few exposures, however, show a dark-grey andesite, which owes its light colour to the predominance of porphyritic plagioclase felspar. The latter form weathers to a light-grey to greenish-grey incoherent rock—the "sandstone" of the miners; the former often to a brownish-red or brownish-yellow clay.

The eruptions of this period seem to have produced lavas remarkably deficient in steam and in other vapours, for vesicular structure—and consequent amygdaloids—is entirely absent. The whole faces of the lavas of this period indicates a flow such as might emanate from a fissure rather than from separate vents, and the few tuffs and breccias met with result, I am inclined to think, from parasitic cones on the lava-flow, and not from the main fissure-vent.

Mr. A. McKay, F.G.S., Government Geologist, separates the auriferous andesites of the peninsula into two groups *—a lower or Thames-Tokatea group, and an upper or Kapanga group; at the same time admitting that the rocks of the two groups are indentical both in petrological and lithological characters.

In this determination he relies on the following conclusions, which I will traverse seriatim :—

(*a.*) The greater alteration of the rocks of the Thames-Tokatea group is a proof of greater antiquity. While admitting a greater alteration in a limited area on the Tokatea ridge, yet further south—viz., near Castle Rock—we find andesite on the same horizon as the Tokatea perfectly fresh and undecomposed, proving at the least that the greater alteration is not universal. Again, speaking generally, the Thames-Tokatea group of Mr. McKay occupies a more elevated position than the Kapanga group, which is disposed nearer to and at sea-level. Hence, since it follows that the more elevated rocks must, other things being equal, suffer greater decomposition owing to the unrestricted circulation of percolating waters, the Thames-Tokatea group—*i.e.*, the andesites on the higher levels—may be expected to show greater alteration than the Kapanga andesites, or those on the lower levels.

(*b.*) The evidence of cessation of eruption furnished by the fine coal-seams in the Triumph Mine, and elsewhere to the north of the Coromandel area, is a proof of unconformity. This cessation need not, however, have been of very long duration, geologically speaking. After the Krakatoa eruption of 1883, when more than two-thirds of the island was blown away, and all vegetation entirely obliterated, it was found that in 1886—in three years' time—an abundant vegetation had established itself on the decaying green algæ†; and it might well be that the carbonaceous beds, or rather partings, in the Triumph Mine took no longer than a hundred years to form—a period certainly not of sufficient duration to constitute a geological unconformity. At any rate, no greater lapse of time can be proved by these carbonaceous partings than the actual time required for the growth of the vegetation from whence they have been derived.

(*c.*) Proofs of long-continued denudation after the deposition of the Thames-Tokatea group, and before the eruption of the Kapanga rocks. Mr. McKay's arguments are, briefly, two in number: the first, that since the deposits of the Thames-Tokatea group were piled up along the higher part of mountain-range (of which there is no proof, to the best of my belief), the slates of the western portion of that suppositious range—for I am inclined to believe that the first eruptions were submarine rather than subaerial, and in this belief I am supported by the evidence of the marine beds of Torehine—could not have escaped covering by the Thames-Tokatea group, and that, therefore, this covering must have been eroded long before the deposition of the Kapanga group of rocks, an operation which would necessarily occupy a considerable time. But this presupposes that the total elevation of the peninsula took place prior to the eruption of the Kapanga group, and that no elevation was concomitant with the Kapanga eruptions or those of the Miocene times; for, if otherwise, since the slates are now only 1,000 ft. above sea-level, and apparently no depression has taken place, the slates could have been no higher than, say, 500 ft. above sea-level at the commencement of the deposition of the volcanic rocks, and the mountain-range postulated would then be non-existent.

Mr. McKay's second argument in favour of long-continued denudation is based on the presence of rolled boulders, &c., in the Waiau Valley, at the base of his Kapanga group. I am not clear as to the exact position of the section from which Mr. McKay made his determination, and can therefore say nothing on this point. From Mr. McKay's own account, however, these are of no great thickness.‡

I have endeavoured to briefly state Mr. McKay's arguments as fairly as possible, and have also set down the objections that have occurred to me. Taking into account, therefore, the identical petrological and lithological characters of the rocks, and the absence of a well-marked geological unconformity, it appears to me reasonable to group the whole of the andesites together as manifestations of an eruption confined to a single geological period.

In the Tokatea district, next to the east, the andesites have now but a small development, the ancient extensive flows which were deposited along the Success Range being almost wholly removed by the agents of denudation. South of the hotel, and along the extreme crest of the ridge, they have a width of 1 to 5 chains, and are disposed as a southern prolongation of the main northern or Triumph area. They are also preserved in a small area on the eastern aspect of the range below the Tokatea Hotel. On proceeding eastward along the Waikoromiko track the andesites become more solid, and two miles from the ridge they are dark-grey, porphyritic, and undecomposed, which features they maintain as far as mapped in that direction.

The auriferous andesites occupy nearly the whole breadth of the northern extremity of the area under discussion. They consist in the west of great flows of a dark-grey pyroxene andesite,

* "Report on the Geology of the Cape Colville Peninsula, Auckland,"—C.-9 of 1897.

† M. Treub.: "Notice sur la nouvelle Flore de Krakatoa," Ann. Jard. Bot. Buitzonzorq, Vol. xii., p. 213, 1888.

‡ Since writing the above, Mr. McKay informs me that, on further investigation, he is inclined to abandon this argument.