

Mineralogical Chemistry.

Boron, Lithium, and Thallium in Volcanic Exhalations.

A. BRUN (*Bull. Soc. franç. Min.*, 1917, **40**, 107—110).—These elements may very often be detected spectrographically in the saline sublimations of fumaroles and in the altered scoria of Vesuvius and other volcanoes. Thallium was detected from Vesuvius, Etna, and Teneriffe in amounts ranging from 2·5 to 24 in 10,000. It is present as the soluble chloride in association with ammonium and sodium chloride, or as an insoluble sulphide in association with sulphides of arsenic.

L. J. S.

Thallium in the Lead Sulpharsenate Minerals of the Binenthal, Switzerland.

A. BRUN (*Bull. Soc. franç. Min.*, 1917, **40**, 110—111).—Spectroscopic examination of crystals of sartorite, dufrenoyite, and jordanite, as well as all fragments giving a black or chocolate-brown streak, showed the presence of thallium. Hutchinsonite [which contains 5% of Tl] was not detected amongst these fragments. The association with sulphur and arsenic is here analogous to the Vesuvian occurrence.

L. J. S.

Minerals from the Stanley Antimony Mine, Idaho.

EARL V. SHANNON (*Amer. Min.*, 1918, **3**, 23—27).—The ore consists of pure stibnite in a quartz-vein which carries some gold. The following mineral-species are described: stibnite, blende, gold, iron-pyrites, mispickel, kermesite, valentinite, cervantite, stibioferrite, and volgerite. The volgerite occurs abundantly as an earthy, dirty-white crust on stibnite; material from the interior of the crusts is more compact, somewhat translucent with a faint resinous lustre, and pale greyish-brown in colour. $D^{20} 3\cdot082$, $H 3\frac{1}{2}$. The mineral is completely soluble in hot concentrated hydrochloric acid, and at a red heat it gives off some oxygen, the higher oxide, Sb_2O_5 , apparently passing into Sb_2O_4 . It contains H_2O 12·6, Fe_2O_3 1·4%. The amount of water is lower than that required by the usual formula ($Sb_2O_5\cdot 5H_2O$ or $Sb_2O_5\cdot 4H_2O$), but this may perhaps be explained by the colloidal nature of the material.

L. J. S.

A peculiar Fibrous Form of Opal.

GEORGE P. MERRILL (*Amer. Min.*, 1918, **3**, 11—12).—Bunches of light grey, asbestiform material are embedded in a massive mixture of opal and chalcedony from Metolius, Oregon. It has the appearance of serpentine-asbestos (chrysotile), but is brittle and is harsh to the touch. Under the microscope it is seen to consist of wavy, colourless, isotropic fibres. Analysis gave: SiO_2 89·56, $Al_2O_3 + Fe_2O_3$ 4·72; loss on ignition, 5·62%.

L. J. S.

Ores of Manganese and Iron from the Crystalline Massif of Brosteni, Roumania. V. C. BUTUREANU (*Bull. Soc. franç. Min.*, 1917, **40**, 164—177).—A résumé is given of previous papers (P. Poni, A., 1901, ii, 26; Butureanu, A., 1908, ii, 955; 1909, ii, 745; 1912, ii, 949). The minerals considered are manganites of manganese and iron (brostenites of Poni) and carbonates of manganese and iron (ponites of Butureanu). The brostenites have been derived by the alteration of the ponites. Numerous analyses are quoted showing the wide range in composition. L. J. S.

Ulexite from Lang, California. WILLIAM FOSHAG (*Amer. Min.*, 1918, **3**, 35).—This occurs in some quantity, associated with colemanite, howlite, and calcite, in the Sterling Borax Co. mine. It has a fibrous structure with a botryoidal surface; it differs from the ordinary type of this mineral in being more compact and harder ($H=3\frac{1}{2}$) and in its association with colemanite. Analysis gave:

B ₂ O ₃ .	CaO.	H ₂ O.	Na ₂ O.	Total.
43.13	14.14	35.68	[7.05]	100.00

The mineral is probably a lake deposit from the alkaline waters of the neighbouring streams, and the colemanite has perhaps been derived from it by the action of alkaline chloride solutions.

