The contradictory results which have been obtained by workers on the etch figures of sylvite and other halides may well be connected with the principle here under discussion. One worker may have used an etching medium which yields only (111) pits, and since this form is geometrically the same in all five classes of the cubic system, he reports holosymmetry. Another may have chanced upon a medium capable of producing (*hkl*) pits, and finds them asymmetric. I have sought in vain in the controversial papers on the etching phenomena of halides of the past 20 years for a recognition of this elemental principle. Perhaps our textbooks are to blame, in that they do not emphasize the point, and the diagrams of etch figures they give are often misleading in this very respect.

BROMYRITE FROM TOMBSTONE, ARIZONA*

CHARLES ALFRED RASOR, *Tucson, Arizona.*

Bromyrite at Tombstone, Arizona, here described, is believed by the writer to represent the first authenticated occurrence from the United States, though others have mentioned it without publishing a chemical analysis. Search for this mineral has been made, especially in the silver districts of Nevada.

In the study of the mineralogy of the Tombstone district, several specimens of unusually well crystallized dark green "horn silver" had not changed its color since they were first collected by the writer in April 1935. Specimens collected before that date by others had, also, not changed color. Therefore, a carefully separated sample of about 3 grams submitted to the chemistry department of the University of Arizona was analyzed by Mr. R. Carrillo under the supervision of Dr. R. L. Nugent and gave the following composition:

	Per cent	Ratios	
Cl	0.6	.017	
Br	38.9	.487	.524
I	2.6	.020	
Ag	56.7	.526	.526
	98.8		

The analysis shows the mineral to be bromyrite, probably containing, isomorphously, small proportions of iodyrite and cerargyrite.

The silver haloid, mined from the surface to the lowest depths of oxidation, both in the early days and at present, has been called cerargyrite without any mention that bromine was a constituent. In unpublished

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notes on the Tombstone district, Dr. F. L. Ransome did mention embolite, Ag(Br,Cl), as the principal silver mineral in the ores from the State of Maine mine, which is four or five miles west of the main producing area.

Many specimens of rich silver ore were collected showing bromyrite crystals, such as the cube modified by the octahedron. Other specimens showed bromyrite as large masses of greasy dark green scales associated with hydrous iron oxides, cellular quartz, and cerussite. Some excellent specimens from the rich silver ores of the old Flora Morrison mine and the Empire mine contain bromyrite associated with coiled masses of native wire silver, bright yellow flakes of gold resting on the green bromyrite, and unidentified green ferric tellurites.

The presence of tellurites or tellurates suggests that much of the silver had been derived from the alteration of the silver telluride, hessite. Specimens of hessite were found by the writer in the Flora Morrison ores, but the mineral had been previously described by Genth.[1]

The vertical distribution and the relative abundance of the silver haloids at Tombstone is uncertain, but the rare silver bromide is believed to have been the most abundant and to have been concentrated in a fairly definite zone particularly around the 400 foot level. In other mining districts Burgess[2] has shown that the different haloids, except bromyrite, occupy definite zones in the ore deposits, probably because of the relative concentration of the three halogens, and it is thought that bromyrite occupies a zone between embolite and iodobromite. However, if the three halogens were equally abundant in the mine waters, as suggested by Emmons,[3] the bromide and iodide of silver would probably predominate in the silver deposits as suggested at Tombstone by the abundance of bromyrite.

It would be interesting to know if the "horn silver" found at the surface at Tombstone by Ed Schiefflin, and others, was all cerargyrite, or if it was in part or entirely bromyrite. This can not be known unless some one will donate specimens for chemical analysis that were collected in the early days of mining activity.

A feature of the bromyrite at Tombstone is the characteristic odor

[1] Genth, J. A., Hessite from the Westside mine, Arizona: *Am. Phil. Soc.*, vol. **24,** p. 36, 1887.

[2] Burgess, J. A., The halogen salts of silver and associated minerals at Tonapah, Nevada: *Econ. Geology*, vol. **6,** pp. 13–21, 1911. The halogen salts at Wonder, Nevada: *Econ. Geology*, vol. **12,** pp. 589–593, 1917.

[3] Emmons, W. H., The enrichment of ore deposits: *U. S. Geol. Survey*, Bull. **625,** pp. 256–257, 1917.

given off when first exposed to the air. Burgess[4] has described it as a "drug store or laboratory odor."

The source of so much bromine along with the other halogens is not definitely known, but it may well have been derived from the alkali lakes or playas which are not far distant.

ACKNOWLEDGMENTS

This study of bromyrite represents a portion of a thesis on the mineralogy of the Tombstone mining district, Arizona, which was submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Arizona. The writer is indebted to Dr. B. S. Butler for guidance and criticism in the preparation of the manuscript, to Dr. E. D. Wilson, geologist for the Arizona Bureau of Mines, for many helpful suggestions, and to Dr. W. T. Schaller for critical reading.

[4] Burgess, J. A., *op. cit.*, p. 593, 1917.

PROCEEDINGS OF THE EIGHTEENTH ANNUAL MEETING OF THE MINERALOGICAL SOCIETY OF AMERICA AT WASHINGTON, D.C.

PAUL F. KERR, *Secretary*

The eighteenth annual meeting of the Society was called to order Wednesday, December 29th, at 1:30 P.M. in the Rose Room of the Hotel Washington, Washington, D.C., President Norman L. Bowen presiding. The customary business of the Society was conducted, including reports by the officers of the Society and committees summarized as follows:

MINUTES OF THE LAST ANNUAL MEETING.

REPORT OF THE SECRETARY.

REPORT OF THE EDITOR.

REPORT OF THE TREASURER.

MEMORIALS:

Brief oral tributes were presented by Dean Edward H. Kraus of the University of Michigan for Reinhard Brauns and A. H. Phillips, late Fellows of the Society.

COMMITTEES:

REPORT OF THE AUDITING COMMITTEE

The business meeting was adjourned at 2:00 P.M., and the president, Norman L. Bowen, called for the presentation of papers. The report of the election of officers and fellows for 1938, the reports of the Secretary, Editor, and Treasurer, and the reports of the committees are given in the following pages.