

## **Old books and manuscripts as a source of valuable ecological knowledge**

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**ABSTRACT:** Speaking about the value of old and rare books, one usually means their historical and cultural significance. This report will specially focus on their importance in carrying out ecological studies.

Like everything in this changeable world, we have to adapt to/live through a complicated network/ a complicated web of natural rhythms going on different time scales. It is through insight into the past we understand changes that develop today, and it is insight into the past that helps to predict would-be events. The past discloses either through investigation of geological sediments or through old books and manuscripts. The analysis we have made shows how recent publications on ecological disciplines can be used in paleoreconstruction of the past events. An important aspect is the problem of preservation of the old books and manuscripts which are the valuable information resource to be used by ecologists and marine biologists today and in future. Old books must not be only properly stored and preserved but also thoroughly studied. Therefore, it is advisable to work out an international research programme intended to combine the efforts of ecologists and the librarians who deal with the old and rare book stock.

Books and manuscripts written in the former times are not just the relicts of history and culture; they also supply information valuable to modern scientific investigations on the long-term changes in the global environment. Understanding that the majority of the alterations in our changeable world are quasi-periodical has been acknowledged as a fundamental principle of natural sciences. Forecast of the potential environmental changes has become of top importance; otherwise the humanity would miss the chance for sustainable development. However, to predict a future change in the environment one should gain the insight into the past events. In other words, the past is the platform on which the future develops. There are two sources that may provide a valuable assistance: 1) geological deposits and sediments, those original records that the nature has left about the past changes, and 2) old books and manuscripts.

Here are three examples adopted from the Great Book of Nature:

1. Organisms both fossil and living nowadays have several indicators of growth and growth fluctuation – daily, monthly, seasonal and annual ones. In fossil corals the growth rings are especially distinct on the wrinkled outer layer (epitheca); from these age rings the number of days in a year was computed for the past geological epochs (Nikolov, 1986). The computations have shown that since Cambrian when first corals emerged the year has been progressively decreasing - from 420-425 to 365.25 days.
2. In learning and deciphering the information about geological sediments of the prehistoric times palaeontologists use a valuable tool - actualistic approach, i.e. the knowledge of the analogues between the present and ancient phenomena, processes and systems. For instance, studying the communities inhabiting extreme hypersaline lakes facilitates decoding of the most ancient fossil communities known on the Earth (Gerasimenko, Orleansky, 2004; Mikhodyuk et al., 2005; Gerasimenko et al., 2008).
3. The ratios between stable oxygen isotopes measured in the shells of prehistoric Foraminifera, ostracods and molluscs help to reconstruct temperatures of the environment in which those organisms lived (Fenton, Fenton, 1996).

In getting understanding about environmental phenomena of the past the chronicles and manuscripts passed down from generation to generation are of utmost significance. For instance:

1. The Chinese and the more recent European records have helped to reconstruct the more than 2 thousand-year dynamics of fluctuations of the sun spots (The Variations ..., 1992). This permitted to differentiate between the solar activity rhythms of different duration and to understand the effects this activity produces upon life on the Earth.
2. A notable contribution to the history and agricultural meteorology was made after surveying numerous old manuscripts; the results obtained had shed light on the weather conditions and their impact upon poor harvests in Europe for as large time span as 2 thousand years (Barash, 1989).
3. Consulting the scientific literature related to his investigation of Black Sea hypersaline lagoons, the author by sheer luck had found the publications in which the Russian scholar P.A. Chikhachov described his study on the similar subject made in the first half of the 19<sup>th</sup> century (Chikhachov, 1982). In exploring the topic, P.A. Chikhachov used manuscripts left by ancient authors that helped him in defining the time limits for which some of the lagoons had existed. Moreover, the span of time had been specified for which the port of the ancient town of Cymmeric was exploited, and, correspondingly, the time when lake Koyashskoye separated from the Black Sea (Golenko, 2007).
4. Having gained the knowledge about the environmental demands of different birds V.I. Voronetsky (2000) coupled it with conclusions he had arrived at when reading the manuscripts written during the 14 – 15<sup>th</sup> centuries and then had reconstructed the list of the bird fauna typical of the region at that time.
5. Ancient and old writings permitted to have traced Arctic climate changes in retrospect and to state that the temperatures registered in our days are not higher than those of the past ages (Klimenko, 2008). This conclusion agrees with results of the corresponding dendrochronological examination and provokes criticism of the hypothetically dramatic climate changes in Arctica.

It is regrettable that most of the valuable information the humanity was accumulating from age to age and from epoch to epoch has only rarely and by chance been employed in modern environmental sciences. The usual counterarguments are the “non-scientific and obsolete” character of the documents. But to those who study the past neither document of the past ages is obsolete. As to “non-scientific ” nature of the information, too often only those written sources provide the relevant knowledge accessible to interested researchers. Having been thoughtfully and adequately analysed with employment of modern methodology, such information would happily transform from non-scientific to scientific. Therefore, the task of primary importance is to make the past work for the present and, finally, to the future; in our case it refers to studying the long-term environmental changes. To be a success, bibliographers, ecologists and historians should combine their enthusiastic efforts. Old writings should not be carefully stored only but also treasured as the source that generously supplies invaluable ecological information to new generations interested in gaining the insight into the natural phenomena and cataclysms that have left an imprint on the human history. Specialists in different scientific disciplines should also unite to work out and implement the corresponding research programmes.

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