OBSERVATIONS OF PLUTO IN BUCHAREST DURING 1932 AND 1967-1975: PRECISE POSITIONS AND MAGNITUDES

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ABSTRACT. The observations of Pluto obtained in 1932 and during 1967-1975, performed at the Astronomical Observatory of Bucharest with the 380/6000 mm astrograph are presented. Both Turner's (constants) and Schlesinger's (dependencies) methods were used for the computation of the normal coordinates of the object.

1. PRECISE POSITIONS

Pluto was observed in 1932 by G. Demetrescu on plates of $13{\times}18$ cm, with a 52 minutes exposure, and also in the period $1967-1975$ by C. Cristescu on plates of $24{\times}24$ cm, with exposures ranging between 20 minutes and one hour. To determine more precise positions, we tried to take into consideration as many reference stars as possible, and we have used the PPM catalogue J2000.0, referring all the determinations to the epoch 2000.0. The most difficult problem was the identification of the planet (by superposition of two plates) on the plates obtained in 1932, because all observations were made in the same month and the planet did not have a significant proper motion.

The values $(O - C)_\alpha$ and $(O - C)_\delta$ were calculated by M. Svechnikov from the Institute of Applied Astronomy in Sankt Petersburg, on the basis of the precise positions obtained in Bucharest, which we integrated in Pluto's orbit (Table 1).

2. DETERMINATION OF MAGNITUDE

We have also determined the photographic magnitude of Pluto at the observatory level, as against the photographic magnitude of 9 stars situated in the neighbourhood of the planet. We used the machine for coordinates measurements, with which we measured twice the diameter for each star, as well as for Pluto. By means of a graphic program, where we introduced for each plate the diameter in abscissa and the photographic magnitude of the stars in ordinate, we obtained a straight line ($M = m \times d_P + n$) and the values m and n. Introducing in the straight line equation the value of Pluto's diameter we obtained the value of its photographic magnitude. To check the parameters m and n for several cases, we resorted to Gauss' method, obtaining values very close to those of the two parameters. The results obtained are approximate because of the imprecision, especially of the measurement of Pluto's diameter. We give the graph for 7 January 1932 (Fig. 1).

| N o	Data + UT			$\alpha_{2000.0}$			$\delta_{2000.0}$			$(O-C)_\alpha$	$(O-C)_\delta$	M
				h	m	s	°	'	"			
1	1932	01	07.950165	7	35	54.645	22	08	56.50	+0.008	+0.05	13.1
2	1932	01	15.914949	7	35	11.033	22	11	06.97	.012	- .08	13.1
3	1932	01	29.888239	7	33	56.211	22	14	48.39	.011	.24	13.1
4	1967	05	15.806346	11	42	20.067	18	25	55.35	- .099	- .28	12.3
5	1967	06	03.874135	11	41	57.156	18	19	57.85	- .074	- .32	12.3
6	1967	06	07.825795	11	41	57.635	18	18	06.59	- .058	- .92	12.2
7	1968	02	22.835410	11	57	53.882	17	17	54.38	- .116	- .40	11.5
8	1968	03	21.855089	11	55	14.951	17	38	06.11	- .073	.20	11.5
9	1968	04	18.824871	11	52	41.305	17	50	09.77	- .032	- .08	11.4
10	1968	04	22.812544	11	52	22.639	17	50	59.67	- .033	- .62	11.5
11	1973	03	29.877944	12	39	31.497	14	15	14.59	.027	.87	11.5
12	1974	03	18.863596	12	49	44.763	13	20	33.36	.009	- .15	11.5
13	1974	03	21.848487	12	49	27.560	13	22	44.22	- .015	- .94	11.6
14	1975	04	03.840961	12	57	21.330	12	42	48.00	- .003	- .57	12.3
15	1975	04	07.856013	12	56	57.352	12	45	11.84	.068	- .33	12.3
16	1975	04	14.787035	12	56	16.030	12	48	52.49	- .024	- .47	12.5
17	1975	05	05.798947	12	54	20.626	12	56	00.18	.099	.13	12.4
18	1975	05	08.789367	12	54	06.121	12	56	28.57	- .008	.07	12.4
19	1975	05	12.801994	12	53	47.693	12	56	53.50	- .017	.20	12.4
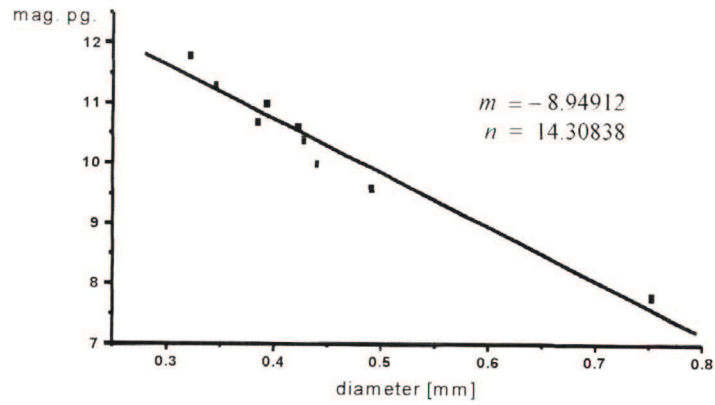
Fig. 1. Diameter-magnitude diagram

More details can be found in Bocşa's (2001) paper.

3. REFERENCE

Bocşa, G.: 2001, *Rom. Astron. J.* **11**, 77.