metasilicates of manganese[19] and calcium in which the ratio between manganese and calcium seems to vary from 1 : 0 to 1 : 1. However, these minerals differ too much optically and crystallographically[20] to belong to an isomorphous series in the narrow sense of that term. The chief types thus far known are the following:

Mineral	Formula	Ratio of Ca to Mn(+Fe+Mg)
Pyroxmangite	$(Fe, Mn)SiO_3$	1 to ∞ or 0 to 1
Sobralite	$CaMgFe_2Mn_4(SiO_3)_5$	1 to 7
Rhodonite	$CaMn_5(SiO_3)_6$	1 to 5
Fowlerite	$Ca(Mn, Fe, Zn)_5(SiO_3)_6$	1 to 5
Vogtite	$Ca(Mn, Fe, Mg)_2(SiO_3)_3$	1 to 2
Bustamite	$CaMn(SiO_3)_2$	1 to 1

Babingtonite probably belongs to this group, but its formula is still under discussion.

THE MINERALS OF VESUVIUS[1]

Albert Pelloux, *University of Genoa.*

The minerals that occur about Vesuvius, which now number more than one hundred and fifty species, may be arranged genetically into four groups:

I. Minerals that are found in the ejected limestone blocks of Monte Somma.[2]

II. Pneumatolytic minerals formed in cavities of leucotephrites and conglomeratic blocks ejected by Monte Somma and Vesuvius, or coating the walls of ancient lavas.

[19] With or without iron and magnesium.

[20] As proved especially by their X-ray patterns: see *Am. Jour. Sci.*, **CCX**, 1925, p. 383.

[1] In the preparation of this paper, I have consulted and taken considerable data from the following important works on Vesuvian minerals:

A. Scacchi. Catalogo dei minerali vesuviani con notizie della loro composizione e giacimento Napoli, 1887.

ibid. Catalogo dei minerali e delle rocce vesuviane. (*Atti della R. Academiac delle scienze fisiche e matematiche di Napoli*, Vol. I, 4 Series) Napoli, 1889.

A. Lacroix. Etude minéralogique des produits silicates de l'eruption du Vésuve (avril 1906). (*Nouvelles archives du Muséum*, 4 series. Vol. IX) Paris, 1907.

ibid. Les minéraux des fumerolles de l'eruption du Vésuve en avail 1906. (*Bulletin de la Société fançaise de minéralogie*), Paris 1908.

F. Zambonini. Mineralogia vesuviana. (*Atti della R Accademia delle scienze fisiche e matematiche di Napoli*, Vol. XIV Ser es 2, no. 7) Napoli, 1912.

F. Zambonini. Appendice alla Mineralogia vesuviana (*Atti Reale Accad. delle scienze di Napoli*, Vol. XV series 2, no. 12) Napoli, 1912.

Notices of new vesuvian minerals are reported in the publication: *Annali dell' Osservatorio vesuviano* (terza serie a cura del comitate vulcanologico di Napoli) of which the first vol. (1924) has been issued.

[2] Monte Somma is the name of an ancient crater wall which forms a semicircular cliff to the north and east of the modern cone. In views of Naples it is seen as a ridge to the left of the present cone.

III. Fumarolic products.

IV. Minerals that occur as rock constituents of Vesuvius and Monte Somma.

I. MINERALS IN EJECTED LIMESTONE BLOCKS

The blocks that are mentioned in the first group occur scattered in the tuffs of which Monte Somma is largely built, and may be easily collected in the ravines of the volcano, especially after long periods of rain. These limestone blocks are in various stages of metamorphism, from blocks that are intact or only calcined, to those in which the original limestone has been entirely replaced by aggregates of silicate minerals. Some of the blocks show geodes in which are found the finest crystallized specimens of Vesuvian minerals; others, however, form compact masses. In this paper the common minerals are indicated by the letter (c), rare minerals by (r) and very rare minerals by (vr).

