

Waikowhau Rivers ('Second Report on Thames Goldfields,' 1868-69, p. 6, and section 3), but I did not visit this again last year.

"*Volcanic Rocks.*—None of these are holocrystalline, but all have a trachytoid texture. They show considerable variety, but nearly all are propylites—that is, andesites, in which the bisilicates have been altered into hydrated magnesian unisilicates. Different opinions are held among geologists as to whether the name 'propylite' should be retained. This rock bears the same relation to andesite that diabase does to dolorite, and if one is retained, so also should be the other. I am inclined to think that the change indicated by the terms propylite, diabase, melaphyre, and serpentine is worthy of being recorded in the name of the rock, perhaps by the adjective chloreitic, but as there is no unanimity of opinion I will use them here.

"Structure of the District.

"If we omit the tuffs of Coromandel, Kennedy's Bay, &c., then, so far as my observations go, the only elastic rocks belonging to the auriferous formation are those at Mata and Waiohanga, already described as forming the basement of the series; but Mr. Davis states that fragments of slate occur in some of the breccias in Karaka Creek (Reports, Geological Explorations, 1870-71, p. 65). These breccias are composed of angular fragments of andesite in an andesite matrix, which is in general so much decomposed that I was unable, except in one case, to obtain a specimen fit for microscopic examination. The single exception was the breccia exposed on the beach north of Tararu Creek, just below the cemetery. Here it is a pale greyish-white rock, with an earthy fracture, and largely impregnated with pyrites. The microscope shows an abundant divitified ground-mass with secondary quartz and leucoxene, in which lie crystals of felspar decomposed into calcite, and isotropic chlorites, probably pseudomorphs after augite, but much decomposed. I have no hesitation in calling the rock a decomposed lava-stream. In other places the matrix of the breccia passes insensibly into evidently eruptive rocks. Probably all are brecciated lavas, or perhaps some of them may be the friction-breccias of dykes. Mr. Davis mentions a block in a breccia in Tinker's Gully as being itself part of an older breccia (*loc. cit.*, p. 56), and this may perhaps be due to a dyke breaking through an older breccia.

"These breccias are by no means limited to the base of the series, but occur at many horizons and in many different places beside the Hape, Karaka, and Tararu Creeks. They are all, I think, local, and of small superficial extent. Mr. S. H. Cox identifies the breccias of Hape Creek with that found at the bottom of the shaft of the Queen of Beauty Mine (Reports, Geological Explorations, 1882, p. 10). This may be correct, but similar breccias are also found in the upper part of the shaft of the same mine, and others in the Waiotahi and Moanataiari Creeks. Another was passed through in an early drive in the Moanataiari Mine (Reports, Geological Explorations, 1868-69, p. 31, fig. 1), and another occurs at the point north of the mouth of the Kuranui Creek. I see no reason for identifying the breccia at the bottom of the Queen of Beauty shaft with any one of these more than another; but if Mr. Cox's view of the structure of the district should turn out to be correct, four or five additional bands of breccia at least will have to be introduced into his section.

"A microscopic study of the other rocks of the series shows that they are mostly lava-streams in which fluxion structure is rare, so that they must generally have consolidated after movement had ceased. Only two among my specimens show fluxion structure. One is a hornblende andesite, probably a dyke from the north side of Coromandel Harbour, and the other is an augite andesite, certainly a lava from high up Mount Te Aroha. The total absence of vesicular texture in all the lavas over so wide an area is difficult to explain, but it is no doubt connected with the absence of fragmental volcanic rocks, and both point to a viscous anhydrous condition of the lavas on first extrusion.

"Surface decomposition has penetrated downwards in a very irregular manner, and has left in places isolated masses of dark, undecomposed rock, surrounded on all sides by the paler products of decomposition. A very good example was seen in a shaft in the Caledonian Mine, which was sunk vertically for 40 ft. alongside a hard mass of decomposed rock (Davis: Reports, Geological Explorations, 1870-71, p. 63, and section 6). Also, at the 350 ft. level of the same mine, a hard patch was met with which was supposed to be isolated. Mr. Cox gives another explanation of the position of this last mass (Reports, Geological Explorations, 1882, p. 30, and fig.), but he seems to have overlooked Mr. Davis's section. One of the early drives in the Moanataiari Mine passed under a large isolated block of hard rock (Reports, Geological Explorations, 1868-69, p. 31, fig. 1), and in the Puriri district many large spherical masses of undecomposed andesites occur in the decomposed portions (Reports, Geological Explorations, 1868-69, p. 35).

"This irregular decomposition may account for some of the hard masses which still appear at the surface, but nevertheless I think that many of them are dykes. This was my opinion in 1868; but, with the exception of Mr. Davis, the Government Geologists who have reported on the Thames since 1870 have treated the whole series as a volcanic formation of great thickness without any contemporaneous dykes, but possibly with some belonging to a later and quite different period. Indeed, Mr. Cox seems to think that the hard portions are regularly bedded with the softer portions, and dip to the west-north-west at an angle of about 26° with all the regularity of a sedimentary formation, and as quite unbroken by dykes. The microscopic examination of these rocks has, however, tended to confirm the idea that some of the hard masses are true dykes. I base this opinion on the absence of magnetite dust in the base, and its collection into large grains, on the grouping of the pyroxene crystals, and on the ophitic structure; for all these things prove that the cooling process was slow, and that during the whole time the mass of rock was at rest. . . .

"Although I collected every variety of rock that I could find at the Thames, including specimens of the Miocene dolorites of the Geological Survey, I have failed to find any sharp line of division. If two widely separated volcanic formations are present at the Thames they cannot be recognised by