ABSTRACTS—CRYSTALLOGRAPHY

In 1914 Professor Victor Goldschmidt began the publication of a new journal, *Beiträge zur Krystallographie und Mineralogie* (Contributions to crystallography and mineralogy) to appear in numbers containing about 40–50 pages each, at irregular intervals. The breaking out of the war delayed the arrival of this journal in this country, but it is now being received. Abstracts of the articles in the first two numbers are given here, and as soon as subsequent numbers reach us their contents will be abstracted also.

CRYSTALLOGRAPHY AND MINERALOGY. V. GOLDSCHMIDT. Heidelberg. *Beitr. Kryst. Min.*, **1** (1), 1–9, 1914.

A brief account of the history of crystallography and mineralogy and their relations to one another is given. Some of the purposes of crystallography are outlined: As a descriptive science; "biology" of crystals; crystallography and molecular physics; contact mechanics of crystals; mechanics of the solution process; the contrasted mechanics of organisms; crystallography, optics, use of X-rays for crystal study; relation to chemistry; relation to other sciences and industries; and relation to philosophy of nature. "If we look back and review the high aims, to which our science so successfully strives, we may well say that it ranks beneath no other science, and that an aspiring spirit, a real man, may well dedicate the whole of his living and creative power to its service." E. T. W.

ETCHING AND SOLUTION EXPERIMENTS ON ALUM. HANS BAUHANS. Heidelberg. *Beitr. Kryst. Min.*, **1** (1), 11–40, 4 plates, 1914.

A description of elaborate experiments, made chiefly with potassium alum crystals. The purposes of the investigation were: to study the etching phenomena on individual faces of alum from new points of view; to test out the validity of the laws of etching of crystals formulated by Professor Goldschmidt; and to determine whether the inferences drawn by Fersmann and Goldschmidt from their work on natural etching phenomena on diamond could be experimentally demonstrated.

The alum crystals were etched by warmed or diluted mother liquor, special attention being paid to the circulation of the liquid, it being found that this had considerable influence on the form ultimately obtained. Faces not present originally were cut upon crystals by means of the 2-circle grinding goniometer. The etched crystals were studied on the 2-circle goniometer, some with the cube face in polar position, others with an octahedron so placed. A point signal and diminishing lens combination were used, and the objective brought close to the crystal. The reflection effects shown were sketched on black paper with yellow crayon, and all types of points and fields were subsequently drawn in gnomonic projection. The features shown by the different faces are described in detail. Spheres of alum were also submitted to solution, and gave effects which could be correlated with those obtained on the crystals.

The effects obtained on alum were closely similar to those shown by diamond crystals, and it is concluded that the peculiarities shown by diamond have arisen thru solvent action. Three-sided pits such as observed on diamond are shown on alum to be not growth figures, as often supposed, but to be etching

phenomena. The most important zones of alum, as of diamond, proved to be first $p:p$ and then $p:c$. The rounded hexoctahedron of diamond is found by observations of alum to represent the end-form of etching.

Etching figures proved to develop best on the most important forms, as had been observed previously with certain minerals. They form most readily on p, next on c, and finally on d. The reflections from etching figures stretch over the principal zones of the natural evolution of forms; $p:d$ is most important, and next $p:c$. The reflections from solution faces curve to both sides of the zone lines, and leave significant vacant spaces.

The pentagonal hemihedrism of potassium alum is weak; but with the aid of artificially cut faces of (012), it was possible to distinguish the + and − forms. Cesium alum is, however, strongly hemihedral. It is noteworthy that etching can thus indicate the relative strength of hemihedrisms; and that hemihedrism varies in strength thru the isomorphous series of alums.

The paper is illustrated by excellent figures. E. T. W.

RELATIONS BETWEEN CRYSTAL SURFACES AND REFLECTIONS; METHODS OF REFLECTION ANALYSIS. PAUL BERBERICH. Freiberg. *Beitr. Kryst. Min.*, **1** (2), 43–70, 1914.

A detailed treatment of the relation of the shape and character of a crystal surface to the reflection produced by it in the goniometer. The definite relations which exist are first discussed, with special reference to the types of curvature to be expected in reflections from faces showing various curves. A method of analysis is discussed theoretically, and also as to its practical application to the goniometer. It is pointed out that the goniometer reverses the position of curved faces; that whether a curvature is concave or convex can be ascertained by inserting a shutter in the eyepiece; the radius of curvature can also be estimated by the rapidity with which the image changes. A number of practical details of manipulation are described. E. T. W.

TOPAZ FROM MINAS GERAES, BRAZIL. V. GOLDSCHMIDT and V. ROSICKÝ. Heidelberg and Prague. *Beitr. Kryst. Min.*, **1** (2), 71–77, 1 plate, 1914.

