

nucleation mechanisms in an inhomogeneous (at least with respect to fO_2) magma.

The cause of locally elevated fO_2 in the Glen Creek Gabbro magma remains unclear. That it relates to heterogeneities in H_2O content is suggested by the presence, within the olivine-oxide rock, of small lenses and pods of gabbroic lithology that are abnormally enriched in amphibole (kaersutite) and phlogopite to the exclusion of pyroxene, but with the other phases—olivine, plagioclase, oxides, and others—present in their usual abundances (fig. 98). The source of the extra H_2O is not known, although the implication that its concentration is localized suggests a local source. This is problematic, however, because the rock enveloping the Glen Creek Gabbro (at least at the exposed level) is the anhydrous Glen Mountains Layered Complex, which is nonporous and unlikely to contain much meteoric water. For the present, the question remains unresolved.

Ultramafic material petrographically similar to that in the Glen Creek Gabbro was reported by Ham and others (1964, p. 266) in the subsurface in sec. 35, T. 7 N., R. 18 W., Kiowa County, indicating that olivine-magnetite-ilmenite rock is not unique to the Glen Creek locality. According to Ham and others, the rock has the following modal abundances: "iron ore" (28 percent), olivine (27 percent), pyroxene (20 percent), calcite (8 percent), chlorite (9 percent), iddingsite (2 percent), apatite (2 percent), plagioclase (2 percent), and "basaltic hornblende" (1 percent). The rock is relatively altered, and we do not know from the brief description whether it originally contained primary biotite or phlogopite. Associated rock types were not reported, and its origin is not known. We mention it here to point out that the ultramafic occurrence at the Glen Creek locality may not be unique in the province, although such lithologies are rare in rocks available for sampling.

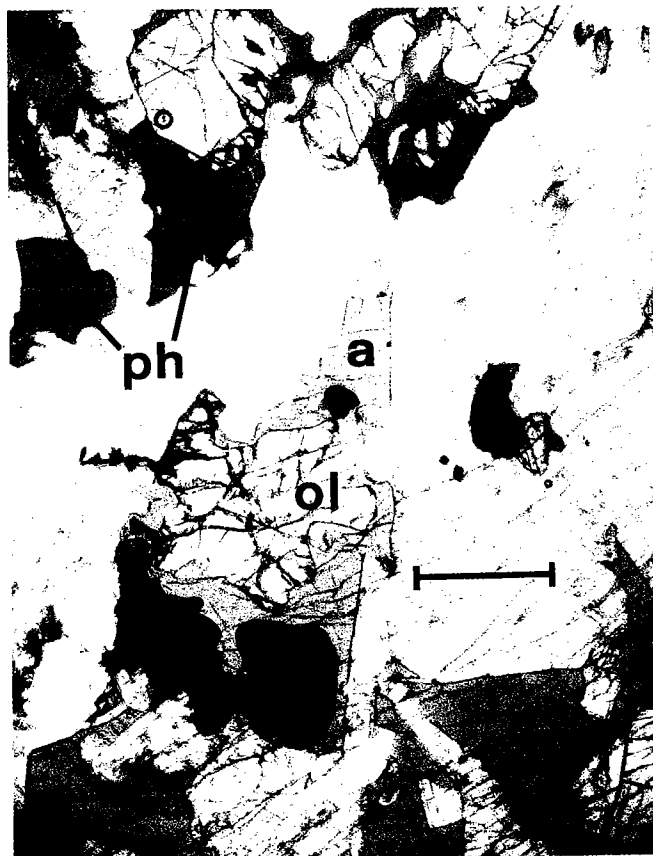


Figure 98. Photomicrograph of sample of gabbroic lens surrounded by ultramafic material in Glen Creek Gabbro (sample MP-27). (See figure 96 for sample location.) Abundant kaersutitic amphibole (a) and phlogopite (ph) occupy usual textural position of pyroxene, which is absent from this sample. White grains are plagioclase; opaques include magnetite and ilmenite. Phlogopite and amphibole are optically continuous over their respective areas shown (and larger). Bar is 1 mm.