The minerals occurring in ejected limestone blocks are as follows:

GRAPHITE: small masses with fluorite (vr). MOLYBDENITE? scales and fine granular masses in galena. GALENA: lamellar or granular masses with sphalerite, seldom with pyrrhotite and molybdenite. SPHALERITE: usually lamellar, rarely in crystals; very ferriferous. PYRRHOTITE: tabular crystals (r). CHALCOPYRITE: in small masses. PYRITE: very small crystals. FLUORITE: colorless crystals in geodes (r). PERICLASE: small pale green crystals with forsterite (r). MASSICOT: yellow coatings on galena (vr). HEMATITE (c). MAGNETITE (c). SPINEL: (pleonaste), black, or dark green crystals with humite, mica, forsterite, pyroxene (c). Ruby spinel was found in a marble of Monte Somma, while chlorspinel was observed in some blocks with humite (vr). LIMONITE: occurs as an alteration product of iron minerals. CALCITE: (c). DOLOMITE. SIDERITE: in small crystals with dolomite (r). MAGNESITE (?) earthy. ARAGONITE: crystals in geodes (r). HYDROZINCITE: white crusts on sphalerite, as an alteration product (r). ORTHOCLASE, SANIDINE: (c). ANORTHITE: fine crystals with meionite and leucite. LEUCITE: in geodes with meionite, augite, and rarely davyne, microsommite, and humite. DIOPSIDE: yellow crystals with mica, humite, garnet, and magnetite; white and green crystals with mica, vesuvianite, garnet, and augite. AUGITE: dark green to black. WOLLASTONITE: rarely in good crystals, or lamellar masses. AMPHIBOLE. NEPHELITE: in geodes with mica, humite, vesuvianite. KALIOPHILITE: colorless crystals in geodes with mica and augite (r). DAVYNE-MICROSOMMITE: colorless crystals with garnet, vesuvianite, and sometimes sanidine. NATRODAVYNE: in geodes with garnet, pyroxene, sanidine, amphibole, and vesuvianite. CANCRINITE: in geodes with calcite, mica, nepheline, forsterite, humite, and spinel (vr). CALCIOCANCRINITE? SODALITE: colorless, white or greenish crystals with garnet, vesuvianite, mica, augite, and rarely leucite; rarely in meionite geodes. MOLYBDOSODALITE: Pale green crystals with humite, vesuvianite, and garnet (r). HAUYNITE: blue, granular, rare. LAPIS-LAZULI: blue masses, with mica (r). GARNET: (grossularite, almandite,

andradite, melanite, etc.) with vesuvianite, sodalite, and cuspidine; in geodes, (c MONTICELLITE: colorless or yellowish crystals or grains, with mica, vesuvianite, cuspidine, pleonaste, and green pyroxene (r). FORSTERITE: colorless, white, or gray crystals, in geodes, always associated with pleonaste. OLIVINE: yellowish-green or honey-yellow crystals or grains with pleonaste, pyroxene, and sometimes mica. MEIONITE: colorless crystals (white, when altered), occurring in geodes of the limestone blocks, with leucite and augite, and sometimes anorthite, davyne, garnet, titanite, (r). AKERMANITE: glassy, colorless, massive, with pale blue diopside containing copper (vr). VESUVIANITE: greenish-yellow, olive-green, reddish-brown, dark brown to black; in geodes with garnet, mica, sodalite, pyroxene, amphibole, pleonaste, forsterite, davyne, humite, cuspidine, meionite, etc. (c). CUSPIDINE: white, colorless, or pink, with mica, and some augite. CHONDRODITE, HUMITE, CLINCHUMITE: yellow, red, brown, rarely colorless or white; in geodes or forming the mass of the rock, with pleonaste, forsterite, and olivine. BIOTITE: yellowish, reddish, brownish, or black, crystals in geodes, with humite, pyroxene, and forsterite. TITANITE: pale yellow, in geodes. DYSANALYTE: found in small amounts in two limestone fragments. PEROVSKITE: small black crystals in geodes with spinel, calcite, and apatite, (vr). APATITE: colorless, with sphalerite. ANGLESITE: alteration of galena, (vr).

