

PHOTOGRAPHIC POSITIONS OF BRIGHT MINOR PLANETS AND PLUTO

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RESUMEN

Se dan coordenadas ecuatoriales de asteroides brillantes y el planeta Plutón. Las placas fotográficas fueron obtenidas durante 1987 con el telescopio astrográfico doble de 20 pulgadas de Yale Southern Observatory. Las estrellas de referencia fueron seleccionadas del AGK3 o SAO dependiendo de la declinación del objeto.

ABSTRACT

Equatorial coordinates for some bright minor planets and Pluto have been measured on direct photographs taken during 1987 with the 20-inch Yale Southern Observatory double astrograph. Reference stars were taken from the AGK3 or SAO depending on the declination of the object.

Key words: ASTROMETRY – PLANETS

I. INTRODUCTION

Since its dedication on March 31 1965, the Yale Southern Observatory and Felix Aguilar Observatory (San Juan University, Argentina), have been surveying the southern sky for the Southern Proper Motion program (SPM). The observing station is located in the province of San Juan (Argentina) at $\lambda = 4^{\text{h}}37^{\text{m}}19.002^{\text{s}}$ (west), $\phi = -31^{\circ}48'8.2''$ at an altitude of 2348m. Details about the telescope can be seen in Wesselink (1974) while the status of the program has been reported by López (1982), López, Lee, and van Altena (1986) and van Altena, Girard, and López (1987).

Even though the telescope is used most of the time to the observation of the SPM program, the observation of solar system objects is also included in the schedule of the instrument. So far, around 6000 individual positions of asteroids and comets as well as some positions of Jupiter's satellites have been published. In addition, more than 40 new asteroids and 5 comets have been discovered during the last 20 years.

II. OBSERVATIONS AND REDUCTION

The minor planets included in this study were selected from the Ephemerides of Minor Planets for 1987, while the ephemerides for Pluto were taken from Kaplan, Seidelmann, and Smith (1972). All observations were recorded on Kodak 103a-O plates which were exposed

5 to 10 minutes using the blue lens of the 20-inch double astrograph. Eight to ten reference stars were taken from the AGK3 for positive declinations while for positions south of the equator, the SAO was used. The exception to this rule is asteroid (41) Daphne for which only AGK3 stars were used for both the October and November positions (see Table 1). Each plate was measured in the direct and reverse positions with the manual measuring machine of the Felix Aguilar Observatory. The reductions utilized the method of least-squares with three unknowns including linear terms in the coordinates and a zero point. The average standard error of the derived positions is the same in both RA and DEC, namely $\pm 0.50''$ or $\pm 0.35''$, depending on whether SAO or AGK3 reference stars were used.

Table 1 lists the topocentric right ascension and declination for equinox 1950.0.

TABLE 1

PHOTOGRAPHIC POSITIONS OF BRIGHT MINOR PLANETS AND PLUTO

Object	Epoch (UT)	RA			(1950) DEC		
		h	m	s	°	'	"
(16) Psyche	1987 05 22.03357	10	29	09.17	+10	54	50.8
	05 22.05365	10	29	09.76	+10	54	47.4
(18) Melpomene	1987 06 27.97306	13	22	45.60 [*]	+03	19	15.2
	06 27.99384	13	22	45.94	+03	19	09.1
(24) Themis	1987 06 26.05747	15	15	16.53	-18	35	07.4
	06 26.07825	15	15	16.12	-18	35	05.5

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TABLE 1 (CONTINUED)