L. J. S.

Randannite [= Diatomite] from Madagascar. A. LACROIX (*Bull. Soc. franç. Min.*, 1916, **39**, 85—88).—A bed of diatomite, interbedded with basaltic tuffs, is exposed on the banks of the stream Sandrangoty, near Mt. Raynaud, in the extreme north of Madagascar. The material is white, porous, and fairly coherent. Under the microscope, the material is seen to be colourless, colloidal, and to be composed of fusiform diatoms. Analysis by Raoult gave:

SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MgO.	CaO.
76.00	1.24	6.24	1.80	0.85	0.07	0.80
Na ₂ O.	K ₂ O.	P ₂ O ₅ .	H ₂ O at 105°	H ₂ O (ign.).	Organic matter.	Total.
0.39	0.18	0.12	5.87	6.07	0.60	100.23

The high percentage of titanium dioxide suggests that the impurities (Al₂O₃ and SiO₂ [2.90%] insoluble in alkali) are due to the presence of admixed laterite. L. J. S.

Lattice-like Inclusions in Calcite from North Burgess, Ontario. R. P. D. GRAHAM (*Min. Mag.*, 1918, **18**, 252—258).—Pale blue, coarsely crystalline calcite from this locality shows twin-striations, due to repeated twinning on the obtuse negative rhombohedron $e(110)$, and encloses fine needles, which are arranged parallel to the edges of this rhombohedron. On dissolving the calcite in acid, these needles remain as a delicate and intricate network or lattice-like structure. Analyses of this material, D 2.5,

gave the results under I and Ia, agreeing with the formula $5\text{MgO}, 6\text{SiO}_2, 4\text{H}_2\text{O}$. The material is slightly attacked by hydrochloric acid; after digestion with concentrated acid and drying at 100° , the residue had the composition given under II. The blue calcite itself (anal. III) contains very little magnesia.

	SiO_2 .	MgO .	FeO .	CaO .	H_2O .	CO_2 .	Total.
I.	57.23	30.35	1.66	0.37	n.d.	—	—
Ia.	56.37	30.43	2.47	nil	10.87	—	100.14
II.	63.93	26.16	1.21	—	8.08	—	99.38
III.	—	0.41	—	56.12	—	43.53	100.06

L. J. S.

Mineralogy of Black Lake Area, Quebec. EUGENE POITEVIN and R. P. D. GRAHAM (*Museum Bull. Geol. Survey Canada*, 1918, No. 27, 1—82).—An account is given of thirty-four mineral species found in the several asbestos (chrysotile) and chromite mines and quarries in the 'serpentine belt' near Black Lake, Megantic Co., Quebec. Many of these minerals are aluminosilicates rich in lime, such as idocrase, grossularite, etc., which are usually formed by the contact-metamorphism of impure limestones. In this area, however, they occur as fillings in dyke-like fissures penetrating peridotite and serpentine, that is, in rocks containing very little lime (0.20—0.68% CaO). These dykes are considered to represent the last phase of the igneous intrusions, when the residual acid magma or magmatic waters became enriched in lime by their solvent action on the surrounding rocks. Analyses are given of the following minerals: I. Diopside, colourless crystals from the Montreal chrome pit. Corresponding with the low percentage of iron, the refractive indices ($\alpha_{\text{Na}}=1.669$, $\beta=1.676$, $\gamma=1.698$) are lower than any previously recorded for diopside. II. Grossularite, colourless, transparent crystals from Southwark pit; refractive index, 1.734. III., lilac-coloured, and IV., yellowish-green crystals of idocrase; the refractive indices ($\omega=1.708$; $\epsilon=1.705$) of the lilac-coloured crystals are low. V.—VII. *Colerainite*, a new species, forming minute, colourless, hexagonal scales which are optically uniaxial and positive ($n=1.56$), and are often aggregated as white rosettes or botryoidal forms. Analysis V of the crystals leads to the formula $4\text{MgO}, \text{Al}_2\text{O}_3, 2\text{SiO}_2, 5\text{H}_2\text{O}$. Analyses VI and VII are of the underlying matrix, which is white, finely granular to compact, and resembles unglazed porcelain in appearance; this material

	SiO_2 .	Al_2O_3 .	Fe_2O_3 .	FeO .	MnO .	CaO .
I.	54.77	—	0.17	0.89	0.11	26.33
II.	39.49	22.35	—	1.00	0.15	36.62
III.	36.88	20.03	0.85	n.d.	0.23	37.61
IV.	36.62	15.96	4.30	0.54	trace	38.66
V.	24.40	22.77	0.45	n.d.	0.09	0.10
VI.	26.98	16.10	0.22	nil	0.20	0.12
VII.	33.00	13.12	—	—	—	trace
VIII.	43.31	0.38	0.27	nil	trace	0.12
IX.	50.29	6.23		1.00	—	nil
X.	48.88	3.56		1.36	—	nil

