

Mineralogical Chemistry.

Natural and Artificial Coloration of Amethyst, &c. MARCELLIN BERTHELOT (*Compt. rend.*, 1906, 143, 477—488).—Small crystals of amethyst from Brazil, when heated to 300°, became decolorised. The loss of colour is supposed to be due to the reduction of traces of manganic to manganous salts, with the occlusion of oxygen in the stone. On exposing the decolorised crystals to the action of radium chloride, contained in a sealed glass tube, the original colour is regained in the course of a few weeks, owing to the reoxidation of the manganese salt. Similar results were obtained with violet fluor-spar. Fused quartz and glass, containing traces of manganese, also acquired a violet tint when exposed to the action of radium chloride in the same manner; paper also showed signs of oxidation. It is suggested that the colour of amethyst, and possibly of some other precious stones, may be due to the action of radioactive substances while the stones lie buried in the earth's crust. The decolorisation by heat of smoky quartz and green fluor-spar is accompanied by the distillation of petroleum, and in these cases the colour must be due to organic matter (compare Abstr., 1901, ii, 166).

L. J. S.

Blue Rock Salt. ERNST PIESZCZEK (*Chem. Centr.*, 1906, ii, 906; from *Pharm. Zeit.*, 51, 700—701).—The blue portions of rock salt were found to contain 0·4 per cent. less chlorine than pure sodium chloride or than the blue portions rendered colourless by heating. The excess of sodium is attributed to the presence of a subchloride rather than to the presence of metallic sodium as suggested by Siedentopf (this vol., ii, 443) or by Stähli (*Apoth. Zeit.*, 1906, 21, 203), inasmuch as the colour is not removed by boiling with alcohol or by heating at 100° in a sealed tube with mercury.

P. H.

Formation of Oceanic Salt Deposits. XLIX. Artificial Production of Colemanite. JACOBUS H. VAN'T HOFF (*Sitzungsber. K. Akad. Wiss. Berlin*, 1906, 39, 689—693. Compare this vol., ii, 619).—It is found that boronatocalcite not only yields pandermite when heated with a solution saturated with sodium and potassium chlorides at its boiling point (110°), but that the same change takes place in presence of excess of water at very much lower temperatures. The reaction proceeds, moreover, much more readily in porcelain than in glass vessels.

From boronatrocalcite and water in the proportion 1 : 40 the heptahydrate, $2\text{CaO}, 3\text{B}_2\text{O}_3, 7\text{H}_2\text{O}$, was obtained at 90° and the enneahydrate, $2\text{CaO}, 3\text{B}_2\text{O}_3, 9\text{H}_2\text{O}$, at 60° , when the solution was nucleated with crystals of the respective hydrates. At 83° (the higher limit of the investigation), colemanite, $2\text{CaO}, 3\text{B}_2\text{O}_3, 5\text{H}_2\text{O}$, is the stable form of dicalciumtriborate in contact with a solution saturated with sodium chloride. The transformation of the heptahydrate into colemanite, which is accompanied by a diminution in volume, takes place at 40° in presence of sodium chloride, whilst in presence of a solution saturated with sodium chloride, potassium chloride, and glaserite (which has the lowest vapour pressure of all solutions capable of yielding calcium borates), the change takes place below 25° . Colemanite is therefore one of the Stassfurt salts which may have been formed at a temperature below 25° .

H. M. D.

The Amount and Origin of the Ammonia in the Products of the Eruption of Vesuvius in April, 1906. JULIUS STOKLASA (*Ber.*, 1906, 39, 3530—3537).—Contrary to the statements made by other observers that the ammonium chloride found on the lower portions of the lava outflow was due to the burning of vegetation, the author has found ammonium chloride on large blocks of lava at an altitude of 900 metres in places where no vegetation was present, and even in the sand of the crater. The gases streaming out of the crater on May 4th, 1906, contained hydrogen chloride and ammonia, and the whitish-yellow smoke which accompanied the eruption consisted principally of ammonium compounds. In certain localities there were in the lava white druses containing ammonium chloride mixed with the chlorides and sulphates of sodium and potassium. Some of the druses were coloured yellow by ferric chloride, and others exhibited a green colour due to copper chloride.

The portions of lava soluble in water often contained as much as 76—85 per cent. of ammonium chloride. In the lapillæ, the water-soluble portions yielded 33 per cent. of ammonium chloride. The red ash contained only 0.1 per cent. of ammonia, and traces merely were found in the grey ash. All the products of the eruption when heated to redness with soda-lime evolve ammonia, the largest amounts being obtained from a specimen of lapillæ and an olivine bomb. This result points to the existence of various nitrides which would in these circumstances evolve ammonia.

