 31		11 22.46	-04 10.8	6.002	6.326	104.1	8.9	(19.4)
1982 06 10		11 23.90	-04 11.9					
1982 06 20		11 26.22	-04 18.8	6.314	6.326	86.1	9.2	(19.5)
1982 06 30		11 29.36	-04 31.5					
1982 07 10		11 33.22	-04 49.7	6.619	6.326	69.0	8.6	(19.6)
1982 07 20		11 37.74	-05 12.9					
1982 07 30		11 42.82	-05 40.8	6.891	6.325	52.6	7.3	(19.7)
1982 08 09		11 48.38	-06 12.9					
1982 08 19		11 54.35	-06 48.7	7.107	6.325	36.7	5.5	(19.8)

Periodic Comet Gunn

Elements IAUC 3057

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	m2
1981 10 23		12 12.13	+07 30.0	4.131	3.310	30.3	8.7	18.3
1981 11 02		12 24.81	+06 13.1					
1981 11 12		12 37.33	+04 59.2	3.900	3.249	43.1	12.0	18.1
1981 11 22		12 49.62	+03 49.1					
1981 12 02		13 01.58	+02 43.8	3.623	3.189	56.6	15.0	17.8
1981 12 12		13 13.11	+01 44.1					
1981 12 22		13 24.08	+00 50.9	3.311	3.128	70.8	17.3	17.6

1982 01 01	13 34.34	+00 05.1							
1982 01 11	13 43.70	-00 32.5	2.979	3.068	85.8	18.6	17.2		
1982 01 21	13 51.96	-01 01.0							
1982 01 31	13 58.87	-01 19.8	2.645	3.009	102.0	18.7	16.9		
1982 02 10	14 04.17	-01 28.5							
1982 02 20	14 07.61	-01 27.1	2.332	2.951	119.7	16.9	16.5		
1982 03 02	14 08.94	-01 16.0							
1982 03 12	14 08.01	-00 56.4	2.068	2.894	139.2	13.0	16.2		
1982 03 22	14 04.80	-00 30.7							
1982 04 01	13 59.49	-00 02.2	1.881	2.839	159.4	7.1	15.9		
1982 04 11	13 52.57	+00 24.6							
1982 04 21	13 44.73	+00 44.8	1.795	2.785	167.6	4.4	15.7		
1982 05 01	13 36.85	+00 54.1							
1982 05 11	13 29.85	+00 49.0	1.816	2.735	149.5	10.8	15.7		
1982 05 21	13 24.44	+00 28.2							
1982 05 31	13 21.13	-00 08.5	1.925	2.687	129.6	16.9	15.7		
1982 06 10	13 20.16	-00 59.8							
1982 06 20	13 21.56	-02 03.8	2.094	2.642	111.6	21.0	15.8		
1982 06 30	13 25.23	-03 18.6							
1982 07 10	13 31.01	-04 42.2	2.294	2.602	95.8	22.9	16.0		
1982 07 20	13 38.69	-06 12.6							
1982 07 30	13 48.08	-07 48.3	2.505	2.565	81.8	23.1	16.1		
1982 08 09	13 59.00	-09 27.6							
1982 08 19	14 11.31	-11 09.0	2.710	2.534	69.2	21.9	16.2		
1982 08 29	14 24.89	-12 51.2							
1982 09 08	14 39.63	-14 32.8	2.901	2.507	57.5	19.8	16.3		
1982 09 18	14 55.44	-16 12.4							
1982 09 28	15 12.26	-17 48.8	3.069	2.486	46.4	17.0	16.4		
1982 10 08	15 30.00	-19 20.5							
1982 10 18	15 48.62	-20 46.5	3.211	2.471	35.7	13.6	16.5		

Periodic Comet Vaisala 1

Date	ET	R. A. (1950)	Decl.	Delta	r	Variation		NK	396
									m2
1981 11 12		07 09.82	+12 10.3	2.376	3.010	-1.08	-0.6		20.7
1981 11 22		07 10.25	+11 58.0						
1981 12 02		07 08.32	+11 53.9	2.049	2.883	-1.26	-0.6		20.2
1981 12 12		07 03.99	+12 00.5						
1981 12 22		06 57.47	+12 19.3	1.803	2.756	-1.41	-0.9		19.7
1982 01 01		06 49.23	+12 51.0						
1982 01 11		06 40.17	+13 34.9	1.665	2.630	-1.45	-1.5		19.3
1982 01 21		06 31.36	+14 28.9						
1982 01 31		06 23.95	+15 30.0	1.637	2.507	-1.39	-2.3		19.1
1982 02 10		06 18.92	+16 34.9						
1982 02 20		06 16.88	+17 40.6	1.696	2.386	-1.27	-3.0		18.9
1982 03 02		06 18.18	+18 44.6						
1982 03 12		06 22.84	+19 44.7	1.805	2.271	-1.20	-3.4		18.8
1982 03 22		06 30.72	+20 38.9						
1982 04 01		06 41.58	+21 25.4	1.932	2.162	-1.18	-3.3		18.8
1982 04 11		06 55.16	+22 02.3						
1982 04 21		07 11.12	+22 27.9	2.055	2.062	-1.21	-2.7		18.7
1982 05 01		07 29.22	+22 40.6						
1982 05 11		07 49.13	+22 38.8	2.167	1.975	-1.27	-1.8		18.6
1982 05 21		08 10.57	+22 21.3						
1982 05 31		08 33.30	+21 47.2	2.264	1.902	-1.33	-0.4		18.6
1982 06 10		08 57.02	+20 56.1						
1982 06 20		09 21.50	+19 47.8	2.350	1.847	-1.38	+1.2		18.5
1982 06 30		09 46.53	+18 23.0						
1982 07 10		10 11.90	+16 42.7	2.431	1.812	-1.40	+2.9		18.5
1982 07 20		10 37.44	+14 48.5						

