of metastable intermediates may form and persist. However, with less unstable starting materials reaction rates are commonly too slow for recrystallization to be achieved.

It must be stressed that the field of synthesis of a given phase need bear no relation to the field in which this phase is stable. Equilibrium is indicated only if a reaction is reversible or, less decisively, if a number of different starting materials produce the same results. This has not been demonstrated for any of the hydrothermal syntheses described in this paper.

5.2. *The system albite–silica–water*

There is a wide field (Fig. 10) in which both analcime and albite appear from compositions within this system containing excess silica, a type of behaviour typical of many of the systems studied. The following conclusions are drawn from the experimental data.

(1) The apparent upper stability limit of analcime in the presence of quartz, as established by synthesis, is 280°C ± 10° at 1000 bars. The boundary is steep. This is in reasonable agreement with observations of Fyfe (1955b), Sand *et al.* (1957), and Barrer and White (1952).

(2) The fact that analcime alone appears in short runs above 280°C and that albite appears in longer runs (Valpy, 1957) suggests that analcime grows readily in regions where albite is the stable phase, and that the figures in (1) above represent a higher temperature than that for true stability of analcime.

(3) Preliminary experiments by Campbell (1958) on the solubility of albite in the presence of natural analcime and quartz indicate that the analcime + quartz = albite + water equilibrium temperature is near 200°C at saturated water vapour pressure.

(4) The possibility of synthetic high silica analcimes suggested by Mackenzie (1957) is supported by the absence of a silica phase in the recrystallization of albite glass to analcime. Analyses of natural analcimes (Appendix 2) do not indicate a wide variation of composition.

(5) In experiments using amorphous silica and glasses mordenite appears at temperatures below 230–245°C at 2000 bars. Fyfe (1955b) found that analcime was replaced by mordenite below 220°C at 300 bars.

(6) When quartz is used in place of amorphous silica analcime, not mordenite, appears at temperatures as low as 115°C (Table 9).

(7) Lowering the pH by addition of sodium bicarbonate in runs with amorphous silica raises the temperatures at which mordenite appears. This effect can be correlated with the influence of pH on silica activity since high pH increases the rate of formation of quartz.

5.3. *The system anorthite–silica–water*

The following main conclusions are drawn from the experimental data (Appendix 1).

(1) From all starting materials used in experiments in this system wairakite is the highest temperature calcic zeolite to form. The temperature up to which it forms is greatest when amorphous silica is used in the starting materials. A summary of