

APPENDIX 2

When Was Ptolemy's Star Catalogue Really Compiled? Variable Configurations of the Stars and the Astronomical Dating of the Almagest Star Catalogue

This work was done by A. T. Fomenko, V. V. Kalashnikov, and G. V. Nosovsky and was initially published (in Russian) in *Stability Problems of Stochastic Models*, 1988, Systems Research Institute, Moscow [310]. See also [313, 317].

This work is devoted to describing a new method of dating the moving configurations of stars on the celestial sphere. The method was tested on several star catalogues whose dates are well known (Tycho Brahe, etc.) and also on several star catalogues which were generated artificially. Then the same method was applied to the Almagest. The results obtained do not confirm the traditional dating of the Almagest (2nd century A.D. or 2nd century B.C.) but shift its dating to the epoch 600–1300 A.D.

1. History of the Problem and Subject of the Work

Interest in the problem of dating the Almagest (compiled by Ptolemy) is not new. See, for example, *The Crime of Claudius Ptolemy*, a review of the problem by the well-known astronomer R. R. Newton [321], as well as the fundamental investigation of C. H. F. Peters and E. B. Knobel [320].

Increased interest in the problem followed the publication of the investigations of N. A. Morozov in 1928 [13], which raised well-grounded objections to the traditional dating of the 2nd century A.D. or the 2nd century B.C. for the Almagest. Much interesting and critical material is also contained in the book by R. R. Newton mentioned above. Newton formulated the well-grounded conjecture that the main part of the astronomical data in the Almagest had been falsified.

New impetus to a deeper investigation of this problem was given by the works of A. T. Fomenko [18–20, 24, 295] in 1980–1987, in particular by the paper *The jump of the second derivative of the moon's elongation* [20]. Fomenko introduced some new empirico-statistical methods for the analysis of ancient narrative texts (historical chronicles, etc.). He then investigated the whole system of ancient chronology and summarized all these results in a *global chronological diagram* (see details in [18–22]). The recent paper by Y. N. Efremov and E. D. Pavlovskaya [325] attempted to confirm the traditional dating of the Almagest star catalogue based on the proper motions of the stars. Reasons for the failure of this attempt are explained briefly below.

In the present work we describe a method for dating the moving (variable) con-