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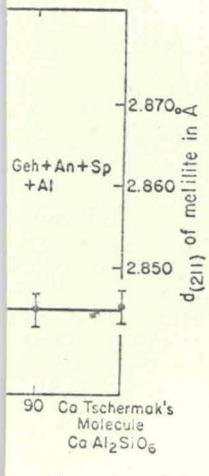

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within the Mel_{ss} + An + Sp volume at a temperature of 1360° ± 5°C. This is only in fair agreement with De Vries and Osborn (1957), who measured a value of 1350°C for this point. "Alumina" refers to corundum and/or "β alumina." These phases often occur together, although "β alumina" is predominant near liquidus temperatures, and only corundum peaks are observed in X-ray patterns of solidus assemblages.

The Sp + An + Fo + $Ak_{69}Geh_{31}$ + L invariant point lies within the Mel_{ss} + An + Fo volume, and its temperature is 1225° ± 5°C. The Di_{ss} + An + Fo + $Ak_{89}Geh_{11}$ + L invariant point also lies within the same volume. Its temperature is not known precisely. It is drawn in figure 1 at 1225°C, which probably represents a maximum value. Since these two invariant points have closely similar temperatures and compositions, it is difficult to decipher their mutual relationship. If they have the same temperature and different compositions, it is likely that some compositions along the Di-CTs join will pass through neither point and will crystallize directly to Mel_{ss} + An + Fo without forming any pyroxene or spinel. This possibility is depicted on figure 1. Another, equally likely, possibility is that the reaction point at which pyroxene is consumed occurs at a slightly lower temperature than the reaction point at which spinel is consumed. If this is so, some compositions along the join may pass through both points as they crystallize, before winding up as a mixture of melilite, anorthite, and forsterite. Since compositions along the "grossularite"-"pyrope" join (Chinner and Schairer, *Year Book 59*) appear to raise but not answer the same questions, the answers can be supplied only by the study of compositions lying off these joins in the Ak-$Ak_{70}Geh_{30}$-An-Fo volume.

Chinner and Schairer observed that several compositions on the "grossularite"-"pyrope" join crystallized an aluminous pyroxene that reacted with liquid at lower temperatures to produce a melilite-anorthite-forsterite assemblage. They suggested that extensive fractionation of diopside crystallized from a basaltic melt as the result of limestone syntexis would enrich the melt in Al_2O_3. Aluminous pyroxene could then store up CaO and Al_2O_3, which would contribute to the formation of melilite as pyroxene redissolved in the magma during the final stages of crystallization. This mechanism is in complete qualitative agreement with the classic contamination sequence described by Tilley and Harwood (1931) at Scawt Hill. It also receives excellent qualitative confirmation by the relations observed on the Di-CTs join. The analogous reaction point in this system is Di_{ss} + $Ak_{89}Geh_{11}$ + An + Fo + L, at which melts do indeed consume pyroxene and form melilite and other phases. This is presumably the same reaction point encountered by Chinner and Schairer. Their mechanism, however, has at least one serious limitation in the application to the melilite rocks of Scawt Hill. The pyroxene at this reaction point in the synthetic system has been shown to contain about 40 mole per cent AlAl for (Ca,Mg)Si. This is more than twice as much Al_2O_3 as is found in Scawt Hill aluminous pyroxenes (Tilley and Harwood, 1931). Thus the analogy between the synthetic and the natural pyroxene reaction point is less direct than Chinner and Schairer inferred.

Phase Relations in the System $CaMgSi_2O_6$-$CaAl_2SiO_6$-SiO_2 at Low and High Pressure

Sydney P. Clark, Jr., J. F. Schairer, and John de Neufville

There is substantial indication that basaltic magmas are generated in the mantle, perhaps at considerable depths. Some of this evidence is seismic, some geothermal, some geologic. With the exception of the seismic activity associated with Hawaiian eruptions, it is indirect and perhaps capable of other