a five phase (olivine + orthopyroxene + clinopyroxene + plagioclase + spinel) stability field. At 1100°C plagioclase is present in the 13.5 kb run, and at 1200°C plagioclase disappears between 13.5 kb and 15.7 kb. Since the reactants were either glass or crystalline olivine + labradorite, metastable persistence of plagioclase to a higher pressure is possible in these runs, and the boundary for the stability field for plagioclase could not be very tightly located by reversals (i.e. growth of plagioclase from Ol + Px + Sp assemblages), because of the difficulty of distinguishing small amounts of plagioclase from possible incipient melting. However, a reversal was obtained in a run at 11.2 kb, 1200°C in which reactants of the Ol + Px + Sp assemblage were re-run and yielded the plagioclase-bearing, 5-phase assemblage. In contrast, anorthite is absent at pressures greater than 8.5 kb at 1200°C in the Fo + An mix.

In the higher pressure experiments on the olivine + labradorite mix, garnet appears from reactions involving spinel and pyroxene solid solution. Garnet first appears in minor amounts in the 18 kb, 1200°C run and between 18 kb and 20.2 kb at 1300°C. These conditions are similar to those at which garnet crystallized in the system Fo + An (2 : 1 mol.ratio) (Kushiro & Yoder 1966), and in diopside + enstatite + spinel systems (MacGregor 1965), but at considerably lower pressure than the appearance of garnet in the pyrolite composition (Green & Ringwood 1967c, 1969). The latter boundary has been confirmed by reversals, and the data illustrate the difficulty in extrapolation from simple to complex system — the presence of chromite solid solution in the spinel probably stabilizes the spinel bearing assemblage to higher pressures.

Pyrolite

The pyrolite composition, even at low pressures, contains the five phase assemblage olivine + orthopyroxene + clinopyroxene + plagioclase + spinel. However, at low pressures the orthopyroxene is a minor phase, olivine is a major phase and the uncommon spinel grains are brown in colour (with the presence of 0.72% Cr_2O_3, in the experimental mix the brown spinel is regarded as chromite-rich). The reaction between plagioclase and olivine yields a marked increase in orthopyroxene and spinel and a decrease in plagioclase; the spinel also changes to pale green in colour as it becomes more abundant. The highest pressure run in which plagioclase is considered to be stable is at 11.2 kb; this is based on the constancy of the Ol/Opx ratio (as deduced from relative intensities of characteristic X-ray reflections), and on the absence of low R. I. grains at higher pressures. Definitive plagioclase X-ray reflections could not be observed in any runs at pressure of 9 kb or more.

It may be inferred that the plagioclase (normative labradorite) in the pyrolite composition should disappear at lower pressures than in the olivine + labradorite mix, because of the presence of diopside in the low pressure