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**GEOLOGICAL SOCIETY
OF
RAJASTHAN**

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GSR Bulletin

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From Editor's pen

Dear Brethrens,

Wish you a happy New Year

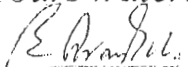
We have been advised by our ancient sages "Better Late than Never". This issue of our society's news letter is a bit later than scheduled and of course under a new heading. During past months, the organizing committee had met at several occasions to chalk out plans to strengthen the society. We have scored a century; nearly hundred geoscientists have joined our society. Such a number in such a short period is the evidence that there was a need for this platform. We are quite hopeful that this platform will grow with our collective strength and will be useful for the cause of geoscientist and thereby serve the nation.

From this issue we shall regularly introduce our members, by putting a brief light on their career, expertise and achievements for the benefit of our members.

We request you to please keep society informed about you regularly, so that any information can be dispersed through GSR Bulletin.

With the hope of your co-operation for the success of our society

Yours fraternally


P. C. Avadich

Biogeochemical changes from the anoxic Archean to the Oxidizing Proterozoic

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Environmental conditions on Earth have changed significantly through its 4,500 million years of history. Most notably, the accumulation of atmospheric oxygen in Earth history has profoundly affected the chemistry of oceans and the evolution of life. This short paper presents a brief overview of some key information on the evolution of Archean and Paleoproterozoic Earth system processes that may have had a significant influence on the evolution of life.

The rock record of the early Earth is well preserved in southwest Greenland where the oldest terrestrial sedimentary rocks occur. Sedimentary rocks deposited in a marine environment in the Isua Supracrustal Belt are more than 3,800 million years old. Multiple sulfur isotopes (isotopes are atoms with identical numbers of protons but different numbers of neutrons) from these rocks have been very useful to provide a crucial line of evidence that demonstrates that the atmosphere did not contain oxygen at that time. In fact sulfur isotopes suggest that Earth's atmosphere was anoxic during the first half of Earth history until about 2,500 million years ago, as illustrated in Figure 1.

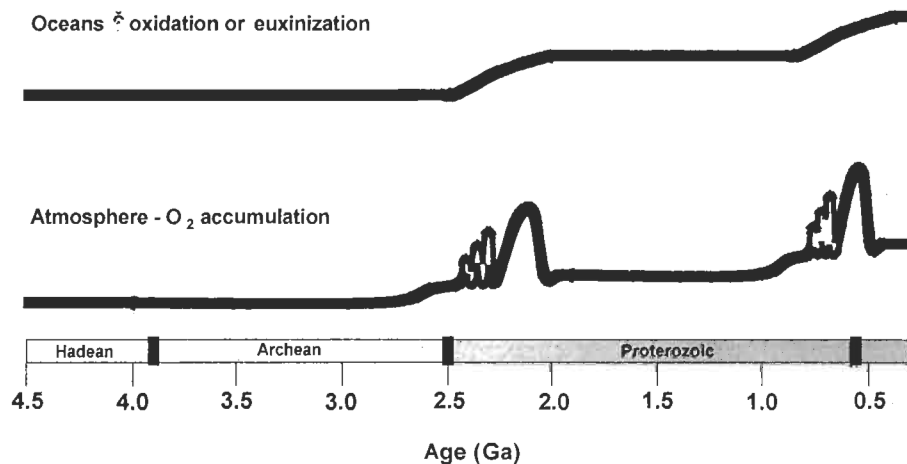


Figure 1. Qualitative illustration of the evolution of oxygen levels in the atmosphere and the oxygenation of the oceans.

To trace the emergence of biological activity on the early Earth, research has been focused on the oldest sedimentary rocks known: the 3,800 million years old Isua Supracrustal Belt and Akilia Association in southwest Greenland. Because these rocks are so old, metamorphism has significantly transformed them and therefore any microscopic fossils or stromatolites (microbially precipitated rocks) have been obliterated. However, isotopes of biologically important elements can survive metamorphism and preserve evidence for biological activity at the time of sedimentation. The current body of stable isotope data from Archean sedimentary rocks in southwest Greenland shows the presence of isotopically light carbon and nitrogen as well as a small range of sulfur isotope ratios. Collectively, these data have been interpreted as indicative of biological activity in anoxic environments more than 3,800 million years ago, but this interpretation is considered controversial. This is because isotope data in highly metamorphosed rocks can sometimes have alternative interpretations, which emphasizes the need for more data from distinct geographical areas.

