and Green (1966, p.398-423) will apply to the gabbro-garnet granulite-eclogite transformation and its geophysical significance whether the Ito and Kennedy 20 bars/^{o}C or the Green and Ringwood 24 bars/^{o}C slopes are used for extrapolation. This particularly applies to the argument that since the geothermal gradient and garnet granulite boundary are subparallel in the 0-10kb interval, no large mineralogical change (without chemical change) can occur over a small depth interval along the geothermal gradient. It may be noted that the boundary advocated by Ito and Kennedy (1971) for the upper pressure limit of the gabbro field is identical to that shown by Green and Ringwood 1967a, Fig. 8 for the upper pressure limit of their low pressure granulite field, i.e. the reaction of olivine + plagioclase to yield garnet or spinel + pyroxenes (see Fig. 4).

Conclusions

The recent experimental studies by Ito and Kennedy (1971) provide improved data on the position of phase boundaries of the gabbro, garnet granulite and eclogite assemblages for a specific olivine tholeiite composition. Ito and Kennedy's conclusion that their new data are inconsistent with earlier data obtained in our own laboratory is shown to be incorrect and apparently based on an inadequate understanding of the role of chemical differences between the various basalts. We have shown that the curves for the solidus, the incoming of garnet, and the out-going of plagioclase determined by Ito and Kennedy (1971) are consistent, within experimental uncertainty, in both position

and slope with boundaries determined in our laboratory on relevant basaltic compositions. Ito and Kennedy (1970, 1971) have failed to unequivocally demonstrate their assertion that there are two 'sharp' increases in density within the gabbro to eclogite transition marking the appearance of garnet and rapid decrease in plagioclase, respectively. Thus we consider that Ito and Kennedy's attempt to relate these 'sharp' density increases to 'Conrad' and Mohorovicic Discontinuities is without foundation, even for the specific basalt composition which they studied.

The experimental work by Ito and Kennedy confirms, for their olivine tholeiite composition, two of the major conclusions from our earlier studies:

1. The transition between gabbroic and eclogitic mineral assemblages occupies a broad pressure interval between the incoming of garnet and disappearance of plagioclase. The positions of the boundaries and the width of the field for the transitional garnet granulite mineral assemblage are sensitive to variations in the chemical compositions of basalts.

2. The extrapolation of experimentally determined boundaries to lower temperatures suggests that eclogite mineralogy is stable in dry basaltic rocks along normal geothermal gradients throughout the continental crust in stable or shield regions. This aspect of the experimental study has been treated fully previously (Ringwood and Green 1966, Green and Ringwood 1967a).