1982 07 30	11 03.05	+12 42.4	2.514	1.800	-1.40	+4.3	18.6
1982 08 09	11 28.60	+10 26.9					
1982 08 19	11 54.04	+08 04.5	2.604	1.811	-1.36	+5.3	18.7

Comet Elias (1981c)

Elements MPC 6050

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	ml
1981 11 12	12 27.32	-34 57.5	5.519	4.795	39.4	7.5	15.5	
1981 11 22	12 32.03	-34 55.9						
1981 12 02	12 35.77	-34 55.2	5.357	4.821	52.5	9.3	15.5	
1981 12 12	12 38.38	-34 53.5						
1981 12 22	12 39.70	-34 48.9	5.120	4.851	68.8	10.9	15.4	
1982 01 01	12 39.55	-34 39.2						
1982 01 11	12 37.80	-34 21.8	4.834	4.885	87.2	11.6	15.3	
1982 01 21	12 34.34	-33 53.8						
1982 01 31	12 29.13	-33 12.0	4.542	4.925	107.3	11.0	15.2	
1982 02 10	12 22.27	-32 13.3						
1982 02 20	12 13.96	-30 55.2	4.293	4.969	128.5	9.0	15.1	
1982 03 02	12 04.56	-29 16.3						
1982 03 12	11 54.57	-27 16.9	4.145	5.017	148.2	6.0	15.1	
1982 03 22	11 44.54	-24 59.9						
1982 04 01	11 35.01	-22 30.1	4.140	5.070	156.1	4.6	15.1	
1982 04 11	11 26.45	-19 53.8						
1982 04 21	11 19.20	-17 17.8	4.292	5.127	142.6	6.8	15.3	
1982 05 01	11 13.45	-14 48.0						
1982 05 11	11 09.26	-12 29.0	4.577	5.187	122.3	9.5	15.5	
1982 05 21	11 06.59	-10 23.6						
1982 05 31	11 05.34	-08 33.2	4.951	5.251	101.7	10.9	15.7	
1982 06 10	11 05.36	-06 57.9						
1982 06 20	11 06.51	-05 37.0	5.362	5.319	82.1	10.9	15.9	
1982 06 30	11 08.63	-04 29.3						
1982 07 10	11 11.56	-03 33.4	5.765	5.389	63.6	9.7	16.1	
1982 07 20	11 15.16	-02 47.8						
1982 07 30	11 19.32	-02 10.9	6.123	5.463	45.8	7.6	16.3	

Comet Meier (1980q)

Elements MPC 5975

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	ml
1981 12 02	13 28.51	-24 51.8	5.182	4.493	41.7	8.4	17.1	
1981 12 12	13 31.20	-26 19.1						
1981 12 22	13 32.84	-27 45.2	5.103	4.678	59.3	10.4	17.2	
1982 01 01	13 33.24	-29 09.3						
1982 01 11	13 32.21	-30 30.6	4.971	4.861	77.9	11.4	17.3	
1982 01 21	13 29.57	-31 47.5						
1982 01 31	13 25.19	-32 58.4	4.820	5.042	97.3	11.2	17.4	
1982 02 10	13 19.01	-34 00.8						
1982 02 20	13 11.07	-34 52.2	4.696	5.221	117.1	9.7	17.5	
1982 03 02	13 01.55	-35 30.0						
1982 03 12	12 50.83	-35 51.9	4.643	5.399	135.7	7.4	17.7	
1982 03 22	12 39.38	-35 57.0						
1982 04 01	12 27.79	-35 45.4	4.699	5.574	148.3	5.4	17.8	
1982 04 11	12 16.67	-35 19.1						
1982 04 21	12 06.51	-34 41.2	4.882	5.748	146.6	5.5	18.0	
1982 05 01	11 57.71	-33 55.8						
1982 05 11	11 50.49	-33 07.1	5.183	5.920	133.2	7.1	18.3	
1982 05 21	11 44.91	-32 18.8						
1982 05 31	11 40.95	-31 34.0	5.575	6.090	116.2	8.6	18.6	
1982 06 10	11 38.50	-30 54.9						
1982 06 20	11 37.40	-30 23.1	6.021	6.259	98.9	9.2	18.9	
1982 06 30	11 37.50	-29 59.5						
1982 07 10	11 38.63	-29 44.3	6.484	6.427	82.3	9.0	19.1	