Evidence for life during the middle Archean has been proposed from sedimentary rocks of marine origin from the Pilbara and Barberton (Western Australia and South Africa, respectively), which contain a variety of biological signatures such as stromatolite shapes (laminated rocks with wavy structures built by microorganisms), microfossils, and carbon, nitrogen and sulfur isotopes. Collectively, these geological and geochemical observations have been used to suggest that life had emerged before 3,500 millions years ago. However, it is important to note that evidence for early life in the geological record is currently considered controversial and microscopic fossils, stromatolites, and isotopes have also been interpreted to have formed without the influence of life. The only way to resolve the current controversies is to provide additional examples of these biological signatures from geographically distinct areas. More geological and geochemical data from Archean cratons such as the Dharwar Craton in India can only help to strengthen interpretations on Archean biogeochemical cycles.

Because oxygen-containing molecules are required for biological respiration, the lack of oxygen in the Archean atmosphere or in the oceans may have been a severe impediment for biological evolution during most of this era. In other words, the complexity of biogeochemical cycles was lower and the diversity of microbial metabolisms was likely smaller on the early Earth. As depicted in Figure 1, the accumulation of oxygen in the Paleoproterozoic atmosphere (around 2,500 to 2,000 million years ago) led to environmental changes favorable to the increase of dissolved oxygen (O_2), sulfate (SO_4^{2-}) and nitrate (NO_3^-) in seawater. The accumulation of these oxidants in Paleoproterozoic environments had a profound impact on the evolution of microbial metabolic pathways. The sedimentary record of stable isotopes indicates a shift in carbon, sulfur and nitrogen isotope ratios co-incident with atmospheric oxygenation at that time. Consequently, microbial metabolic pathways such as sulfate reduction, nitrification, denitrification, aerobic heterotrophy and various others must have become more important. A fascinating and possibly related observation is that the oldest fossils visible to the naked eye are about 1.9 billion years old, which may represent the rise of macroscopic organisms as a consequence of atmospheric oxygenation.

However, the causes of atmospheric oxygenation in the Paleoproterozoic are not well understood, but they may be related to periods of glaciation (possibly "Snowball Earth" events) and/or to the tectonic break-up of large continental landmasses (possibly supercontinents) in the early Paleoproterozoic. Geological evidence suggests that one or two large continental landmasses began to break up at the beginning of the Paleoproterozoic. Rifting of such supercontinents has been observed in various regions on the globe, where glacially derived sediments (e.g. tillites) have also been observed in the stratigraphies. The relationship between glaciations and continental rifting may involve changes in the phosphorous cycle whereby these two types of events lead to increased erosion rates and therefore phosphate delivery to seawater. This sudden increase in phosphorous concentration would in turn stimulate blooms of oxygenic photosynthesis. Sulfur isotope data from Paleoproterozoic interglacial marine sedimentary rocks suggest that atmospheric oxygen accumulated during these time periods and therefore that glaciations may be intimately linked to the accumulation of oxygen in the atmosphere. Research efforts are now focused on trying to understand the relationships between the Paleoproterozoic glaciations, atmospheric oxygenation and the evolution of life.

Member News.

- Dr. A. K. Vaish Additional Director, Dept. of Mines and Geology, GoR has been transferred to Jodhpur.
- Shri O. P. Yadav has joined the Rajsamand office of Senior Geologist, Dept. of Mines and Geology, GoR
- Dr. N. K. Chauhan has undergone a by-pass operation at Baroda, Gujarat. We wish him a quick recovery.
- The President of India has nominated Shri. J.K.dhing, former Chief Manager (Exploration Hindustan Copper Limited, a member on the Ayurvedic Pharma Copoeial comity (APC)), Ministry of Health and Family welfare, Govt. of India for a period of three years. Shri. Dhing, who assumed the charge of his office on 5th April 2006, was assigned to work as an expert for minerals and metals used in Ayurved, Siddha and Unani (ASU) Medicine. Under the same ministry, on 18th October 2006, Shri. Dhing as also been nominated member on the expert comity to consider/ update /revise. Good manufacturing practices (GMP) guide lines for RAS Aushadhes used in ASU drags.