PERICLASE and hydromagnesite occur in the predazzites and pencatites of Monte Somma.

II. MINERALS IN EJECTED BLOCKS FORMED BY PNEUMATOLYSIS

In the second group, to which are referred the minerals formed by pneumatolytic processes, the crystals occur coating the cavities of the blocks or covering the walls of the lava fissures. Such crystals are generally small, but many are very rare and interesting. The blocks in which the pneumatolytic minerals occur may be found along the slopes of Vesuvius, or are enclosed in some of the lavas. In the latter case they may be collected in the ravines (locally named "cupe"), in the lava cracks, or in the small quarries that have been opened in the ancient lava flows. The Minerals of this group may be listed as follows:

MINERALS IN EJECTED LEUCOTEPHRITE BLOCKS

CHALCOPYRITE: in cavities, (r). PYRITE: small crystals in cavities. HALITE and SYLVITE: excellent crystals were observed in a leucotephrite block ejected in 1906. SELLAITE: occurs only in needles and microscopic crystals in a conglomeratic block that was found enclosed in the lava of 1872; the mineral filled the cavities, and was associated with anhydrite, gypsum, hematite, mica, and wagnerite. CHLORMANGANOKALITE: yellow crystals were found in a leucotephrite block ejected in 1906; it was associated with halite and sylvite. QUARTZ: in crystals in geodes of blocks of Monte Somma (r). TRIDYMITE: observed in cavities associated with wollastonite, augite, aegirite, and titanite, (r). HEMATITE. MAGNETITE. PSEUDOBROOKITE: crystals were found in a block similar to the one which produced sellaite,

(vr). CALCITE. DOLOMITE. SIDERITE. ARAGONITE: crystals in geodes. THERMONATRITE: white crusts in cavities of some blocks, associated with trona. SANIDINE. OLIGOCLASE. ANORTHITE: in the blocks containing sellaite. LEUCITE, (c). ENSTATITE: very small reddish crystals in the cavities of a block ejected in 1906; with sanidine, mica, hematite, magnetite, apatite, gypsum, and anhydrite, (vr). AUGITE. WOLLASTONITE, (r). AMPHIBOLE. NEPHELITE. MICROSOMMITE: rare in the leucotephritic blocks of Monte Somma, and very common in those of Vesuvius. SODALITE. HAUYNITE. OLIVINE: in some blocks ejected in 1906, sometimes altered to Iddingsite. FAYALITE: in some blocks ejected in 1906, with magnetite, sanidine, augite, and sodalite, (r). WERNERITE: in blocks containing large leucite crystals. ILVAITE: in the cavities of a 1906 block. PHILLIPSITE; ANALCITE; SCOLECITE; THOMSONITE: these occur in some blocks on Monte Somma. BIOTITE. TITANITE. APATITE: in the block that contained sellaite; fine crystals also were found in a block ejected in 1872. WAGNERITE: small wine-yellow or white crystals covered with a crust of apatite; in the block that showed sellaite. ANHYDRITE. BASSANITE: formerly found with hydrargyllite and gypsum in blocks ejected in 1906. GYPSUM. SYNGENITE: colorless crystals in cavities in a block ejected in 1906, (vr).

MINERALS IN EJECTED SANIDINITE BLOCKS

PYRRHOTITE: tabular crystals in sanidinites of Monte Somma, (r). FLUORITE: colorless crystals in some blocks of Monte Somma, particularly those carrying hiortdahlite and zircon. HEMATITE. MAGNETITE. BADDELEYITE: small pale green to brownish green crystals in a sanidinite of Monte Somma with sanidine, fluorite, zircon, magnetite, and pyrrhite, (vr). SANIDINE: transparent crystals in cavities. AUGITE. HIORTDAHLITE: pale yellow crystals with sanidine, sodalite, amphibole, biotite, melanite, zircon, titanite, and fluorite. AMPHIBOLE. MICROSOMMITE. SODALITE. GARNET. VESUVIANITE, (c). ZIRCON: colorless, pale blue, or violet crystals. ALLANITE: a few black crystals have been found. BIOTITE, (c). TITANITE. PYRRHITE: reddish brown, minute octahedral crystals.

