Mineralogical Society of Western Australia (inc.)

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Forward Diary 2004

Presidents Report

Greetings to all members.
It us with great pleasure that I am able to report that your committee for the 2005 Seminar is well on track and that excellent progress is being made. I would like to thank the hardworking members who are so generously giving of their time and expertise.In particular John Reeve for his unflagging efforts on the field trip guide for the 2005 seminar.
As you will see the field trips for this year are being formulated and I urge as many members as possible to support them.
One of our members has returned from "Tucson" with a bucket full of goodies, which I am sure she will be pleased to exhibit. The specimens are really worth seeing.If any other members have new aquisitions that they would like to show off we would be pleased to view them
In conclusion, I would like to thank Jeff for wielding his magic to produce our newsletter.

***February* 4th**
Club Meeting

***April* 7nd**
Club Meeting

***June* 2nd**
Club Meeting

***August* 4th**
Club Meeting

October 6th
Club Meeting

December 1st
Club Meeting

Fulgurite - Lightning Fused sand!

Grayish- Blackish....17.8 Grams - Sahara desert.

Newsletter Contents.

FULGERITES by Dennis Kelsall

The name fulgurite comes from the Latin word Fulgur, which means lightning.

Fulgurites are described in *The Dictionary of Geology* as 'A ramifying or branching tube consisting of fused silica or silicates, formed by the action of lightning striking sandy soil.The description goes on to say that fulgurites should not be confused with siliceous or other concretions, which occasionally form around the roots of plants and are somewhat similar However, as we shall see, this description is not complete as fulgurites may also be appear in solid rock and in clay soils.

Lightning. Firstly, let's look at lightning. During every minute of every day, roughly 1,800 to 2,500 thunderstorms are creating lightning somewhere on Earth. It strikes something or someone every time it flashes from the sky down to the earth. When lightning strikes the earth, it doesn't stop there. Often, the lightning current will continue to flow either downward or radially outward from the strike point.

Lightning can have temperatures of between 25,000 to over 250,000 degrees Fahrenheit and have pressures exceeding 100 atmospheres. It can be hotter than the surface of the sun. So when it strikes, the ground may be liquefied or even vaporized for an instant as the current passes through it. As the ground cools down, it may reform into a solid glassy mass or a tube. Very few things are formed in a single awesomely powerful way as fulgurites. One instant they are plain everyday rock or sand and in a wink of an eye they exist in another form, fashioned and re-arranged by a mighty force that nothing can withstand.

(Just as a side issue, because lightning currents don't always dissipate immediately when they reach the earth, you should know how to conduct your posture if you are ever caught unprotected in the midst of a thunderstorm. You should squat down (don't lie down) and make sure your feet are together and not spread apart. If lightning strikes near you and doesn't dissipate immediately, it may flow toward you along the ground. If your feet are apart, there is a chance the current may flow up one leg, through your body, and out the other leg. A wholly unpleasant experience).

Where are they Found? Although fulgurites are found in many parts of the world they are most common in sand and sandy soils. The most classical areas are in the Sahara and Kalaharri Deserts.A high thunderstorm rate is not enough in itself to guarantee abundant fulgurites. They are absent from areas with a dense canopy of forest and are rare in rocky areas lacking superficial sand or sandy soil. They may be formed in sandy soils, in rock and two recent discoveries have been made in clay soils in Western Australia.

Sand Fulgurites. Sandy soils yield by far the most fulgurites and the best known are found in quartz sands (Si02). This type of formation in called a Sand Fulgurite. The outer surface of sand fulgurites are often rough, with adhering, unfused sand grains. The inner surface of the tubes is usually smooth and glassy, in some specimens resembling an applied glaze. The hollow interior is the result of the vaporization of the sand. (So, there are three distinct areas; (i) the outer surface, which has been only partially melted, (ii) the inner surface, which has been melted to form a glassy surface, and (iii) the hollow center where the sand has been vaporized.

Rock Fulgurites are formed when lightning strikes the surface of a rock, melting and fusing the surface and sometimes the interior of the rock. Reports of fulgurites in solid rock are rare. Rock fulgurites are usually solid.

Clay Soil Fulgurites. The discovery of two fresh lightning strikes in the Eastern Goldfields of WA and the fulgurites that were found have been referred to as Clay Soil Fulgurites, which are, when formed in a clay soil are very different from the narrow tapering silica tubes produced by lightning strikes in sand.

One discovery was made in June 1984 on Avoca Downs Station, north of Randall on the Trans Australia Railway line. There had been thunderstorms in the area and what was

What belongs in a Mineral Collection?

Susanne Koepke, November 2003

Have you ever seen a mineral collection and wondered whether some of the objects displayed - such as amber or man-made specimens - belong into the collection? Depending on whom we talk to, the word mineral has several different meanings. When people in government and industry discuss mineral resources, they frequently include natural oil, gas and coal. To most mineral collectors however, a mineral is any naturally occurring chemical element or compound having a definite chemical composition and atomic structure and formed as a product of inorganic processes.

By definition, this excludes materials such as amber, which is the fossilised, hardened resin of a pine tree and can therefore not be classified as a mineral. It is interesting to note at this point that some authors use the term organic minerals[1,2] in their effort to include such specimens in their publications. While we may not fully agree with this compromise, it must certainly be preferable to the practice of others who also include amber in their writings on minerals[3,4], but fail to clearly mention in laymen's terms that amber is not in fact an approved mineral[5].

