# Sturla Einarsson, 1913: Thesis Abstract

THESIS:—On the Orbits of the Minor Planets (624) Hector and (588) Achilles of the Trojan Group.

The equilateral triangle configuration is one of the two cases in the problem of three bodies which can be solved without approximation. The four minor planets of the Trojan Group conform roughly to this case. According to the investigations of E. W. Brown, the motions of these bodies have the following distinctive features: The mean motion suffers a perturbation of long period (approximately 150 years); this long-period perturbation is nearly independent of the eccentricity and inclination, the only known case of such independence; the libration in the mean motion may become very large, for it may carry the body from one triangle point to the other, 60 degrees on the opposite side of Jupiter from the Sun.

Definitive orbits of these bodies will be of great assistance in the verification of these purely theoretical considerations. Only one has been computed to date, that of (624) Hector, by Professor Strömgren of the University of Copenhagen. The difficulties which he experienced and the great amount of numerical work which he had to perform led to the investigation of the most suitable methods for the derivation of osculating orbits for the minor planets of this group.

Comparison of cometary orbits computed by many different methods has established the fact that the Laplacean methods yield, almost without exception, more accurate results and involve considerably less numerical work. In addition, when the attraction of a third body is appreciable, that method will yield the most accurate result, which takes immediate account of this attraction in the computation of the preliminary orbit. Investigation of the orbits of (624) Hector and (588) Achilles was undertaken by Leuschner's method of deriving orbits on the basis of more than one attracting body in order to supply actual numerical verifications of these statements. The result of this investigation shows that a first approximation by Leuschner's methods yields results as accurate as a second, and sometimes a third, approximation by other methods.