

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 696

Konkoly Observatory
Budapest
1972 July 12

ROSINO'S OBJECT: EVIDENCE FOR A FOURTH OUTBURST

Rosino's object is a peculiar variable star-like object situated about 5 arc minutes from the Sb galaxy NGC 4501 (1). It has been observed at maximum only 3 times. The first maximum was discovered on November 17, 1961 (1), and was monitored by Bertola (2). A second maximum was later found by Zwicky on March 26, 1965 (3). This outburst was also monitored by Bertola (4), who has further reported (2) the object at maximum on a plate taken on April 26, 1892, in the Isaac Robert collection. According to Bertola the variable appears to be an explosive type variable of the U Geminorum type.

In an effort to bridge the gap between 1892 and 1961, a search of the plate collection of the Harvard College Observatory was undertaken. The accompanying table is the result of that search. The search was exhaustive in the RH and BM series, and in the MC and MA series the search was thorough for all plates with exposures greater than 30 minutes. In the table M.J.D. (= J.D. - 2,400,000), are modified Julian days. The upper magnitude limits come from observing the faintest star visible on each plate using Bertola's comparison sequence (2).

In this search, Rosino's object was found at maximum on only 1 plate taken on June 25, 1941. Using Bertola's sequence the plate was measured on an Askania Astrophotometer. The magnitude was $m_{pg} = 13.84 \pm 0.07$, well above the plate limit of $m_{pg} \approx 17.3$. An attempt was made to find any plates in the entire Harvard collection taken of the object during the months of June and July, 1941. Three A plates taken at Bloemfontein, South Africa, were catalogued, but all three plates were lost at sea. The following series turned up no information at the suspected time of maximum: AI; AX; AM; C; EE; I; IR; MF; RB; RL; and, X.

One fact deserves special attention. An MA plate taken on May 20, 1941, shows

no indication of the object. The faintest star of Bertola's sequence visible is $m_{pg} = 16.44$. The object, therefore, brightened at least 2.5 magnitudes in one month. This is the only reported estimate of a rise-time for Rosino's object.

There is very little possibility that the image is a plate defect. The plate for June 25, 1941, is an excellent plate, and the image looks exactly like the images of the other stars.

Due to the nearness of Rosino's object to the ecliptic, and the fact that only one plate was found, a normal question arises as to whether merely an asteroid was observed. A quick calculation using results obtained by Kiang (5) shows that the probability of this is about 1 in 10^4 . Furthermore, the plate exposure is 90 minutes which should be long enough to have trailed an asteroid at any point except possibly at a stationary point. The probability of having observed an asteroid in the exact position of Rosino's object and at a stationary point in its orbit is far less than 10^{-4} .

This work was supported in part by a grant from the National Science Foundation.

It is a pleasure to thank the staff of the Harvard College Observatory for the hospitality they extended while this work was being done.

S.C. LUCCHETTI
P.D. USHER
Department of Astronomy
The Pennsylvania State University
University Park, Pa. 16802
U.S.A.
June 28, 1972

References

1. Rosino, L. 1961, I.A.U. Circular, No. 1782.
2. Bertola, F. 1964, Ann. d' Ap., 27, 298.
3. Zwicky, F. 1965. I.A.U. Circular, No. 1902.
4. Bertola, F. 1965, Comm. 27 I.A.U., Inf. Bull. Var. Stars, No. 103.
5. Kiang, T. 1939, M.N., 123, 509.