Fossils where another mineral has replaced the original mineral of the fossil can be interesting to classify. Quite often these replacement specimens fit easily into both a mineral and a fossil collection. Shells replaced by opal, for example, are displayed next to hyalite and other silicates in my own collection. Shells replaced by gypsum are housed on a shelf with gypsum crystal specimens, while shells replaced by pyrite or marcasite have been accommodated among the sulphides. Naturally, all these altered fossil shells could form part of a fossil collection, and the reader might argue that indeed they should. Alternatively, they might also be grouped with pseudomorphs in a sub section within a mineral collection, or according to locality and so forth, according to the collector's preference.Man-made specimens can present mineral collectors with quite a serious challenge, especially where the fakes are difficult or impossible to distinguish from natural minerals and are not labelled as artificial or created.

The artificial sulphur crystals grown by an Italian ornithologist in the 1970s[6] are a perfect example of the predicament faced by collectors and the scientific community, as even museums have apparently been conned into acquiring the fakes, some of "which have been photographed and published as being natural"[7]. Most would agree that these fraudulent items should not deliberately be included in collections due to ethical considerations and "the danger of contaminating the scientific knowledge base"[8]. But even if we concede that artificial specimens would be clearly labelled as such, over time labels can become detached and lost, and knowledge of the artificial origin may become lost as well.

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interpreted to be a very recent lightning strike was recognized. The point at which the deduced lightning discharge appeared to have entered the ground was marked by a small area less than 50 cm across where the ground surface had been greatly disturbed with small clods of soil having been thrown out onto the surrounding surface. The small patch of disturbed ground formed the top of a very low conical mound with cracks in the soil radiating out from it. The diameter of the cone was about six metres and most of the ground surface was essentially intact with some small cracks and a slight unevenness of the surface. Only small, crumbly fulgurites were found. The lightning, on this occasion, did not penetrate deeply into the soil but radiated out just below the surface. Recent rain followed a long dry period and the lightning dissipated in the wet shallow topsoil instead of coursing into the dry sub-soil.

The second discovery was made in May 1986 on Pinjin Station about 60 km north of Avoca Station. Here, shortly after a thunderstorm, a recently formed mass of vesicular glass was found on the surface.

These discoveries have confirmed that the fragments of glassy vesicular material that are commonly found in the Eastern Goldfields are fulgurites,

An Eye Witness Account. One of the few W.A. eyewitness accounts of fulgurite formation to be scientifically verified is that of Mr G. E.Watts of West Popanyinning, some 150 km's southeast of Perth. During a severe storm in 1931, Mr Watts saw a flash of lightning strike the ground about 350 metres away, followed by rising smoke or steam. He investigated and found a blackened and hot area about 20 centimetres in diameter. Digging revealed a vertical mass of hollow and brittle glassy material that extended downward for about a metre, with small branches radiating from it in several places. Dr E. S. Simpson, the Government Mineralogist, later identified the material.
One of the few practically complete fulgurites found in Western Australia came from sand near Black Point in 1977

Size and Shape of Fulgurites. Fulgurites take many shapes, sizes and colorations depending on the material being fused by the lightning. The colour of the glassy, fused Si02 material usually varies from pale grey, to smoky gray, to a shiny black. Specimens found by geologists in the southern parts of Western Australia have been described as streaky grey, to dull green, to brown.

Although sand fulgurites are quite small in diameter, usually only a few millimeters, and are very fragile, some very lengthy ones have been found. Charles Darwin's Observations of his voyage in the Beagle when anchored off Monte Video in July 1832 describes some quite large ones. Quote " by working with my hands I traced one of them two feet deep; and some fragments which evidently belonged to the same tube, when added to the other part, measured five feet three inches. The diameter of the whole tube was nearly equal, and therefore we must suppose that originally it extended to a much greater depth. These dimensions are, however, small, compared to those of the tubes from Drigg, one of which was traced to a depth of not less that thirty feet.
Conclusion. I can recall back in the days when 1 was working in Telstra and the state of the art communication coaxial cable had been laid to Port Hedland. The cable was four feet underground but it was constantly being struck by lightning. Telstra did some studies on the number of lightning strikes that were occurring in the area and it amounted to quite a few thousand in a relatively short period. Apparently thousands of lightning strikes are occurring in the areas in which we fossick, the areas are relatively sparsly vegitated and fulgurites are commonly located by geologists in these areas.
So why haven't we found any? All of the ingredients are there. Perhaps we have seen some but didn't realize that they were?

http://www.sciencemall-usa.com/scimall-usa/fulgurites2.html

One could of course argue that the inclusion of artificial mineral specimens in a collection is acceptable provided specific criteria are met. As a case in point, visitors to the South Australian Museum can view created emerald pieces, which are identified as such and labelled appropriately, displayed next to natural mineral specimens. Since a museum's purpose is to educate (among other things), it fulfils this purpose by displaying both natural and man-made objects. In any case, the created emerald is distinguishable from natural stones, so even if labels and catalogues were lost, these objects would still be identifiable.

So, what belongs in a mineral collection, and what does not? I think I shall let the readers decide for themselves.

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[1] *The Macdonald Encyclopedia of Rocks & Minerals*, Little, Brown and Company, London, 1997, p.410.

[2] David Barthelmy, *New Dana Classification of Organic Minerals*, 2003. URL: http://webmineral.com/dana/X-50.shtml.

[3] Walter Schumann, *Minerals of the World*, Sterling Publishing Co., Inc., New York, 1998, p.32.

[4] Jaroslav Bauer, *A Field Guide in Colour to Minerals, Rocks and Precious Stones*, Treasure Press, London, 1989, numbers 140, 552.

[5] New minerals should be approved by the Commission on New Minerals and Mineral Names (CNMMN) of the International Mineralogical Association (((IMA). URL: http://www.geo.vu.nl/users/ima-cnmmn/.

[6] Renato Pagano, Artificial "Sicilian" Sulfurs, T*he Mineralogical Record*, volume 33, March-April 2002, pp.149 – 154.

[7] Ibid., p.153.

[8] Ibid., p.153.

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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.