temperature conditions of formation of the assemblages are qualitatively consistent with that model. Significant aspects of that model may therefore now be considered verified by the evidence of the natural mineral assemblages discussed herein.

The primitive 'pyrolite' chemical composition of the mantle has been taken (somewhat arbitrarily) to be equivalent to a mixture of one part of basalt to three parts of dunite. The rocks discussed in this paper possess chemical compositions closely approaching that model. It should be emphasized, however, that any parent rock characterized by basalt-dunite ratios between 1:1 and 1:10 would probably be capable of crystallizing in each of the four mineral assemblages, according to the specific *P-T* conditions.

Accordingly, if ultrabasic rocks in this composition range do, in fact, predominate in the upper mantle, large-scale mineralogical zoning controlled by the *P-T* distribution will be inevitable. The upper mantle cannot, therefore, be regarded as a homogeneous region possessing a characteristic set of physical parameters (such as density and seismic velocity). Implications of this mineralogical zoning with respect to the presence or absence of a low-velocity zone, and to regional variations in seismic velocity profiles and surface heat flow, were outlined in previous papers [*Ringwood,* 1962*a*, *b*]. Further progress now awaits the direct experimental determination of the *P-T* fields of the four assemblages, as well as a better knowledge of the elastic properties of the individual minerals of these assemblages, as a function of temperature and pressure.

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