STROSS, F. H. AND S. T. ABRAMS, (1951). Thermal analysis of the system sodium stearate-cetane. *Jour. Am. Chem. Soc.*, **73**, 2825–2828.

WARNE, S. ST. J. AND P. BAYLISS, (1962). Differential thermal analysis of cerussite. (Am. Mineral., in press.)

THE AMERICAN MINERALOGIST, VOL. 47, MAY–JUNE, 1962

PARAMELACONITE AND ASSOCIATED MINERALS FROM THE ALGOMAH MINE, ONTONAGON COUNTY, MICHIGAN

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Since the first description of paramelaconite from the Copper Queen mine, Bisbee, Arizona, by Koenig in 1891, only two specimens have been known to exist. During the present study a third specimen from the type locality, donated by Koenig to the A. E. Seaman Museum at the Michigan College of Mining and Technology, was found and used for purposes of comparison. The specimen is a small, superb group of crystals associated with connellite and malachite.

Several other specimens were found in the museum with the locality given as the Algomah mine, Ontonagon County, Michigan. Examination of these specimens revealed that all contain paramelaconite crystals, some reaching a length of eight mm. The crystals are rough and pitted and of pseudocubical habit, although a few individuals are pseudo-octahedral. A few cavernous crystals were found which contained small, highly perfect paramelaconite crystals in parallel orientation with the outer individual. Four of these crystals were examined on the goniometer and the following forms noted: {001}, {010}, {110}, {013}, {011}, {113} and {112}. All of these forms but {001}, {010} and {011} are new for the species. Two crystals exhibited {013} and {113} together and {110} and {112} were found once, on each of the other two crystals respectively. The appearance of all of these four crystals resembles the habit illustrated by Frondel (1941). The specific gravity of this material is 6.11 (average of four determinations on the microbalance).

The crystals occur in thin seams which are coated with poorly crystallized malachite and scattered small dioptase prisms. The matrix of the specimens contains small blebs of cuprite which are ringed by tenorite and then chrysocolla. Blades of atacamite may be found embedded in the chrysocolla. Veinlets of granular paramelaconite transect all of the minerals in these blebs. Dioptase is earlier than the paramelaconite but malachite is later; crystals of malachite commonly line skeletal paramelaconite crystals.

Professor K. Spiroff of the Department of Geology loaned the writer several specimens from the departmental collection which were obtained

at the Algomah mine. Several of these specimens were identical to those just described. A few, however, consist of massive paramelaconite which is coarsely granular and shows well developed basal parting. Close examination revealed that this material is pseudomorphous after quartz, and large, perfectly developed crystals show the rhombohedra *z* and *r*, the prism, and one or more trigonal trapezohedra.

Veinlets of a fibrous blue mineral cutting the paramelaconite in these specimens were examined and proved to be planchéite as defined by Billiet (1942). The optical properties of the planchéite are as follows: $\alpha = 1.697$, $\beta = 1.720$, and $\gamma = 1.744$. The optic sign is + with 2V approaching 90°. The pleochroism is fairly strong in blue; Z and Y are blue and X is sensibly colorless with $Z > Y > X$. The fibers show positive elongation and parallel extinction.

Thin sections of this material show the sequence dioptase-paramelaconite-planchéite-malachite-chrysocolla. Perfect pseudomorphs of planchéite after dioptase are relatively common.

On a recent collecting trip to the Algomah mine a few massive pieces of paramelaconite were found, two of which contain small pockets of crystals. The Algomah mine is now closed and filled with water; it seems unlikely that it will ever be reopened.

The writer is grateful to Professor K. Spiroff of the Department of Geology, Michigan College of Mining and Technology, and to Professor John W. Anthony, Department of Geology, University of Arizona, for reading the manuscript and offering helpful suggestions.

References

Billiet, V. (1942), Onderzoek het verband tusschen chrysocolla, katangiet, plancheiet, bisbeeiet, shattuckite en dioptaas. *Verk. k. Vlaamsche Acad. Wetensch Lett. Belgie.* **4**, 1.

Frondel, C. (1941), Paramelaconite: a tetragonal oxide of copper. *Am. Mineral.*, **26**, 657.

Koënig, G. A. (1891), On paramelaconite and the associated minerals. *Proc. Acad. Nat. Sci. Phila.*, 284.

THE AMERICAN MINERALOGIST, VOL. 47, MAY–JUNE, 1962

"SILICONE COMPOUND," A SUBSTITUTE FOR VASELINE AS A POWDER BINDER FOR GLASS FIBER MOUNTS IN *X*-RAY DIFFRACTION CAMERAS[1]

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"Silicone compound" may be substituted for vaseline as a powder binder for glass fiber mounts in *x*-ray diffraction cameras. Isotropic vaseline crystallizes with time and produces interfering diffractions. In contrast, diffraction effects from seven-year old "silicone compound"

[1] Publication authorized by the Director, U. S. Geological Survey.