MINERALS IN EJECTED SARCOLITE BLOCKS

The sarcolite rocks occur as ejected blocks, which represent leucitites that have been metamorphosed by absorption of limestone.

WOLLASTONITE, (c). DAVYNE-MICROSOMMITE: large, fine crystals. OLIVINE. SARCOLITE: pale flesh-colored to colorless crystals in geodes, or making up the mass of the rock, (vr). MELILITE. MELANITE. CUSPIDINE, (r). BIOTITE. APATITE.

OTHER EJECTED BLOCKS.

QUARTZ: common in blocks ejected in 1906. AEGIRITE and AEGIRITE-AUGITE: occur as reddish brown crystals in blocks and ashes of various eruptions. MIZZONITE: colorless or white crystals (vr), in geodes of some blocks of nephelite microsyenites, with sodalite, vesuvianite, augite, davyne, and garnet. MELILITE: occurs in blocks with augite, olivine, mica, and pleonaste, and sometimes kaliophilite; some square red crystals of melilite occur in geodes of an ancient lava of Pollena, associated with augite, anorthite, and mica.

III. FUMAROLIC PRODUCTS

The fumarolic minerals occur as a product of direct sublimation, or as a result of the chemical reactions between various emanations. Professor Lacroix has classified the fumaroles as follows:

A. High temperature fumaroles which produce essentially potassium and sodium salts. These correspond to the "Dry Fumaroles" of Saint Clair Deville, and yield also chlorides and sulfates of copper and lead, some sulfides of iron, and several iron and copper oxides.

B. Acid fumaroles which, at a lower temperature, produce iron, magnesium, alumnium, and manganese chlorides, as well as sulfur and realgar.

C. Sal Ammoniac fumaroles which occur especially where the lava flows covered vegetation, giving also a small quantity of ammonium sulfate and fluoride.

D. Sulfurous fumaroles which produce sulfuric acid and abundant steam. To these fumaroles must be referred the occurrence of sulfur, gypsum, sassolite, and sulfates of potassium, aluminum, and iron. Likewise the formation of opal due to the alteration of silicates may be ascribed to these emanations.

Many of the fumarolic products are of great interest, both from the study of the genesis of the minerals, and because of their rarity; a number of species being peculiar to Vesuvius, or even restricted to a single eruption. Unfortunately many of them are subject to rapid alteration, or being quite soluble, are quickly carried off by rains shortly after their formation. The best way to preserve them from alteration consists in sealing them in glass tubes or bottles.

SULFUR:[3] small crystals; also massive, globular, and stalactitic; very abundant. SELENIUM: deep red to pink crusts on the lavas of 1858 and 1859; also observed in fumaroles of 1895 and 1906; was extracted from ashes of 1906; (vr). SILVESTRITE (SIDERAZOT): thin metallic coatings of some lavas, (r). REALGAR: small crystals with sulfur and selenium from various eruptions particularly those of 1822 and 1906, (r). ORPIMENT: from alteration of realgar. GALENA: with pyrite, pyrrhotite, and magnetite, (vr). COVELLITE: thin crusts, produced in 1803, 1907, and 1909, (vr). MILLERITE: observed only once in capillary crystals on Vesuvian scorias, (vr). PYRRHOTITE: 1906, (r). CHALCOPYRITE: thin crusts on lapilli of 1906, (r). PYRITE: with galena, (r). HALITE and SYLVITE: rarely in crystals, commonly as incrustations, earthy or arborescent; occurring together in dry fumaroles. SAL AMMONIAC: very common; present in some ashes and lapilli. HYDROPHILITE? according to Zambonini this deliquescent mineral is probably CHLOROCALCITE, (vr).

