twinning together with the twinning according to the albite and pericline laws. Extinctions of triclinic minerals, zonary structure. The plagioclastic fragments present two kinds of habit: dull and cloudy with the debris of older eruptive rocks, glassy and colourless with those of more recent eruption and in volcanic ashes; alteration into zeolitic matter, kaolin, mica, and saussurite; microchemical reaction of lime and soda. When it was altogether impossible, on account of the alteration or of their minuteness, to determine whether the felspathic fragments were to be referred to the monoclinic or the triclinic felspars we use the general term *felspar*.

Garnet.—Often in rhombododecahedral crystals or in grains either quite round or angular, irregular fracture without cleavage, numerous inclusions of various minerals, occasionally coated with green chloritic or serpentinous substance or with phyllitic matter. Generally little altered, isotropic, reddish by transmitted light, unacted upon by acid, high index of refraction, strong dispersion. The most frequent varieties in the deep-sea deposits are common garnet, almandin, and pyrope; they occur generally with debris of older crystalline and schisto-crystalline rocks.

Glauconite.—Grains more or less rounded, sometimes split, often retaining the form of Foraminifera or other organisms in which the glauconite has been moulded. The colour by reflected light is yellow, more or less dark green, black or reddish; by transmitted light it shows greenish or reddish tints. Between crossed nicols aggregate polarisation spotted with bluish and yellowish tints, in some cases appears isotropic, numerous inclusions, reaction of potash (see description of glauconitic deposits).

Gypsum.—Generally regularly-bounded crystals, sometimes rounded, perfect cleavage following the klinopinakoid, transparent, colourless, greyish or brownish from numerous inclusions of clayey and other substances from the bottom. Double refraction strong; axial plane in the plane of symmetry. In some cases, if not in all, these crystals were formed in the bottles containing the deposits preserved in alcohol.

Hematite.—Generally found as *red hematite*, as flakes or small granules coating or colouring other mineral particles, sometimes isolated in the deposits. Often transparent, red to yellowish. Soluble in strong hydrochloric acid. In the deposits this earthy red hematite is very difficult to distinguish from *brown hematite* or *limonite*, the former being frequently altered. Brown hematite, often associated with manganese, is the most frequent in the deposits as brownish amorphous colouring matter, easily soluble in hydrochloric acid.

Magnetite.—Readily extracted with a weak magnet, angular grains frequently in the form of octahedral crystals, sometimes twinned following the spinel law, frequent skeleton crystals and groups of irregular grains, opaque, black, with a characteristic bluish metallic lustre. Occasionally a zone of limonite covers the surface of these magnetic particles; often imbedded in volcanic glass, and associated in the same fragment with other volcanic minerals such as felspar, augite, hornblende, &c., more rarely with debris of older schisto-crystalline rocks and cosmic spherules. Titaniferous magnetite or ilmenite is often found in irregular jagged grains; it is distinguished in some cases from true magnetite by a coating of leucoxene. Acted upon by hydrochloric acid, it is slowly dissolved, giving a yellowish green solution.

Mica.—The minerals of this group are generally distinguished by the naked eye in the deposits; they are seen as shining flakes, particularly when the water is being decanted. As it is difficult, or almost impossible, to distinguish the various species of the micas in the deep-sea deposits, we have taken into account for a broad distinction the following characters. The particles of mica do not show crystallographic outlines, except on the cleavage plane, which is shining; they are perfectly cleavable in thin lamellæ parallel to the basal plane. More or less transparent in various colours from light yellowish or almost colourless to green, brown, or almost opaque, showing brilliant interference colours, optically negative, extinction parallel to the cleavage. We divide all the micas into: (*a*) *Black mica*, flakes parallel to the cleavage deep brown or green, also red or almost black, in convergent light biaxial character scarcely determinable, very strongly pleochroic, the rays vibrating parallel to the cleavage strongly absorbed. Associated with debris of schisto-crystalline and metamorphic rocks, and of old and recent eruptive rocks. This subdivision comprises biotite, and probably anomite and phlogopite in some cases. (*b*) *White mica*, with a silvery lustre, transparent, colourless, light yellowish or greenish; no pleochroism, but absorption of the rays parallel to the cleavage. Intense coloration between crossed nicols, large axial angle. In some cases *sericite* is met with in the soundings associated with fragments of porphyroids or phyllites; it is observed as irregularly-bounded flakes, bent and twisted; the lamellæ are irregular. The other characters are the same as for white mica. The white mica is commonly found