Mineralogical Society of Western Australia (inc.)

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Forward Diary 2004

***February* 4th**
Club Meeting

***April* 7nd**
Club Meeting

***June* 2nd**
Club Meeting

Guest Speaker

Marjorie Apthorpe

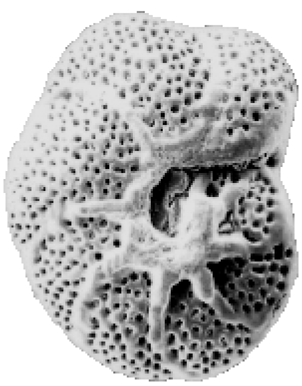
***August* 4th**
Club Meeting

October 6th
Club Meeting

December 1st
Club Meeting

Presidents Report

Greetings to you all.
I am pleased to report that subsequent to the last general and committee meetings a number of Society activities are being arranged, also that the arrangements for the 2005 Seminar are progressing in a satisfactory manner,
You will all be pleased to know that, thanks to Alex and John (Curator and Assistant Curator,W.A.Museum),the "Simpson Collection" is properly and safely housed at the W.A.Museum. Excellent new, expensive and proper storage cabinets are being installed and the old "ammunition boxes" disposed of.
It is gratifying to know that, at long last, the Simpson Heritage is in safe keeping.
I look forward to seeing you all at our next meeting.



Foraminifera

Newsletter Contents.

About The Guest Speaker:

Marjorie Apthorpe is a micropalaeontologist / geologist who has spent the last 40 years working on foraminiferal biostratigraphy for the petroleum exploration industry, on marine geotechnical projects, and as a technical editor for geological publications. She obtained a BA degree in Geology from Sydney University before beginning her career with BHP. She subsequently joined Shell as a micropalaeontologist, later moving to Burmah Oil (later Woodside Petroleum) in Perth. After leaving Woodside in 1987 she worked as a consultant for a variety of petroleum companies, carrying out biostratigraphy, and later moved into using foraminifera in marine geotechnical projects involving analysis of the sea floor, in Australian and Indonesian waters. She also spent some of the last 12 years working part-time on a PhD in geology, which she finished last year.

She will talk about what foraminifera are, their place in the world around us (as sand grains on the beach and in sedimentary rocks), and how and why they are used for a variety of purposes. She will also briefly show some of the other microscopic organisms that make up the grains that we refer to as "sand".

THE SANDS OF THE SEAS : FORAMINIFERA IN TIME AND SPACE; THE WORLD OF THE MICROPALAEONTOLOGIST

Abstract: This talk will cover what the marine microscopic animals known as foraminifera are, why they are important as fossils for age dating of rocks, and how they are used in dating. It will also deal with where and how they live in estuaries and oceans; and how they are used for studies of modem and ancient environments, climate change and sea level change.
The talk will be illustrated with 35mm slides, several poster displays with scanning electron micrographs, along with specimens of foraminifera (visible under a decent hand lens, or microscope).

Foraminifera are shell-building unicellular organisms that live in marine and brackish water. They can be regarded as most similar to the amoeba in terms of their living cell form, but unlike amoeba they build complex and beautiful shells in which their single, very large and complex cell partly lives. In size they range from very small (less than one tenth of a millimetre across) to discs the size of a five-cent piece. There are thousands of species, which live in almost every imaginable habitat on the sea floor, and floating in the ocean. Most species are typically the size of a grain of beach sand. Their importance lies in the fact that their dead shells compose a large part of the calcium carbonate sand in the deeper parts of the continental shelves and the deep oceans. They are also common in shallow water, although there their shells tend to be overshadowed by the larger volume of mollusc shell fragments and other calcareous-secreting organisms.

• Foraminifera are important shell-building organisms for several reasons.

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1) Their huge numbers mean that they contribute very large volumes of calcium carbonate grains to sediments. With passage of time, and burial at depth, these sediments harden and are cemented into sedimentary rocks. The limestone of the pyramids of Egypt, for instance, is largely made up of the shells of foraminifera.

2) Foraminifera are very varied in shell shape, living locations, diet and lifestyle.