On 64 crystals 28 forms were observed, of which two are rare and have only recently been recognized, and two are new: W: (061) and o: (445). The crystals are clear, with brilliant surfaces, and are doubly terminated. Many are short prismatic, some domatic, some tabular on c, and some even approach equidimensional habit. Altho there is considerable variation in the relative sizes of different faces of the same form, there is no regularity in this respect which could be interpreted as indicating hemimorphism. The harmonic series shown by two of the zones are discussed, and descriptions of the form development of 20 typical crystals are given. Interesting form relations, and etching figures, with their reflections, are illustrated. E. T. W.

THE RANKING OF TWINNING LAWS, ILLUSTRATED BY ARSENOPYRITE. V. GOLDSCHMIDT. Heidelberg. *Beitr. Kryst. Min.*, **1** (2), 79–86, 2 plates, 1914.

When more than one twinning law occurs in the same substance, the different laws necessarily vary in rank. To determine in a given case which is most probable, important, and of highest rank, the following procedure is

suggested: Prepare a gnomonic projection of the observed forms of the crystal species in one position; in the same drawing, prepare an identical projection in a second position, according to law A; observe coincidence of points and zones in the composite projection; repeat this for law B (and any others). That law in which the greatest number of coincidences occurs is the highest in rank. Details to aid this process in special cases are given. The method is illustrated by a discussion of the 4 laws to be expected in arsenopyrite (2 of which are known). In this mineral twinning plane *e* (101) is found to be most important, and observation on a number of crystals shows it to be in fact somewhat more frequent than the other. An interesting point is brought out,—that paucity of forms and variation in angles, which usually accompany the formation of composite crystals, are both present in arsenopyrite; perhaps the angle variation is due not to variable composition, but to obscure composite-crystal formation. E. T. W.

AZURITE CRYSTALS FROM MINERAL HILL, NEAR CONDOBOLIN, NEW SOUTH WALES. C. ANDERSON. Australian Mus., Sydney. *J. Proc. Royal Soc. New S. Wales*, **51**, 275–287, 1917.

Specimens from the Iodide Mine, Mineral Hill, consist of oxidized minerals such as limonite, cerussite, malachite, azurite, etc. The azurite is well crystallized, the crystals averaging 0.5 cm. in length, and being attached to the matrix by one end of axis *b*; 18 of these crystals were measured on the two-circle goniometer. A total of 21 forms was obtained, one of them, X ($\bar{4}81$) being new to the mineral. The features shown by these forms are described in detail. The Schrauf elements for azurite, measured on crystals from Chessy, France, are usually accepted, but values obtained on crystals from other localities are distinctly different, *a* and *c* being larger. The present crystals are close to those from such localities as Bisbee, Arizona, and Broken Hill, N. S. W., the average values being: $a:b:c = 0.8572 : 1 : 0.8858$; $\beta = 87° 35'$. Figures showing the development of 10 crystals are given. E. T. W.

THE OPTICAL PROPERTIES OF MAGNESIUM CHLOROPLATINATE. PAUL GAUBERT. *Bull. soc. franc. min.*, **40**, 177–182, 1917.

Crystals with $7H_2O$ were studied, and altho the amount of water and consequently the refractive indices vary with the moisture content of the atmosphere, measurements were obtained, the indices for D being: $\omega = 1.561$, ϵ = approx. 1.91. Data for some double cyanoplatinates are also given. E. T. W.

ISOMORPHOUS MIXTURES. PAUL GAUBERT. *Compt. rend.*, **167**, 491–494, 1918.

An extended study of the properties of isomorphous mixtures of chlorates with permanganates and of chromates, sulfates, and selenates with manganates. E. T. W.

THE SYN-CRYSTALLIZATION OF POTASSIUM AND AMMONIUM NITRATES AT ORDINARY TEMPERATURES. CAILLART. *Bull. soc. franc. min.*, **41**, 21–30, 1918.

From aqueous solutions it was possible to obtain mix-crystals with the form of both end members. Equilibrium data are given. E. T. W.

THE INFERENCES FROM THE GEOMETRICAL STRUCTURE THEORIES AND THE RESULTS OF ANALYSIS BY ROENTGEN RAYS. W. VOIGT. Univ. Göttingen. *Physik. Z.*, **19**, 237–247, 331–343, 357–366, 446–462, 1918.

An elaborate discussion of the geometrical theory of space-lattices, symmetry classes of crystals, etc., with a summary of the results of X-ray study. E. T. W.

THE COHESION OF CRYSTALS AT THE TEMPERATURE OF LIQUID AIR. A. JOHNSEN. Kiel. *Centr. Min. Geol.*, **1918**, 233–235.

Observations were made upon calcite, gypsum, halite, gold, silver, copper, and muscovite. Cooling with liquid air decreased plasticity in all but the last. E. T. W.

ABSTRACTS—MINERALOGY

APPARATUS FOR PRODUCING ULTRA-VIOLET RADIATION. W. S. ANDREWS. *General Electric Review*, April, 1916.

A description of a transformer for producing a spark between iron terminals, which is rich in ultra violet light, and produces fluorescence and phosphorescence in many minerals and other substances. E. T. W.

