

and related to defects in the crystal. The diffusion of atoms and vacancies in alloys is examined statistically and thermodynamically.

Part IV is concerned with the properties and effects of surfaces and boundaries in the crystal. Surface and intergrain boundary tensions are discussed by Fisher and Dunn. Read and Shockley continue with a treatment of the geometry of boundaries, and boundary energy. Smith examines interphase energies, and concludes with the topology of interfaces. Mosaics and fine structures are also discussed. The book concludes with a discussion of the properties, physical and chemical, of grain boundaries, and diffusion effects near the boundaries.

On the whole, the book gives a well unified picture of the somewhat heterogeneous knowledge collected to date. A lesser amount of confusion of nomenclature and diversity of belief is evident than might be expected in a collection of essays. Of course, the authors actually worked together at the symposium; the differences of opinion which do exist are included as reproductions of the discussions which took place at the conference.

The book assumes considerably more knowledge of metallurgy and the theory of solids than the average mineralogist possesses. It fails in several small instances where a very slight amount of reorganization or additional information would make the book more understandable.

In the first place, the book looks at crystal imperfections from a different viewpoint from any previously held. The nomenclature and classification of crystal defects is not entirely new, but will be unfamiliar to mineralogists. Principally, the difficulty is that one of the authors assumes another has already explained the unfamiliarity. The term "F-center" is used several times with ominous import; finally about midway through the book it is grudgingly admitted what it is. In another case, we find twice the mention of "holes attached to vacancies." The meaning is obscure, even when one knows what the terms mean.

The paper on geometry is short and difficult, though the geometry of dislocations forms the basis for description of all subsequent distortions in crystals. A system of ill-defined and obscure vector mathematics is used to describe dislocations. The illustrations fail to clarify the text. The chapter is possibly a satisfactory refresher for one versed in the concepts used, but is abstract and unsatisfying for the mineralogist.

The most significant article is the first, by Seitz. His tentative unification of crystallography, metallurgy, and physics into a new science of solids should appeal to most readers. Seitz points to the hazy outline of a unified theory of solids which seems sure to come in the future.

The book presents a concise picture of most of the important experimental and theoretical work done on solids in recent years, and furnishes a wealth of references. The editors cheerfully admit that the experimenters and interpreters have barely started to integrate their findings; the book will be of greatest value if it stimulates others to enter the field. It is highly recommended to all who are interested in crystals and solids.

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## NEW MINERAL NAMES

### Gunnbjarnite

O. B. BØGGILD, Gunnbjarnite, a new mineral from East Greenland. *Medd. om Grønland*, Bd. 142, No. 8, 1-11 (1951) (in English).

The mineral occurs with calcite in veins cutting a basalt dike at Mt. Steensby. It is dark brown to nearly black, streak very light brown. Luster pearly on the basal cleavage.

Cleavage basal micaceous, the flakes flexible and elastic in one direction, easily broken in the other. A second cleavage, taken as {010}, is strongly developed so that ribbon-like fragments are formed. Hardness  $2-2\frac{1}{2}$ , sp. gr. variable (depending on hydration?); measurements using Thoulet solution gave 2.025 to 2.134. Optically negative, axial plane (010), with indices variable,  $\beta=1.540$  to  $1.571$ ,  $\gamma=1.561$  to  $1.593$ ,  $2V$  ca.  $60^\circ$ .

Analysis by A. H. Nielsen gave  $\text{SiO}_2$  43.15,  $\text{TiO}_2$  none,  $\text{Al}_2\text{O}_3$  3.29,  $\text{Fe}_2\text{O}_3$  14.57,  $\text{FeO}$  1.06,  $\text{MnO}$  0.13,  $\text{MgO}$  12.98,  $\text{CaO}$  3.66,  $\text{H}_2\text{O}^+$  7.19,  $\text{H}_2\text{O}^-$  12.17,  $\text{CO}_2$  not detd.; sum 98.20%. (Presumably the sample contained calcite M.F.). A dehydration curve is given; 9.47% was lost to  $110^\circ$ , 11.3% to  $206^\circ$ , 12.4% to  $300^\circ$ . The mineral rehydrates rapidly in the air. Nearly infusible before the blowpipe; very thin splinters fuse to a black, magnetic mass. Easily decomposed by HCl with separation of amorphous silica, which shows double refraction.