[3] Also observed filling fissures of a marl of Monte Somma.

FLUORITE? in a Pollena lava with vesbine. CHLOROMAGNESITE: a deliquescence on lava, mixed with halite and sylvite (vr). LAWRENCITE?: stalactites found in the crater of 1922 were composed of a ferrous chloride, with halite and salammoniac; according to Zambonini it is probably, partly, RINNEITE, (vr). SCACCHITE: a deliquescence with other chlorides, (vr). MELANOTHALLITE: rapidly altering thin black scales, sublimed on crater walls formed in 1868 and 1906. COTUNNITE: acicular crystals, scales, arborescent aggregates or fused masses; also as pseudomorphs after galena formed in 1906, (r). PSEUDOCOTUNNITE: thin crusts and needles, formed in 1902 and 1906, (vr). MOLYSITE: commonly mixed with other salts; the yellow and red color of the rocks near the crater are due to this altered mineral. CHLORMANGANOKALITE: yellow crystals found in a block of leucotephrite ejected in 1906, (vr). HIERATITE: observed in very small colorless crystals with selenium in 1895, (vr). CRYPTOHALITE: microscopic crystals in some sal ammoniac crusts of 1850 and 1906, (vr.) MATLOCKITE? formed in 1858 and 1872. ATACAMITE: thin green crusts on lavas of 1631 with vesbine and azurite; on some blocks ejected in 1906, (c). HYDROMELANOTHALLITE: a green alteration of melanothallite. ERYTHROCALCITE: pale blue wool-like aggregates formed in 1868, with melanothallite, hydromelanothallite, hydrocyanite, dolerophanite, and euchlorite, (vr). ATELITE: a green alteration of tenorite, (c). KREMERSITE: red crystals of 1851, (vr). ERYTHROSIDERITE: red crystals, very deliquescent, (r). CHLORALLUMINITE: small crystals in some stallactitic crusts, 1906, (vr). OPAL: a sublimate of sulfurous fumaroles. CUPRITE: found only once in dark red-violet microscopic crystals with atacamite on lava of 1631. TENORITE: minute black scales, with halite and sylvite; dry fumaroles, now rare. HEMATITE: crystals encrusting lavas; was very abundant at Fosse Cancherone, a vent of Monte Somma. MAGNETITE. MAGNESIOFERRITE: magnetic iron-gray crystals on the Fosse Cancherone scorias; also in fumaroles of 1855 and probably of 1906 (r). HAUSMANNITE: thin brown coatings of lavas of 1631 and on sodalite crystals. MINIUM: dusty red layers forming cement of a conglomerate near the lava flows of Le Novelle near Resina, in 1912, (vr). SASSOLITE: thin colorless scales as a product of various eruptions; with gypsum and sulfur in fumaroles and with realgar in those of the Atrio del Cavallo in 1909, (r). HYDRARGYLLITE: hexagonal scales with bassanite, (vr). ANTIMONY TRIOXIDE? some crusts on the lavas of 1850, and sublimates of 1872. AZURITE: blue coatings on lavas of 1631. THERMONATRITE: white crusts on lavas, sometimes in stalactites, (r). NATRON: efflorescences in interior of some lavas. GARNIERITE? DESCLOIZITE? (Vesbine): in yellow or greenish crusts coating lavas of 1631; was considered by A. Scacchi to be an aluminum salt of a new element called by him Vesbium; according to Zambonini it may be descloizite. MASCAGNITE: white crystalline crusts mixed with sal ammoniac, sylite, and halite, on the Boscotrecase lavas of 1906. THENARDITE: white crusts on walls of some caves of lava. The mineral formed stalactites 60 cm. in length, with some sylvite and halite, (r). APHTHITALITE: tabular crystals, bladed aggregates, massive, incrusting, stalactitic; white, blue or green; a product of fumaroles which yield potassium and sodium salts. ANGLESITE: small, pale violet crystals; white to greenish crusts; formed in 1868, 1906 and 1907. PALMIERITE: minute hexagonal scales resembling sassolite; a product of dry fumaroles of 1868, 1872, 1906, and 1919; occurs with aphthitalite, (which sometimes encloses it), ferronatrite, jarosite, and euchlorine, (vr). BASSANITE: in some fumaroles on west side of crater formed in 1911. MANGANOLANGBEINITE-

