the spots in the oscillation photographs indicate a fairly distinct pseudo cell which is 1/24 the volume of the orthorhombic unit cell, but its shape is very far from cubic. This pseudo cell is indicated by the relatively very high intensities of spots with indices like 084, 086, 344, 346, 3 12 0, 3 12 2, 3 12 4. These indices are of the form $3n$, $4n$, $2n$, and the pseudo cell thus has the dimensions $\frac{1}{3}a_o$, $\frac{1}{4}b_o$, $\frac{1}{2}c_o$, or 3.94 Å, 6.75 Å, 6.70 Å. The pseudo cell is therefore pseudo-tetragonal, and also pseudo-hexagonal. (In accordance with what has been said above the product 3.94 Å × 6.75 Å × 6.70 Å is very nearly equal to $(5.59 \text{ Å})^3$, which is the volume of the unit cell of cubic Cu_2S.) — The general positions of equivalent points in the space group Q_h^{19} — *Cmmm* are sixteen-fold. This is an additional indication that the real number of "molecules" Cu_2S in the unit cell is 96 and not a number in the neighbourhood of 96, for 192 and 96 positions are readily built up of sets of 16. 12 + 6 sets of 16 will be needed, and the number of parameters to be fixed to determine the structure is probably (12 + 6) × 3, or 54.

Oslo, Mineralogisk-geologisk museum, November 1944.

Ivar Oftedal.

NOTE ON THE METAMORPHIC DIFFERENTIATION OF SOLID ROCKS

This note should be considered as a supplement to my article in this journal *24* p. 98—111.

The activity of the given mineral usually varies with the kind and composition of the surrounding minerals (the variation of the activity with *Z*) even if the composition and the size of the given mineral and the *P*, *T* are constant. This is because of the influence of the surrounding phases on the surface tension of the considered phase. Thus, in a homogeneous rock consisting of chemically compatible minerals it may happen that the activities of the assemblage decrease if special minerals cluster concretionary together. During the metamorphism there will therefore exist activity gradients in a homogeneous rock that try to differentiate the rock by dispersion of some minerals at some places, migration of the dispersed elements towards places of lower activities and consolidation there. The variation of the activity of a mineral with the surrounding phases is thus — along with the variation of the activity with the pressure, *P*, and the size of mineral, *Y* — the most important factor to consider when treating the metamorphic differentiation theoretically. In this way I explain the occurrence of concretions of many mineral assemblages as for instance calcite in slate, chert in chalk, quartz and small pegmatite veins in gneisses, epidote, quartz and calcite in low grade amphibolites and so on. During the growth of the concretion which commonly consists of minerals containing the element with the greatest power of diffusion in the rock, the other minerals must be enriched in a zone along the boundary of the concretion.

Mineralogisk Institutt, Oslo, February 1935.

Hans Ramberg.