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BOOK REVIEW

FRANKLIN AND STERLING HILL, New Jersey: The World's Most Magnificent Mineral Deposits. By Pete J. Dunn. Privately printed. 1995. 775 pages in 5 volumes (available separately). Contact: FOMS, P.O. Box 146, Franklin, New Jersey 07416, U.S.A. $150.00 plus $15 shipping.

Decreed by State legislature in 1968, Franklin, Sussex County, New Jersey is "The Fluorescent Mineral Capital of the World." In the 1970s and 1980s, a large sign by Route 23 greeted incoming motorists with this fact. Over 83 discrete mineral species are stimulated by UV radiation, long having made Franklin a magnet for "glow-in-the-dark" people. For nearly 100 years, the New Jersey Zinc Company recovered the rich ores from the Franklin Marble of Grenville age (1000 Ma) in the sister deposits at Franklin and Sterling Hill (Ogdensburg), separated by 5 km. These enormous steeply plunging deposits, reaching depths to 1000 m from the surface, yielded cumulatively about 6.5 million tons of zinc. The principal ores were franklinite, $(Fe,Mn)^{3+}_2(Zn,Mn)^{2+}O_4$, a spinel; willemite, $(Zn,Mn)^{2+}_2SiO_4$, phenakite (by extension, Si_3N_4) structure type; zincite, (Zn,Mn)O, wurtzite structure type. These major ore minerals are but rarities elsewhere in the world.

The number of verified mineral species associated with the deposits is a staggering 330+, those known only from the deposits about 35, including rhombohedral mcgovernite, which possesses the largest cell translation for a mineral, c = 203 Å! Drop the adjective and call Franklin/Sterling Hill "The Mineral Capital of the World" and you will not be far off, arguably contested by Långban in Sweden, Crestmore in California, Mont Saint-Hilaire in Quebec, Kola Peninsula in Russia, and Tsumeb in Namibia. Literature on the Franklin/Sterling Hill deposits is vast: Over 1200 references are tabulated in this monograph. Questions (including genesis of the deposits) outweigh answers. Unknown numbers of new species wait to be documented, especially with modern cutting-edge techniques. True, traditional mineralogical problems here are no longer lying in the street, but the sidewalks need much sweeping.

Three eminencies stand out as lifelong devotees of Franklin mineralogy: Charles Palache, deceased for 40 years, of Harvard, and his classic U.S. Geological Survey Professional Paper 180, the Minerals of Franklin and Sterling Hill, Sussex County, New Jersey (1935); Clifford Frondel, also of Harvard; and Pete J. Dunn of the U.S. National Museum of Natural History (Smithsonian). In volume 2, Dunn describes the people that he considers most representative of Franklin's history. Two (Clifford Frondel and John L. Baum) are still with us and are members of MSA. I found Robert M. Catlin especially fascinating. To rectify the disorder at Franklin (Mine Hill looked as if it were attacked by manic moles), the New Jersey Zinc Company (then already becoming powerful) brought in Catlin as mine superintendent. He earlier served with distinction in South Africa, and he served Franklin for 24 years in the first quarter of this century. He not only "puttied up the cracks," but through methodical top-slicing he made zinc mining really profitable for the company, which could then take on the entire orebody. For the town, he establish a water system, paved streets, and got in a quality police force among many other things. He is presented to us in a picture that shows a lively bowler-hatted gentleman with rimless glasses and a professorial beard.

Although Franklin was exhausted in 1954 and Sterling Hill in 1986, enormous quantities of specimens have been preserved. In addition, the Franklin-Ogdensburg Mineralogical Society (FOMS) and its organ *The Picking Table* (a biannual journal with a fine layout, and articles ranging from casual to quite technical), and two excellent museums make any trip to this mineralogical Mecca worthwhile. True, hardystonite, hendricksite, and hodgkinsonite—once common species and found nowhere else in the world—no longer are lying around, but Nick Zipco, a Ukranian-American of long association with the mines and one of the sights of Franklin, still hawks specimens near the Franklin Mineral Museum, which is across the street from the fabled enormous hole, the Buckwheat Open Cut.

For over 20 years, Dunn has been perspicacious in his zeal toward Franklin and Sterling Hill mineralogy, and he has described and named over 25 new species just from these localities. Arguably (unless Sid Williams beat him to it), he holds a world record for new mineral species description in general, although I am sure some beetle people hold even bigger records for taxa in general.

