THE DISTRIBUTION OF ENERGY PERTURBATIONS FOR HALLEY'S AND SOME OTHER COMETS

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1. Introduction

As a result of conversations with Dr. J. M. Hammersley the writer became interested in the "random walk" which a comet performs along the energy scale when making its successive revolutions about the sun. The subject is of course far from being a new one; in particular, significant papers by H. N. Russell [13], A. J. J. van Woerkom [17], and J. H. Oort [12] must be mentioned. Recently, however, J. M. Hammersley and R. A. Lyttleton [9] have taken up some of the stochastic problems involved in great detail, and following on their work the relevant integral equations have been investigated (Kendall [10]) from a slightly different point of view. In all this analysis a conspicuous role is played by the frequency distribution of energy perturbations suffered by a comet during the transition from one aphelion to the next, and it therefore seemed appropriate to collect and discuss some empirical evidence on the form of this distribution which is available in virtue of earlier computations.

It is important for the theoretical work that one should know the distribution of energy perturbations for strongly bound as well as for loosely bound comets, and it is fortunate that the evidence is not entirely restricted to the loosely bound comets, even though the fragment of evidence relating to the other end of the energy scale concerns just one comet (Halley's) and that not a specially typical one.

2. Energy perturbations for Halley's comet

In 1907–1908 P. H. Cowell and A. C. D. Crommelin [1]–[5] made an extensive series of computations concerning the motion of Halley's comet. These were inspired in the first instance by the forthcoming reappearance in 1910 and by the desire to predict as accurately as possible the epoch of perihelion. Their best known series of calculations, and the most accurate, relates to the motion

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