implies the unreasonably low temperature, 500°K , particularly since the hyperfine structure amounting to a separation of components of $0.12\text{\AA}$ should appear. Hence its interpretation as hydrogen absorption is uncertain. The absorption feature and the asymmetry of the line disappear at the limb.

The general asymmetry of the line can be explained if we assume a complex emission core produced by jets or small prominences, some having a radial velocity of 5 km/sec toward the sun and others with a velocity of 8 km/sec outward from the sun. In a general way this agrees with the H_2 , K_2 emission in *Ca. T.* Royds observed on $\text{H}\alpha$ spectroheliograms that dark markings and the bright emission markings accompanying spot disturbances showed best when the second slit of the spectroheliograph was set $0.2\text{\AA}$ to the violet.¹ When the slit was set to the red it was observed that the markings disappear and the image is much less contrasty. Further observations will be made on the relationship of the line profile to spectroheliograms.

1. *M. N.* 71, 723, 1911.

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Rabe, Eugene K. Escaping satellites of Jupiter.

The transfer between satellite and planetary motion, in view of G. P. Kuiper's conception of a decreasing mass of the original Proto-Jupiter due to evaporation, has been studied by numerical integrations for one selected hypothetical case of an intermediate motion. The orbit that Hill considered the orbit of maximum lunation, properly adjusted for the assumed large mass of Jupiter in our case, has been chosen for the starting conditions. Since Hill's orbit was computed on the basis of approximate differential equations, some deviation from actual periodicity had to be expected for the result of my own computations for an original Jupiter mass of 0.020 solar masses. Due to its non-periodicity, the resulting oscillating satellite-type motion is unstable. The small body escapes from Jupiter even without the additional effect of Jupiter's mass decrease. The orbital curve resembles, with its loops and with a close passage of Jupiter before the final ejection, the ejection orbits which have been computed by Darwin and at the Copenhagen Observatory. For almost a whole synodic revolution, including the backwards integration, the small body of my investigation moves

in reasonably close agreement with the synodic period of Hill's approximating solution, but then a close approach to Jupiter and the following ejection put an end to this similarity, even for a constant mass of Jupiter. By comparison of my two computed orbits, one for a constant mass and one for a rapidly decreasing mass of Jupiter, the effect of Jupiter's mass decrease on this type of periodic or near-periodic motion could easily be shown.

Both integrations were started with the satellite in opposition to the sun. In both cases the small body is soon ejected towards increasing solar distances. The planetary orbit thus produced by some deviation from the selected periodic orbit of the satellite type resembles most the Hidalgo-type of planetary orbits, with an eccentricity very close to that of the actual planet Hidalgo. This result gives some support to Kuiper's suggested origin of Hidalgo as an escaped satellite of Jupiter. For an original mass of Jupiter of the order of the adopted value, there seems to be a natural connection between the limiting ejection-type periodic satellite orbits and planetary orbits of the Hidalgo type. Such a transition appears likely if we may assume that in the last stages of its satellite existence such a small body actually moves in an orbit somewhat similar to the very special type of an intermediate orbit here considered. Further computational evidence would be desirable to justify such an assumption.

My integrations further revealed a systematic decrease of the value of the Jacobi integral, C , in consequence of Jupiter's mass decrease, in agreement with the conclusion that I had previously obtained by analytical considerations of the effect of a changing planetary mass on the classical restricted problem of three bodies. It is my intention to continue and extend these numerical investigations at some later time, mainly with regard to the Trojan planets, for which an origin as escaped satellites of Jupiter has also been suggested by Kuiper. Details about the method of integration and the numerical results will then be presented together.

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Roberts, Morton and Allan Sandage. Group characteristics of the RR Lyrae stars in M 3.

The purpose of this investigation was to determine the region occupied by the RR Lyrae stars in the color-magnitude diagram of M 3. Twenty-