1939PA....47..331.

months. The diagram shows several small stars with which Juno comes into conjunction in its path across the stellar fields.

On the chart the positions are for 7:00 P.M., E.S.T. They were taken from the ephemerides published by the Astronomisches Rechen-Institut at Berlin-Dahlem, Germany. Computation was by Dr. F. Gondolatsch. The right ascension and declination were given for 1939 and we reduced these positions to corresponding coördinates for 1855. This reduction was for the purpose of fitting them to Beyer-Graff's *Stern-Atlas,* whose equinox is 1855, and which is reproduced herewith.

The asteroids 1 Ceres and 2 Pallas are not in a position for observation until late in the year. The other one of the "big 4"—No. 4 Vesta—is also observable this summer, but during June and July rises very late and is not as suitable as Juno during this period. On June 25 Vesta is in Pisces, 5° nearly west of α Piscium, and the magnitude is 7.9. On July 31, it is in Cetus, 6° approximately northeast of the same star. We expect to publish a chart of its apparent path in the next issue of this magazine.

There are four other asteroids that may be picked up by astronomers at this time, and we give the ephemerides below, as computed by the Rechen-Institut. The equinox is 1950, in conformity with standard computing practice.

ASTEROID EPHEMERIDES. FOR 0^h U.T. EQUINOX 1950.

43 ARIADNE ($8^M.8$)

		α h m	δ ° ′
May	25	17 47.6	—24 46
June	2	17 41.9	—24 20
	10	17 34.8	—23 51
	18	17 27.0	—23 18
	26	17 19.6	—22 45
July	4	17 13.5	—22 12

18 MELPOMENE ($9^M.1$)

		α h m	δ ° ′
June	10	18 58.8	— 8 17
	18	18 52.9	— 8 19
	26	18 45.6	— 8 33
July	4	18 37.5	— 8 58
	12	18 29.3	— 9 35
	20	18 21.5	—10 21

10 HYGIEA ($9^M.1$)

		α h m	δ ° ′
June	10	18 47.0	—24 16
	18	18 40.9	—24 14
	26	18 34.2	—24 11
July	4	18 27.3	—24 6
	12	18 20.7	—23 59
	20	18 14.8	—23 51

7 IRIS ($8^M.7$)

		α h m	δ ° ′
June	18	19 24.8	—18 52
	26	19 17.7	—18 45
July	4	19 9.6	—18 41
	12	19 0.9	—18 37
	20	18 52.4	—18 35
	28	18 44.6	—18 33

Hayden Planetarium, American Museum of Natural History,
New York City, May 18, 1939

Comet Notes

By G. VAN BIESBROECK

COMET 1939 *d*. The central bureau of astronomical telegrams at the Harvard College Observatory reported April 18 the discovery of an unexpected comet as bright as third magnitude. The first information about this object was received through S. Rosseland, director of the observatory at Oslo, Norway, who reported that an observer, Hassel, had sighted the newcomer in the evening of April 16 in the approximate position: Right Ascension $1^h 27^m$, Declination +41°. The comet was at that time in Andromeda almost exactly in conjunction with the sun which made it most conspicuous in northern stations. As usual such a bright object was

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1939PA.....47..331.

noticed independently by several observers; two Russian amateurs, Achmarof at Balesino and Jurlof in Votkinsk, reported to the Pulkova Observatory that they had found it on April 15. Further independent early discoveries were made by L. V. Smith at Segewick (Alberta, Canada) on April 16, E. W. Barlow (England), and E. Buchar (Prague) on April 18, C. L. Friend at Escondido (California) and Kozik at Aschabad (Russia) on April 19 and many more later. It would be impractical to attach so many names to the designation of 1939 *d* but the central bureau of the Astronomical Union at Copenhagen has decided in such cases to limit the names to three. This comet will therefore be called Jurlof-Achmarof-Hassel (1939 *d*). When first discovered it made a beautiful sight especially in a binocular. It showed a large round coma with diffuse edges and a bright central