AN IMPROVED FORM OF PHOSPHOROSCOPE. W. S. ANDREWS. *Gen. Elec. Rev.*, March, 1917.

A description of an apparatus in which ultra-violet light is produced by an intermittent spark between iron terminals; the powdered mineral or salt can be viewed thru one eyepiece continuously, and any fluorescence seen; and thru another only while the spark is interrupted, to observe phosphorescence. E. T. W.

AN APPARATUS FOR SEPARATING VISIBLE FROM INVISIBLE LIGHT. W. S. ANDREWS. *Gen. Elec. Rev.*, October, 1917.

Taking advantage of the fact that a lens brings light of different wavelengths to a focus at different points, an iron spark producing light rich in ultra-violet is placed at one side of a quartz lens, and a metal plate pierced by a pinhole at the focus of the ultraviolet rays on the other side. By this means most of the visible light from the spark is intercepted, while the ultra-violet gets thru, and will produce fluorescence in a mineral placed beyond. The true color of the fluorescent light can then be determined. E. T. W.

THE LARGEST KNOWN BERYL CRYSTAL. W. A. WALDSCHMIDT. S. Dak. Sch. Mines. *Pahasapa Quart.*, 9 (1), 11–16, 1919.

A brief review is given of the occurrence of various minerals, some of them usually considered rare, in large masses or crystals, in the Black Hills region. The largest crystal of beryl heretofore described appears to have been one of 5 tons weight at Grafton, N. H. (*Am. Min.*, 4 (3), 21–22, 1919). One now exposed in the Bob Ingersoll Mine, near Keystone, S. Dak., is probably still larger. It is hexagonal in outline, about 6 decimeters on a side, or 1.2 meters in largest diameter. The color is nearly white, and the specific gravity 2.73. It was originally at least a meter long, and weighed several tons, altho a considerable part has been quarried away. Photographs and diagrams of the crystal are given. E. T. W.

AN INTERESTING OCCURRENCE OF ISOMORPHOUS SIDERITE AND CALCITE. J. HARLAN JOHNSON. S. Dak. Sch. Mines. *Pahasapa Quart.*, **9** (1), 20, 1919.

In Crystal Cave, on Elk Creek, S. Dak., some calcite crystals and knobs were found containing nuclei of brown siderite. Cleavages up to 7 cm. across were observed. E. T. W.

CACOCLASITE FROM WAKEFIELD, QUEBEC. N. L. BOWEN. Queen's Univ. *Am. J. Sci.* [4], **48** (6), 440–442, 1919.

From a careful reëxamination of this material it is concluded: Chemical microscopic, and crystallographic evidence all point to the fact that cacoclasite is a pseudomorph (essentially a paramorph) of grossularite after sarcolite, with calcite and apatite filling the voids produced by the reduction of volume involved in the change. S. G. G.

AN INTERESTING OCCURRENCE OF MANGANESE MINERALS NEAR SAN JOSE, CALIFORNIA. AUSTIN F. ROGERS, Stanford Univ. *Am. J. Sci.* [4], **48** (6), 443–449, 1919.

A boulder of manganese ore situated on the bank of Penetencia Creek, below Alum Rock Park, was found to consist largely of pyrochroite, with tephroite, hausmannite, ganophyllite, rhodochrosite, barite and psilomelane, the latter forming a crust on the exterior of the boulder. The boulder undoubtedly represents a block (probably of Franciscan age) detached from its original location in the hills above in some past period. The paragenesis of the minerals is discussed. S. G. G.

NOTES ON METEORITES. ALEXANDER SCOTT. North Staffordshire Field Club, *Trans. & Ann. Rept.*, **53**, 35–45, 1918–1919.

The composition, structure, and origin of meteorites are discussed. S. G. G.

METEORIC IRON FROM DEHESA, CHILE. F. BERWERTH. *Min. petr. Mitt.*, **34**, 272, 1916; thru *J. Chem. Soc.*, **114**, ii, 403, 1918.

New data presented shows this iron to be a very fine octahedrite. E. T. W.

FURTHER NOTES ON THE PLAINVIEW, TEXAS, METEORITE. GEORGE P. MERRILL. *Proc. U. S. Nat. Mus.*, **54**, 503–505, 1918.

The stone proves to be a breccia of two types of material, apparently of distinct origin. One of these appears to have been friable, and on compression the two have been mixed, so as to obscure the brecciation. E. T. W.

THE EFFECT OF TIME AND TEMPERATURE ON THE MICROSTRUCTURE OF PORCELAIN. ALBERT B. PECK. Bureau Standards. *J. Am. Ceram. Soc.*, **2** (3), 175–194, 1919.

Petrographic-microscopic examination has been made of porcelain burned for different lengths of time. The clay passes into amorphous silica and sillimanite, and the latter then crystallizes; quartz may dissolve in the feldspar. Sillimanite also crystallizes from solution in feldspar flux. E. T. W.