iron ore and rare pseudomorphs after olivine. The plagioclase shows minor alteration to feathery wisps and films of thomsonite. Such alteration is more advanced in a slightly crushed anorthositic segregation, no. 950, from the same area, having bytownite An_{81} as its major primary phase. It is riddled with flecks of thomsonite which are especially abundant near irregular criss-crossing bands of almost pure zeolite, from which innumerable angular embayments extend into the feldspar. Rosette-like clusters of prehnite are often enclosed within the thomsonite and there are also a few threads of an epidote-group mineral, chloritic films and traces of other zeolites. Variable refractive indices such as α 1·527, γ 1·538 indicate aluminous members of the thomsonite series (Hey, 1932a, p. 79). To a first approximation, such alteration of calcic bytownite to thomsonite can be regarded as a simple hydration to $CaAl_2Si_2O_8.2.4H_2O$. In the most crushed rocks plagioclase is completely replaced by thomsonite with nests of prehnite, minor laumontite and tiny veinlets of unidentified fibrous zeolite. There is much relict augite, some hornblende and chloritic material.

Another hypersthene gabbro, 588, from 29 chains downstream from Pyramid Bridge, shows labradorite An_{50} net-veined and partially replaced by thomsonite, pools and later veins of analcime, minor laumontite and occasional nests of prehnite within the thomsonite. In some associated metagabbros feldspar has been completely destroyed. The earlier analcime is penetrated by needles of thomsonite and is likely to have coexisted in equilibrium with it. The analcime presumably represents excess sodium over that taken up by the thomsonite. Replacement of the albite component of plagioclase by analcime would result in the release of silica. A small amount of this could be taken up by an increase in the Si : Al ratio of the thomsonite and it is tempting to consider that the remaining excess silica has caused the formation of the more silica-rich zeolite, laumontite.

A still less basic differentiate, 1581, an apatite-bearing hornblende hypersthene gabbro from about $2\frac{1}{2}$ miles NE of Otama Hall has An_{36} for its plagioclase and shows incipient alteration to laumontite. Another specimen, 1584, which may initially have been rather similar, has had its calciferous plagioclase completely replaced by albite, laumontite and prehnite. These rocks are associated with hornblende and pyroxene andesinites, as well as albitites (e.g. 1587) veined and riddled with laumontite, prehnite, and epidote, suggesting that they were produced by the alteration of andesinites or oligoclasites under conditions transitional between the zeolite facies and the greenschist facies. In some cases the prehnite appears to be replacing earlier laumontite.

The Otama albite microgranites, hornblende microgranites and granophyres are remarkable for near-universal signs of cataclasis, for the uniformly purely albitic plagioclase which is usually somewhat cloudy and flecked with sericite, for their liberal sprinkling and veining along crush-bands with prehnite, epidote and in some cases pumpellyite and for the paucity of potash feldspar. Chloritic minerals and secondary sphene are widespread. Zeolitization is rare both in these and in the albite–hornblende–epidote–sphene hornfelses, and except for a late vein of stilbite (9728) and an occurrence of analcime in a mylonite (9683) the only zeolite noted so far in these quartz-bearing rocks is laumontite. In one case (9741) this appears to be in the process of replacement by pumpellyite and prehnite.

The usual mineral assemblage in the unhornfelsed keratophyric and spilitic volcanics is albite–epidote–chlorite–sphene(–quartz). In other cases pumpellyite (9735), or prehnite and pumpellyite (9734), largely take the place of epidote.

Summarizing the above observations on the Otama rocks it may tentatively be concluded:

(1) At some time subsequent to consolidation, the Complex was subjected to regional cataclasis and alteration under conditions ranging from those of the zeolite to the greenschist facies, quartz–albite–epidote–chlorite–sphene assemblages being typical of the latter.

(2a) Calciferous plagioclase in the microgranites, hornfelses and spilitic volcanics was replaced by assemblages of albite plus prehnite, pumpellyite