

They are probably amphibole. A few flakes have haloes round colourless crystal inclusions. Many grains are bleached and others are completely altered into green chlorite.

*Calcite* is abundant in most samples in colourless, generally rounded, cleavage flakes, many of which show twin lamellae.

*Chloritoid* is common in one or two samples in subangular cleavage flakes. They show characteristic pleochroism—indigo blue > olive green, and the positive acute bisectrix emerges almost normal to the cleavage.

*Cyanite* occurs in a number of samples but is never very common. The cleavage flakes are generally angular, rarely rounded, and have characteristic optical properties.

*Chlorite* is common as an alteration product of biotite and less common after amphibole.

*Diallage* is rare in rounded prismatic grains which have black rod inclusions parallel to the prism. One optic axis emerges almost normal, and the plane of the optic axes is parallel to the inclusions. The double refraction is positive.

*Dolomite* was observed in one sample (No. 101) only. It is present in abundance in yellow cleavage grains which show varying degrees of rounding. The grains are soluble with effervescence in hot dilute HCl only. In well-defined cleavage flakes the refractive index of the extraordinary ray lies between 1.586 and 1.60 (the calculated value for dolomite is 1.588, for calcite 1.567, and for chalybite 1.748).

*Epidote* is common in many samples in irregular, subangular grains with pleochroism—yellowish green > pale yellow or colourless. Occasionally, smaller grains of prismatic habit give striking steely blue and yellow—first order polarization colours. One optic axis emerges within the field of view and shows dispersion  $\rho > \nu$ ; the plane of the optic axes is transverse to the prism and the double refraction is negative.

*Gypsum* is very abundant in one or two samples in rounded crystals, simple and twinned, of all sizes. It is also abundant in a few samples in fine-grained concretions.

*Garnet* occurs in nearly all samples in angular to subangular isotropic grains. They are usually colourless and faint pink, but faint sherry-coloured grains are sometimes seen. Grains with crystal (dodecahedral) outline are very rare. Some grains contain colourless crystal and irregular black inclusions.

*Hypersthene* is common in one or two samples in subangular, prismatic grains, pleochroism green > red. Some grains have black rod inclusions arranged parallel to the green vibration, and brown plates arranged in rows parallel to the red vibration.

*Magnetite* is common in shiny black grains which often present an octahedral outline.

*Microcline* is present in most samples in angular to rounded grains, which vary from clear to turbid in the same sample.

*Muscovite* is common and sometimes abundant in rounded and broken cleavage flakes which sometimes contain inclusions of colourless crystals of apatite. Undulose extinction is common, and many grains have their edges battered and turned up and thus show a rim of brighter polarization colours.

*Orthoclase* is common in all samples. The grains vary from angular to rounded and from clear to turbid in the same sample.

*Plagioclase* is generally present but is never very common. The grains, which vary from angular to rounded and from clear to turbid, are all referable to oligoclase-andesine, as shown by their extinction angles and refractive index.

*Quartz* is abundant in all samples in grains which show considerable variation in the degree of rounding, in clearness, and in the number and nature of the inclusions they contain. Simple and compound grains occur, and undulose extinction is common.

*Rutile* is rare and present in few samples. Two types are seen:

(a) Yellow prisms, with rounded ends or with one end terminated by faces; and

(b) Foxy red, rounded prisms and grains.

*Salt* is present as a cement in one or two samples.

*Staurolite* is rare and confined to a few samples. The grains are angular to subangular, yellow to brownish yellow, and show pleochroism—yellow or brownish yellow > colourless or faint yellow. Some grains are quite clear, others contain rounded colourless crystal inclusions with or without irregular black inclusions. Very rarely grains show well-developed crystal outline.

*Sillimanite* is rare and confined to a few samples. It occurs as clear colourless prisms with straight extinction, positive elongation, and rather high double refraction.