age pending further study. The mineral occurs both as anhedral colorless masses up to 1 cm. in size embedded in a granular matrix of quartz, siderite and feldspar, and as small crystals associated with whitlockite, brazilianite, goyazite, quartz, siderite and apatite in drusy cavities. The granular matrix occasionally contains disseminated grains of dark blue lazulite. The augelite crystals, although monoclinic, usually have a markedly pseudo-rhombohedral habit, very similar to that figured by Prior and Spencer[1] for augelite from Bolivia. Such crystals are virtually indistinguishable on casual examination from whitlockite crystals that have the common $\{01\bar{1}2\}$ habit. The augelite crystals often have a white, frosted surface due to slight etching, but others are colorless and glassy. Optically, the crystals have α 1.573, β 1.576 and γ 1.587, with 2V medium.

A PROPOSED PETROGRAPHIC METHOD FOR THE RAPID DETERMINATION OF ILMENITE

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Recently, while studying crushed fragments of opaque minerals under the petrographic microscope, it was noticed that many ilmenite fragments could be easily distinguished from all other opaque fragments by a distinct orange-red color appearing on the very thin edges of the fragments. This effect was noticed only under crossed nicols and with the upper lens of the condenser swung into position. A rather strong source of light is necessary which the condenser aids in illuminating the thin edges of the fragments.

The fragments of the opaque minerals were mounted on slides with a few drops of Canada Balsam or immersed in oil ($n=1.545$) and then covered with a thin cover glass. The effect was seen in fragments from 1/4 mm. to less than 1/16 mm. sizes (50 to 150 mesh A.S.T.M. or Tyler Standard Screen Scale sieves 264 to 62). In the smaller sizes, minute particles often exhibit orange-red translucency throughout the grains.

Observations of ilmenite specimens from Norway, Maryland, California, Arizona, and three of unknown locality showed this distinct color effect on the thin edges. To date the writer has not found any other opaque mineral, that, when crushed, will give this distinct orange-red color. The closest mineral resemblance found under these conditions was that of specular hematite. However ilmenite can be readily distinguished from specular hematite as the latter has a more blood-red color which is visible also without the aid of the condenser lens. The color in specular hematite may also be seen in plane light. It was noticed that magnetite appeared as a light grayish yellow in a few of the thinnest

[1] Prior, G. T., and Spencer, L. J.: *Mineral. Mag.*, 11, 16 (1895).

edges while viewed under the same conditions as in observing the ilmenite fragments. Likewise picotite appeared a light tan color on thin edges.

The explanation of this phenomenon in an opaque mineral is not known to the writer, but the observations, and the conditions under which they were made, are recorded here in the hope that they will be of use to students working with opaque detrital grains. These would probably need to be crushed to obtain angular fragments. The author will be glad to learn whether others obtain the same result with crushed grains of ilmenite.

HOPPER CRYSTALS OF HALITE IN THE SALINA OF MICHIGAN

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In the manufacture of grainer salt, crystal growth is effected by evaporation at temperatures below boiling in order to prevent turbulence and permit the formation of a thin surface film of high density brine. In this film the halite crystals begin to grow. As growth continues the cube tends to sink under its own weight although it is held at the surface by surface tension. Because only one cube face of the crystal is in contact with the high density film, growth takes place only along its edges. In this manner, while the crystal sinks, growth continues upward and outward along these edges resulting in a hollow pyramid with its apex pointing downward. When the surface is disturbed the crystals are broken or swamped and sink. Manufactured crystals of this sort are shown in Figure 1.

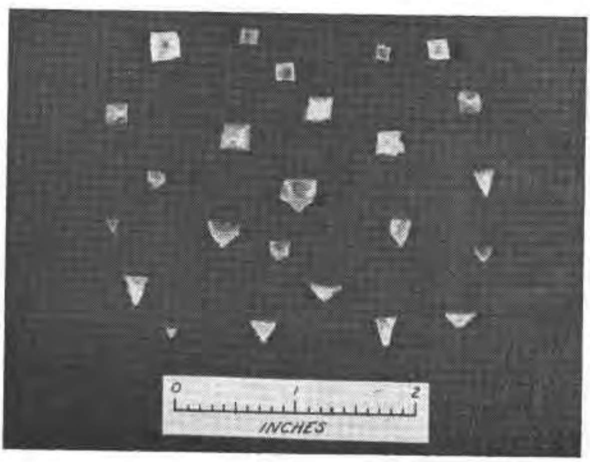

Fig. 1. Artificial hopper crystals.


Fig. 2. Photomicrograph of hopper crystals outlined by oriented liquid inclusions. (×18)