About 25,000 species of living and extinct foraminifera were recognised some years ago. Foraminifera have a history that has changed through time, with many species becoming extinct and new ones appearing at intervals. Palaeontologists realised that different layers of rock contained different fossil species of foraminifera, in the same way that different strata of rock contained different fossil species of ammonite shells or dinosaur bones.
They studied these changes in the fossils present, and set up schemes for defining the relative age of the rocks as a series of zones, which have proved to be a very useful tool for dating sedimentary rocks. Foraminifera are much more useful for this in marine rocks than larger fossils (such as dinosaurs etc) because they are much more common, and their small size means that when they are present, a small rock sample of a few grams weight may contains thousands of specimens which can be used for age dating.
Age dating using them developed about 60 years ago, in response to the need of the petroleum industry to rapidly date the sedimentary rocks that exploration wells were drilled through. They were the first group of micro fossils to be used for this purpose, although dating of sediments by the use of fossil pollen and algae quickly followed. Nowadays quite sophisticated age dating schemes using several different types of micro fossil are used in the petroleum industry.

3) Foraminifera as living organisms have been used as indicators of the recent history of the sea floor, or of estuaries. Foraminifera are sensitive to changes in water salinity and temperature, and also to changes in other factors such as light penetration and amount of dissolved oxygen in the water. Changes in the past conditions in an estuary, for example, have been detected by taking cores of sediment which record the estuary's history, and examining the foraminifera present at different levels to interpret what past salinity levels and water depth etc were. Some species are only found abundantly living on plant roots in brackish-water marshes, while others live in the sandy bottom of tidal channels with marine water present for much of the time. Other species only live in shallow marine areas in sea grass meadows, where they cling to the leaves and browse for tiny algae such as diatoms which themselves grow on the sea grass. Some bottom- living foraminifera in tropical, nutrient-poor seas have developed an additional food source. They live in a symbiotic relationship with certain species of algae. The photosynthetic algae live within translucent outer chambers of the foraminiferal shell and tissue, and provide sugars to the foram as part of the food supply. In return, the foram provides a protective enclosed habitat like a series of tiny glass-houses, for the algae to live within. The importance of this supplementary food supply is suggested by the fact that these symbiotic foraminifera are the largest foram type known, growing up to 1 cm in diameter. Almost every type of rock or plant surface provides a habitat for foraminifera to live on, or to burrow under.

4)Although most of the bottom-living foraminifera appear to be vegetarians or feed on bacteria and detritus in the sea floor sediment, another large group of foraminifera have a completely different strategy. Planktonic foraminifera float at different depths throughout the world's oceans.
Some migrate up and down during a day-night interval, feeding on algae (mainly diatoms). Others are carnivores,

actively fishing for tiny zooplankton, in some cases catching and eating Crustacea that are as big as the foram. There are not as many different species ofplanktonic foraminifera as there are benthic (or bottom-dwelling) ones, only about 44 planktonic species being recognised in today's oceans. Planktonie foraminifera have been studied for well over a century Different species are found in tropical, temperate and polar seas, and the study of fossil species of these provides important evidence for determining past ocean water temperatures and the history of climate change over millions of years. Although planktonic foraminifera form a fairly small percentage of the total plankton, because of the constant deposition of dead shells and relative lack of shells amongst other plankton, planktonic foraminiferal shells cover large areas of the deep sea floor, forming the so-called "Globigerina ooze". Planktonic foraminifera have had a relatively rapid turnover of extinctions and new species appearances, making them very useful for age dating zonations, as well as for palaeoceanography.
http://www.ucl.ac.uk/GeolSci/micropal/foram.html

EVIDENCE OF METEOR IMPACT NEAR AUSTRALIA LINKED TO LARGEST EXTINCTION IN EARTH'S HISTORY

May 13, 2004

(Santa Barbara, Calif.) - An impact crater, believed to be associated with the "Great Dying," the largest extinction event in the history of life on Earth--much earlier than the extinction of the dinosaurs--appears to be buried off the coast of Australia, according to new findings of a major research project headed by a scientist at the University of California, Santa Barbara. A scientific paper describing the crater was published on the Internet by Science Express, the electronic publication of the journal Science, on May 13.

Most scientists agree that a meteor impact called Chicxulub, in the area of Mexico's Yucatan Peninsula, accompanied the extinction of the dinosaurs 65 million years ago. But until now the time of the Great Dying--when 90 percent of marine life and 80 percent of life on land became extinct 250 million years ago--lacked evidence and a location for a similar impact event.

