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**KN Gem: MISCLASSIFIED BECAUSE OF MISIDENTIFICATION**

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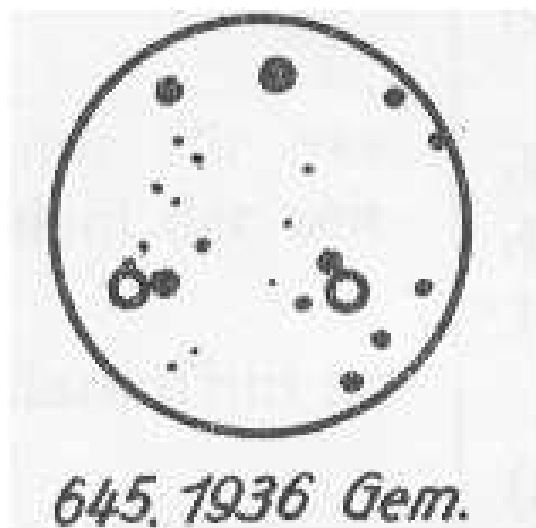
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The variable star KN Gem = AN 645.1936 was discovered by Morgenroth (1936), whose publication includes a finding chart. He attributed the star to possible U Gem variables: it was observed bright on a single plate, on January 24, 1936. The next night's plate does not show the star, it was fainter than  $14^m.5$ . The variability range was given as  $13^m$  to fainter than  $15^m.5$ . Because of only one positive observation, the star was kept in catalogs of suspected variables (Prager 2863, CSV 779), though the discoverer specially stated that the object did not look like a plate defect and probably was not a minor planet. Later Meinunger (1965) claimed that Morgenroth had misclassified the star. According to Meinunger's photographic observations, the star is red, belongs to Mira variables, and has the light elements  $\text{Max} = 2428194 + 156^d.0 \times E$ . This finding was the reason for the GCVS team to give the star its final variable star designation. The only other paper known to the author that apparently mentions positive observations of KN Gem belongs to the AFOEV team (1970). It states that the star was always at  $13^m$  during 91 visual observations (JD 2439790–2440707).

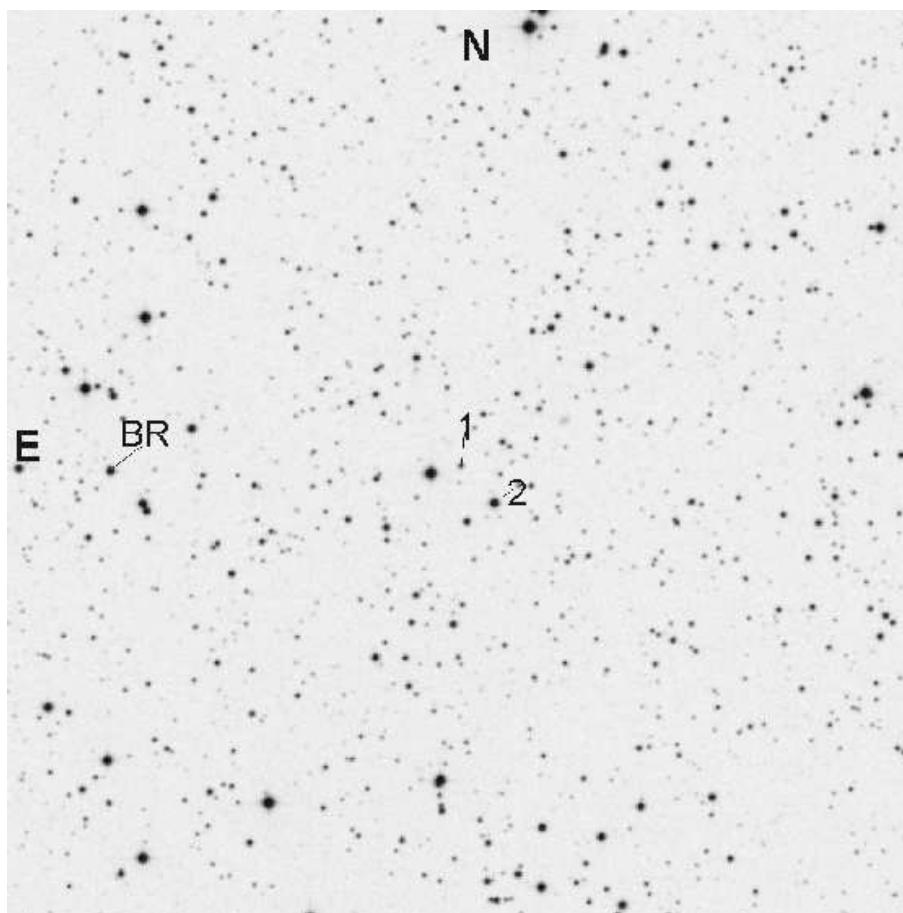
The GCVS group is now working on improved positions for all “old” variable stars. KN Gem attracted our special attention because Gulyaev (1995) had warned us that the charts by Morgenroth (1936) and by Tsessevich and Kazanasmas (1971) had different stars indicated as KN Gem (as a rule, in such cases we decide in favor of the chart published by the discoverer).

We were surprised to find that there was no red star in the position of KN Gem. The Morgenroth (1936) chart, in agreement with the chart published by Brun and Petit (1959), leads to a region with several candidate stars from the US Naval Observatory A2.0 catalog, the brightest of them at  $6^h35^m53^s.94$ ,  $+26^\circ52'58''.1$  (2000.0), with the blue magnitude  $15^m.0$  and the  $b - r$  color index  $-0^m.3$ . (The Tsessevich & Kazanasmas star is GSC 1888.143, its USNO A2.0 blue magnitude and color index are respectively  $13^m.3$  and  $0^m.9$ .)

Interesting enough, the chart in Morgenroth (1936), reproduced in Fig. 1, though labeled “645.1936”, actually shows two variable stars, 645.1936 and 646.1936. The latter star is the designated GCVS star BR Gem. The GCVS gives for it the Mira type and the light elements  $\text{Max} = 2439909 + 155^d.80 \times E$ . A list of maxima of BR Gem, derived from Sonneberg plates, was published by Van de Voorde (1943); all of them have their counterparts in the list of maxima of KN Gem determined from Sonneberg plates by Meinunger (1965), deviations are within errors. Thus we definitely conclude that all Meinunger's results for KN Gem actually refer to BR Gem.



**Figure 1.** The finding chart from Morgenroth (1936). According to Morgenroth, the diameter of the displayed field is  $10'$ ; south is on top. Of the two stars marked, 645.1936 = KN Gem is to the left and 646.1936 = BR Gem, to the right



**Figure 2.** The  $15' \times 15'$  field around KN Gem (from the second-generation Digitized Sky Survey, red image). 1: the brightest USNO A2.0 candidate (see text); 2: the star marked in Tsessevich & Kazanymas (1971). BR Gem = GSC 1888.611 is also shown

I have checked 85 plates of the field taken with the 40-cm astrograph of the Crimean Laboratory, Sternberg Astronomical Institute, on JD 2433307–2438499 and 2445756–2447918. No outbursts have been detected. The 15<sup>m</sup>0 candidate, mentioned above, can be slightly variable.

My final conclusion is that KN Gem is no Mira but remains an unconfirmed U Gem variable. The blue color of the candidate makes the U Gem classification possible, but by no means proven.

The stars mentioned above are identified in Fig. 2. Astronomers having access to the original Morgenroth's plate of January 24, 1936 are encouraged to check if the image of KN Gem is actually no plate defect and to measure the star's accurate position.

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