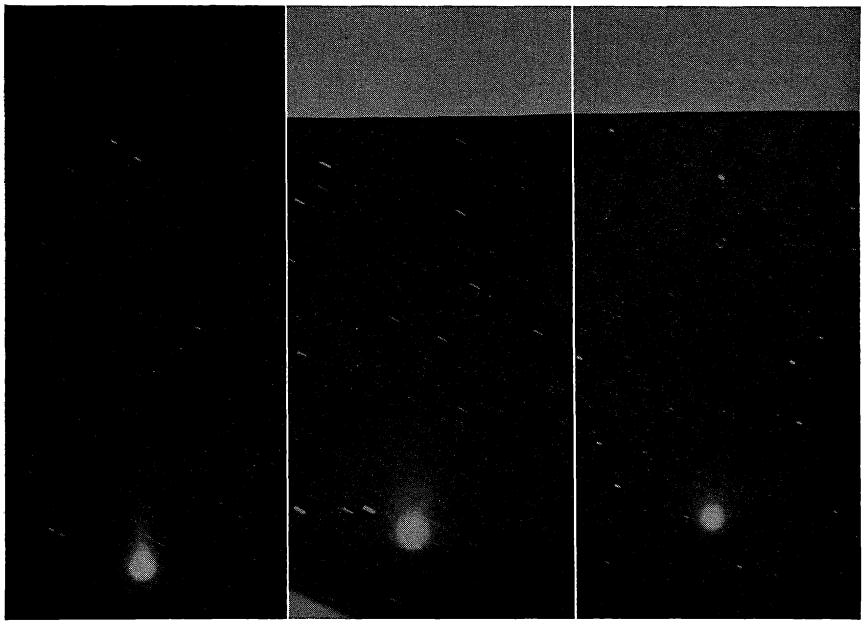

FIGURE 1 FIGURE 2 FIGURE 3

COMET 1939 *d* (JURLOF-ACHMAROF-HASSEL)

April 20 April 23 April 25

nucleus; besides there was a conspicuous tail, traced to a length of at least 20° by Quenisset at Juvisy (France). Figures 1, 2, and 3 are short exposures obtained by the writer with the 24-inch reflector of the Yerkes Observatory. The dates are April 20, 23, and 25. They show the rapid changes in the inner part of the tail composed of a bundle of numerous smaller streamers. A great many observations have been made on this object. Moving eastward through Perseus and Auriga it was well situated in the evening sky in the latter part of April but soon lost in brightness. Many orbits became available; they showed that the comet had been nearest to the sun on April 10. The following elements computed by A. D. Maxwell from an interval of two weeks (April 19, 25, and May 3) are evidently quite accurate; no marked deviation from a parabolic orbit is apparent, so that the period must be very long.

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1939PA.....47..331.

ELEMENTS OF COMET 1939 *d*

Date of perihelion	1939 April 10.17922 U.T.	
Perihelion to node	89° 15′ 50″.7	
Longitude of node	311 24 46.7	1939.0
Inclination	138 6 15.0	
Perihelion distance	0.528287	

EPHEMERIS (1939.0)

1939	α h m s	δ ° ′	—Distance from— sun	earth	M
May 13	6 9 3	+28 2	0.902	1.378	6.7
21	28 11	24 6	1.035	1.638	7.7
29	41 30	21 6	1.169	1.881	8.5
June 6	6 51 52	19 52	1.301	2.104	9.3
14	7 0 33	+16 44	1.432	2.308	9.9

The comet was nearest to the earth about the time of perihelion so that it must have been quite bright in the morning sky before discovery but probably too close to the sun to be easily seen. The magnitudes given in the above ephemeris are based on an estimation of $6^{M}.6$ on May 12 by the writer. The rapid decrease in brightness will soon put an end to the visibility as the angular distance to the sun decreases in June. By July 13 there will be conjunction with the sun.