Plate	M.J.D.	m pg	Plate	M.J.D.	m pg
MC 21795	24199	>15.15	BM 855	29022	>15.15
RH 4860	27104	>15.15	BM 1136	29289	>15.15
RH 5026	27183	>14.28	BM 1180	29311	>15.15
RH 5760	27478	>16.44	MA 7521	29318	>17.50
MC 27128	27511	>18.43(a)	MA 7523	29319	>17.30
RH 5823	27512	>15.15	BM 1209	29319	>15.15
RH 5830	27515	>15.15	BM 1250	29333	>14.28
RH 5978	27574	>14.28	BM 1268	29339	>15.15
RH 5980	27574	>15.02	MA 7574	29344	>17.30
RH 6013	27595	>12.63	BM 1298	29361	>14.28
RH 6023	27596	>14.28	RH 8805	29377	>15.15
RH 6392	27808	>16.44	BM 1317	29396	>15.15
RH 6396	27813	>16.44	BM 1327	29397	>15.15
RH 6424	27832	>16.44	BM 1949	29638	>14.28
BM 364	27834	>14.28	BM 2124	29671	>15.15
RH 6445	27840	>17.23	BM 2204	29698	>15.15
RH 7087	28554	>15.15	RH 9641	29708	>14.28
RH 7131	28293	>14.28	RH 9665	29726	>17.23
RH 7580	28600	>16.44	MA 8242	29726	>17.30
BM 499	28624	>12.63	BM 2304	29730	>14.28
BM 510	28636	>15.15	BM 2322	29734	>14.28
RH 7646	28653	>16.44	BM 2337	29748	>14.28
RH 8006	28898	>16.44	BM 2370	29760	>15.15
RH 8013	28904	>16.44	BM 3120	30002	>15.15
BM 804	28982	>15.15	BM 3172	30018	>14.28
RH 8234	28993	>15.15	RH 10182	30020	>16.44
BM 825	28993	>15.02	BM 3209	30030	>14.28
BM 845	29013	>14.28	MA 8753	30049	>17.50
RH 8272	29016	>15.15	MA 8783	30105	>16.44
RH 8281	29020	>15.15	MA 8811	30134	>16.44

Plate	M.J.D.	m_{pg}	Plate	M.J.D.	m_{pg}
MA 8819	30144	>16.44	RH 15253	33301	>16.44
MA 8853	30171	13.84(c)	MC 36778	33388	>16.44
RH 11005	30438	>15.15	RH 15635	33768	>15.15
MC 33435	31176	>16.44	MC 37233	34045	>18.43(a)
RH 12922	31523	>15.15	MC 37919	34834	>17.50
MC 34483	31859	>17.50	MC 37921	34834	>18.05
MC 34535	31907	>18.43	MC 37924	34836	>18.43(b)
RH 13841	31911	>16.44	MC 37926	34836	>18.05
MC 34544	31930	>18.43	MC 37933	34837	>18.43(a)
MC 34576	31976	>18.43	MC 37935	34837	>18.05(a)
MC 35259	32213	>16.44	MC 37939	34854	>17.50
MC 35328	32264	>18.43	MC 37941	34855	>17.50
MC 35354	32285	>18.43(a)	MC 37942	34855	>18.43(b)
MC 35362	32293	>18.43	MC 37943	34855	>16.44
MC 35941	32623	>18.43	MC 37944	34857	>16.44
MC 35948	32628	>17.50(b)	MC 37946	34857	>16.44
MC 35962	32645	>18.43(b)	MC 37956	34862	>17.50
MC 35968	32648	>17.50	MC 38158	35163	>17.50
MC 35985	32668	>18.43(a)	MC 38166	35181	>17.50
MC 36287	32955	>18.43(b)	MC 38176	35186	>17.50
MC 36307	32969	>17.50	MC 38178	35186	>17.50
RH 14936	32979	>16.44	MC 38189	35195	>17.50
MC 36338	32996	>18.43(a)	MC 38196	35214	>17.50
MC 36359	33028	>17.50	MC 38199	35216	>17.50
MC 36702	33036	>18.05	MC 38200	35216	>17.50
			MC 38201	35216	>17.50

Notes

- Rosino's object is possibly barely visible by eye.
- Rosino's object is barely visible by eye. Probably on the order of $m_{pg} \approx 18.5$ as a star with $m_{pg} \approx 18.5$ was not observed.
- See text.