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THE MOTION OF COMET 1929 I
(SCHWASSMANN-WACHMANN 2) IN THE
YEARS 1936-1942

BY

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KØBENHAVN

I KOMMISSION HOS EJNAR MUNKSGAARD

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In a previous publication¹ I have given the results of a calculation of the elements of periodic comet Schwassmann-Wachmann 2 from observations in the apparitions 1929-1934 as well as the perturbations during this period. The elements are:

Epoch and osculation 1929 February 18.0 U. T.

$$\begin{array}{r}
 M = 354^{\circ}.91062 \\
 \omega = 357^{\circ}.71203 \\
 \Omega = 126^{\circ}.32728 \\
 i = 3^{\circ}.72839
 \end{array}
 \left.
 \begin{array}{l}
 \\
 \\
 \\
 \end{array}
 \right\} 1950.0$$

$$\begin{array}{r}
 e = 0.3945470 \\
 a = 3.452821 \\
 \mu = 0^{\circ}.1536183
 \end{array}$$

Comparison of the computed orbit with selected observations showed so small residuals that it will hardly be worth while to revise the elements until observations from the opposition 1941-1942 are available. The elements are accurate enough for the purpose of calculating a search ephemeris for the opposition just mentioned. I have, therefore, continued the integration of the perturbed co-ordinates from 1936 to 1942. As before, account was taken of the attractions by Jupiter and Saturn.

¹) D. Kgl. Danske Vidensk. Selskab, Math.-fys. Medd. XIII, 16 and Publikationer og mindre Meddelelser fra Københavns Observatorium Nr. 106.

The calculated co-ordinates, referred to the equinox 1950, are given in the following table.

0 ^h U. T.		x	y	z
1936	Jan. 13 ¹	- 2.303 459	+ 0.202 413	+ 0.208 371
	Feb. 2	2.380 985	- 0.027 971	0.123 206
	— 22	2.437 737	0.258 138	+ 0.036 955
	March 13	2.474 915	0.486 261	- 0.049 603
	April 2	2.493 850	0.710 823	0.135 805
	— 22	2.495 924	0.930 603	0.221 098
	May 12	2.482 521	1.144 635	0.305 029
	June 1	2.454 992	1.352 175	0.387 232
	— 21	2.414 624	1.552 662	0.467 419
	July 11	2.362 630	1.745 693	0.545 362
	— 31	2.300 140	1.930 988	0.620 890
	Aug. 20	2.228 200	2.108 367	0.693 875
	Sept. 9	2.147 769	2.277 734	0.764 225
	— 29	2.059 732	2.439 052	0.831 875
	Oct. 19	1.964 891	2.592 335	0.896 787
	Nov. 8	1.863 985	2.737 638	0.958 939
	— 28	1.757 684	2.875 041	1.018 326
	Dec. 18	1.646 602	3.004 649	1.074 953
1937	Jan. 7	1.531 297	3.126 581	1.128 835
	— 27	1.412 282	3.240 969	1.179 995
	March 8	1.164 951	3.447 672	1.274 264
	April 17	0.907 907	3.625 915	1.358 022
	May 27	0.643 936	3.776 874	1.431 570
	July 6	0.375 418	3.901 702	1.495 223
	Aug. 15	- 0.104 401	4.001 506	1.549 294
	Sept. 24	+ 0.167 333	4.077 342	1.594 095
	Nov. 3	0.438 216	4.130 203	1.629 920
	Dec. 13	0.706 851	4.161 023	1.657 055
1938	Jan. 22	0.971 980	4.170 678	1.675 769
	March 3	1.232 457	4.159 990	1.686 315
	April 12	+ 1.487 221	- 4.129 731	- 1.688 934

¹ In the previous publication the x -co-ordinate for this date was erroneously printed as x : - 2.303859, instead of - 2.303459.