The study's first author, Luann Becker, research scientist at UCSB, and her team, have now found extensive evidence for a 125-mile-wide crater called "Bedout" off the northwestern coast of Australia. They found that the clues match up with the Great Dying, the time period known as the end-Permian when the Earth was configured as one primary land mass called Pangea, and a super ocean called Panthalassa.

During recent research in Antarctica, Becker and her team found meteoric fragments in a thin claystone "breccia" layer, pointing to an end-Permian event. The breccia contains the impact debris that resettled in a layer of sediment at end-Permian time. They also found "shocked quartz" in this area and in Australia. "Few earthly circumstances have the power to disfigure quartz, even high temperatures and pressures deep inside the Earth's crust," said Becker. Quartz can be fractured by extreme volcanic activity, but only in one direction. Shocked quartz is fractured in several directions and is therefore believed to be a good tracer for the impact of a meteor.

Becker discovered that oil companies in the early 70's and 80's had drilled two cores into the Bedout structure in search of hydrocarbons. She and co-author Robert Poreda, of the University of Rochester, went to Australia to examine these cores held by the Geological Survey for Australia in Canberra. "The moment we saw the cores we thought it looked like an impact breccia," said Becker. In the cores Becker's team found evidence for a melt layer formed by an impact. A date obtained by co-author Mark Harrison, from the Australian National University in Canberra, on material obtained from one of the cores indicate an age that is close to the end-Permian era. While in Australia on a field trip and workshop about Bedout, funded by the National Science Foundation, co-author Kevin Pope found large shocked quartz grains in end-Permian sediments that he thinks formed as a result of the Bedout impact. Seismic and gravity data on Bedout are also consistent with an impact crater.

In the Science paper, Becker has documented how the Chicxulub cores are very similar to the Bedout cores. She explained that when the Australian cores were drilled, scientists did not know exactly what to look for in terms of evidence of impact craters. The cores sat, untouched, for decades.

The Bedout impact crater is also associated in time with extreme volcanism and the break-up of Pangea. "We think that mass extinctions may be defined by catastrophes like impact and volcanism occurring synchronously in time," said Becker. "This is what happened 65 million years ago at Chicxulub but was largely dismissed by scientists as merely a coincidence. With the discovery of Bedout I don't think we can call such catastrophes occurring together a coincidence anymore."

NASA, a major funder of the research, held a press conference on May 13 to announce the findings.
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More news from UC Santa Barbara can be found at
http://www.ia.ucsb.edu/release/Archive.aspx

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Membership Details:

Joining Fee $5.00
Adult Member $20.00
Newsletter only $15.00
Email Newsletter- No charge to Min Soc members. Email to newsletter editor at jandsman@bigpond.net.au

An application form for membership can be obtained by writing to: -
The Secretary, J. Reeve
Mineralogical Society of Western Australia (Inc)
13 Buchan Place, Hillarys, W.A. 6025

Ordinary meetings of the Society are held on the **FIRST** Wednesday in February, April, June, August, October and December in the **W.A.Lapidary and Rock Hunting Club rooms 31 Gladstone Street Rivervale**, commencing at 7.30pm. The January meeting will involve social activities at a time and place to be notified.

Visitors are most welcome

Newsletter of the Mineralogical Society of Western Australia
13 Buchan Place, Hillarys, 6025
Western Australia, Australia

OUR SOCIETY's MISSION

To encourage mineralogical study by amateur and professional alike and, in so doing, discover, document and preserve the earth's and in particular Western Australia's natural history.

OBJECTIVES

Whilst focusing on the minerals of Western Australia, the overall objectives of the Society shall be:

(a) To advance the science of mineralogy.
(b) To disseminate knowledge of minerals, their occurrence and associations.
(c) To establish and maintain a register of mineral species and their occurrences in Western Australia.
(d) To increase knowledge of related fields of earth science.
(e) To keep members abreast of developments in mineralogy.
(f) To encourage an appreciation of the aesthetic value of minerals.
(g) To promote the proper care and preservation of mineral specimens.
(h) To promote the conservation of the geologically unique and of the environment in general.
(i) To provide a means of contact between professionals and amateurs in the various fields of the earth sciences.
(j) To foster a sense of cooperation and understanding between individuals, institutions and resource companies in the field of mineralogy.
(k) To provide a forum for debate and discussion on matters relating to mineralogy.