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SHORT REPORTS AND COMMUNICATIONS

EMPIRICO-STATISTICAL METHODS FOR ANALYSIS OF NARRATIVE AND NUMERICAL SOURCES WITH APPLICATIONS TO THE PROBLEMS OF ANCIENT AND MEDIEVAL HISTORY AND CHRONOLOGY

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It is regretfully common that numerous historical events are falsely dated. For instance, statistical and astronomical analysis of Ptolemy's Almagest (in "Geometrical and Statistical Methods of Analysis of Ptolemy's Almagest," by A. T. Fomenko, V. V. Kalashnikov, G. V. Nosovski) proves that the date of the compiling the star catalogue in the Almagest belongs to the time interval 600-1300 A.D. This fact contradicts the standard date of the creation of the Almagest: 2nd century A.D. How is it possible?

Chronology is what tells us how much time has elapsed between historical events and the present time. To determine a real chronology one must be able to translate the data from ancient documents into the terminology and notion of modern time reckoning. Many historical conclusions and interpretations depend upon what dates we assign to the events in a given ancient document. This problem is very complicated.

The chronology of ancient and medieval history in its present form was created in a series of works during the 16th and 18th centuries, beginning with J. Scaliger (1540-1609), the "founder of modern chronological science," and D. Petavius (1583-1652). The series of these works, however, is not entirely complete, as the well-known chronologist E. Bickerman observes, "there is no adequate, full-scale treatment of ancient chronology."

The accepted traditional chronology of the ancient and medieval world rests on quite a snaky basis. Indeed, between different versions of dating such important events as the foundation of Rome, there exists 500 years long (standard) deviation (T. Mommsen).

Consequently, it is not surprising that certain skeptical minds have made dramatic conclusions from the above-mentioned difficulties: de Arcilla, Isaac Newton, J. Hardouin, R. Baldauf, E. Johnson, N. A. Morozov and others. Thus, as early as the 16th century A.D., Professor of Salamanca University, de Arcilla, published two papers in which he stated that the whole history earlier than the 4th century A.D. had been falsified. Isaac Newton devoted many years to historical and chronological studies. He made up his own tables in accordance with a new chronological version. Some of the important events of Greek history were moved forward by Newton chronologically 300 years, and those of Egyptian history even

1000 years. The first serious attempt to systematize the considerable critical material and to analyze historical paradoxes and duplicates from the standpoint of natural science was carried out in the fundamental work "Christ," by esteemed academician N. A. Morozov (1854-1946), who was not only a revolutionary and public figure, but also a remarkable scientist with encyclopedic knowledge, an expert in chemistry, physics, mathematics, and history.

Consider the three famous eclipses of Thucydides - 5th century B.C. ("History of the Peloponnesian War," Bks. ii, 27-28; iv, 51-52; vii, 18-19, 50), which can be dated using modern methods. There are only two exact astronomical solutions: the first solution is August 2, 1133 A.D., March 20, 1140 A.D., and August 28, 1151 A.D., whereas the second is August 22, 1039 A.D., April 9, 1046 A.D., and September 15, 1057 A.D. This example is not unique.

In order to overcome the difficulties in establishing accurate chronology, one must try to view the subject from a different vantage point and create an independent methodology which is not based upon subjective impressions. Only after this is done should one proceed to analyze chronology in its entirety. In our opinion, the most worthwhile approach uses statistical analysis of various numerical characteristics of historical texts. Some new methods were suggested by the author and his colleagues. These methods make no claim to universality. Moreover, the results obtained by means of each individual method cannot be taken as definitive. A reasonable criterion for the validity of our results is an agreement between the dates which are obtained by different methods.

About fifty years ago, N. A. Morozov found three pairs of ruling ancient dynasties for which the sequences of lengths (periods) of reign, represented visually on the time line, bore a striking resemblance to one another. He suggested that in each case the two dynasties were actually reflections of a single, real dynasty which "became multiplied" as a result of mistakenly dating the same events described in different texts. However, it is not enough to rely upon subjective impression. For this reason we set about creating a formal quantitative method for determining whether the two dynasties are a merely different manifestation of a single dynasty ("dependent dynasties") or are truly distinct ("independent dynasties") of one another. The application of this method to historical data traditionally believed to belong to earlier than the 13th century A.D., unexpectedly led to the discovery of pairs of dynasties regarded as independent in all the senses, but for which the special proximity coefficient is extremely small.