Logo Competition

To select a logo for the society, entries were invited from members of the society. In response this, three entries were received up to 05-04-06 the last date. The selection commit selected the one submitted by Shri B. S. Yadav after some modifications. The other participants were Shri R. C. Saxena and Shri R. L. Tank

Discovery of Pb-Zn Lodes at 150 m Depth from Surface in the Area where Gossan, Geochemical & Geophysical Anomalies are Not Noticed

PK Yadav

Deputy Director General (Retd), Geological Survey of India, Udaipur

In Sindesar Khurd area which is 5 km north of Dariba in Dariba-Bethumbi belt, gossan has not developed as base metal sulphide bearing dolomite is not exposed on the surface and geochemical and geophysical anomalies are not found but still during 1989-1992 period drilling has indicated 8.0 million tones of +6% Pb+Zn grade lode in Sindesar Khurd south block and 6.0 million tones in Sindesar Khurd Central Block having similar grade.

Success of drilling depended wholly on the study of the previous drill cores. In these cores, two sets of foliations were recorded and on the study of relationship of bedding and foliations in these drill cores, it was concluded that in the subsurface F_2 open fold with moderate plunge in north direction controls mineralization.

In the Sindesar Khurd area during 1988, boreholes were drilled but such F_2 subsurface controlling base metal mineralization was not recorded (record GSI 123 (7), p 72-75. Extended Abstracts of GSI records, 1988-89). Subsequently all the boreholes in Sindesar Khurd south and Central blocks were planned on basis of such sub surface structure and both the limbs of each F_2 folds were drilled and thick Pb-Zn mineralization was found at 150m depth from surface. In Sindesar Khurd south block having 8.0 million tones reserves and in Sindesar Khurd Central block 6.0 million tones reserves having +6% Pb+Zn grade deposit in two limbs of F_2 open, northerly plunging fold was located in dolomitic rocks by me. These areas have been taken up on mining lease by Hindustan Zinc Ltd. The reserves and grade as reported by me on 200 m interval of drilling has been found to be correct by HZL even after carrying out detailed drilling at 50 m interval. The discovery of blind lodes and success in estimation of reserves is wholly due to understanding of subsurface structure, ore geometry and controls of mineralization (records 124, 125 & 126 vol 7. extended abstracts of GSI reports for the years 1989-90, 1990-91 & 1991-1992.

Know Your Fellow Member



Dr. Shyam Bihari Lal Srivastava

Dr. Shyam Bihari Lal Srivastava was born on **10-8-1929**. He obtained his post-graduation [M. Sc.] in geology from Banaras Hindu University in 1951 and Ph. D. from University of Rajasthan in 1985.

Dr. Srivastava, joined Department of Mines and Geology, Government of Rajasthan, in 1951 as Mines Foreman. He gradually progressed and ultimately became the Director in 1980. He retired from the post of Director, DMG in 1984. Soon after, on 1-9-84, he became the 'Geological Advisor' to R.S.M.D.C. Ltd and served till February 1986. Since then he is leading a peaceful retired life.

Dr. Sivastava has vast experience of investigation for a variety of minerals eg. rock phosphate, cement grade limestone, barytes, lignite, emerald fluorspar and many others.

Dr. Srivastava had been a member of various technical committees constituted by state and union governments. He was also on Board of Directors of RSMM ltd and RSMDC ltd. He presented several technical papers in various seminars and symposia. He is the one who initiated the publication of Rajasthan Mineral Bulletin published by Dept. of Mines and Geology, Udaipur.

Dr. Shyam Bihari Lal Srivastava was awarded Merit Certificate by Government of Rajasthan on 15-8-84 and three letters of Appreciation from the Govt. of Rajasthan



Shri Satyendra Narain Bhatanagar

Shri Satyendra Narain Bhatanagar was born on 04-11-1932. He obtained his Post-graduation [M.Sc.] in geology from Department of Geology, University of Rajasthan, Udaipur, in the year 1955. He underwent senior executive General Management Course XL at Administrative Staff College of India, Hyderabad. He also did 'United Nations'

Development Fellowship' in a group of copper mines, owned by Selection Trust of Anglo-American Group in Zambia.

