

MinSoc April 2004

Peter Williams and Allen Arnold

Mini-symposium on the mineral quartz

The symposium was opened by Professor Peter Williams who introduced and described the mineral referring to its name, structure, chemical and optical properties.

The earliest references to quartz were made by Greek writers who called it *crystallos*, which means ice, and is obviously the source of the English word crystal. The origin of the word quartz is not clear but it first appears in the 1600s as *quartzum* with the first spelling as quartz appearing in 1763. At that time the word was apparently being used not for crystals but for the white massive veins of quartz filling lodes in mines. As the chemistry of quartz in crystals and in massive deposits was learned the name was gradually applied to all forms of the mineral.

Quartz, or silica, has an interesting chemistry which, on the surface of the earth, has been taken advantage of by many life forms. Silica in seawater has long been used by diatoms to construct their exoskeletons and at the other end of the biological spectrum, some silica is incorporated into human biochemistry with silicate groups cross-linking collagen to help maintain elasticity in skin and certain muscles. Whilst the amount of silica in the human body is very small some of the more bizarre life-forms have an extensive biochemistry involving silica. As an example Professor Williams displayed a specimen of a Venus's purse which is the dried siliceous skeleton of a sea-cucumber, a type of animal which has existed for around 300 million years and which has perfected a fibreglass-reinforced skeletal architecture over that time. Within the vegetable kingdom the use of silica is much more common with many types of plants using quartz fibres to reinforce their structure, the bamboos being notable examples.

Quartz however is most familiar in its inorganic forms. Whilst there are a few polymorphs of silica such as trydimite and christoballite, with others being occasionally found and reported, the vast majority of the mineral found is alpha- or normal quartz. Crystals are commonly hexagonal prisms (one is lucky to find them complete and doubly-terminated), and have an atomic structure built up of tetrahedral SiO_4 groups with each oxygen atom shared between two silicons to give an overall composition for the mineral of SiO_2 , silicon dioxide.

Professor Williams moved on to describe features of quartz relating to its particular crystal structure, such as the formation left-handed or right-handed crystals and its effect on plane-polarized light. Quartz occurs in a number of colours and the speaker spent some time describing the different varieties and explaining the mechanism of imparting a colour to an otherwise colourless mineral, which may depend on the presence of inclusions of other minerals, on the presence of trace elements or on crystal lattice imperfections. Professor Williams finally referred to a number of specimens of varieties of quartz brought in for display.

The second speaker for the evening, Allen Arnold, was asked to describe his experiences in collecting quartz and other minerals in many different locations, an interest that was sparked in him as a ten-year old and which has continued unabated ever since.

Many years ago the speaker's father purchased a sheep farm at Silent Grove in northern NSW which had a number of tin mines and the collector could find occasional quartz and gem-quality topaz crystals. In time the speaker bought the farm from his father only to experience the problems common to farmers of drought and sheep loss and was

prompted to turn his hand to tin mining, which provided a useful income for a few years. The speaker then took up a job with a company which had bought McGilvray's mine on the property and in working underground was fortunate to be on hand when mining opened up an old shaft at the 200-foot level, which broke into a vugh filled with many hundreds of quartz crystals, many doubly-terminated and some as phantoms. These were shared out among the miners with Allen Arnold managing to retain a fair selection for himself. As a result of this find the speaker received a telephone call one day from a collector Reg Taylor who was active in the 1960s and 1970s and who had built up a private museum and mineral display in Mullumbimby by buying specimens from all over the world. Reg offered to exchange specimens of his for a selection of the McGilvray specimens and accordingly a visit was arranged, with Reg proving to be a sharper trader than Allen!

In time the speaker's interest in collecting, displaying and trading his growing collection led him to meet Albert Chapman at a mineral show. This established a friendship and association with a number of specimen deals being arranged over the years and the speaker often accompanying Albert on collecting and buying trips overseas. As a result of his trips to the US the speaker made a number of contacts and friends there including Bob Jackson who owned the Spruce claim, a quartz and pyrite mine, in an apparently very picturesque but remote and heavily forested area in the Spruce Mountains outside Seattle. With his mining experience the speaker was able to help Bob Jackson work his claim from time to time and on one occasion they found a vugh which yielded 37 wonderful specimens of pyrite crystals as big as ice-cream containers with the clearest quartz crystals protruding through them like porcupine quills.

On the occasion of a trip that Bob Jackson made to visit the speaker in Australia, Allen Arnold received a telephone call from old neighbours of his still working in the Silent Grove area and who had made a discovery of quartz crystals in a decomposed vugh. This site was one which the speaker had probably walked past many times in the past and had taken no notice of, but over the next few years over 70,000 quartz crystals were recovered from an area of about two hundred square meters from just under the topsoil down to about two metres depth.

In the course of his lecture Allen Arnold was able to relate many other experiences of collecting trips and adventures, to beaches along the south-east Alaskan coast, to South America, to the Herkimer diamond site in New York State and in latter years to sites in Russia such as Dalnegorsk and the Ural Mountains. Friendships and associations with other collectors and dealers led the speaker to commence trading at Tuscon regularly for a few years until he had run out of trading material but this led him to make other contacts and friends which led to more trips to other places.

In conclusion he advised that quartz specimens were now being regarded as much more valuable than in previous years from the days when even Albert Chapman advised him that quartz specimens unless absolutely superlative were not very desirable and Allen Arnold recommended that collectors be alert to this development.