

follows directly from the Maxwell theory of reflection and absorption. Experimental determinations of the total emissivity of platinum have verified the derived relation.

MINERALOGY.—*Four new minerals.* WALDEMAR T. SCHALLER, Geological Survey.

The following very brief notes of four new minerals are given in order to secure priority, as it is desired to extend further the optical determinations before the detailed papers are published. The formulas given have all been derived from the completed chemical analyses.

Minasragrite is a blue hydrous vanadium sulphate from Minasragra, Peru. The monoclinic crystals dissolve readily in cold water. The vanadium is quadrivalent and the mineral is a hydrous acid vanadyl sulphate with the formula $V_2O_4 \cdot 3SO_3 \cdot 16H_2O$, which is interpreted as $(V_2O_2)_2H_2(SO_4)_3 \cdot 15H_2O$.

Fernandinite is a green hydrous calcium vanadyl vanadate from Minasragra, Peru. The analysis yields the formula $CaO \cdot V_2O_4 \cdot 5V_2O_5 \cdot 14H_2O$, which may be written, as a metavanadate as follows: $[H_4Ca(V_2O_2)][VO_3]_{10} \cdot 12H_2O$.

Shattuckite is a blue hydrous copper silicate from the Shattuck Arizona Copper Company's mine at Bisbee, Arizona. Its formula is $2CuO \cdot 2SiO_2 \cdot H_2O$ and it is close to plancheite in composition but differs considerably therefrom in its optical properties. Shattuckite forms pseudomorphs after malachite and also occurs as small spherulites.

Bisbeeite is found with the shattuckite and forms pseudomorphs after the shattuckite pseudomorphs of malachite. In composition bisbeeite is identical with diopside, $CuO \cdot SiO_2 \cdot H_2O$, but is orthorhombic, pale blue to nearly white in color, and has distinct optical properties.

ZOOLOGY.—*The geographical divisions of the recent crinoid fauna.* AUSTIN H. CLARK, National Museum.

The division of the present crinoid fauna as a whole into satisfactory zoögeographic regions has proved to be a task of no little difficulty, chiefly because of the almost complete absence