The mineral is a member of the nontronite group, differing from many similar materials in its high content of MgO and  $\text{Fe}_2\text{O}_3$ .

NAME: For the Norseman Gunnbjørn Ulfsson who is generally regarded as the discoverer of Greenland (ca. 900).

DISCUSSION: Study by  $x$ -ray, electron microscope, and differential thermal analysis would be highly desirable.

MICHAEL FLEISCHER

### Dalyite

R. VAN TASSEL, Dalyite, a new potassium zirconium silicate, from Ascension Island Atlantic. *Mineralog. Mag.*, 29, 850-857 (1952).

The mineral occurs as a rare accessory, about 0.2% of the rock, in medium-grained, pinkish-gray alkali granites mainly composed of micropertchite and quartz with aegirine and an amphibole. It is in colorless crystals 0.05 to 0.5 mm. in size with short prismatic habit and vitreous luster. Hardness  $7\frac{1}{2}$ . Sp. gr.  $2.84 \pm 0.02$ . Dalyite is optically biaxial negative with  $\alpha=1.575$ ,  $\beta=1.590$ ,  $\gamma=1.601$ , all  $\pm 0.002$ ,  $2V$   $72^\circ$ ,  $\alpha:c=7^\circ$ . Dispersion very weak with presumably  $v < r$ .

Goniometric measurements of 23 crystals showed 16 forms with  $\{\bar{1}01\}$ ,  $\{100\}$ ,  $\{1\bar{1}0\}$ ,  $\{110\}$ , and  $\{\bar{1}11\}$  most common. Cleavages  $\{101\}$  and  $\{010\}$  good,  $\{100\}$  less distinct. Twinning was observed with  $(100)$  as composition plane. Weissenberg photographs show dalyite to be triclinic, with  $a=7.51$ ,  $b=7.73$ ,  $c=7.00\text{\AA}$ ,  $\alpha=106^\circ$ ,  $\beta=113\frac{1}{2}^\circ$ ,  $\gamma=99\frac{1}{2}^\circ$ . Space group  $P\bar{1}$ . Goniometric data agree with the cell constants from  $x$ -rays. The unit cell contains  $\text{K}_2\text{ZrSi}_6\text{O}_{15}$ .  $X$ -ray powder data are given.

A microchemical analysis by M. H. Hey on 22 mg. gave  $\text{SiO}_2$  61.85,  $\text{ZrO}_2$  21.70,  $\text{K}_2\text{O}$  14.60,  $\text{Na}_2\text{O}$  1.75,  $\text{Fe}_2\text{O}_3$  0.37,  $\text{H}_2\text{O}$  0.64; sum 100.91%, corresponding to  $(\text{K},\text{Na})_2\text{O}:\text{ZrO}_2:\text{SiO}_2=2.11:1.01:5.95$ , or  $\text{K}_2\text{ZrSi}_6\text{O}_{15}$ . Dalyite is unaffected by warm concentrated  $\text{HNO}_3$ , but is attacked slowly by cold HF, readily dissolved by hot HF. The name is for Reginald Aldworth Daly, Emeritus Professor of Geology, Harvard University.

M. F.

### Hanléite

LEWIS LEIGH FERMOR, On a new chrome-garnet. *Geological Magazine*, 89, 145-147 (1952).

A description is quoted from F. R. Mallet, *Mem. Geol. Survey India*, 5, 153-172 (1866) of material from near the Hanlé Monastery, in Rupshu, Kashmir. Here chromite is cut by thin seams, both sides of which are coated with very minute crystals of a brilliant emerald-green color. Analyses are quoted by Mallet of (a) by Komonen, (b) on a minute amount of material by Mr. Tween.

	(a)	(b)
Silica	37.11	41.2
Cr <sub>2</sub> O <sub>3</sub>	22.54	33.5
Al <sub>2</sub> O <sub>3</sub>	5.88	} 24.2
FeO	2.44	
MgO	1.10	—
CaO	30.34	—
H <sub>2</sub> O	1.01	1.1

On this basis, Fermor believes it likely that the material of analysis (b) is mainly Mg<sub>3</sub>Cr<sub>2</sub>(SiO<sub>4</sub>)<sub>3</sub> probably with some Fe<sub>3</sub>Cr<sub>2</sub>(SiO<sub>4</sub>)<sub>3</sub>, and suggests the name hanléite for the locality. The type material can not be found and the locality is very inaccessible.

