ABSTRACTS—CRYSTALLOGRAPHY

A STUDENTS' GONIOMETER. G. F. HERBERT SMITH. *Mineral. Mag.*, **18**, 366–368, 1919.

A goniometer of moderate cost designed for students of elementary crystallography. The direction of reference is given by the reflection of a distant object in a small plane mirror without optical aid and the axis of the graduated circle is horizontal. The instrument was constructed by Messrs. J. H. Steward, Ltd., 406 Strand, London, W. C. 2. W. F. H.

CRYSTALLOGRAPHIC STUDIES OF NICKEL DICHROMATE WITH ETHYLENEDIAMINE. GUISEPPINA CHIAVARINA. Univ. Torino. *Riv. min. crist. Ital.*, **48**, 82–85, 1917.

The formula is $NiCr_2O_7.3C_2H_4(NH_2)_2$. The crystallization is monoclinic. E. T. W.

A STUDY OF THE DEHYDRATION FIGURES ON THE SURFACES OF CRYSTALS. CHRISTOPHE GAUDEFROY. *Bull. soc. franc. min.*, **42**, 284–380, 1919.

Dehydration figures obtained upon crystals of 50 salts were studied. These figures fall into 3 classes, those whose form is dependent upon the structure of: (1) the original salt; (2) the salt formed by the dehydration; and (3) neither of these; the last comprise elliptical figures without definite orientation. C. B. SLAWSON.

CONTRIBUTIONS TO OUR KNOWLEDGE OF BOLÉITE AND CUMENGITE. ASSAR HADDING. *Geol. Fören. Förh.*, **41**, 175–193, 1919.

The anomalies in boléite can best be explained by variation in composition between the central and outer portions. The outer portions pass into cumengite. Boléite then is a mixed crystal. The n for boléite 2.081; for cumengite $\omega = 2.040$, $\epsilon = 1.926$. The Laue diagram for boléite shows it to be isometric. W. F. FOSHAG.

CRYSTAL STRUCTURE OF PYROCHROITE. G. AMINOFF. Stockholm. *Geol. Fören. Förh.*, **41**, 407–433, 1919.

Pyrochroite is ditrigonal scalenohedral. The Laue diagrams show nearly hexagonal symmetry, for in almost all cases the points are present in the plus as well as the minus sextants. The hexagonal elementary parallelopiped has the dimensions $c = 4.68 \times 10^{-8}$ cm., $a = 3.34 \times 10^{-8}$ cm. Preliminary tests show brucite to be similar to pyrochroite, except that the difference in intensity of some of the points is greater in brucite. $c = 4.75 \times 10^{-8}$ cm., $a = 3.13 \times 10^{-8}$ cm. Natural pseudomorphs of pyrochroite, artificial pseudomorphs of brucite, and crystals of both subjected to pressure give instead of the point diagram, a ray diagram of the same symmetry. W. F. FOSHAG.

THE LINEAR FORCE OF GROWING CRYSTALS. (ABSTRACT). J. C. HOSTETTER. *J. Wash. Acad. Sci.*, **7**, 195–196, 1917.

Experiments with loaded crystals of potassium alum show that these crystals will lift their load if unloaded crystals are present in the same solution. Two hypotheses as to the nature and cause of this force are offered but owing to experimental difficulties no conclusion could be definitely arrived at. C. B. S., W. F. H.

PLOTTING OF CRYSTAL ZONES ON A SPHERE. John M. Blake. *Am. J. Sci.*, [4] **43**, 237–242, 1917.

The crystal zones are plotted upon a 30-cm. sphere and [the unknown elements are obtained graphically with the aid of a gnomonic projection. In many cases, especially when founded on uncertain measurements, the more difficult algebraic solutions are no more accurate than those obtained by graphical methods.   C. B. S., W. F. H.

EFFECT OF SURFACE TENSION ON CRYSTALLINE FORM. Cecil H. Desch. Royal Techn. Coll., Glasgow. *Chem. Met. Eng.*, **21** (15), 773–776, 1919; abstract reprinted by permission from *Chem. Abstr.* **14** (4), 372, 1920.