microscopic pink tetrahedrons, in stalactites composed of thenardite, and sodium and potassium chlorides, (vr). HYDROCYANITE: abundant in fumaroles of 1868, with euchlorine, erythrocalcite, melanothallite, and doleropahnite; also in some of 1895; rapidly alters to chalcanthite, (r). EUCHLORINE: grass-green to emerald-green incrustations; tabular crystals; lava of 1868 with hydrocyanite; in fumaroles of the Atrio del Cavallo of 1892–1893; with metavoltine formed in 1906; (c). CHLOROTHIONITE: pale greenish blue to green crusts; 1872 and 1906. DOLEROPHANITE: chestnut to dark brown crystals, 1868, (vr). VERNADSKITE: grass-green aggregates of minute crystals; an alteration product of dolerophanite, (vr). LINARITE: microscopic crystals and grains in gypsum, in some scorias of 1881–1882. MIRABILITE: obtained by solution and recrystallization of salt mixtures found in fumaroles of 1855 and 1906, (vr). EXANTHALITE: white efflorescence on a lava of 1813, (vr). GYPSUM: small white crystals, very common. EPSOMITE: obtained by solution of some crusts, 1850 and 1855, (r). CUPROMAGNESITE: green conglomerates found among the bombs of 1872 were partly soluble in water, and A. Scacchi obtained crystals of this substance, (vr). MELANTERITE? 1822. CHALCANTHITE: a secondary product, (r). PICROMERITE: with cyanochroite; also obtained by solution of salts of 1855 and 1872. CYANOCHROITE: pale blue crusts, (r). KALINITE: white crusts; in the sulfurous fumaroles of the Atrio del Cavallo, (c). ALUNOGEN: mixed with kalinite in products of various eruptions; in 1908 in silky fibrous masses on the Atrio del Cavallo. FERRONATRITE: thin adamantine needles embedded in a mixture of white and blue salts collected in the crater in 1919, with aphthitalite and palmierite; also found in ash nodules in 1913; (vr). VOLTAITE: greenish grains; Atrio del Cavallo, (r). METAVOLTINE: obtained from solution of salts, 1906. Also in yellow crusts and minute crystals with euchlorine. ALUNITE: as a yellow crust in a block ejected in 1906 from the crater; with halite, sylvite, gypsum, and erythrosiderite, (r). JAROSITE: thin crusts of microscopic crystals, found with aphthitalite, euchlorine, and rare chlorides on a scoriaceous lava collected in crater in 1919 (r).

IV. MINERALS OCCURRING AS ROCK CONSTITUENTS

To the fourth group of Vesuvian minerals are referred those species that are the constituents of the various rocks of Monte Somma and Vesuvius. These rocks comprise chiefly leucotephrites, leucitic phonolites, phonolites with large crystals of sanidine, mica trachytes, sanidinites, microsyenites, monzonites, etc. In the cavities of these rocks the constituent minerals occur sometimes well crystallized, and are occasionally associated with minerals produced by pneumatolytic processes. Only a few of these rocks, such as the leucotephrites, form the lava flows and dikes of Vesuvius and Monte Somma; the others are encountered as ejected blocks and are found in tuffs, where they may be collected.

QUARTZ: small masses. OPAL: derived from various silicates under the action of fumarolic gases. LIME: occurs enclosed in some lavas due to the calcining of fragments of limestone. HEMATITE. MAGNETITE: it may be observed in quantity among the sands of the Vesuvian torrents and along the seashore. SANIDINE: very

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 micaceous 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.