1982 07 20	11 40.61	-29 37.5						
1982 07 30	11 43.32	-29 39.1	6.930	6.592	66.5	8.1	19.4	

Periodic Comet Schwassmann-Wachmann 2 (1979k)

Elements HBAA 1980, 98

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	m2
1981 12 02		14 14.48	-10 28.2	3.530	2.774	34.5	11.6	19.2
1981 12 12		14 29.28	-11 36.5					
1981 12 22		14 43.45	-12 37.0	3.423	2.850	47.3	14.7	19.2
1982 01 01		14 56.85	-13 29.6					
1982 01 11		15 09.35	-14 13.8	3.271	2.927	61.2	17.1	19.2
1982 01 21		15 20.77	-14 49.9					
1982 01 31		15 30.92	-15 17.7	3.083	3.005	76.2	18.6	19.2
1982 02 10		15 39.59	-15 37.4					
1982 02 20		15 46.58	-15 49.2	2.874	3.082	92.6	18.7	19.2
1982 03 02		15 51.65	-15 53.4					
1982 03 12		15 54.63	-15 50.4	2.667	3.158	110.7	17.1	19.1
1982 03 22		15 55.36	-15 40.6					
1982 04 01		15 53.80	-15 24.6	2.492	3.234	130.7	13.5	19.1
1982 04 11		15 50.05	-15 03.2					
1982 04 21		15 44.38	-14 37.7	2.385	3.309	152.5	8.1	19.1
1982 05 01		15 37.28	-14 09.8					
1982 05 11		15 29.41	-13 41.9	2.377	3.383	173.6	1.9	19.2
1982 05 21		15 21.48	-13 16.3					
1982 05 31		15 14.20	-12 55.6	2.484	3.455	160.3	5.7	19.4
1982 06 10		15 08.15	-12 41.8					
1982 06 20		15 03.71	-12 35.9	2.696	3.527	139.0	10.9	19.6
1982 06 30		15 01.09	-12 38.5					
1982 07 10		15 00.33	-12 49.3	2.988	3.596	119.3	14.3	19.9
1982 07 20		15 01.37	-13 07.4					
1982 07 30		15 04.07	-13 31.9	3.327	3.664	101.3	15.8	20.2
1982 08 09		15 08.29	-14 01.5					
1982 08 19		15 13.85	-14 35.1	3.684	3.730	84.8	15.7	20.5
1982 08 29		15 20.60	-15 11.5					
1982 09 08		15 28.39	-15 49.6	4.034	3.795	69.2	14.4	20.8
1982 09 18		15 37.06	-16 28.4					
1982 09 28		15 46.51	-17 07.1	4.357	3.858	54.2	12.2	21.1
1982 10 08		15 56.62	-17 44.8					
1982 10 18		16 07.28	-18 20.8	4.635	3.918	39.6	9.3	21.3

Comet Bowell (1980b)

Elements MPC 6193

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	m1
1981 12 22		15 48.88	-18 48.0	4.264	3.452	30.5	8.3	12.0
1982 01 01		16 04.57	-19 34.5					
1982 01 11		16 20.12	-20 14.8	4.062	3.414	43.3	11.4	11.9
1982 01 21		16 35.42	-20 48.8					
1982 01 31		16 50.32	-21 16.4	3.828	3.387	56.6	14.0	11.7
1982 02 10		17 04.66	-21 37.9					
1982 02 20		17 18.28	-21 53.8	3.573	3.370	70.3	16.0	11.5
1982 03 02		17 30.99	-22 04.5					
1982 03 12		17 42.61	-22 11.0	3.308	3.364	84.7	17.1	11.4
1982 03 22		17 52.96	-22 14.1					
1982 04 01		18 01.84	-22 14.8	3.048	3.370	100.1	17.0	11.2
1982 04 11		18 09.08	-22 14.3					
1982 04 21		18 14.53	-22 13.4	2.812	3.386	116.8	15.4	11.0
1982 05 01		18 18.09	-22 13.1					
1982 05 11		18 19.74	-22 14.0	2.624	3.413	135.0	12.1	10.9
1982 05 21		18 19.56	-22 16.4					
1982 05 31		18 17.76	-22 20.2	2.507	3.450	154.7	7.2	10.9
1982 06 10		18 14.73	-22 25.1					