COMET 1939 *e*. The fifth comet of the year is the expected reappearance of Periodic Comet Kopff. It was found by the writer on a pair of plates taken shortly before sunrise on April 22; it appeared as a centrally condensed coma 30″ in diameter; the total magnitude was estimated as 13.5 but this estimate is uncertain on account of the low altitude at which the observation was made. The discovery position is

1939 April 22.40248 $22^{h}\ 19^{m}\ 38^{s}.44$ —5° 12′ 21″.0

When compared with the ephemeris published by F. Kepinski the residual is only $+0^{s}.2$ and —3″ showing that this is the most precise prediction of a periodic comet ever made. This comet has now been observed at four returns since its first discovery by A. Kopff in Heidelberg in 1906. The period is 6.6 years. It passed perihelion on March 13 of this year and will change little in brightness in the coming months.

EPHEMERIS OF PERIODIC COMET 1939 *e* (KOPFF)

1939	α h m	δ ° ′	1939	α h m	δ ° ′
June 2	23 39.9	+ 6 7	July 4	0 24.8	+13 26
10	23 52.9	8 7	12	32.7	14 55
18	0 4.7	10 1	20	39.1	16 15
26	15.4	11 48			

The two comets 1939 *b* and *c* mentioned last month are still favorably situated for observation: the first one is slowly fading as expected and can only be seen with powerful telescopes. From the observations on March 20, 25, and April 8, T. J. Bartlett, H. A. Panofsky, and Miss E. L. Scott, students in Berkeley, have deduced improved elements as follows:

Perihelion	1939 April 25.77256	
Perihelion to node	44° 4′ 20″.9	
Longitude of node	135 24 41.3	1939.0
Inclination	11 19 24.3	
Eccentricity	0.637066	
Period	10.7453 years	

This is one more well-established member of the family of periodic comets.

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1939PA.....47..331.

COMET 1939 *c* (PERIODIC PONS-WINNECKE) is rapidly gaining in brightness, having reached magnitude 12.5 on May 10. This is more than a magnitude brighter than is given in the ephemeris on p. 281, which is being continued here:

EPHEMERIS OF COMET 1939 *c* (PONS-WINNECKE)

1939	α h m	δ ° ′	M
June 2	15 6.0	+42 29	12.0
6	9.2	40 4	
10	13.6	36 41	11.7
14	19.4	32 2	
18	27.0	25 33	11.4
22	37.0	16 31	
26	15 50.1	+ 4 14	11.1
30	16 6.8	—11 8	
July 4	16 28.1	—27 37	11.0

Maximum brightness is reached at the end of June at which time it should be easy to locate the comet traveling southward through the constellation of Serpens.

Williams Bay, Wisconsin, May 16, 1939

Comet 1939*d*.—On the original plate of a fifteen-minute exposure of Comet 1939 *d* which was taken at Smith College Observatory on April 21 the tail can be traced for a distance of four to five degrees. On a short exposure made soon after this, a fairly well-defined nucleus elongated in right ascension—not in the direction of the tail, apparently—could be seen. Whether this was an illusion or not, I do not know. The position angle of the tail is about 23°.

DOROTHY N. DAVIS.

VARIABLE STARS

Variable Star Notes from the American Association of Variable Star Observers

By LEON CAMPBELL, Recorder

Z Camelopardalis-Type Variables, 1937-38: Continuing the presentation of observational features concerning special types of variable stars, begun in the previous issue with a discussion of the SS Cygni-type variables, we now give for the same years similar facts for most of the known Z Camelopardalis-type stars.

Besides the type-star, Z Camelopardalis and the well-observed similar variable RX Andromedae, there are at least three others that appear to belong to this class: TZ Persei; — Draconis, 195377; and CN Orionis. Variables of this type are closely allied to the SS Cygni-type stars, except that the former are usually of smaller range, have shorter mean cycles, and are subject to long intervals during which little variation in light is apparent. Facts concerning these five stars are enumerated below:

Name	Designation	Magnitude Max.	Min.	Cycle days	Spectrum
RX And	005840	10.5	13.3	8-40	
TZ Per	020356	12.5	[15.0	15-25	f:
CN Ori	054705	11.9	[14.6	15-20	
Z Cam	081473	10.2	13.5	11-35	F
— Dra	195377	11.9	14.6	10-15	

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