

night). It was here also in 1903 that an unemployed debt-collector, Simon Iturbi Patino, began to lay the foundations of one of the great mining fortunes of this century.

All good, stirring stuff, but has it any use? This may be a largely irrelevant question, but I can answer in the affirmative. Dutch settlers knew that the Lenape Indians (in what is now New Jersey) used brightly coloured zinc minerals as pigments, and this led them to discover the Sterling Hill zinc deposit in 1640. In 1838 the United States Customs Department demanded the use of brass weights, leading eventually to the development of the Sterling-Franklin mines, and the establishment of the great New Jersey Zinc Company (now, alas, deceased and subsumed into one of the newer faceless energy/raw materials conglomerates). From these mines came chlorophoenicite, glaucocroite, leucophoenicite, margarosanite, norbergite, zincite and franklinite (this last with echoes of Benjamin Franklin and of Pierre Berthier). The reviewer has found this information fascinating, and has obtained samples of minerals from this locality for structural investigations relevant to the production of artificial pigments.

What more can you ask: good bed-time reading and commercial utility!

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Quartz. By *Michael O'Donoghue*.
Pp. ix + 110. London: Butterworths, 1987. Price £20.00.

This monograph is published in Butterworth's *Gem Book Series* with the intention of providing all necessary information on one particular gem species to dealers and collectors. In nine chapters the author deals with the origin of quartz, the chemistry of silicon dioxide, colour in quartz and physical and optical properties. There are three chapters on the occurrence of the mineral in Europe, America and the rest of the world and, finally, testing and fashioning of quartz.

Though most of the book is concerned with the description of exceptional occurrences of the quartz family, coarse and fine crystalline varieties throughout the world, the author has spent a fair amount of effort introducing the reader to crystallography, petrology, physics and chemistry of quartz. Since the book is meant for a general audience, these chapters are kept on an introductory level. Unfortunately, these first four chapters contain many imprecise statements and errors.

On page IX, O'Donoghue summarizes 'constants and characteristics' for silica minerals crystallizing in the quartz structure type and has subdivided into quartz and chalcedony instead of using the established classification where coarse (rock-crystal, amethyst *etc.*) and microcrystalline (chalcedony, agate, onyx *etc.*) varieties are distinguished. On page 8, tridymite is cited as a stable polymorph of silica. On page 9, 'polymorphism', 'form' and 'habit' are used with

different and misleading meanings. On page 10, the room-temperature symmetry of quartz (point group 32) is discussed in the text, but reference is given to figures depicting the high-symmetry form. On page 22, 'In some quartz trivalent aluminium may be substituted by tetravalent silicon' occurs instead of the substitution of silicon by aluminium. On page 34, reaction equations with 'NH⁺' ions and 'NH₄⁺' or 'HF₂⁻' molecules are introduced. Furthermore, symbols for crystal faces, directions and forms are mixed up, 'molecules' and 'atoms' are interchanged, imperial and metric measures are used together and citation of references seems to be arbitrary. This is only to mention a few of the most obvious errors.

Overall, I had the impression that the author was addressing these subjects without the required familiarity and the necessary care and precision (in particular for his chapter on colour in quartz).

The three chapters on occurrences of members of the quartz family report many interesting localities from all over the world. Here, for the more scientifically interested collector, many helpful references to unusual occurrences will be found.

In conclusion, I regret that the author missed the occasion to present a valuable and popular introduction to solid-state science and petrology of quartz for amateur collectors and gemmologists.

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