1982 06 20	18 10.93	-22 30.7	2.484	3.498	175.3	1.4	10.9
1982 06 30	18 06.95	-22 36.5					
1982 07 10	18 03.38	-22 42.3	2.567	3.555	163.8	4.6	11.1
1982 07 20	18 00.70	-22 48.0					
1982 07 30	17 59.33	-22 53.5	2.752	3.621	143.8	9.5	11.3
1982 08 09	17 59.50	-22 58.8					
1982 08 19	18 01.31	-23 03.8	3.019	3.695	125.1	13.0	11.6
1982 08 29	18 04.77	-23 08.3					
1982 09 08	18 09.80	-23 11.7	3.346	3.776	107.7	14.7	11.9
1982 09 18	18 16.24	-23 13.6					
1982 09 28	18 23.98	-23 13.4	3.708	3.865	91.4	15.0	12.2
1982 10 08	18 32.81	-23 10.7					
1982 10 18	18 42.59	-23 04.8	4.082	3.960	76.0	14.1	12.5
1982 10 28	18 53.16	-22 55.4					
1982 11 07	19 04.36	-22 42.2	4.447	4.060	61.0	12.3	12.8
1982 11 17	19 16.04	-22 24.9					
1982 11 27	19 28.08	-22 03.5	4.785	4.166	46.4	9.9	13.1
1982 12 07	19 40.34	-21 38.0					
1982 12 17	19 52.73	-21 08.6	5.080	4.276	31.9	7.0	13.3

Periodic Comet Grigg-Skjellerup

Elements MPC 6193

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	m2
1981 12 22		07 40.86	-14 38.9	1.200	2.015	134.4	20.4	20.9
1982 01 01		07 31.75	-17 26.0					
1982 01 11		07 19.11	-19 47.2	0.987	1.841	138.2	20.9	20.1
1982 01 21		07 03.85	-21 26.2					
1982 01 31		06 47.74	-22 09.3	0.849	1.663	130.0	27.0	19.4
1982 02 10		06 33.06	-21 51.6					
1982 02 20		06 21.85	-20 37.3	0.763	1.485	115.4	37.0	18.6
1982 03 02		06 15.59	-18 36.1					
1982 03 12		06 15.00	-15 59.3	0.694	1.314	100.8	48.0	17.9
1982 03 22		06 20.24	-12 53.7					
1982 04 01		06 31.40	-09 19.9	0.610	1.161	88.9	59.4	17.1
1982 04 11		06 48.59	-05 12.0	0.558	1.097	84.2	65.4	16.6
1982 04 16		06 59.57	-02 50.8					
1982 04 21		07 12.32	-00 14.5	0.502	1.045	80.3	71.5	16.2
1982 04 26		07 27.03	+02 40.0					
1982 05 01		07 43.97	+05 55.9	0.443	1.009	77.4	77.2	15.8
1982 05 06		08 03.51	+09 36.2					
1982 05 11		08 26.10	+13 42.2	0.390	0.991	76.0	81.5	15.4
1982 05 16		08 52.33	+18 11.7					
1982 05 21		09 22.83	+22 56.4	0.350	0.993	76.8	83.0	15.2
1982 05 26		09 58.06	+27 40.0					
1982 05 31		10 37.99	+31 58.9	0.335	1.015	80.6	80.4	15.2
1982 06 05		11 21.69	+35 27.7					
1982 06 10		12 07.14	+37 47.1	0.347	1.054	86.7	74.1	15.4
1982 06 15		12 51.75	+38 50.9					
1982 06 20		13 33.16	+38 46.5	0.386	1.109	93.4	66.2	15.9
1982 06 25		14 10.02	+37 48.8					
1982 06 30		14 42.00	+36 14.2	0.445	1.175	99.4	58.6	16.4
1982 07 05		15 09.44	+34 16.6					
1982 07 10		15 33.00	+32 05.7	0.519	1.250	104.2	52.1	17.0
1982 07 15		15 53.40	+29 48.1					
1982 07 20		16 11.29	+27 28.4	0.605	1.331	107.6	46.7	17.6
1982 07 25		16 27.22	+25 09.4					
1982 07 30		16 41.63	+22 53.4	0.702	1.416	109.7	42.5	18.2
1982 08 04		16 54.85	+20 41.9					
1982 08 09		17 07.14	+18 35.7	0.811	1.503	110.4	39.2	18.8

1982 08 19	17 29.67	+14 41.7	0.933	1.592	109.8	36.7	19.4
1982 08 29	17 50.42	+11 14.5					
1982 09 08	18 10.05	+08 15.5	1.210	1.770	105.5	33.3	20.4
1982 09 18	18 28.95	+05 44.1					
1982 09 28	18 47.37	+03 39.1	1.532	1.946	98.2	30.6	21.3

Periodic Comet Longmore (1981a)

