common in Monte Somma rocks; often occurs as transparent crystals in cavities of sanidinite, syenite, sommaite, monzonite, phonolite, and trachyte; sometimes enclosed in large leucite crystals. ANDESINE: occurs in some lavas of 1631; also as a constituent of sanidinite. LABRADORITE: thin tabular crystals in some Vesuvian lavas, and in leucitophyre of Pollena. RIVAITE (a mixture of wollastonite and glass) was found as a small radiated blue nodule. LEUCITE: an essential constituent of the lavas and dikes, as well as of various ejected blocks; the larger crystals occur in leucotephrite. It occurs also in the white pumice of Pompeii. DIOPSIDE: sparingly in sanidinite. AUGITE: abudant in lavas; and in ejected blocks of trachyte, sanidinite, phonolite, monzonite, microsyenite, and sommaite. HIORTDAHLITE: in sodalitic sanidinites of Monte Somma, and in microsyenite. AMPHIBOLES: as constituents of sanidinite, leucitite, phonolite, monzonite, and microsyenite; also in the pumices of Pompeii. NEPHELITE: abundant in the following rocks and their cavities: sodalite sanidinites, sanidinites with garnet, microsyenites with vesuvianite, phonolites with large crystals of sanidine, and micaeous trachyte. SODALITE: a component of various sodalitic rocks of Monte Somma; occurs also in some lavas (1631). HAUYNITE: an accessory constituent of phonolite, mica trachyte, and leucotephrite. GARNETS: in mica syenite, phonolite, and microsyenite. OLIVINE: a constituent of Vesuvius and Monte Somma leucotephrites; occurs also in the lavas of 1631. FAYALITE: dull black tabular crystals in the lavas of 1631, and in some leucotephrite blocks ejected in 1906. WERNERITE: formerly found in large colorless, pale blue or violet crystals in sanidinite blocks. ALLANITE: only found in a very few crystals in a sanidinite. BIOTITE, (c). KAOLINITE: common, as an alteration product of leucite. TITANITE: an accessory constituent of trachyte, phonolite, sanidinite, and microsyenite. LITIDIONITE (neocianite): occurs in some lapilli of 1873. APATITE: an accessory constituent of some lavas and ashes.

A NOTE ON THE OCCURRENCE OF ALASKAITE

W. HORATIO BROWN, *University of Arizona.*

Several summers ago while engaged in professional work in the San Juan region of Colorado, specimens of two uncommon bismuth minerals, lillianite and alaskaite, were collected. Lillianite was identified with ease by means of the tables of Davy and Farnham[1] but alaskaite caused considerable difficulty and it was not until a specimen was obtained from the U. S. National Museum for comparison that it could be positively identified. On account of a cleavage which may be brought out by etching, the appearance of the mineral under the metallurgical microscope is very characteristic.

The alaskaite, which is an argentiferous variety of galenobismuthinite, was found in the Saxon mine, which adjoins the

[1] Davy, W. M. and Farnham, C. M.: Microscopic Examination of the Ore Minerals, New York, 1920.

Alaska mine where the mineral was discovered by Koenig[2] and from which it is named. These mines are in Poughkeepsie Gulch, in the Silverton Quadrangle, Colorado.

The material from the Alaska mine has been studied by several investigators. Gramont[3] made a spectroscopic examination of the mineral. Liweh[4] classified it as a variety of fahlerz but Koenig[5] disagreed with Liweh because alaskaite carries only a very small amount of antimony. Ransome described the Alaska mine[6] and noted the occurrence of other bismuth minerals in the region.

The mineral occurs as particles usually less than half a centimeter in diameter in vein quartz associated with pyrite. Under the microscope it can be seen that the alaskaite is moulded around euhedral crystals of quartz and pyrite. In places the pyrite is corroded. In polished section corroded areas of sphalerite and tetrahedrite are also visible in the alaskaite and it is cut by minute veinlets of covellite and some dark minerals which may be oxidized lead or copper compounds. Several blade-like areas of chalcopyrite were also found in the polished sections. In the specimen from the Alaska mine, loaned to the writer by the U. S. National Museum, which has a large percentage of chalcopyrite, these rather rectangular blades were much more abundant, so much so that in places the texture was similar to that of a diabasic texture in a rock. Similarily shaped blades of alaskaite were also seen in the chalcopyrite. It is probable that the alaskaite is hypogene and that these intricate intergrowths account for the copper, lead and zinc in Koenig's analyses.

Both the Davy and Farnham etching reactions and blowpipe tests were tried on the specimens. The etching reactions were checked against the specimen loaned to the writer by the U. S. National Museum. The reactions and the physical properties determined are given in the following table.

[2] Koenig, G. A.: Ueber den Alaskaite, ein neues Glied der Reihe der Wismuthsulfosalze: *Zeit. f. Kryst. u. Min.*, **6**, 42–47 (1882). Also in *Proc. Am. Phil. Soc.*, **19**, p. 472 and **22**, p. 211 (1885).

[3] Gramont, A. de: Directe Spectral Analyse der Mineralien: Abstract in *Zeit. f. Kryst. u. Min.*, **27**, p. 625 (1897).

[4] Liweh, Th.: Fahlerz von Alaska gang im südwestlichen Colorado: *Zeit. f. Kryst. u. Min.*, **10**, p. 488 (1885).

[5] Koenig, G. A.: Ueber Alaskaite: *Zeit. f. Kryst. u. Min.*, **14**, p. 254 (1888).

[6] Ransome, F. L.: Economic Geology of the Silverton Quadrangle, Colo: *U. S. Geol. Survey Bull.* **182**, p. 84 and 195 (1901).

Macroscopic

Color......Silvery or light lead gray.
Luster.....Metallic.
Hardness...Two.
Blowpipe...Lead and bismuth reactions on charcoal.
Assay......Ore carrying small proportions assays from 300 to 600 ounces of silver per ton.

Microscopic

HNO_3.....Tranishes brown or iridescent, develops cleavage.
HCl.......Negative or slight gray tarnish, rubs clean.
KCN......Negative.
$FeCl_3$......Tarnishes brown and develops cleavage.
$HgCl_2$.....Negative.
KOH......Tarnishes gray and develops cleavage, may take fifteen minutes to an hour.
Color......In reflected light, galena white.
Optical.....In reflected polarized light, slightly anisotropic changing from gray to darker gray.
Cleavage...Two directions.

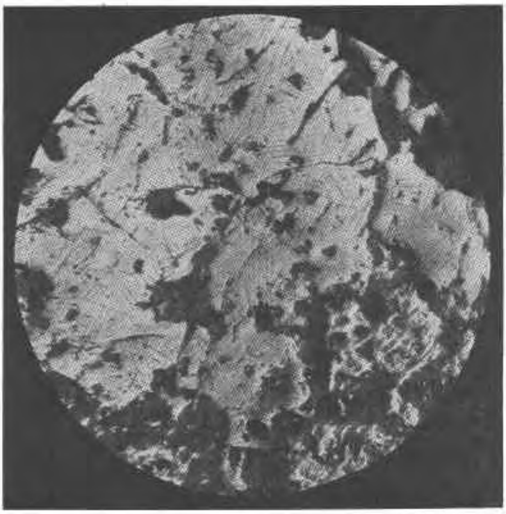

Fig. 1.
Polished section of alaskaite showing cleavages developed by etching.

The accompanying photograph shows the cleavages as brought out by nitric acid. It is believed that the mineral will be found to be fairly abundant in the San Juan region in future studies of the ores as indications of bismuth are frequently encountered in assaying the ores.