We had to put together as complete as possible a table of events in traditional chronology of the ancient and medieval history of Europe, the Mediterranean, Egypt, and the Middle East. To do this we combined the information from 15 chronological tables and 228 primary sources. Together, these chronicles describe practically all important events between 4000 B.C. and 1800 A.D. In this way we constructed a table, which we call *Global Chronological Diagram* (GCD). Our statistical methods for dating events and recognizing duplicates were applied to the large quantity of historical data in the GCD table. After performing a vast computer experiment involving the analysis of hundreds of texts, we unexpectedly discovered pairs of periods which in traditional history are assumed to be independent (in all senses of the word), but have statistical characteristics which are extremely close.

Let us give an example. The chapter-volume graph for the primary sources which describe ancient Roman history from 753 B.C. to 236 B.C. has its local maxima at essentially "the same points" as the analogous graph for medieval Roman history from 300 A.D. to 816 A.D. Of course, here we must first align the two 500-year time intervals. This same statistical parallelism was also revealed by other methods.

The global chronological diagram represents the modern version of traditional "textbook" of ancient and medieval history and chronology (based on Scaliger's chronology). We investigate the inner hidden structure of this "textbook." Our calculations show that the "modern textbook" contains an extremely interesting system of statistical duplicates.

Speaking loosely, we might say that the commonly accepted "textbook" of ancient and medieval

European, Mediterranean, Egyptian, and Middle Eastern history is a layered chronicle obtained by gluing together four nearly-identical copies of a shorter chronicle 'A'. The chronicle-original 'A' describes the events from 9th century A.D. to 17th century A.D. The other three chronicles are obtained from 'A' by redating and renaming the events described in them; we rigidly move 'A' in its entirety backwards in time by 333, 1053 and 1778 years (approximately). Thus, the "textbook" was obtained (many years ago) by duplication of its smaller part, namely - from chronicle 'A'. Almost all of the information in the original chronicle 'A' is concentrated to the right of 960 A.D. In reality, we have extensive historical records only starting from 960 A.D. Thus, the currently accepted global chronology before the 13th century A.D. is in need of radical changes. Conjecture: we have to redate a certain number of ancient events which until now have been placed in very ancient times. To do this we must take out large parts from the "textbook" (namely, the part before 10th century A.D.) and move them forward in time, as indicated above. After this procedure, one finds that the known written history of Europe, the Mediterranean, etc. becomes much shorter: most of the events which are traditionally dated earlier that the 10th century A.D. (ancient Rome, ancient Greece, etc.) turn out to be in the time interval from 10th century A.D. to 17th century A.D. Revising chronology in this way, one finds that many of the old paradoxes in traditional dating disappear.

However, we categorically disagree with the suggestion of N. A. Morozov and some of his predecessors that our information about antiquity is a fabrication (some fantasy) of later chroniclers. The results obtained by means of the new statistical dating methods show that almost all surviving ancient documents are authentic and written to the purpose of perpetuating real events rather than leading the future historians astray. More than that, many of the documents regarded today as adulterated turn out to be originals which are extremely and naturally consistent with our new version of short statistical chronology. In our opinion, practically everything described in the old documents "did, in fact occur." The problem is: when and where?

SUMMARY. These two volumes represent a major, unique work which is the first of its kind published in the English language. A comprehensive set of new statistical techniques is pre-sented for the analysis of historical and chronological data. These techniques constitute a new important trend in applied statistics.

The first volume concentrates mainly on the development of statistical tools and their applications to astronomical data: of ancient eclipses, of the Almagest, etc. The second volume analyzes ancient and medieval chronicles and records (Egyptian, Byzantine, Roman, Greek, Babylonian, and European). An astonishing wealth of historical data is presented. The surprising conclusions are drawn from the new approach to the historical chronology designed in an entirely different time scale. [The conventional chronology can be restored from the one proposed by Fomenko by using special "time shifts."] They will certainly provoke controversy and serious debates. In particular, in this scenario, ancient Rome and Greece are placed in medieval times. The book provides all necessary backgrounds and materials for intelligent participation in such debates.

Audience: Statisticians, historians, astronomers, archaeologists, and others with an interest in the integrity of the historical data with the use of modern science.

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