Elements NK 338

Date	ET	R. A. (1950)	Decl.	Delta	r	Variation		m2
1981 12 22		15 38.14	-29 59.1	3.212	2.433	-0.85	+7.3	18.9
1982 01 01		15 58.57	-32 01.4					
1982 01 11		16 19.21	-33 57.2	3.088	2.457	-0.94	+6.2	18.9
1982 01 21		16 39.96	-35 46.4					
1982 01 31		17 00.68	-37 29.4	2.937	2.487	-1.05	+4.9	18.8
1982 02 10		17 21.18	-39 06.8					
1982 02 20		17 41.29	-40 39.5	2.767	2.523	-1.16	+3.3	18.7
1982 03 02		18 00.75	-42 08.9					
1982 03 12		18 19.30	-43 36.4	2.585	2.565	-1.28	+1.5	18.7
1982 03 22		18 36.67	-45 03.8					
1982 04 01		18 52.49	-46 32.9	2.400	2.610	-1.42	-0.4	18.6
1982 04 11		19 06.39	-48 05.2					
1982 04 21		19 17.96	-49 41.8	2.228	2.660	-1.60	-2.3	18.5
1982 05 01		19 26.67	-51 22.9					
1982 05 11		19 32.02	-53 07.1	2.084	2.714	-1.84	-3.8	18.4
1982 05 21		19 33.49	-54 51.0					
1982 05 31		19 30.66	-56 29.0	1.988	2.770	-2.16	-4.3	18.4
1982 06 10		19 23.54	-57 53.2					
1982 06 20		19 12.68	-58 54.9	1.961	2.829	-2.44	-3.1	18.5
1982 06 30		18 59.38	-59 26.7					
1982 07 10		18 45.61	-59 25.2	2.016	2.890	-2.46	-0.9	18.6
1982 07 20		18 33.35	-58 52.1					
1982 07 30		18 24.15	-57 52.9	2.154	2.953	-2.18	+0.8	18.9

1970 AF1

Elements MPC 6192

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		19 21.61	-11 47.7	1.252	2.260	169.6	4.6	15.3
1981 07 25		19 11.63	-11 57.1					
1981 08 04		19 03.40	-12 14.6	1.331	2.281	152.7	11.8	15.7
1981 08 14		18 57.83	-12 37.3					
1981 08 24		18 55.34	-13 02.1	1.494	2.302	132.6	18.9	16.1
1981 09 03		18 56.01	-13 26.4					
1981 09 13		18 59.67	-13 48.0	1.715	2.322	114.7	23.2	16.5
1981 09 23		19 05.97	-14 04.9					
1981 10 03		19 14.58	-14 15.6	1.968	2.341	98.9	25.0	16.9
1981 10 13		19 25.15	-14 18.9					
1981 10 23		19 37.32	-14 13.9	2.233	2.360	84.7	24.8	17.2

1942 TJ

Elements MPC 6203

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		19 27.40	-21 56.8	2.294	3.310	178.2	0.6	16.1
1981 07 25		19 18.97	-21 53.0					
1981 08 04		19 11.37	-21 46.8	2.334	3.284	155.4	7.4	16.6
1981 08 14		19 05.26	-21 38.1					
1981 08 24		19 01.13	-21 27.4	2.474	3.257	133.9	12.9	16.8
1981 09 03		18 59.21	-21 14.9					
1981 09 13		18 59.59	-21 00.8	2.685	3.230	114.2	16.5	17.1
1981 09 23		19 02.17	-20 45.0					
1981 10 03		19 06.80	-20 27.1	2.934	3.203	96.4	18.1	17.3
1981 10 13		19 13.29	-20 06.5					
1981 10 23		19 21.38	-19 42.6	3.192	3.175	80.1	18.0	17.4

1980 EC		Elements MPC 6198						
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		19 55.61	-05 09.4	1.597	2.585	162.8	6.7	16.7
1981 07 25		19 47.15	-06 17.8					
1981 08 04		19 39.28	-07 37.4	1.635	2.609	159.3	7.9	16.8
1981 08 14		19 32.92	-09 02.1					
1981 08 24		19 28.72	-10 26.1	1.773	2.633	140.5	14.1	17.2
1981 09 03		19 27.04	-11 44.9					
1981 09 13		19 27.99	-12 55.2	1.987	2.656	121.6	18.8	17.5
1981 09 23		19 31.45	-13 55.3					
1981 10 03		19 37.21	-14 44.1	2.251	2.680	104.3	21.2	17.9
1981 10 13		19 45.00	-15 21.3					
1981 10 23		19 54.54	-15 46.7	2.538	2.702	88.5	21.6	18.2

1976 QF1		Elements MPC 6205						
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		20 33.62	-27 54.5	1.867	2.862	165.3	5.2	17.2
1981 07 25		20 25.06	-28 18.4					
1981 08 04		20 16.23	-28 32.9	1.859	2.854	165.9	5.0	17.2
1981 08 14		20 08.20	-28 35.9					
1981 08 24		20 01.83	-28 27.1	1.955	2.847	145.6	11.6	17.5
1981 09 03		19 57.76	-28 07.8					
1981 09 13		19 56.29	-27 39.7	2.134	2.841	125.7	16.7	17.8
1981 09 23		19 57.46	-27 04.7					
1981 10 03		20 01.12	-26 23.8	2.368	2.837	107.6	19.6	18.1
1981 10 13		20 07.05	-25 37.8					
1981 10 23		20 14.92	-24 46.9	2.630	2.834	91.3	20.5	18.3

