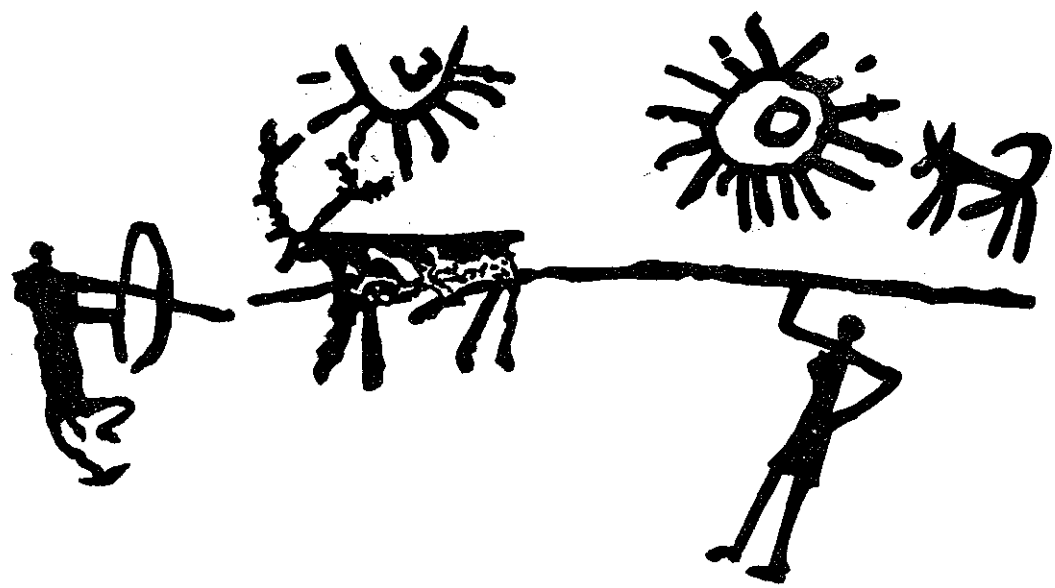
Reprinted from :

1983
VII

Man and Environment



INDIAN SOCIETY FOR PREHISTORIC
AND QUATERNARY STUDIES

Fossil diatoms from Baltal, Kashmir

Though diatoms are known from the mid-nineteenth century in the West, in India the first record of fossil diatoms was mentioned by De Terra and Paterson in 1939. After them several other subsequent workers have reported on the diatoms from Kashmir Karewas. In this note we discuss our findings on the diatoms of Baltal, on the river Romushi, in the light of the available literature.

The site Baltal is a village, near Romu, on the Romushi valley. The Romushi is flowing west to east, cutting through and exposing the thick pile of the Karewas, along its course, till it meets the Jhelum. The main exposures are on the left bank of the Romushi. The samples were collected by the team working for the Multidisciplinary Palaeoclimatic Project in Kashmir.

We have so far analyzed 41 samples from Baltal which have proved fairly rich in diatoms. Besides these, we analyzed 19 samples from the Hirpur Section, 71 from Dilpur, 32 from Sombur and 36 samples from Raithan. Except Baltal, all other samples proved sterile in diatoms.

TECHNIQUE

In the course of maceration, the samples were given following treatment.

A small portion of each sample was taken and boiled in concentrated hydrochloric acid for 15-20 minutes rendering it into a fine powder. The acidified samples were treated with distilled water and centrifuged. This was repeated till all the traces of acid were removed. The final residue was collected in specimen tubes after the removal of sandy substrate and preserved in 5-6 % formalin.

DIATOMS

The following genera were identified from the Baltal assemblage :

Cyclotella, Stephanodiscus, Fragilaria, Achnanthes, Cocconeis, Diploneis, Caloneis, Navicula, Pinnularia, Amphora, Cymbella, Gomphonema, and *Surirella.*

In all the samples *Stephanodiscus astraea* (Ehr.) Grun. predominated. A number of specimens were without porous membranes. Similarly *Cocconeis* were mainly represented by their outer shells. This degradation of the diatoms suggests a great age.

PREVIOUS WORK

De Terra and Paterson (1939) men-

tion the occurrence of only 3 entities of *Cyclotella*. In 1943 Iyengar and Subrahmanyan described 17 diatoms from the Karewas, probably derived from Gulmarg area. Rao and Awasthi (1962) published the diatoms from Laradura and described 10 Centric diatoms out of which, according to them, 4 new varieties and 1 new species were noted. They ascribed these elements to the Pleistocene period. They also mentioned the occurrence of Pennate diatoms but did not describe them in detail. The most recent work was by Roy (1974:204) who analyzed several samples containing fossil diatoms from 32 localities of Kashmir. He reported that diatoms were confined only to the Lower Karewas, the Upper Karewas were sterile. He further stated that the lower-half of the Lower Karewas (Bio-zone I) was dominated by Centric diatoms and the upper half of the Lower Karewas (Bio-Zone II) was dominated by the Pennate types.

DISCUSSION

Baltal is a new locality and diatoms are being reported for the first time. Our findings show that the assemblage is a mixture of both the Centric and the Pennate types. Thus both our evidence and Rao and Awasthi's report go against the contention of Roy that there is a segregation of the two types in the lower and the upper parts of the Lower Karewas. Similarly we are against using the limited evidence for dating. A large number of diatom taxa, reported from the Karewas, are known to have a wide temporal range from the Oligocene to the Holocene, on the basis of the evidence available from U S A., Europe, Japan and other countries.

Roy (1974: 204) reports *Coscinodiscus, Raphoneis, Mastogloia, Pleurosigma* and *Licmophora,* besides other genera. These genera, however, are of marine origin, and therefore have to be pre-Miocene in the context of Kashmir. Either these identifications have to be doubted or the earlier marine diatoms could have been reworked. We are looking into the earlier marine rocks for the possible presence of diatoms.

On the basis of the limited data at hand for Baltal, we would not like to hazard any definitive palaeo-ecological inferences, except to say that the occurrence of *Stephanodiscus, Rhoicosphenia, Melosira,* and *Tetracyclus,* suggest a lacustrine milieu and the presence of large *Pinnularia, Stauroneis* and *Cymbella* indicate cold conditions.

We are analyzing a large number of samples from all the available sections (exposures) of the Karewas of Kashmir. We hope to build up both a bio-stratigraphy and a climato-stratigraphy of the Karewas on the basis of diatoms as well as other collateral evidence obtained under the Multidisciplinary Palaeoclimate Project.

ACKNOWLEDGEMENT

We thank Dr. C. K. Shah, Head of the Botany Department for providing the laboratory facilities and Prof. D. L. Agrawal (P.R.L.) for providing the samples. We also wish to thank Dr A.B. Vora, Principal investigator, D. S. T. Project for associating us in the work.

REFERENCES

De Terra, H. and Paterson, T. T. 1939 *Studies on the Ice Age in India and Associated Human Cultures*, Publication number 493. Washington : Carnegie Institute

Iyengar, M.O.P. and Subramanyan, R. 1943. Fossil diatoms from the Karewa Beds of Kashmir, *Proc Nat. Acad. Sci.* 13(B): 225–237.

Rao, A.R. and Awasthi, P. 1926. Pleistocene diatoms from Kashmir, *Palaeobotanist* 11(1 and 2) : 82–91.

Roy, D. K. 1974. Stratigraphy and palaeontology of the Karewa Group of Kashmir. *In GSI Miscellaneous Publications No. 24.* New Delhi : Geol. Survey of India.

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