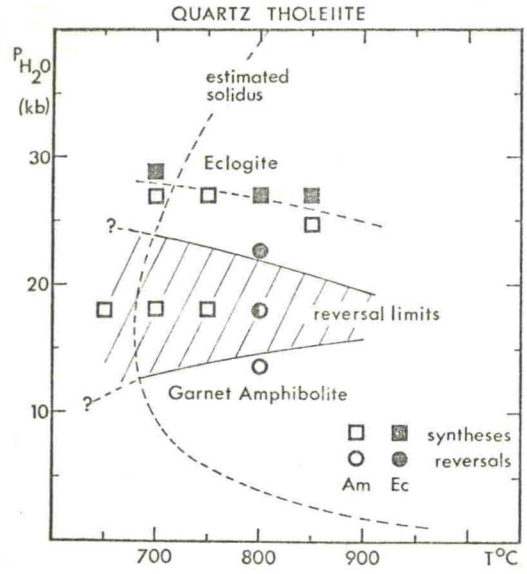

Fig. 5. Stability limit of amphibole in an albite-rich quartz tholeiite, comparing synthesis runs with reversals.

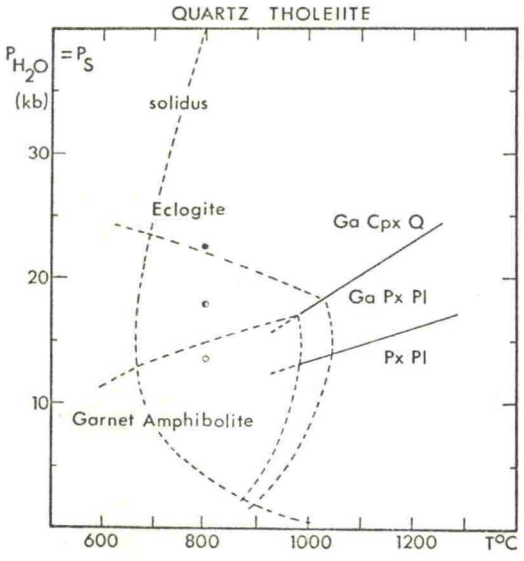

Fig. 6. Combination of present data for the alkali olivine basalt with that of GREEN and RINGWOOD (1967). Sa = Sanidine, Ga = Garnet, Pxs = Pyroxenes, Pl = Plagioclase, Ol = Olivine.

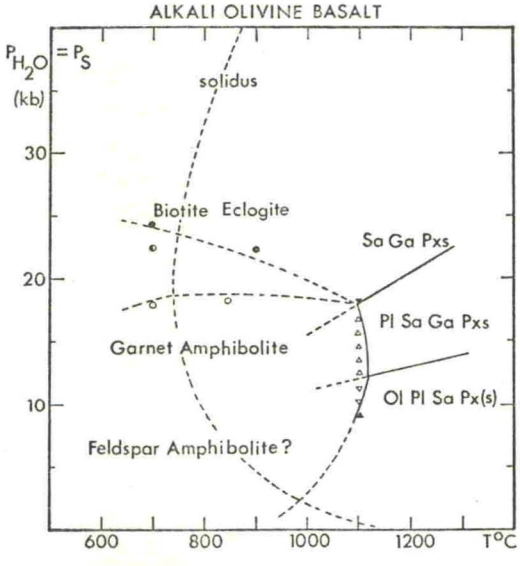

Fig. 7. Combination of the present data for the quartz tholeiite with that of GREEN and RINGWOOD (1967) and data for the amphibole stability from the Silberbach eclogite as determined by YODER and TILLEY (1962).

thesis boundary appears to be rather sharp and reproducible.

The solidus was difficult to locate for these basaltic compositions due to the formation of quench amphibole and the formation of only a small amount of glass near the solidus. It was estimated from the runs plotted in figs. 4 and 5 and by comparison with YODER and TILLEY's (1962) and LAMBERT and WYLLIE's (1968) data. The solidus for the alkali olivine basalt with 26% normative olivine is thought to be 50–75° higher than that for the quartz-normative tholeiite.

The upper stability of amphibole in supersolidus runs will involve reaction with melt as well as vapor, but these data have been included to place gross limits on the possible slopes for the supersolidus curves. GREEN and RINGWOOD (1967) found amphibole between 10.1 and 16.8 kb at 1100 °C with $P_{H_2O} < P_T$ in the alkali olivine basalt and this is used in fig. 6 to tentatively fix the amphibole stability. Yoder and Tilley's data on the stability of amphibole in various basalts have been consulted to estimate the amphibole stability in the quartz tholeiite (fig. 7).

The subsolidus reaction of amphibolite to eclogite is not likely to be a sharp transition but a gradual reaction among amphibole, garnet and pyroxenes (and feldspars?). It is best thought of as a sliding reaction with a number of substitutions in each phase and may be generalized as:

$$\text{hornblende}_A + \text{garnet}_B + \text{pyroxene}_C = \text{hornblende}_D + \text{garnet}_E + \text{pyroxene}_F \mp \text{quartz} \pm \text{olivine} + \text{water}.$$

The hornblende etc. on each side of the reaction will form a solid solution shifting with ΔP, T to any of a