Object	Epoch (UT)	RA (1950)			DEC		
		h	m	s	°	'	"
(25) Phocaea	1987 06 25.09967	15 43 27.49	+06 21 45.3				
	06 25.12045	15 43 27.02	+06 21 52.6				
(32) Pomona	1987 10 24.15850	01 16 58.83	+10 35 28.3				
	10 24.17374	01 16 58.06	+10 35 21.5				
	11 20.08167	01 00 11.85	+07 54 42.4				
	11 20.10106	01 00 11.41	+07 54 36.7				
(37) Fides	1987 05 28.19136	17 05 28.73	-27 01 50.3				
	06 26.13226	16 38 04.78	-26 23 05.1				
	06 26.15304	16 38 03.62	-26 23 02.6				
(40) Harmonia	1987 10 15.21840	02 19 47.22	+06 29 23.4				
	10 15.23918	02 19 46.01	+06 29 18.0				
	10 20.21998	02 15 01.36	+06 06 49.8				
	10 20.24076	02 15 00.11	+06 06 44.3				
	11 20.13049	01 46 48.64	+04 41 34.2				
	11 20.14919	01 46 47.90	+04 41 33.6				
(41) Daphne	1987 10 22.25123	03 30 04.52	+02 44 56.5				
	10 22.32014	03 30 01.68	+02 44 29.3				
	11 24.17532	03 04 58.09	-00 11 37.0				
	11 24.19956	03 04 56.95	-00 11 42.2				
(44) Nysa	1987 11 24.23245	04 51 50.16	+16 24 58.3				
	11 24.25323	04 51 48.94	+16 24 56.7				
(45) Eugenia	1987 06 25.06089	14 55 01.93	-06 40 13.1				
	06 25.08167	14 55 01.75	-06 40 16.2				
(51) Nemausa	1987 10 19.23553	02 23 49.77	+04 09 54.6				
	10 19.25976	02 23 48.46	+04 09 41.2				
	11 24.12511	01 54 38.57	+00 13 28.0				
	11 24.14727	01 54 37.81	+00 13 24.0				
(52) Europa	1987 10 22.34126	05 14 34.41	+13 49 07.5				
	10 22.35511	05 14 36.13	+13 49 08.2				
(54) Alexandra	1987 06 24.06155	15 37 25.13	-36 54 56.4				
	06 29.02504	15 35 27.88	-36 11 45.9				
	06 29.04582	15 35 27.49	-36 11 35.0				
(68) Leto	1987 06 29.22519	19 15 10.17	-33 43 58.5				
	06 29.25081	19 15 08.75	-33 44 05.2				
(69) Hesperia	1987 10 16.07023	22 36 47.42	-05 41 29.1				
	10 16.09101	22 36 47.04	-05 41 35.6				
	10 20.05723	22 35 50.50	-05 58 26.3				
	10 20.07801	22 35 50.21	-05 58 30.8				
	10 22.10579	22 35 28.83	-06 06 20.5				
	10 22.12657	22 35 28.63	-06 06 24.8				
(78) Diana	1987 05 28.28901	19 00 14.98	-33 32 09.7				
	05 28.30633	19 00 14.27	-33 32 13.3				
	06 29.18432	18 32 28.80	-33 59 37.8				
	06 29.20510	18 32 28.81	-33 59 37.0				
(97) Klotho	1987 06 29.13031	17 06 07.15	-06 38 34.6				
	06 29.15108	17 06 05.81	-06 38 37.6				
(103) Hera	1987 06 26.09417	15 48 14.14	-12 23 09.3				
	06 26.11495	15 48 13.52	-12 23 09.9				
	06 29.06382	15 46 51.88	-12 26 56.5				
	06 29.08460	15 46 51.29	-12 26 58.3				
(111) Ate	1987 10 17.02664	21 04 56.42	-13 39 12.7				
	10 17.04742	21 04 56.75	-13 39 10.9				
	10 22.01403	21 06 38.90	-13 31 00.0				
	10 22.03827	21 06 39.47	-13 30 57.6				
(129) Antigone	1987 10 24.25096	02 03 40.89	-04 59 23.1				
	10 24.26827	02 03 40.05	-04 59 28.1				
	11 24.07421	01 42 44.29	-06 10 11.7				
	11 24.09845	01 42 43.58	-06 10 10.4				
(198) Ampella	1987 06 02.20680	17 27 21.71	-26 09 08.0				
	06 02.22757	17 27 20.44	-26 09 02.0				
	06 25.14538	17 02 51.57	-24 04 38.8				
	06 25.16616	17 02 50.21	-24 04 30.5				
(216) Kleopatra	1987 05 21.04149	10 57 13.23	-02 03 52.4				
	05 21.07266	10 57 13.83	-02 03 48.0				

TABLE 1 (CONTINUED)

Object	Epoch (UT)	RA			DEC		
		h	m	s	°	'	"
(287) Nephthys	1987 10 16.27592	03 29 20.36	+02 38 17.0				
	10 16.29670	03 29 19.59	+02 38 07.9				
	10 22.25123	03 25 21.35	+01 56 35.8				
	10 22.27477	03 25 20.21	+01 56 25.2				
(308) Polyxo	1987 06 27.00626	13 40 29.22	-06 20 03.5				
	06 27.02704	13 40 29.65	-06 20 06.2				
(313) Chaldaea	1987 10 24.33441	06 20 38.98	+07 40 28.0				
	10 24.35103	06 20 39.60	+07 40 20.0				
(375) Ursula	1987 10 15.16646	23 34 33.46	+10 14 48.6				
	10 15.18723	23 34 32.55	+10 14 46.3				
	10 17.14853	23 33 14.21	+10 11 01.6				
	10 17.16931	23 33 13.44	+10 10 59.6				
(385) Ilmatar	1987 10 17.07512	22 17 35.39	-10 08 48.0				
	10 17.09590	22 17 34.95	-10 08 45.4				
	10 22.06320	22 16 29.57	-10 00 21.1				
	10 22.08744	22 16 29.27	-10 00 18.2				
(387) Aquitania	1987 10 24.29321	05 23 42.51	+02 18 34.1				
	10 24.31052	05 23 42.20	+02 18 29.9				
(423) Diotima	1987 10 16.23229	01 40 07.86	-02 41 45.6				
	10 19.21129	01 37 40.44	-02 48 48.7				
(432) Pythia	1987 06 25.22295	19 00 52.74	-26 49 31.8				
	06 25.24373	19 00 51.48	-26 49 44.3				
(532) Herculina	1987 06 24.98333	12 59 18.93	+13 30 58.1				
	06 25.00410	12 59 19.94	+13 30 40.8				
Pluto	1987 04 23.20555	14 44 32.21	+01 45 06.5				
	05 27.13142	14 41 39.09	+01 58 14.7				
	06 01.10842	14 41 02.09	+01 58 21.7				
	06 22.00952	14 39 26.31	+01 57 03.0				
	06 28.04716	14 39 06.03	+01 55 33.1				

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