Shri S.N Bhatanagar served as Geologist in private enterprises between 1955 and 1962 in Karnataka. His field of work was iron ore, manganese ore etc. He joined National Mineral Development Corporation Ltd. in May 1962 as a Senior Geologist and worked at Kiruburu iron ore mines till January 1965. Later on Shri Bhatanagar moved to Khetri Copper Complex of M/s Hindustan Copper Ltd. Here he worked till December 1979. The last post held, here, was of Additional Chief Geologist. From copper, he moved to zinc and joined Hindustan Zinc Ltd. and worked there till December 1990 as Chief Geologist and later promoted as General Manager [Geology}. Since January 1991, Shri Bhatanagar worked as Consultant with Hindustan Zinc Ltd., Mineral Exploration Corporation, Vineet Udyog Ltd, Wolkem India Ltd. Binani Industries Ltd. Between March 1988 and April 2001, he worked as Consultant Engineer at Roan Antelope Mining Corp. of Zambia plc, Zambia, a group owned by M/s Binani and L N Mittal.

Shri S.N Bhatanagar had been member of several committees and Groups of both public and private sector and Government of India Committees and went abroad to several countries. He has published 23 technical papers and had been Visiting Speaker to Several universities including IITs

Shri Satyendra Narain Bhatanagar has been decorated with many awards. He has been awarded 'Dr. J. Coggin Brown Memorial Gold Medal' (1983), National Mineral Award [1986] and 'Raj Minerex' Award [1998] for his outstanding contribution in the field of mineral exploration and development.



Shri Ram Swaroop Sharma

Shri Ram Swaroop Sharma was born on 19-5-1933. He obtained his post-graduation [M.Sc.] in geology from Lucknow University in the year 1953. Shri Sharma had specialized training in Groundwater at United States Geological Survey in 1971, under USA Technical Cooperation with other Government Program, sponsored by UNFAO. He has done post graduation course on 'Soil Salinity and Alkalinity' from Budapest University, Hungary under UNESCO fellowship. Shri Sharma had also attended GSI training camp and Foundational Training Program of HCM Institute of Public Administration, Jaipur

Shri Sharma, joined Department of Mines and Geology, Government of Rajasthan, in 1955. There he served in various capacities in the field of Mineral Exploration, Mineral

Administration, Applied Geology and Groundwater hydrology. He gradually progressed and ultimately held the post of Additional Director [Geology], jurisdiction being entire Rajasthan. He retired in 1991, from the post of Additional Director, [Geology], Shri Sharma worked for 4 years in UNDP-FAO project in Kota as an Indian counterpart to UN experts in groundwater.

Shri Sharma is the grand old young man, who, with all his energy and drive provided leadership in the foundation of Geoscientist Society of Rajasthan.

Shri Sharma has vast experience of investigation for a variety of minerals specially Pb-Zn deposit of Rampura Agucha, rock phosphate deposit of Jhamarkotra, cement grade limestone of Darauli, SMS grade limestone, Jaisalmer and other minerals. He is specially known for finding and establishing Dimondiferous Conglomerate at Kesarpura, Pratapgarh in Chittaurgarh district of Rajasthan. He had initiated Noble Metal Exploration program in Rajasthan.



Dr. Mahendra Kumar Pandya

Dr. Mahendra Kumar Pandya was born on 01 June, 1933. . He obtained his post-graduation (M.Sc.) in geology from Department of Geology, University of Rajasthan, Udaipur, in the year 1955 where he held First Position in the university examination. He obtained his research degree 'D. Sc.' in the year 1967 from Universite Libre de Bruxelles, Brussels, Belgium with Grand Distinction (80% marks).

Dr. Pandya joined teaching faculty of Department of Geology, University of Rajasthan, at Udaipur in 1955 where he served in various capacities in teaching, research and administration and rose to become Professor. With transfer of the department from University of Rajasthan to Mohanlal Sukhadia University, his services were also transferred to the later university. He retired in the year 1993. At the time of retirement he was holding the post of Dean, faculty of Science of Sukhadia University and Dean, College of Science, Udaipur. At times Dr. Pandya had worked as acting Vice Chancellor, during the absence of later.