(2418) 1971 UV		Elements MPC 6194						
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		20 52.86	-19 30.4	2.311	3.292	161.7	5.6	18.0
1981 07 25		20 45.36	-20 01.3					
1981 08 04		20 37.23	-20 31.8	2.249	3.261	174.9	1.6	17.7
1981 08 14		20 29.24	-20 58.7					
1981 08 24		20 22.17	-21 19.8	2.299	3.229	152.4	8.3	18.0
1981 09 03		20 16.66	-21 33.5					
1981 09 13		20 13.19	-21 39.6	2.445	3.197	131.0	13.7	18.3
1981 09 23		20 11.96	-21 38.1					
1981 10 03		20 13.02	-21 29.3	2.658	3.163	111.4	17.1	18.5
1981 10 13		20 16.29	-21 13.6					
1981 10 23		20 21.57	-20 51.2	2.904	3.130	93.7	18.5	18.7
1981 11 02		20 28.65	-20 22.3					
1981 11 12		20 37.29	-19 46.9	3.154	3.096	77.5	18.2	18.9

1975 EE3		Elements MPC 6204						
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.
1981 07 15		21 00.89	+16 54.4	1.295	2.146	136.1	19.2	16.7
1981 07 25		20 51.94	+16 17.1					
1981 08 04		20 41.65	+14 52.6	1.205	2.132	147.5	14.8	16.4
1981 08 14		20 31.38	+12 43.3					
1981 08 24		20 22.54	+09 59.2	1.201	2.115	145.9	15.5	16.4
1981 09 03		20 16.24	+06 54.8					
1981 09 13		20 13.23	+03 46.1	1.283	2.095	132.2	20.8	16.6
1981 09 23		20 13.71	+00 46.4					
1981 10 03		20 17.60	-01 55.3	1.432	2.072	115.7	25.8	17.0
1981 10 13		20 24.61	-04 13.8					
1981 10 23		20 34.32	-06 07.1	1.623	2.047	100.1	28.6	17.3
1981 11 02		20 46.36	-07 35.3					
1981 11 12		21 00.34	-08 39.1	1.830	2.019	86.0	29.3	17.5

1965 UB1		Elements MPC 6196							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 07 15		21 42.26	-26 46.2	1.080	2.028	150.6	14.2	17.5	
1981 07 25		21 35.13	-27 33.7						
1981 08 04		21 24.97	-28 14.7	0.976	1.978	167.1	6.6	17.1	
1981 08 14		21 13.21	-28 38.4						
1981 08 24		21 01.76	-28 37.6	0.960	1.930	156.6	12.0	17.1	
1981 09 03		20 52.52	-28 09.9						
1981 09 13		20 46.91	-27 18.3	1.025	1.885	136.3	21.6	17.4	
1981 09 23		20 45.54	-26 07.7						
1981 10 03		20 48.38	-24 42.9	1.145	1.844	118.3	28.5	17.8	
1981 10 13		20 55.08	-23 06.7						
1981 10 23		21 05.03	-21 21.1	1.296	1.807	103.3	32.4	18.1	
1981 11 02		21 17.67	-19 26.4						
1981 11 12		21 32.49	-17 23.0	1.461	1.775	90.8	33.9	18.3	
1981 11 22		21 49.01	-15 11.0						
1981 12 02		22 06.89	-12 50.6	1.630	1.751	79.9	33.7	18.6	
1981 12 12		22 25.85	-10 22.3						
1981 12 22		22 45.64	-07 47.1	1.798	1.734	70.3	32.3	18.7	

(2429) 1977 TZ		Elements MPC 6201							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 07 15		00 55.73	-04 20.1	2.020	2.424	100.7	24.3	18.0	
1981 07 25		01 01.90	-03 29.6						
1981 08 04		01 05.85	-02 48.4	1.773	2.405	116.7	22.1	17.7	
1981 08 14		01 07.24	-02 16.7						
1981 08 24		01 05.78	-01 54.0	1.561	2.388	135.3	17.3	17.3	
1981 09 03		01 01.30	-01 39.3						
1981 09 13		00 53.96	-01 30.3	1.413	2.371	156.9	9.6	16.8	
1981 09 23		00 44.31	-01 23.6						
1981 10 03		00 33.34	-01 15.2	1.358	2.356	175.1	2.1	16.4	
1981 10 13		00 22.39	-01 00.7						
1981 10 23		00 12.77	-00 36.8	1.410	2.343	153.6	10.9	16.8	
1981 11 02		00 05.51	-00 01.5						
1981 11 12		00 01.22	+00 45.9	1.555	2.332	131.5	18.5	17.2	
1981 11 22		00 00.05	+01 45.1						
1981 12 02		00 01.88	+02 55.0	1.762	2.323	112.3	23.1	17.6	
1981 12 12		00 06.44	+04 14.6						
1981 12 22		00 13.36	+05 42.6	2.001	2.316	95.7	25.0	17.9	

