36	1,390	35	cpx			qz	glass	55	Medium grained; qz > cpx.
36	1,420	20	cpx			qz	glass	75	Medium grained; qz > cpx.
36	1,450	20				qz	glass	95	Fine grained quartz only crystalline phase.
Dacite + 2.5% garnet									
27	1,200	120	cpx	felds	ga	qz	—	—	Medium grained; qz > ga > felds > cpx.
27	1,350	60	cpx		ga	qz	glass	85	Subhedral, inclusion filled garnet, rare stubby clinopyroxene, common small quartz crystals; qz > ga ≫ cpx.
27	1,370	60			ga ?	qz	glass	95	Trace of resorbed garnet-inclusion free; minor small quartz crystals; no evidence for growth of garnet.
27	1,380	60				qz	glass	99	Rare quartz crystals; very rare resorbed, anhedral garnet fragments.

(5—30 μ) equant stubby crystals, often in aggregates. The crystal form usually distinguishes primary clinopyroxene from quench pyroxene (which is evident as "feathery" aggregates of acicular crystals). Garnet is characterized by its large crystal size (usually > 30 μ) and euhedral form. It is usually comparatively free of inclusions in compositions ranging from high-alumina olivine tholeiite to andesite but in the dacite composition garnets grown under dry conditions contain abundant inclusions (quartz mainly and some pyroxene). Quartz occurs as small crystals evenly scattered throughout the glass. It has low, negative relief and very low birefringence.

a) Crystallization at 9 kb

It has been noted elsewhere (T. H. Green, 1967a, b; Green, Green and Ringwood, 1967) that plagioclase and pyroxene are the near-liquidus phases in the high-alumina basalt and the andesite (quartz diorite) compositions at 9 kb. Similarly clinopyroxene and plagioclase are the near-liquidus phases in the basaltic andesite at 1220 and 1200° C. In the dacite composition plagioclase is the liquidus phase at 1240° C and is the only phase crystallizing until 1180° C, where it is joined by clinopyroxene and possibly quartz. Quartz is definitely present at 1100° C. Feldspar and quartz are the near-liquidus phases in the rhyodacite I composition at 1190° C and are joined by pyroxene at 1170° C.

b) Crystallization at 18 kb

In the high-alumina olivine tholeiite at 18 kb clinopyroxene is the liquidus phase at 1340° C and is the only phase to crystallize until 1280° C, where it is joined by garnet and plagioclase. These three phases continue crystallizing into the sub-solidus field. Clinopyroxene is the liquidus phase in the high-alumina quartz tholeiite at 1345° C, and is joined by plagioclase and garnet crystals at 1300° C, and these three phases are possibly joined by minor quartz at 1250° C in the sub-solidus field. Similarly in the basaltic andesite composition clinopyroxene is the near-liquidus phase at 1300° C, joined by plagioclase and garnet at 1250° C, and finally by quartz at 1200° C in the sub-solidus field. In contrast to these results described so far, the near-liquidus phases in the andesite at 18 kb 1260° C are plagioclase and garnet and these phases are joined by clinopyroxene and quartz at 1220° C. These four phases continue to crystallize into the sub-solidus field. (Note: the sub-solidus runs listed as "wet" in Table 7 have only had access to a minor amount of water — no water has been added to the sample as in the wet runs described on p. 142.) Quartz is the liquidus phase in the dacite

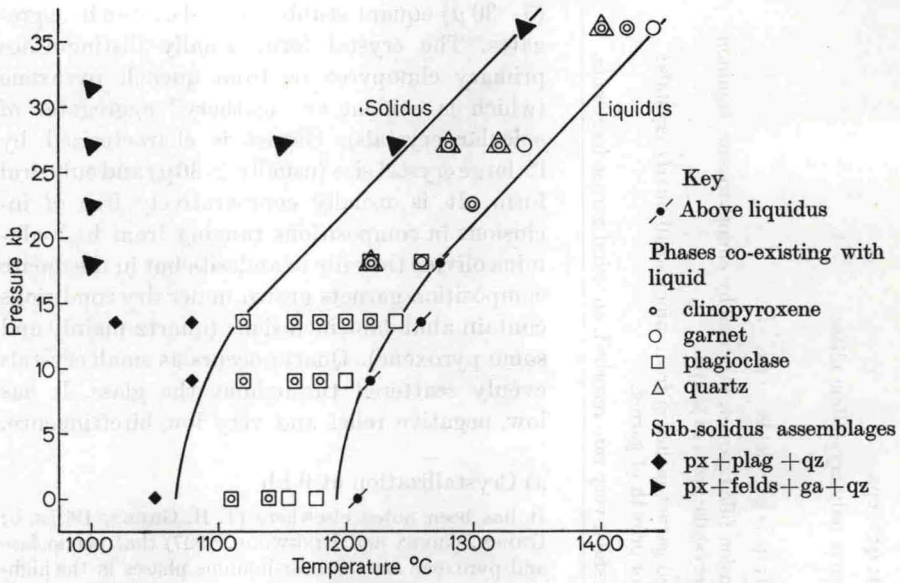

Fig. 4. Results of the dry experimental runs on the andesite composition

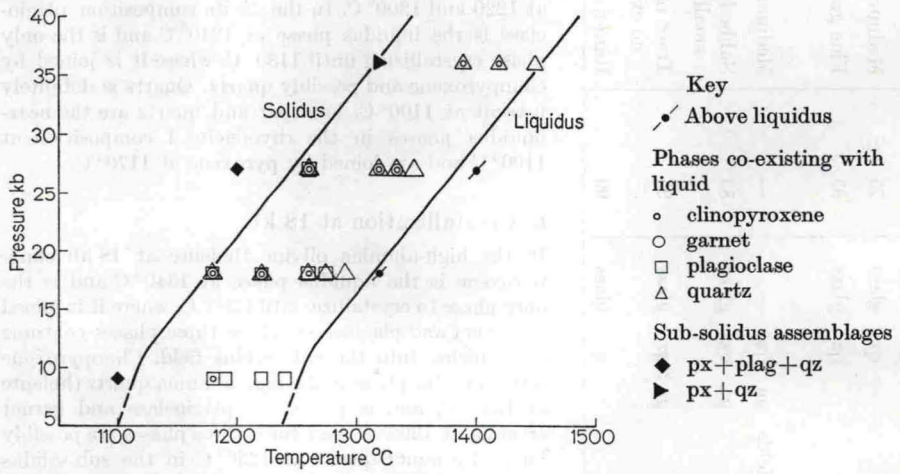

Fig. 5. Results of the dry experimental runs on the dacite composition

at 1290° C joined by plagioclase (1275° C) and then by clinopyroxene (1260° C) and finally garnet (1220° C).

c) Crystallization at 27 kb

Clinopyroxene is the liquidus phase (1435° C) in the high-alumina olivine tholeiite at 27 kb; it is joined by garnet at 1430° C and these two phases continue to crystallize together to the solidus (below 1360° C). Clinopyroxene is more common than garnet at all temperatures. A similar pattern of crystallization occurs in the high-alumina quartz tholeiite with clinopyroxene on the liquidus at 1440° C, joined by garnet at 1420° C. These phases continue