DISCUSSION: Inadequate basis for giving a new name.

M. F.

### Sinhalite

G. F. CLARINGBULL AND MAX H. HEY, Sinhalite (MgAlBO<sub>4</sub>), a new mineral. *Mineralog. Mag.*, 29, 841-849 (1952).

A brown cut gemstone labelled olivine was found by George Switzer of the U. S. National Museum to give an *x*-ray photograph differing from that of olivine. Examination of 22 such stones in England showed 2 to be olivine, 20 to be a new mineral. The color is yellow to dark brown and greenish-brown. The mineral is biaxial, negative with *n<sub>s</sub>* (Na): $\alpha = 1.6667$  to  $1.6765$  (19 samples),  $\beta = 1.6966$  to  $1.7038$  (18 samples),  $\gamma = 1.7048$  to  $1.7121$  (20 samples),  $\gamma - \alpha = 0.036$  to  $0.0383$ , sp. gr. 3.47 to 3.50 (15 samples). The hardness is close to that of olivine. Weissenberg photographs showed sinhalite to be orthorhombic with  $a = 4.328$ ,  $b = 9.878$ ,  $c = 5.675$  Å,  $a:b:c = 0.4381:1:0.5745$ . The unit cell contains 4MgAlBO<sub>4</sub>. Calculated sp. gr. 3.446. The following space groups are possible:

$$D_{2h}^5 - Pbcm, C_{2v}^2 - Pb2_1m, \text{ and } C_{2v}^4 - Pbm(2).$$

Further study is in progress. *X*-ray powder data are given. Analysis of 6.4 mg. gave B<sub>2</sub>O<sub>3</sub> 24.2, Al<sub>2</sub>O<sub>3</sub> 41.01, Fe<sub>2</sub>O<sub>3</sub> 2.0, MgO 32.3, H<sub>2</sub>O 0.3; sum 99.8%. Sinhalite is insoluble in or only slightly attacked by acids other than HF. Four of the 20 samples are known to be from Ceylon; the others are from unknown sources. The name is for Sinhalā, the Sanskrit name for Ceylon.

M. F.

### Sanderite, Leonhardtite

WALDEMAR BERDESINSKI, Sanderit, Leonhardtit, Allenit und Hexahydrit, neue Mineralien der marinen Kalisalzagerstätten. *Neues Jahrb. Mineral., Monatsh.* 1952, No. 1, 28-29.

J. LEONHARDT AND W. BERDESINSKI, Über die Effloreszenzen des Kieserits in Salzbergwerken: *Z. anorg. Chem.*, 265, 284-287 (1951).

Efflorescences on kieserite in the 601 m. level of the "Hansa I" shaft, Empelde, and the 675 m. level of the "Niedersachsen" shaft near Wathlingen are shown by *x*-ray powder photographs to be mixtures of MgSO<sub>4</sub>·2H<sub>2</sub>O (Sanderite), MgSO<sub>4</sub>·4H<sub>2</sub>O (Leonhardtite), MgSO<sub>4</sub>·5H<sub>2</sub>O (Pentahydrate, here called Allenite, see *Am. Mineral.*, 36, 641 (1951), and MgSO<sub>4</sub>·6H<sub>2</sub>O (Hexahydrate). Approximate optical data are given for some of the mixtures. Sanderite is named for Professor Bruno Sander, Innsbruck, Austria; leonhardtite for Prof. J. Leonhardt of Kiel.

DISCUSSION: As pointed out by Berdesinski, the name leonhardtite (Blum, 1843) has long been used for a variety of laumontite.

M. F.

## DISCREDITED MINERALS

**Milanite (=Halloysite)**

DUŠAN STANGAČILOVIČ, Milanite—the Serbian mineral: *Geol. Vesnik*, 9, 271–274 (1951), (in English 272–274).

X-ray study of material from Majdanpek, Yugoslavia, previously called milanite (Tietze, 1870); kaolinite, allophane, and halloysite, shows it to be halloysite.

M. F.