This monograph, in five parts, is attractively laid out. The print is sharp and the contrast on white background is excellent. It is not right-justified, which I much prefer. I like the soft cover, good binding, and excellent reproductions of crystal drawings (mostly from Palache's classic monograph of which much of the 420 black and white figures are derived). Dunn's monograph reveals his artistic bent in some of the most exquisite SEM photographs I have ever seen in mineralogical literature. The solution (?) structures on page 681 parallel to the (010) plane for sarkinite jump out at you like gaping maws. The mooreite (Gideon Moore of the nineteeth century) on page 638 looks like a coffin ready for use. The largest known replica of a Franklin mineral crystal is shown on page 663. It is the facsimile of the unique boroarasenate cahnite and serves as the tombstone for Lazard Cahn, an outstanding micromounter and a Palache collaborator in the early part of this century. The SEM photographs alone are valuable for scientific intelligence; not only can they be used as determinative tools, but they aid in deciphering paragenesis. Perhaps it is asking too much, but if goniometric angles were provided in the legend with respect to the base, prism, pinacoid, cleavage, etc., it would then be possible to reconstruct the entire crystal on Eric Dowty's SHAPE package!

In some photographs, you could directly work out the forms with little trouble, for example, sarkinite and chlorophoenicite. If there is any drawback in the monograph, it is found in the black and white photographs of the minerals themselves. They are all but useless and therefore are a waste of space. Franklin and Sterling Hill minerals, particularly the more exotic Mn^{2+}-bearing species, are known for their colors. The bright pink to pale rose of hodgkinsonite and the commanding bronze folia of mcgovernite just do not make it without color. I am sure Dunn has color photos of these exquisite minerals and their associations; he should have included an optional collection of such prints to accompany the monograph—at an additional fee, of course.

The text is truly exhaustive, a grandiloquent (in the positive sense of the term) display. Dunn's enthusiasm clearly shows here. The tenor in general is that of a classic communication of scientific intelligence, but it is never bone dry for the reader. A sort of manic frenzy occasionally appears, but it never goes over the edge; rather, it leaves the reader with a kind of infectious enthusiasm. There are five volumes altogether. Volume one (Bibliography; introduction; historical perspectives of local iron and zinc mining and processing, p. 1–160) concerns mining and gives the enormous bibliography for the entire treatise right at the beginning. Volume two (the quarries in the Franklin Marble; major zinc mining companies; benefaction of zinc ores; cultural aspects of Franklin and Sterling Hill; regional and local geology; geology and structure of zinc deposits; geochemistry; fluorescence of min-

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erals in UV; mineral assemblages, p. 161–320) describes the cultural aspects, including colorful and dynamic personalities, mining in the Franklin Marble, regional and local geology, the zinc deposits, geochemistry, and mineral assemblages. Volumes three through five (p. 321–755) constitute the backbone of this tome are surely Dunn's passion: descriptive mineralogy. This section is very well organized and is reminiscent of Palache's US Geological Survey Professional Paper 180. Much valuable new information is given, especially the fine SEM photographs along with reproductions of Palache's crystal drawings. Dunn has also been busy with the electron microprobe: A wealth of new analytical information is provided in tabular form, most of it previously unpublished. Even some dubious formulas have been purged. Each volume can be purchased separately.

Winding down, I find Dunn's monograph for all intents and purposes unique. The work is sincere, accessible, and knowledgeable. Then again, he does not speculate and create theories. It is, in fact, a mineralogical treatise in the classical sense of the term. You do not need any mathematics, and not much chemistry, but you had better be up on your minerals for Dunn does not cater to the uninitiated in these matters.

People who know Dunn understand that he is a truly independent soul. This remarkable monograph was privately printed and published by him. There is no ISBN number. It does provide an example of the force of an individual in getting something done. However, I strongly urge that Dunn find a publishing house that will take on printing and marketing this book. Parts could be rearranged, the occasional redundancy could be eliminated, and a bit more terseness could be invoked, especially at the beginning. I have little doubt that it will sell—the amateur mineral community is huge, even though most are penny-wise (regarding buying books and learning) but pound-foolish (in buying mineral specimens). This is a valuable scientific document and should be presented accordingly in book form. But most important, it sets an example toward the other great mineral cornucopias that really need updating and compilation in monograph form.

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