DISCREDITED SPECIES

FAMILY: SILICATES. DIVISION: R'' : R'''' : H_2O = 8 : 7 : 5.

"Caryopilite" (Dana No. 508) = Bementite (No. 507).

J. T. PARDEE, E. S. LARSEN, JR. AND GEORGE STEIGER: Bementite and neotocite from western Washington, with conclusions as to the identity of bementite and caryopilite. *J. Wash. Acad. Sci.* 11(2), 25–32, 1921.

Discovery of a new occurrence of bementite led to comparison with related minerals, and "caryopilite" from Sweden was found to be optically identical with bementite. As the differences in composition between them are insufficient to maintain distinctness "caryopilite" should be dropped from the list of mineral species. As the properties of bementite and of neotocite have not been very fully recorded heretofore, they are tabulated here.

REDEFINITION OF SPECIES

Bementite

G. A. KOENIG, 1887. (Including "caryopilite," Hamberg, 1889.) Re-defined by PARDEE, LARSEN AND STEIGER, *op. cit.*, pp. 28–30.

CHEMICAL PROPERTIES: *Formula:* 8MnO: $7SiO_2$: $5H_2O$ or $H_{10}Mn_8Si_7O_{27}$, with slight replacement of manganese by iron, magnesium, and zinc. Theory, MnO 52.6, SiO_2 39.1, H_2O, 8.3%.

The original analysis of bementite from Franklin Furnace by Koenig, a new one of material from the same locality by Steiger, that of the new Washington mineral, and the original one by Hamberg of "caryopilite," (on an admittedly unsatisfactory sample) all agree essentially. The average of the two new analyses, the only ones made on optically controlled material, is: SiO_2 39.14, MnO 40.40, FeO 4.55, MgO 3.91, CaO 0.51, ZnO (abs. from Wash. material) 1.47, Al_2O_3 1.14, Fe_2O_3 0.36, H_2O- 0.55, H_2O+ 7.96, sum 99.99%. Before the blowpipe it fuses readily to a black glass. It is decomposed by hot HCl with separation of granular SiO_2.

CRYSTALLOGRAPHIC AND OPTICAL PROPERTIES: System probably orthorhombic; cleavable in three directions, one perfect. Refractive indices: $\alpha = 1.603-1.624$, $\beta = 1.632-1.650$, $\gamma = 1.632-1.650$, $\gamma-\alpha = 0.023-0.029$. Biaxial negative with 2 E very small. Orientation, α shown normal to plates; elongation accordingly +. The range in indices is obviously connected with the varying isomorphous replacements of manganese.

PHYSICAL PROPERTIES: Color gray, grayish brown or grayish yellow; darkens on weathering. Luster vitreous to pearly. Transparent in thin splinters. Structure, aggregates of small plates and fibers. Rather tough with splintery fracture. Hardness variable, from 6 in unaltered Washington material down to 2 in presumably somewhat altered Franklin Furnace material. Specific gravity 3.106 on fresh Washington material down to 2.83 on impure "caryopilite"; range in this as in optical properties connected with isomorphism.

OCCURRENCE: In all three regions—Franklin Furnace, N. J., Pajsberg, Sweden, and Olympic Mountains, Washington—occurs in metamorphosed manganiferous limestone.

DISCUSSION: The composition heretofore assumed for bementite is evidently incorrect, and the more complex one here assigned seems justified by the agreement of analyses on optically homogeneous material from widely separated localities. Two other minerals of somewhat similar properties are known, inesite and ectropite, but they are sufficiently different chemically and optically to show that they are distinct from bementite. E. T. W.