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

the first recorded in the annals of electrical science.) Another property of the resin, not generally known, is its flexibility at a certain temperature. Formerly when it required bending it was softened by being placed in warm linseed oil, after which it could be bent in any required form. An easier way is simply to hold it over a lamp and draw it out slowly by hand.

True amber yields on dry distillation succinic acid, the proportion varying from about 3 to 8 per cent., and being greatest in the pale opaque or "bony" varieties. To this acid are mainly due the aromatic and irritating fumes emitted by the resin when burned. The Baltic variety is the only one distinguished by its yield of this acid, for many of the other fossil resins which are often termed amber contain either none of it, or only a very small percentage.

A piece of genuine amber is an interesting mineralogical specimen, especially if it contains some fossilized insects which had been attracted to it when it was a sweet and liquidly-flowing gum, and there and then got entangled in it. An anonymous poet, referring to such enclosures, has remarked:

> "The thing itself is neither rich nor rare,
> The wonder's how the devil they got there."

The inclusions are of great interest. Although they furnish an incomplete picture of the flora and fauna of the primeval forest, they nevertheless supply many features characteristic of that early epoch, and afford valuable information in regard to the history of some of our living species and groups, many of the extinct species having affinity with tropical forms of the present day. The organisms preserved are rarely found elsewhere as fossils, and most of them represent extinct forms. Altogether about 2,000 species of insects have been found and described. Among the spiders the genus differs from the living species in the position of the eyes, the length of the jaws, and especially by the head, which is distinctly separated from the breast. In many or perhaps most cases the organic structure has disappeared, leaving only a cavity or the covering of chitin. A few feathers show that the amber forest contained birds, and a tuft of hair proves the presence of mammalia. Fragments of wood are not uncommon, with the tissues well preserved by impregnation by the resin; while leaves, flowers, and small fruits are occasionally found in wonderful preservation. Impurities are often present, especially when the gum had dropped on the

ground, and sometimes it is tinged a blue color due to the enclosure of pyrite. Frogs, lizards, and small fishes which are not seldom found in specimens of amber offered for sale have been introduced by artificial means for purposes of deception.

(*To be continued*)

NEW MINERALS

ZEBEDASSITE

Amalia Brusoni: Zebedassite; nuovo silicato idrato di alluminio e magnesio di Zebedassi nell' Appeninno Pavese. (Zebedassite, a new hydrous silicate of aluminium and magnesium from Zebedassi, in the Pavese Appennines.) *Riv. Min. Crist. Ital.*, **50**, 74–79, 1918.

NAME: From the locality.

PHYSICAL PROPERTIES

Color: bright white; luster: silky; structure: fibrous; H. = 2; sp. gr. = 2.194.

OPTICAL PROPERTIES

Refractive indices about 1.51 to 1.53; birefringence strong; extinction straight; elongation + ; system probably rhombic.

CHEMICAL PROPERTIES

Readily soluble in acids, with formation of gelatinous silica; before the blowpipe infusible; with cobalt nitrate reacts for Al and Mg; in tubes gives off considerable water promptly, and an additional portion at red heat. The water behaves like that of the zeolites, being partly lost over sulfuric acid. Material for analysis was dried at 105°.

Analysis: H_2O 10.49, SiO_2 50.27, Al_2O_3 12.90, MgO 26.98, sum 100.64 per cent. This agrees fairly well with the formula: $4H_2O.Al_2O_3.5MgO.6SiO_2$, or $H_8Al_2Mg_5(SiO_4)_6$. Related to neolite, but differs in the absence of iron, white color, lower specific gravity and different proportions of several constituents.

OCCURRENCE

Occurs in a serpentine formation, as part of a rock which was originally a granite or granitic gneiss, but has now been transformed into this magnesium silicate, with some residual microcline, apatite, zircon, and part of the original biotite.

E. T. W.

NOTES AND NEWS

The brief article, " Reminiscences of William E. Hidden," published in our August number (p. 100), had been submitted by Dr. Kunz some months previously, and the editor supposed that it was complete. After it was in page proof—too late for essential change—word was received that Dr. Kunz had sent additional manuscript, but this was apparently lost in the mail. A carbon copy has now come to hand, and the balance of the account of the activities of this well known mineralogist will be published in the October and November numbers.

E. T. W.