Dr. Pandya had been a member of several decision making committees and groups of both the universities and state and union governments. He had been on the panel of experts of many states for various selection and examination bodies. He went abroad to several countries, attended number of conferences and seminars He has published over 100 technical papers in different journals and had been Visiting Speaker to several universities. He supervised 15 Ph.D.s, and many post graduate dissertations

Dr. M. K. Pandya is specialist of economic geology, ore geology, igneous and metamorphic petrology, Precambrian geology and applied geology. He has been awarded following international and national fellowships:

- i. Awarded Belgian Government Fellowship to work at Universite Libre de Bruxelles, Brussels [Belgium] Under Indo-Belgium Cultural Exchange program, 1965-1967.
- ii. Visiting professorship in Bulgaria at Higher Institute of Mining and Geology at Sophia (University of Sophia. 1982).
- iii. Awarded Emeritus Fellowship of UGC, Govt. of India New Delhi.
- iv. Awarded Emeritus fellowship of the All India Council of Technical Education



Shri V.C. GARG

Shri. Vimal Chandra Garg was born at Dungarpur on 4 – 11 – 1933. He got his school education at Udaipur and obtained the B.Sc. degree from Allahabad University. He did his post graduation M.Sc. in Geophysics from BenarasHindu University Varanasi in 1956. There after he joined oil and Natural Gas Commission and carried out extensive geophysical surveys working in various hierarchical status. He got his superannuation from O.N.G.C. from the post of General Manager (Geophysics). Presently he is settled at Udaipur and leading a happy life with good health.



Shri. M.S. Murdia

Shri. M. S. Murdia was born on 25 /10/1934 at Udaipur. He represents the first post graduate batch of students obtaining the M.Sc. degree in 1954 from collage of Geology of Udaipur, the then affiliated to the Rajasthan University, Jaipur. Therefore Shri. M.S. Murdia joined the Rajasthan State Department of Mines and Geology at Udaipur. He carried out mineral survey and explorations for Manganese in Banswara, Iron ore deposits of Udaipur and Chomu Moriga area in Jaipur district, limestone deposits in Chittorgarh district, in very adverse living conditions in the field and with inadequate

transport facilities. Later on after the leaving the job of geologist. Shri Murdia started his business and at present he represents a well reputed business house dealing in computer etc. It is matter of proud that Shri. Murdia is still closely associated with the various activites related to mineral development besides other social services.



Shri Chandra Shekhar Dwivedi

Shri Chandra Shekhar Dwivedi was born on 15 November 1934. He obtained his post-graduation [M.Sc.] in geology from Department of Geology, University of Rajasthan, Udaipur, in the year 1958. Shri Dwivedi specialized in Photogeology and had obtained diploma in Aerial Photo Interpretation from IPI, Dehradun in 1974-75.

Shri Dwivedi joined Department of Mines and Geology, Government of Rajasthan, in 1958. There he served in various capacities in the field of Mineral Exploration and Mineral Administration. He gradually progressed and ultimately became the Additional Director in the year 1990. He retired in 1992 from the post of Additional Director [Geology].

Later on, Shri Dwivedi worked as Consulting Geologist for H.N.G.L. Kolkata from 1993-1996. Presently he is leading a peaceful retired life.

Shri Dwivedi has vast experience of investigation for a variety of metallic and industrial minerals and building stones specially rock phosphate, cement grade limestone, chemical grade limestone and SMS grade limestone, bauxite, mica, pegmatite, aquamarine, topaz, clay, soapstone, apatite, andalusite, bentonite, selenite (gypsum), splitable sandstone and limestone, black granite, and other minerals. He supervised exploration for Tungsten at Sohela, Tonk., galena near Sardarda, Sojat, scheelite near Kararavav, Pali

राजस्थान सरकार



सत्यमेव जयते

रजिस्ट्रीकरण प्रमाण-पत्र

क्रमांक : 124/उदयपुर/2006-07

प्रमाणित किया जाता है कि **जियोक्सर्टिस सोसायटी आफ**
राजस्थान जिला - उदयपुर का राजस्थान संस्था
रजिस्ट्रीकरण अधिनियम 1958 (राजस्थान अधिनियम संख्या 28, 1958) के अन्तर्गत
रजिस्ट्रीकरण आज किया गया।

यह प्रमाण-पत्र मेरे हस्ताक्षर और कार्यालय की मोहर से आज दिनांक 27

माह जुलाई सन् 2006 हजार 08 को उदयपुर में दिया।



रजिस्ट्रार संस्थाएँ
उदयपुर