According to the hypothesis of Quincke, metals and other substances before solidifying from the liquid state separate into 2 immiscible liquids, one much smaller in amount than the other. These liquids exhibit surface tension and form a foam, the one in smaller amount constituting the cell-walls, the other the cell-fillings. The cell walls should be represented in the solid mass by the boundaries of the crystal grains; and if the original hypothesis is correct, the grains in a solid metal should approximate in shape the cells in a foam. From the principles determining the stability of foam structures, especially the number of films which meet in a point and the most favorable angles, it would be predicted that this is essentially a tetrakaidecahedron; this is a cubo-octahedron, with all the edges equal, 6 of the faces squares, and 8 regular hexagons. To possess minimum area, the faces of this would be concave, bounded by nearly circular arcs of $19°28'$. By examn. of a foam obtained by blowing air thru a liquid, it was found that actually 5-sided faces were by far the most frequent, 4 and 6 about equal, but much less frequent, and other numbers of rare occurrence; the form of the cells thus most often approaches that of the regular pentagonal dodecahedron, (also with curved edges) a form the angles of which do not deviate greatly from the theoretically most favorable ones. If the hypothesis were wrong, and crystn. were not affected by surface tension, the crystals should form around equidistant nuclei, and the dominant forms of the crystals be either rhombic dodecahedrons, if the packing were cubic, or the quadrilateral-faced dodecahedrons of hexagonal packing. To test the matter out, β-brass containing some aluminium was treated with mercury whereupon the grains separated and their faces could be counted. Their average shape agreed almost exactly with that of the foam described above, confirming the correctness of the original hypothesis. Near boundaries both foam and metal—in this case an ingot of crucible steel—showed as would be predicted more 6-sided faces. An attempt was made to approach the matter also from the cross-sections of the polyhedrons concerned, but this did not give satisfactory results.

Evidently 2 forces are competing in the formation of crystals, cohesion—the force of crystallization—and surface tension. Which of these is dominant depends on many factors, such as the nature of the substance, compn. of the mother liquor, dimensions of the mass, temp., etc. When the mass is small, the surface forces are most important. Metals with marked power of orientation tend to form interlocking grains. Ice, as in glaciers, is a good example of the latter relation.   E. T. W.

CRYSTAL INVESTIGATION OF BRANDTITE. G. Aminoff. Stockholm. *Geol. Fören. Förh.*, **41**, 161–174, 1919.

Monoclinic. $a : b : c = 0.8720 : 1 : 0.4475$; β 99° 37.' $p_0 = 0.5132$, $q_0 = 0.4412$, $e = 0.1669$.

No.	Letter	Gdt.	Miller	φ	ρ
1	A	0∞	010	0° 00′	90° 00′
2	C	$\infty 0$	100	90 00	"
3	η	2∞	210	66 44	"
4	δ	$3/2\infty$	320	60 11	"
5	φ	∞	110	49 19	"
6	υ	$\infty 3/2$	230	37 47	"
7	ζ	$\infty 2$	120	30 11	"
8	P	$+1/2$	212	72 02	35 57
9	S	$+1$	111	57 01	39 26
10	Q	$+12$	121	37 37	48 29
11	R	-1	11$\bar{1}$	38 07	29 38

Twinning: Twinning plane 100. Cleavage 010, good. Optical properties: Plane of the optic axes (010), sign $+$, extinction angle 8°, $\alpha = 1.707$, $\gamma = 1.729$.
W. F. Foshag

THE ROLE OF CRYSTAL WATER AND THE STRUCTURE OF THE ALUMS. ANSWER TO VEGARD. Clemens Schaefer and Martha Schubert. *Ann. Physik*, **59**, 583–588, 1919. A continuation of acrimonious discussion. E. T. W.

APPLICATIONS OF THE POLARIZING MICROSCOPE IN CERAMICS. Albert B. Peck. Bur. Standards. *J. Am. Ceramic Soc.*, **2** (9), 695–707, 1919.

An outline of the methods of identifying minerals, especially those met with in ceramic work, by the immersion method under the microscope. The great advantages of this method of study are pointed out, and the needs of the industry for trained petrographers are shown. E. T. W.