G. T. M.

Brunnerite from Avigliana. GIUSEPPE PIOLTI (*Atti R. Accad. Torino*, 1906, 41, 1066—1069).—A sample of brunnerite obtained from a serpentine cave near Avigliana was found to have n_D 1.715, and the percentage composition: MgCO_3 , 90.47; FeCO_3 , 9.45; MnCO_3 , traces. The angle of the cleavage rhombohedron had the value $107^\circ 30'18''$.

T. H. P.

Analysis of the Ash which fell in Naples on the Night of April 4—5th, 1906. EZIO COMANDUCCI and M. ARENA (*Rend. Accad. Sci. Fis. Mat. Napoli*, 1906, [iii], 12, 267—280. Compare Comanducci and Pescitelli, this vol., ii, 177; Johnssen, this vol., ii,

621; Oglialoro, this vol., ii, 621).—Analysis of the ash which was emitted from Vesuvius and collected in Naples on the night between April 4th and 5th gives the following percentages :

Cl.	SO ₃ .	P ₂ O ₅ .	SiO ₂ .	TiO ₂ .	Fe ₂ O ₃ .	FeO.
0.5992	0.9361	0.7494	43.6865	0.1720	12.2915	2.7219
MnO.	Al ₂ O ₃ .	MgO.	CaO.	CoO.	CuO.	K ₂ O.
0.2962	16.7468	2.2982	11.9677	0.0038	0.0854	4.6609
	Na ₂ O.	NH ₃ .	NO ₂ .	NO ₃ .	SO ₂ .	
	4.6329	0.03071	0.00134	0.000054	0.0224.	

Fragments of crystals of leucite, felspar, augite, magnetite, and ferrite were detected in the ash. T. H. P.

Silicate Fusions. HANS HERIBERT REITER (*Jahrb. Min.*, 1906, *Beil.-Bd.*, 22, 183—265).—A continuation of the work of C. Doelter on silicate fusions; the results obtained are discussed in detail with respect to the views expressed by Doelter and Vogt (*Ann. Rep.*, 1904, 1, 224; 1905, 2, 269). In the several experiments various minerals (albite, nephelite, augite, olivine, and magnetite) were fused together in different proportions. The order of separation of the minerals in the crystallised products so obtained is: spinel, hæmatite, magnetite, olivine, magnetite, augite, magnetite, nephelite, plagioclase. The fact that spinel is formed as a new component of these mixtures proves that there must have been dissociation, and the recurrence of magnetite shows that the order of separation does not depend on the fusibility of the minerals, but rather on the varying saturation of the silicate solution. L. J. S.

Compounds Allied to Spinel. Z. WEYBERG (*Centr. Min.*, 1906, 645—649).—Attempts to produce alumin-, chrom-, and ferri-silicates of the type $R''R_2'''Si_2O_8$ by fusing the materials with salts of alkalis or alkaline earths (*Abstr.*, 1906, ii, 23, 91) have frequently resulted in the formation of double oxides of the spinel type, $R''R_2'''O_4$. Silicic acid, aluminium hydroxide, and lithium carbonate, in the proportions given by $2SiO_2$, Al_2O_3 , Li_2O , when fused for several hours with an excess of lithium sulphate gave a white powder consisting of rounded, birefringent (perhaps orthorhombic) grains of lithium aluminate, $Li_2Al_2O_4$. Lithium chromite, $Li_2Cr_2O_4$, was obtained by fusing kaolin with lithium chromate; it crystallises as brown, isotropic octahedra with the characters of a spinel. When this crystallised lithium chromite is fused, it produces chromic oxide in crystals of an unusual habit. Calcium chromite, $CaCr_2O_4$, was obtained as green, strongly pleochroic, acicular crystals by fusing kaolin with potassium chromate and calcium oxide. Several attempts to synthesise the ferrisilicates resulted in the formation of violet-black octahedra with the composition $2CaO, 5Fe_2O_3$. L. J. S.

