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SURGES IN COMETARY BRIGHTNESS AND OBSERVATIONAL ERRORS

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In the brightness of some comets sometimes surges, sudden outbursts or drops have been observed. Well-known anomalous outbursts in the brightness of the periodic comet Schwassmann-Wachmann 1, of the order up to 5 magnitudes, were recorded on the basis of ample observational material, mostly photographic; they are doubtlessly real /1/. Similar, but not so strong increasings were observed in brightness of comets P/Pons-Brooks 1884 I, Whipple-Fedtke-Tevzadze 1943 I, Burnham 1960 II, Alcock 1963 III and some others.

On the other hand, some comets show sudden drops in brightness, as e.g. comet Ikeya-Seki 1968 I for which a decrease amounting to about 1 magnitude, occurring about 1968, March 25, was reported by several observers /2/.

There is no doubt that fluctuations in brightness of comets do exist. But sometimes these surges are deduced from visual estimates the accuracy of which is very problematic. The writer collected visual and photographic magnitudes of comet 1968 I published by various observers /3, 4, 5, 6/. These magnitudes are plotted in Fig. 1 which clearly shows the inhomogeneity of the observational material. Although an accurate determination of the cometary brightness - both visually and photographically - is rather difficult, it is incomprehensible that two estimates of the comet's

brightness obtained at the same time (e.g.1968 February 28.1) differing by about 5 magnitudes may be published! Such a case is, of course, exceptional. However, from Fig. 1 it is evident that differences of 1 magnitude or more are current. If such observational material is used, many fictive "outbursts" or "drops" of comets' brightness may be found.

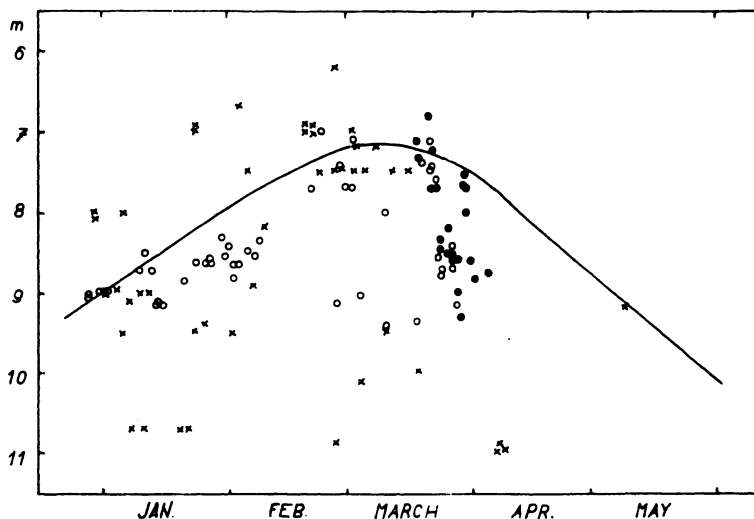


Fig. 1. Brightness of comet 1968 I in the year 1968. Photographic (crosses) and visual (open circles) magnitudes according to various observers /3, 4, 5/ and visual magnitudes by A. L. P. O. reduced to a common aperture of the objective of 2.67 inches (full circles) /6/. The full curve represents computed brightness of the comet assuming empirical formula  $m = 3.12 + 14.62 \log r + 5 \log \Delta$ .

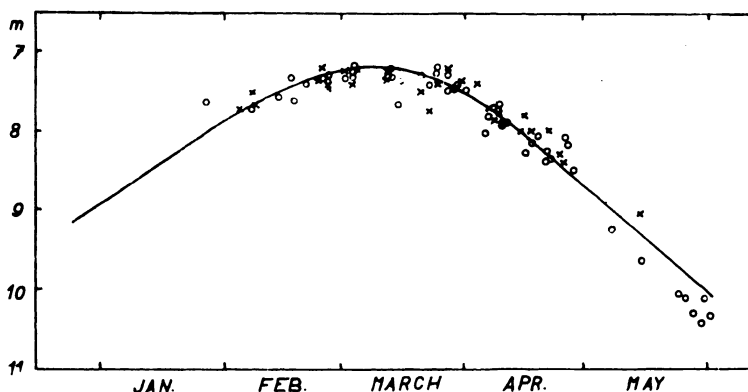


Fig. 2. Visual brightness of comet 1968 I in the year 1968 according to observations by Beyer (open circles) and Wenske (crosses) /7/. Full curve:  $m = 3.12 + 14.62 \log r + 5 \log \Delta$ .

On the other hand, there are some observers of comets, whose observational material is very homogeneous and accurate. Fig. 2 contains the brightness of comet 1968 I according to observations by Beyer and Wenske /7/. These observations show only small fluctuations in cometary brightness the occurrence of which is quite usual, but they do not show any sudden drop about March 25. Likewise, photoelectrical observations by Vanýsek /8/ confirm that during the observational period (March 25 - April 17) no larger fluctuations were observed in the comet's brightness.

It must be supposed that also some surges in brightness of other comets may be explained by observational errors only. For every investigation of brightness of comets, first of all very homogeneous observational material, preferably photoelectrical, must necessarily be used. If such material is not available, all corrections (for telescope aperture effect, etc.) are illusory.

#### References

- /1/ Richter N., Astr. Nachr. 271, 207 (1941).
- /2/ I.A.U. Circ. No 2068 (1968).
- /3/ I.A.U. Circ. Nos. 2046, 2047, 2048, 2050, 2051, 2054, 2056, 2057, 2059, 2061, 2068, 2074, 2082 (1968).
- /4/ Kometn. Tsirk. Kiev Nos. 64, 65, 66, 68 (1968).
- /5/ British Astron. Ass. Circ. No. 497 (1968).
- /6/ Sky Telescope 35, 329 (1968).
- /7/ Beyer M., Astr. Nachr. 291, 239 (1969).
- /8/ Vanýsek V., Bull. astr. Inst. Csl. 20, 355 (1969).