	MgO.	(K,Na) ₂ O.	H ₂ O.	Total.	Sp. gr.
I.	18.46	—	—	100.73	3.267
II.	0.28	—	—	99.89	3.60
III.	2.17	—	3.09	100.86	3.32
IV.	1.25	—	3.18	100.51	—
V.	32.70	0.30	19.63	100.44	2.51
VI.	36.56	0.28	19.91	100.37	2.44
VII.	35.30	0.26	18.67	100.35	2.34
VIII.	40.03	0.28	15.77	100.16	2.51
IX.	29.99	—	13.30	100.81	—
X.	31.41	—	15.67	100.88	—

consists mainly of the mineral colerainite. VIII is of 'precious' or 'noble' serpentine from the Megantic mine; this is chrysoprase-green and translucent with a somewhat waxy or greasy lustre. Included in it are sometimes grains and veins of chromite and the rare mineral stichtite, a chromiferous magnesium hydroxycarbonate. IX and X are of porcellophite, an impure variety of serpentine; IX is of pale grey material from the Megantic mine, and X, of pale brown material from the Hall chrome pit; both are very compact, resembling dried clay in appearance, and so light that they float on water.

L. J. S.

Flokite, a New Zeolite from Iceland. KAREN CALLISEN (*Medd. Dansk Geol. For.*, 1917, 5, No. 9, 1—6).—A specimen in the Copenhagen Museum, labelled 'Eskefjord? Iceland,' and regarded as mesolite, proved on examination to represent a new species. It forms slender, flattened, monoclinic prisms with perfect (100) at (010) cleavages. The crystals are water-clear or pale yellowish-green. Sections perpendicular to the prism-zone show a division into sectors with different optical orientations. $\alpha_{Na} = 1.4720$, $\gamma_{Na} = 1.4736$; D 2.102; H 5. Before the blowpipe, the material fuses readily with intumescence; it is not attacked by hydrochloric acid. Analysis by C. Christensen gives the formula $H_8(Ca,Na_2)Al_2Si_9O_{26} \cdot 2H_2O$.

SiO ₂ .	Al ₂ O ₃ .	CaO.	MgO.	Na ₂ O.	H ₂ O > 100°.	H ₂ O < 100°.	Total.
67.69	12.43	2.65	0.09	4.36	8.82	4.53	100.57

L. J. S.

The Mesosiderite-Grahamite Group of Meteorites: Analysis of Vasca Muerta, Hainholz, Simondium, and Powder Mill Creek. G. T. PRIOR (*Min. Mag.*, 1918, 18, 151—172. Compare A., 1916, ii, 635).—In the Rose-Tschermak-Brezina classification of meteorites, the mesosiderites are defined as consisting of iron and crystalline olivine and bronzite, with the metallic and stony matter in approximately equal amounts, whilst the grahamites contain the same constituents with the addition of plagioclase-felspar. It is now found that typical members of both groups contain abundant felspar, and that there is no essential difference between them. For the combined group, the earlier name mesosiderite is retained. The members of this group consist mainly of pyroxene and felspar, with nickel-iron in large amount,

but rather unevenly distributed, and nodules of olivine somewhat sparsely distributed, but occasionally of considerable size. Accessory constituents are troilite, chromite, and schreibersite. The felspar is nearly pure anorthite; the pyroxene is fairly rich in iron, the ratio of $\text{MgO}:\text{FeO}$ being about 2:1; the olivine, on the other hand, is poor in iron, the ratio $\text{MgO}:\text{FeO}$ being from 6:1 to 10:1; and the nickel-iron is poor in nickel, $\text{Fe}:\text{Ni}=10:1$ to 13:1. The cataclastic structure of the mesosiderites suggests that they represent a mixture of two types, to one of which belong the pyroxene and anorthite, and to the other the iron and olivine.

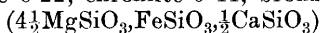
Vaca Muerta (Chili).—Several masses ('Sierra de Choca,' 'Llano del Inca,' 'Doña Inez,' etc.) are included in this fall. The bulk-composition (I) is deduced from analyses of the magnetically attracted portion and of the portions soluble and insoluble in hydrochloric acid of the unattracted portion. Ia is of the olivine, corresponding with $10\text{Mg}_2\text{SiO}_4, \text{Fe}_2\text{SiO}_4$, and Ib is the mineral composition. Hainholz (Westphalia).—II the bulk-composition, IIa of the olivine ($7\text{Mg}_2\text{SiO}_4, \text{Fe}_2\text{SiO}_4$), and IIb the mineral composition. Simondium (Cape Colony) (A., 1910, ii, 315).—This is much weathered. The portion of the unattracted material soluble in water contained NiO 1.28, CaO 0.91, SO_3 2.71%. Other detailed analyses are given. Powder Mill Creek (Tennessee).—The attracted portion contained Fe 73.15, Ni 5.61, insoluble 11.58, anorthite, etc. (9.66)=100. The olivine gave IIIa, corresponding with $10\text{Mg}_2\text{SiO}_4, \text{Fe}_2\text{SiO}_4$. The composition of some other meteorites of this group is also discussed.