Minerals of the Composition $MgSiO_3$; a Case of Tetramorphism. EUGENE T. ALLEN, FRED. EUGENE WRIGHT, and J. K. CLEMENT (*Amer. J. Sci.*, 1906, [iv], 22, 385—438).—The orthorhombic

and monoclinic amphiboles and pyroxenes with the composition MgSiO_3 have all been prepared artificially, some of them for the first time. They were usually obtained as spherulites or finely fibrous aggregates and were identified by their optical characters, but in the case of the monoclinic pyroxene, minute, measurable crystals were obtained. The sp. gr. of the different forms are as follows: glass (MgSiO_3), 2.743; orthorhombic amphibole, 2.857; monoclinic amphibole?, orthorhombic pyroxene, 3.175; and monoclinic pyroxene, 3.192.

The order of stability of these four polymorphic forms is the same as that of their specific gravities. Monoclinic pyroxene is stable at all temperatures, and the others are monotropic towards it; they change into it at an elevated temperature (orthorhombic pyroxene at 1250°) with development of heat.

Monoclinic pyroxene, the most stable of the four forms, was obtained in several different ways: (1) by crystallising a fused mass of the same composition; (2) by heating the glass (MgSiO_3 ; melting point 1521°) to a temperature above 1300° ; (3) by heating any of the other crystalline forms; (4) by the action of molten magnesium chloride or tellurite on amorphous silica; (5) by recrystallising magnesium silicate from a flux of magnesium chloride, magnesium vanadate, calcium vanadate, or tellurium dioxide. The minute crystals obtained by the last method have the same prism-angle, 88° , as ordinary diopside, but the other angles differ; the optical characters of this magnesian, monoclinic pyroxene are identical with those of the pyroxene of the Bishopville meteorite.

Orthorhombic pyroxene, enstatite, crystallises at lower temperatures than the monoclinic pyroxene, and was obtained by heating the glass between 1000° and 1100° . Large crystals were obtained in silicate (magmatic) solutions.

Monoclinic amphibole forms in very small quantities by rapidly cooling the fused mass, and also when the orthorhombic amphibole is heated with water at $375\text{--}475^\circ$.

Orthorhombic amphibole, kupfferite, is obtained by heating the molten silicate far above the melting point, at about 1600° , and then cooling rapidly in the air.

In many of the experiments, crystals of forsterite (Mg_2SiO_4) were obtained with the other products; optical and crystallographic determinations were made on this material.

L. J. S.

Composition of some Montreal Minerals. B. J. HARRINGTON (*Trans. Roy. Soc. Canada*, 1905, [ii], 11, (3), 25—28).—The following minerals are found in the Corporation Quarry, at the back of Mount Royal.

Nephelite-syenite is a pale flesh-red, translucent, vitreous to slightly greasy in lustre, and shows no marked cleavage, but sub-conchoidal to uneven fracture (anal. I.).

Acmite (ægirite) occurs in deeply-striated prisms, mostly greenish-black or brown; has a subvitreous lustre, is nearly opaque, and has a hardness approaching 6, and a sp. gr. 3.521; it fuses quietly to a black, magnetic glass (anal. II.).

Lepidomelane occurs in rough, black crystals, which are green by transmitted light, and has a vitreous lustre and a small optic axial angle; it has the hardness 3, and a sp. gr. 3.269, is readily decomposed by hydrochloric acid, and when fused over the blowpipe forms a black, magnetic slag (anal. III.). If the titanium dioxide is calculated with the silica, this mineral has the composition $5(R_2O, RO), R_2O_3, 4SiO_2$.

Natrolite is white, translucent, and vitreous, has the hardness 5, and a sp. gr. 2.234, gelatinises readily when treated with hydrochloric acid, and fuses to a glass colouring the flame yellow (anal. IV.).

Analcite forms large, white, translucent trapezohedrons with vitreous lustre, and has a hardness slightly greater than 5 and a sp. gr. 2.22 (anal. V.).

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MnO.	CaO.	MgO.	Na ₂ O.	K ₂ O.	Li ₂ O.	H ₂ O.
I.	44.98	—	32.65	0.72	—	—	trace	—	16.08	4.54	—	0.97
II.	49.51	0.61	2.72	22.26	5.82	1.51	7.16	1.09	8.62	0.38	—	0.57
III.	32.96	2.80	10.34	8.85	27.19	2.79	0.64	0.73	0.98	7.75	0.03	4.36
IV.	47.09	—	26.99	trace	—	—	trace	—	16.46	0.01	—	9.80
V.	54.83	—	24.20	—	—	—	0.08	—	12.01	—	—	8.50

G. Y.

Metallic Iron found at Magdeburg in 1831. FRITZ RINNE (*Jahrb., Min.*, 1906, ii, 61—89).—The composition and micro-structure of this pseudo-meteorite point undoubtedly to an iron of artificial origin.

L. J. S.