0 ^h U. T.		x	y	z
1938	May 22	+ 1.735 284	- 4.080 629	- 1.683 852
	July 1	1.975 706	4.013 372	1.671 282
	Aug. 10	2.207 590	3.928 613	1.651 428
	Sept. 19	2.430 065	3.826 976	1.624 483
	Oct. 29	2.642 274	3.709 060	1.590 630
	Dec. 8	2.843 370	3.575 444	1.550 048
1939	Jan. 17	3.032 499	3.426 696	1.502 907
	Feb. 26	3.208 797	3.263 376	1.449 377
	April 7	3.371 378	3.086 040	1.389 623
	May 17	3.519 327	2.895 252	1.323 814
	June 26	3.651 690	2.691 593	1.252 120
	Aug. 5	3.767 466	2.475 662	1.174 720
	Sept. 14	3.865 598	2.248 095	1.091 800
	Oct. 24	3.944 959	2.009 576	1.003 561
	Dec. 3	4.004 346	1.760 850	0.910 226
1940	Jan. 12	4.042 468	1.502 743	0.812 043
	Feb. 21	4.057 929	1.236 187	0.709 295
	April 1	4.049 226	0.962 247	0.602 313
	— 21	4.035 308	0.822 885	0.547 351
	May 11	4.014 726	0.682 157	0.491 481
	— 31	3.987 256	0.540 249	0.434 765
	June 20	3.952 663	0.397 368	0.377 267
	July 10	3.910 704	0.253 739	0.319 063
	— 30	3.861 128	- 0.109 607	0.260 233
	Aug. 19	3.803 672	+ 0.034 757	0.200 867
	Sept. 8	3.738 067	0.179 055	0.141 067
	— 28	3.664 036	0.322 957	0.080 945
	Oct. 18	3.581 293	0.466 099	- 0.020 627
	Nov. 7	3.489 550	0.608 077	+ 0.039 748
	— 27	3.388 512	0.748 444	0.100 021
	Dec. 17	3.277 888	0.886 700	0.160 014
1941	Jan. 6	3.157 386	1.022 291	0.219 530
	— 26	3.026 727	1.154 600	0.278 343
	Feb. 15	2.885 647	1.282 938	0.336 202
	March 7	+ 2.733 905	+ 1.406 542	+ 0.392 821

0 ^h U. T.		<i>x</i>	<i>y</i>	<i>z</i>
1941	March 27	+ 2.571 300	+1.524 560	+ 0.447 882
	April 16	2.397 681	1.636 048	0.501 027
	May 6	2.212 966	1.739 964	0.551 855
	— 26	2.017 165	1.835 159	0.599 918
	June 15	1.810 414	1.920 382	0.644 722
	July 5	1.592 995	1.994 275	0.685 723
	— 25	1.365 384	2.055 387	0.722 330
	Aug. 14	1.128 292	2.102 194	0.753 909
	Sept. 3	0.882 706	2.133 127	0.779 796
	— 23	0.629 933	2.146 625	0.799 310
	Oct. 13	0.371 636	2.141 193	0.811 773
	Nov. 2	+ 0.109 852	2.115 490	0.816 551
	— 22	- 0.153 010	2.068 424	0.813 083
	Dec. 12	0.414 207	1.999 258	0.800 925
1942	Jan. 1	0.670 740	1.907 711	0.779 801
	— 21	0.919 472	1.794 036	0.749 631
	Feb. 10	- 1.157 278	+ 1.659 070	+ 0.710 564

From the co-ordinates and velocities the following osculating elements have been derived:

Epoch and osculation 1942 January 1.0 U. T.

$$\begin{array}{l}
 M = 353^{\circ}.38019 \\
 \omega = 358^{\circ}.00835 \\
 \Omega = 126^{\circ}.04333 \\
 i = 3^{\circ}.72521 \\
 e = 0.3854489 \\
 a = 3.488424 \\
 \mu = 0^{\circ}.1512726
 \end{array}
 \left. \vphantom{\begin{array}{l} M \\ \omega \\ \Omega \\ i \\ e \\ a \\ \mu \end{array}} \right\} 1950.0$$

According to this calculation the comet will pass through perihelion 1942 February 13.76080 U.T. The comet will be well placed for observation from November 1941.

The following ephemeris has been calculated with the elements just given.

		0 ^h U. T.					
1941		$\alpha_{1941.0}$		$\delta_{1941.0}$	r	Δ	
		h	m				
Oct.	13	7	8.3	+ 19° 29'	2.320	2.040	
	17		13.6	19 20	2.309	1.984	
	21		18.7	19 10	2.299	1.929	
	25		23.4	19 1	2.289	1.874	
	29		27.9	18 52	2.280	1.820	
Nov.	2		32.0	18 43	2.270	1.767	
	6		35.9	18 35	2.261	1.715	
	10		39.3	18 28	2.252	1.664	
	14		42.4	18 21	2.244	1.615	
	18		45.1	18 16	2.236	1.568	
	22		47.3	18 12	2.228	1.522	
	26		49.1	18 10	2.220	1.477	
	30		50.4	18 9	2.213	1.436	
	Dec.	4		51.3	18 10	2.206	1.396
		8		51.6	18 13	2.199	1.358
12			51.4	18 18	2.193	1.324	
16			50.8	18 25	2.187	1.293	
20			49.7	18 34	2.182	1.265	
24			48.1	18 45	2.177	1.240	
28			46.1	18 58	2.172	1.219	
32		7	43.8	+ 19 12	2.167	1.202	

Corrections for T 1 day later:

Oct. 13.	-1.5^m	+1'
Nov. 22.	-2.1	+3
Dec. 32.	-2.7	+4

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