4579 P-L		Elements MPC 6207							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 07 15		00 47.81	+03 49.0	1.392	1.854	99.5	32.7	18.8	
1981 07 25		00 59.36	+04 49.5						
1981 08 04		01 08.42	+05 32.8	1.232	1.880	113.2	29.7	18.5	
1981 08 14		01 14.57	+05 56.9						
1981 08 24		01 17.42	+06 00.5	1.096	1.911	130.1	23.9	18.2	
1981 09 03		01 16.68	+05 42.7						
1981 09 13		01 12.44	+05 05.2	1.006	1.947	151.0	14.5	17.8	
1981 09 23		01 05.27	+04 12.4						
1981 10 03		00 56.27	+03 11.7	0.989	1.988	174.4	2.8	17.4	
1981 10 13		00 47.01	+02 13.3						
1981 10 23		00 39.00	+01 26.7	1.067	2.031	160.3	9.5	17.9	
1981 11 02		00 33.39	+00 58.4						
1981 11 12		00 30.82	+00 51.5	1.231	2.077	138.3	18.5	18.5	
1981 11 22		00 31.38	+01 05.6						
1981 12 02		00 34.88	+01 38.5	1.460	2.125	119.4	23.9	19.0	
1981 12 12		00 40.97	+02 27.3						
1981 12 22		00 49.23	+03 29.0	1.728	2.173	103.1	26.2	19.5	

1980 PV		Elements MPC 6206							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 08 04		02 20.44	+23 53.0	2.946	3.122	90.4	19.0	18.3	
1981 08 14		02 26.09	+24 45.4						
1981 08 24		02 29.95	+25 30.2	2.678	3.122	106.7	18.1	18.0	
1981 09 03		02 31.77	+26 06.0						
1981 09 13		02 31.34	+26 30.8	2.435	3.123	125.0	15.3	17.8	
1981 09 23		02 28.62	+26 42.7						
1981 10 03		02 23.67	+26 39.5	2.249	3.122	145.1	10.6	17.5	
1981 10 13		02 16.89	+26 19.9						
1981 10 23		02 08.90	+25 44.1	2.151	3.122	164.6	4.9	17.2	
1981 11 02		02 00.53	+24 54.2						
1981 11 12		01 52.72	+23 54.9	2.166	3.120	161.6	5.7	17.3	
1981 11 22		01 46.26	+22 52.1						
1981 12 02		01 41.75	+21 51.9	2.291	3.119	141.0	11.5	17.5	
1981 12 12		01 39.51	+20 59.6						
1981 12 22		01 39.61	+20 18.6	2.502	3.117	120.4	15.8	17.8	
1982 01 01		01 41.97	+19 50.4						
1982 01 11		01 46.41	+19 35.3	2.764	3.115	101.6	18.0	18.1	

1975 VD2		Elements MPC 6204							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 08 24		03 40.37	+17 37.6	2.761	2.995	93.4	19.7	17.0	
1981 09 03		03 45.96	+17 53.9						
1981 09 13		03 49.54	+18 03.5	2.526	3.029	110.5	18.1	16.8	
1981 09 23		03 50.89	+18 06.2						
1981 10 03		03 49.85	+18 02.1	2.322	3.063	130.0	14.5	16.6	
1981 10 13		03 46.44	+17 51.3						
1981 10 23		03 40.86	+17 34.5	2.183	3.097	152.0	8.7	16.3	
1981 11 02		03 33.55	+17 12.5						
1981 11 12		03 25.24	+16 47.3	2.143	3.131	175.5	1.4	16.0	
1981 11 22		03 16.79	+16 21.7						
1981 12 02		03 09.05	+15 58.8	2.220	3.164	159.9	6.1	16.4	
1981 12 12		03 02.79	+15 41.7						
1981 12 22		02 58.47	+15 32.4	2.406	3.197	137.1	12.1	16.7	
1982 01 01		02 56.35	+15 32.2						
1982 01 11		02 56.47	+15 41.2	2.671	3.229	116.3	15.8	17.0	
1982 01 21		02 58.72	+15 58.8						
1982 01 31		03 02.93	+16 23.8	2.981	3.261	97.6	17.4	17.3	

1975 BX		Elements MPC 6196							
Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	Mag.	
1981 10 03		06 04.88	-00 38.1	2.357	2.674	97.2	21.8	19.0	
1981 10 13		06 10.08	-01 29.7						
1981 10 23		06 13.01	-02 21.5	2.086	2.635	112.8	20.4	18.7	
1981 11 02		06 13.35	-03 09.9						
1981 11 12		06 10.90	-03 49.6	1.848	2.595	129.8	17.0	18.3	
1981 11 22		06 05.58	-04 14.9						
1981 12 02		05 57.61	-04 19.3	1.673	2.552	146.2	12.4	17.9	
1981 12 12		05 47.60	-03 57.0						
1981 12 22		05 36.54	-03 05.1	1.591	2.508	152.9	10.3	17.7	
1982 01 01		05 25.65	-01 44.2						
1982 01 11		05 16.18	+00 01.3	1.615	2.461	141.4	14.4	17.8	
1982 01 21		05 09.08	+02 04.2						
1982 01 31		05 04.95	+04 17.0	1.730	2.413	123.1	20.0	18.1	
1982 02 10		05 04.01	+06 33.1						
1982 02 20		05 06.19	+08 47.2	1.903	2.364	105.2	23.8	18.3	
1982 03 02		05 11.30	+10 56.0						
1982 03 12		05 19.05	+12 57.0	2.104	2.314	89.2	25.4	18.5	

