NATROLITE: Another member of the zeolite family popular with collectors is natrolite. Fine specimens of radiating groups, associated with datolite, apophyllite and pyrite, were found. Tufts of natrolite made up of groups of stout crystals with the "picket-fence" terminations were taken out and are probably as good as those from any locality (Plate 11, Fig. 1).

LAUMONTITE: Found only in microscopic crystals of the common form, showing the prism *m* and oblique termination *e*, entangled with microscopic crystals of datolite and apophyllite; the whole mass held together by an asbestiform mineral.

STILBITE: Sheaf-like aggregates of stilbite crystals were rare; those noted were mostly flattened six-sided crystals coating datolite and calcite. A specimen was found showing individual crystals of stilbite, tabular in habit with the forms shown in Dana's System, Fig. 3, and a millimeter or two in diameter. The outer portions of these crystals are colorless and transparent, but each contains an opaque white nucleus or "phantom" crystal, with the same shape as the crystal as a whole, and occupying about half its volume.

CHALCOPYRITE CRYSTALS FROM THE BERGEN ARCHWAYS

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The crystals of chalcopyrite mentioned by Mr. Manchester in the preceding paper[1] as brought to view by dissolving out calcite vein material proved to be well suited to crystallographic measurement, which was undertaken by the writer, using a Goldschmidt 2-circle goniometer. Two types were found to be represented.

In Type 1, the average development of which is shown in figure 1, the unit sphenoid, *p* (111) is dominant. The negative unit sphenoid, *p*, $(1\bar{1}1)$, is always present as small to medium sized faces, and the base, *c*, (001), as a well-marked narrow face. In addition the prisms *a* (100) and *m* (110) are distinctly developed, tho mostly only in the midst of striations, and the second-order pyramid *e* (011) occurs similarly, in marginal striations. The figure shows, in somewhat idealized manner, the positions of these forms and of the striations observed on a single crystal.

[1] The Minerals of the Bergen Archways, *Am. Min.*, **4** (9), 110, 1919.

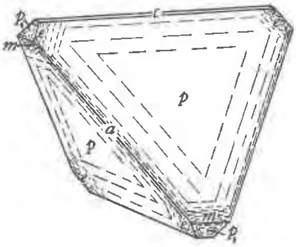

FIG. 1

Chalcopyrite

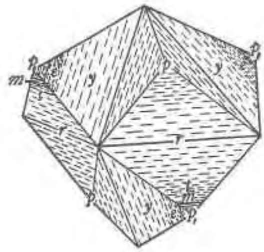

FIG. 2

The other, more complex and more abundant, habit, is shown in figure 2, again in average development. Three crystals of this type were measured, and the forms proved to be the same on all of them, the only difference being in the length of the dominant sphenoid from one to the other. The dominant sphenoid in this case appears to be *r* (332), altho this form does not yield particularly sharp reflections, but grades almost imperceptibly into the steeper form *t* (221) and this in turn into the prism *m* (110). The chief termination is the scalenohedron *y* (133), which grades into the second order pyramid *e* (001). In addi-

TABLE 1. ANGLES OF CHALCOPYRITE FROM BERGEN HILL.
Dana's orientation. $c = 0.997$; calculated angles based on $c = 0.9853$.

Number, Letter	Symbols Gdt.	Symbols Mill.	Description	Angles Observed ϕ	Angles Observed ρ	Angles Calculated ϕ	Angles Calculated ρ
			Type 1. (one crystal)				
1 c	0	001	Well developed	.. ..	0° 00′	.. ..	0° 00′
2 a	0∞	010	Distinct, striations	0° 00′	90 00	0° 00′	90 00
3 m	∞	110	" "	45 00	"	45 00	"
4 e	01	011	" "	0 00	44 45	0 00	44 35
5 p,+	1	111	Dominant form	45 00	54 40	45 00	54 20
6 p,−	1−1	$1\bar{1}1$	Small but good	$\overline{45}$ 00	"	$\overline{45}$ 00	"
			Type 2. (3 crystals)				
1 m	∞	110	Distinct, striations	45 00	90 00	45 00	90 00
2 e	01	011	" "	0 00	44 45	0 00	44 35
3 p,+	1	111	" "	45 00	54 40	45 00	54 20
4 p,−	1−1	$1\bar{1}1$	" "	$\overline{45}$ 00	"	$\overline{45}$ 00	"
5 r,+	$\frac{3}{2}$	332	Prominent, striated	45 00	64 30	45 00	64 26
6 t,+	2	221	Distinct, striations	"	70 20	"	70 16
7 y,+	$\frac{1}{3}$1	133	Prominent, striated	18 30	46 10	18 26	46 05

tion, both the positive and negative unit sphenoids p (111) and $p_,$ $(1\bar{1}1)$ are present, not as separate faces, but as well-marked surfaces on striations so deep as to produce pyramid-like elevations at junctions between the dominant faces, as shown in the figure.

The angles actually observed on the four crystals studied are compared with the theoretical ones in table 1. It is noteworthy that the value of axial ratio c indicated, 0.997, is slightly greater than the accepted one (c = 0.9853) but all the faces are more or less rounded and striated, so that there is no reason to regard this as significant. Dana's orientation is, in the opinion of the writer, preferable to that adopted by Goldschmidt in the *Winkeltabellen*, the two differing by a revolution of 45° around the c axis; the symbols and angles have been adjusted accordingly.

AMBER AND ITS ORIGIN

GEORGE F. BLACK

New York Public Library

(*Continued from page 99*)

Amber is not homogeneous in composition, but consists of several resinous substances more or less soluble in alcohol, ether, or chloroform, associated with an insoluble bituminous residue. The average composition leads to the general formula $C_{10}H_{16}O$, which is nearly the same as that for camphor ($C_{10}H_{18}O$). Heated to nearly 300° C. it suffers decomposition, yielding an "oil of amber" and leaving a black residue which is known as "amber colophony," or "amber pitch"; this latter forms, when dissolved in oil of turpentine or in linseed oil, the "amber varnish" or "amber lac" of commerce.

True amber or succinite may be distinguished from the other resins by its hardness, its lesser brittleness, perfect conchoidal fracture, agreeable odor when rubbed, the much higher temperature required to decompose it, and its greater electric action. The hardness is between 2 and 3, which is rather higher than that of many other fossil resins, and the specific gravity varies between 1.05 and 1.10. (Thales of Miletus, the father of Greek philosophy, it may here be remarked, was the first who discovered the electrical properties of amber, as exhibited by its power of attracting light bodies. His simple experiment, which showed that amber when rubbed became strongly electro-negative, is