

## REVIEW

ORIGIN AND DISTRIBUTION OF THE ELEMENTS Physics and Chemistry of the Earth, Volume II, Editor L. H. Ahrens. Proceedings of the Second Symposium, Paris, May 1977, Pergamon Press (Oxford, New York) 1979, x+909, Price: \$ 80.

The study of composition and chemical transformation of the earth attracted the attention of Geochemists from the early days. The objective of their studies has been to determine the distribution of elements in the earth and decipher the processes whereby such a distribution has been achieved. The scope of such studies has been extended recently to cover other celestial bodies and is included under the title Cosmochemistry. The importance of such investigations has been reflected in the formation of The International Association of Geochemistry and Cosmochemistry (IAGC) by the experts from different fields. This organisation has been quite active and has already organised two symposia on the Origin and Distribution of Elements, first in May 1967 and the second a decade later in May 1977. Scientists from many countries and working in a wide variety of fields have contributed to cross fertilization of ideas and programs. The volume under review constitutes the Proceedings of the Second Symposium co-sponsored with the assistance of UNESCO. Over seventy papers were presented at the Symposium organised under nine sections.

The first section on Cosmochemistry (9 papers) includes topics on some processes of nucleosynthesis in the evolving galaxy, origin and content of meteorites, lunar material and a new Table on Solar abundances. Planetology, the second section has 6 papers covering the main features of Geochemistry of lunar rocks, the earth-moon system, the chemical evolution of the galaxy and isotopic ratios in the solar system. Archean atmosphere of the earth (Aldan Tune) and chemical model for origin and distribution of elements in salts and brines during evaporation of water are the topics of two papers in the third section on Hydrosphere and Atmosphere. Trace element distribution in rock forming silicates, rare-earth element behaviour in igneous rocks, indicator elements and platinum elements as well as the significance of their distribution are the major topics dealt in the eleven papers of the fourth section on Distribution and Behaviour of Trace Elements. The major element geochemistry and the mineralogical evolution of granitic rocks during weathering, minor elements in clay rocks, indicators of the sedimentation environment and related topics covered in nine papers are presented in the fifth section,—Geochemistry of the Surface. Geochemistry of the Oceanic and Continental Crust forms the subject matter of the sixth section which includes (i) a review of the geochemistry of Indian and other oceanic rocks, (ii) Evolution of ore formation in the history of the earth and (iii) ore element accumulation in the earth crust evolution. Rare earth element geochemistry of regional metamorphic rocks and chemical evolution in an old crustal area as well as the chemical composition and origin of the primeval continental crust are some of the contents of the seventeen papers presented in the sixth section. Inclusions in diamond, and mineral chemistry of the upper mantle, trace element melting models, the role on partial melting of mantle diapirism and allied subjects are dealt with in the seventh section (5 papers) under the title Geochemistry of The Upper mantle. The role of geochemistry in discovering mineral and ore deposits is highlighted in the eighth section covering the topic in 13 papers, such items as the redox potential field of the earth, and pyrite-pyrrhotite geothermometer. The last section nine, is devoted to the topic, Geochemistry and Health. Problems affecting the health and agricultural crops and livestock due to trace element deficiency or excess are well known. The relations between geochemical parameters and the occurrence of agricultural disorders and human disease as well as the applications of geochemical reconnaissance surveys to

problems of health and disease are covered in six papers. Some of the important results and observations made in U.K., U.S.A. and West Germany are furnished.

Thus the proceedings cover a wide spectrum of items of interest to geologists, chemists, physicists and a host of other experts. We expect that such fascinating account of this interdisciplinary subject will stimulate interest in this subcontinent among scientists and inspire them to take up such studies. The present volume is the thirty-fourth (34th) in the series brought out by the publishers under the title International series in Earth Sciences. The entire set will be a valuable possession of a Library in both academic institutions and industry.

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## COMMENT

### A record of Ichnogenus *Chondrites* from Ladakh, Jammu and Kashmir, India and its significance

(A comment on paper by D. K. Srivastava *et al.*, published in the Journal of the Geological Society of India, Vol. 21, No. 9, pp. 458-460).

Srivastava *et al.*, (1980) while reporting occurrence of *Chondrites* sp. from the hard grey shales in Tegar Formation of Skampu in Ladakh district of Jammu & Kashmir, have stated that the only other report on *Chondrites* from the Indian subcontinent is by Kumar *et al.*, from the Malla Johar area.

In this context it has to be pointed out that Chiplonkar and Tapaswi (1975) have already reported the occurrence of *Chondrites* from the Grey Shale horizon of Dalmiapuram Formation near Kallakudi, Trichinopoly district, South India. Probable age of this horizon is Upper Aptian to Lower Albian as based on the presence of foraminifers (Banerji, 1972) and ostracods (Bhatia and Jain 1969, 1972). The tunnels of the species are of constant diameter of 2 mm, circular in cross-section and are filled with what appear to be faecal pellets disposed more or less transversely to the length of the tunnels. It is a *Fodichnia* of Seilacher's ethological groups and indicates littoral to very shallow water deposition. The matrix is somewhat carbonaceous with minute grains of pyrites suggestive of oxygen poor conditions developed behind bars or lagoonal surroundings.

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## AUTHOR'S REPLY

Authors are thankful to R. M. Badve *et. al.*, for providing this useful information. Although due precautions were taken by the authors at the time of preparation of the manuscript, the reference under question (Chiplonkar and Tapaswi, 1975) was missed due to oversight.

A definite age for the Tegar Formation cannot be assigned at this stage, since no index fossil has been recovered from this horizon so far, though a few unidentifiable calcified shells of bivalves and gastropods are found in this Formation. The age proposed for the Tegar Formation by Bhandari *et al.*, (*Him. Geol.*, vol. 9, in press) is tentative, based on lithologic correlation.

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