THE OPTICAL PROPERTIES OF CERTAIN STRUCTURES OF ANISOTROPIC LIQUIDS. F. Grandjean. *Bull. soc. franc. min.*, 42 (1), 42–86, 1919.

The author has studied the images obtained and developed the mathematical equations for six structures. C. B. S.

ABSTRACTS—MINERALOGY

NEW MINERAL NAMES. W. E. Ford. Yale Univ. *Am. J. Sci.*, [4], **47**, 446–448, 1919.

A list of 8 newly described minerals, with brief descriptions. All have been listed in the new minerals department of this magazine. E. T. W.

BULLETINS ARIZ. STATE BUR. MINES. 1916 to date. A series of educational bulletins containing information of a general nature and much concerning specific Arizona localities. The first bulletins listed below are concerned with descriptions, occurrences, and uses of various minerals. The titles of the others are self-explanatory. By F. L. Culin, Jr.: Bulletins **14**, magnesite; **16**, mica; **18**, vanadium minerals; **19**, gypsum; **35**, celestite and

strontianite. By P. E. JOSEPH: **4**, manganese; **5**, molybdenum; **8**, asbestos; **12**, mercury; **20**, zinc; **22** antimony; **37**, copper; **43**, iron; **45**, lead; **49**, aluminum, platinum, tin, cadmium, nickel, cobalt, arsenic, and bismuth. By A. C. RUBEL: **11**, tungsten. By M. A. ALLEN and G. M. BUTLER: **91**, manganese; **99**, barite. *Bull*. **3**, Directory of Arizona minerals. **23**, Bibliography-Mining, Geology, Mineralogy of Arizona. **41**, Mineralogy of useful Arizona minerals. Blowpipe tests, discussion of physical properties in general, and list of 100 minerals with individual descriptions, tests, occurrences and uses. **48**, Gems and Precious Stones. Descriptions and essential properties. **71**, Select blowpipe and acid tests for minerals. **93**, Field tests for common metals in minerals.

L. S. RAMSDELL, W. F. H.

FELDSPAR IN CANADA. HUGH S. DE SCHMID. *Canada, Mines Branch, No.* **401**, 1916.

A large number of analyses of Canadian feldspars are given.

C. B. S., W. F. H.

A CONTRIBUTION TO THE ANALYSIS OF THE NATURAL SILICATES. LOUIS DUPARC. *Bull. soc. franc. min.*, **42**, (4), 140–241, 1919.

A detailed description of methods. A new constant is introduced which is termed the *coefficient of attackibility*, the amount of material that is dissolved by HCl under certain specified conditions. C. B. S.

THE INDICES OF REFRACTION OF THE RHOMBOHEDRAL CARBONATES. P. GAUBERT. *Bull. soc. franc. min.*, **42** (2), 88–120, 1919.

The observed values of the refractive indices of isomorphous mixtures of these carbonates agree closely with those calculated from their chemical composition by the formulas of Mallard. The following method for distinguishing magnesite from the other carbonates is given: The powdered sample is heated to a red heat and a drop of cobalt nitrate solution is added after cooling. A bluish green halo immediately develops around particles of all carbonates except magnesite. C. B. S.

AN OCCURRENCE OF CELESTITE. A. DUFFOUR. *Bull. soc. franc. min.*, **42** (4), 246–248, 1919.

These small celestite crystals were found enclosed in siliceous geodes in fossiliferous beds. When they were silicified these crystals were enclosed in siliceous concretions, which have protected them from the leaching which has removed all other traces of celestite. C. B. S.

THE MICROCHEMICAL DISTINCTION OF SERICITE AND TALC. O. HACKL. *Verh. geol. Reichanst. Wien*, **1918**, 1; thru *J. Chem. Soc.*

Directions are given for distinguishing these minerals by microchemical tests for K and Al in the former and Mg in the latter. E.T.W.

MINERAL SYNTHESES. C. DOELTER. *Naturwissenschaft*, **6**, 285–290, 1918; thru *Chem. Zentr.* **1918**, II, 144.

A summary of the principles and aims of mineral synthesis, with special reference to precious stones. It is reported that talc and meerschaum have been produced successfully in aqueous media at relatively low temperatures.

E.T.W.