Nickel-iron.			Troilite.		Schreibersite.													
Fe.	Ni.	Co.	Fe.	S.	Fe.	Ni.	P.	SiO ₂ .	Al ₂ O ₃	Fe ₂ O ₃ .	Cr ₂ O ₃ .							
I. 38.25	2.90	0.36	1.37	0.79	1.27	0.70	0.35	26.02	5.87	1.36	0.45							
II. 42.13	4.00	0.41	2.52	1.44	0.36	0.23	0.10	21.69	4.99	2.77	0.33							
FeO.			MnO.		NiO.		CaO.		MgO.		Na ₂ O.		P ₂ O ₅ .		H ₂ O.		Total.	
I. 7.03			0.24		—		4.35		7.36		0.18		—		0.54		99.39	
II. 6.19			trace		0.48		3.49		7.07		0.21		0.34		1.20		99.95	
SiO ₂ .			FeO.		MgO.			Insol.			Total.							
IA.			39.89		8.98			49.50			1.95			100.32				
IIA.			40.48		11.59			42.97			2.76			97.80				
IIIA.			40.18		9.15			48.91			1.42			99.66				
Nickel-iron.			Troilite.			Anorthite.			Pyroxenc.									
IB.			41½			2			17			32						
IIB.			46½			4			14½			27						
Olivine.			Chromite.			Rust.			Schreibersite.									
IB.			1½			1			2			3						
IIB.			1½			½			4			2						

L. J. S.

Composition of the Meteorites Amana and Eagle Station.
G. T. PRIOR (*Min. Mag.*, 1918, 18, 173—179).—The Amana or Homestead meteoric stones, which fell in Iowa Co., Iowa, on

February 12th, 1875, were in the same year analysed by G. D. Hinrichs, J. L. Smith, and by C. W. Gumbel and Schwager. These analytical results show some discrepancies amongst themselves and are not in agreement with the author's theory of the genetic relationship of meteorites (A., 1916, ii, 635). The following new analysis was therefore made. The bulk-composition (I) deduced from analyses of the magnetically attracted portion and of the portions soluble and insoluble in hydrochloric acid of the un-attracted portion, agrees with the following mineral composition: feldspar 9.76, apatite 0.22, chromite 0.44, bronzite



30.75, olivine ($3\frac{1}{2}\text{Mg}_2\text{SiO}_4, \text{Fe}_2\text{SiO}_4$) 40.15, nickel-iron 10.99, troilite 6.25, water 0.47%. This meteorite therefore contains about 11% of nickel-iron in which the ratio of Fe:Ni is 8:1, whilst the ratio of MgO:FeO in the ferromagnesian silicates is 4:1; it thus occupies an intermediate position between the type-meteorites Cronstad (C2) and Baroti (C3).

Nickel-iron.									
	Fe.	Ni.	Co.	Fe.	S.	SiO ₂ .	Al ₂ O ₃ .	Cr ₂ O ₃ .	Fe ₂ O ₃ .
I.	9.71	1.19	0.09	3.97	2.28	39.27	2.10	0.32	0.40
	FeO.	MnO.	CaO.	MgO.	Na ₂ O.	K ₂ O.	H ₂ O.	P ₂ O ₅ .	Total.
I.	12.06	0.08	1.78	24.88	0.92	0.13	0.47	0.26	99.91

A new analysis of the Eagle Station meteorite, which was found in 1880 in Carroll Co., Kentucky, gave II for the attracted portion and III for the olivine. These results confirm those of J. B. Mackintosh (1887). In the nickel-iron the ratio of Fe:Ni is about 6:1 (instead of more than 10:1, as in most other pallasites), and in the olivine the ratio of MgO:FeO is about 4:1 (instead of about 7:1). In composition, as well as in structure, this pallasite is thus exceptional; and it may perhaps be placed in the group A3 (A., 1916, ii, 635).

	Fe.	Ni.	Co.	SiO ₂ .	MgO.	FeO.	P, S, &c.	Total.
II.	79.74	13.98	1.04	1.42	1.74	0.77	(1.31)	100.00
III.	—	—	—	39.22	42.31	18.83	—	100.36

L. J. S.