(2336) Xinjiang

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Phase	MPC	Mag.
1981 10 23		07 27.98	+22 02.4	2.467	2.796	98.7	20.6	5685	17.2
1981 11 02		07 34.46	+21 56.8						
1981 11 12		07 38.68	+21 56.4	2.203	2.786	116.3	18.6		16.9
1981 11 22		07 40.40	+22 02.7						
1981 12 02		07 39.41	+22 16.2	1.980	2.778	136.4	14.2		16.5
1981 12 12		07 35.74	+22 36.4						
1981 12 22		07 29.65	+23 01.7	1.832	2.773	159.0	7.3		16.2
1982 01 01		07 21.71	+23 29.1						
1982 01 11		07 12.89	+23 55.4	1.787	2.769	176.3	1.3		15.8
1982 01 21		07 04.30	+24 17.8						
1982 01 31		06 57.02	+24 34.8	1.855	2.767	152.5	9.4		16.3
1982 02 10		06 51.91	+24 46.0						
1982 02 20		06 49.44	+24 52.0	2.020	2.767	130.6	15.7		16.6
1982 03 02		06 49.78	+24 53.3						
1982 03 12		06 52.85	+24 50.3	2.249	2.770	111.3	19.5		16.9
1982 03 22		06 58.39	+24 43.2						
1982 04 01		07 06.10	+24 31.7	2.511	2.775	94.5	21.0		17.2

1980 LB

Date	ET	R. A. (1950)	Decl.	Delta	r	Variation	MPC	Mag.	
1981 10 23		07 48.58	+07 35.2	2.375	2.596	-0.71	-9.8	5977	
1981 11 02		07 53.13	+08 22.4						
1981 11 12		07 55.24	+09 24.3	2.163	2.665	-0.81	-10.4		16.8
1981 11 22		07 54.65	+10 44.0						
1981 12 02		07 51.17	+12 23.7	1.981	2.734	-0.93	-10.7		16.5
1981 12 12		07 44.81	+14 23.0						
1981 12 22		07 35.89	+16 38.6	1.876	2.804	-1.04	-10.8		16.3
1982 01 01		07 25.06	+19 03.7						
1982 01 11		07 13.35	+21 29.0	1.891	2.874	-1.09	-10.5		15.9
1982 01 21		07 01.98	+23 45.7						
1982 01 31		06 52.08	+25 47.4	2.040	2.943	-1.03	-9.9		16.6
1982 02 10		06 44.52	+27 31.3						
1982 02 20		06 39.75	+28 57.8	2.300	3.011	-0.92	-8.9		17.0
1982 03 02		06 37.91	+30 08.6						
1982 03 12		06 38.87	+31 06.2	2.629	3.078	-0.80	-7.8		17.5
1982 03 22		06 42.35	+31 52.7						
1982 04 01		06 48.04	+32 29.9	2.986	3.144	-0.71	-6.6		17.8

1977 QJ3

Date	ET	R. A. (1950)	Decl.	Delta	r	Variation	MPC	Mag.	
1981 10 23		07 39.51	+20 47.7	1.866	2.203	-1.23	+1.0	4927	
1981 11 02		07 47.44	+20 42.2						
1981 11 12		07 52.45	+20 44.8	1.676	2.254	-1.39	+1.7		18.4
1981 11 22		07 54.20	+20 57.8						
1981 12 02		07 52.40	+21 22.1	1.514	2.304	-1.62	+2.1		18.1
1981 12 12		07 47.01	+21 57.0						
1981 12 22		07 38.40	+22 39.5	1.416	2.353	-1.84	+2.0		17.8
1982 01 01		07 27.39	+23 24.5						
1982 01 11		07 15.40	+24 06.3	1.417	2.399	-1.90	+1.1		17.5
1982 01 21		07 03.99	+24 40.8						
1982 01 31		06 54.57	+25 06.0	1.531	2.444	-1.76	+0.1		18.1
1982 02 10		06 48.14	+25 22.4						
1982 02 20		06 45.06	+25 31.5	1.738	2.487	-1.51	-0.3		18.6
1982 03 02		06 45.32	+25 34.8						
1982 03 12		06 48.66	+25 33.2	2.004	2.527	-1.27	-0.1		19.0
1982 03 22		06 54.63	+25 26.9						
1982 04 01		07 02.83	+25 16.0	2.298	2.564	-1.08	+0.3		19.4