

- “(1.) Slaty shales and siliceous mud-stones.
 “(2.) Felspathic and tufaceous sandstones passing into breccias with gold-bearing veins.
 “(3.) Coarse volcanic breccias and tuffs, with coal and coaly shales at their base.

“The slaty shales and associated rocks form the old floor of the district upon which rest unconformably the two succeeding formations, between which no marked break or unconformity exists. Between Shellback and Hape Creeks these younger formations are arranged as an anticline, the dome of which, formed by the coarse volcanic breccias and tuffs, has been largely denuded, thus exposing the gold-bearing series below. Near the core of the anticline which is situated between the Saxon Mine and the old Queen of Beauty shaft, the strata are inclined at high angles, being much disturbed, but towards the sides of the anticline they are lying flatter, the dip varying from thirty to fifty degrees.

“The auriferous series consists of grey and yellowish-grey and sometimes ferruginous sandstones, which alternate with wide belts of hard greyish-blue, coarser-grained sandstone, often of a felspathic nature. The former are of moderate hardness, are generally highly decomposed, and at the surface look as if at one time they had been permeated in every direction by thermal waters. The gold-bearing veins are almost exclusively confined to the softer decomposed sandstones. In places the harder sandstones pass imperceptibly into angular breccias, which weather on the surface into bright coloured clays, being very subject to decomposition by atmospheric agencies.

“Tabulating them [the rocks of the Thames Goldfield] according to their probable age, they are as follows:—

- “(1.) Upper Eocene—volcanic breccias and tuffs—Mount Brown series.
 “(2.) Lower Eocene—auriferous series—Grey marl series.
 “(3.) Palæozoic—slaty shales, &c.—Te Anau series.

“1. *Upper Eocene*.—This formation covers by far the greater part of the peninsula. It consists of a great succession of trachyte tuffs, andesite breccias, and fine-grained, tufaceous sandstones, passing into dirty greenish-coloured grit beds. Its thickness varies considerably, but is generally between 1,200 ft. and 1,500 ft. It is frequently intruded by dykes of hornblende-andesite, augite-andesite, and trachyte. A fine example of the former may be seen on the coast, three miles past Tararu, and of the latter, in the valley of the Kauaeranga, opposite the Orphanage. Veins of jasperoid, chalcedonic, and opaline quartz, calcite, and ironstone are not uncommon in the breccias and finer-grained tufas, but no gold-bearing quartz, so far as I can ascertain, has up to the present time been found in this formation.

“In a bed of blue tufaceous clay exposed in a road-cutting on the beach, about two miles north of Tararu, there occurs a quantity of selenite, as well-developed crystals and radiating fibrous masses. Near their junction with the underlying auriferous series the breccias often contain large quantities of silicified wood, as at Hape Creek and Kauaeranga, and thin seams of brown-coal and coaly shales, as at Paeroa and Owharoa. The presence of the latter would indicate an approach to land conditions at the close of the Lower Eocene formation, but, as has already been stated, there is no stratigraphical break to mark an unconformity. At Waiohanga they overlap an isolated rocky ride of the Palæozoic rock; elsewhere they rest upon the auriferous series. Between Cape Colville and Te Aroha this formation is arranged as a succession of synclinal and anticlinal folds, the axes of which have a general north-east trend. The underlying auriferous series at the Thames, Tapu, Puriri, Hikutaia, Karangahake, Waitakauri, Te Aroha, and all the other goldfields on the peninsula, are exposed in the denuded cores of the anticlinal folds.

“It may be interesting to note that the Waitakerei Range, extending between the Kaipara and Manukau Harbours, and the Great Pirongia Range, lying between the Waipa and the west coast, are composed of similar rocks. It is evident that, during the period of their formation, the Province of Auckland must have been the scene of the most violent and intense volcanic activity. From stratigraphical reasons I am inclined to think that this great series is probably of Upper Eocene age, and contemporary with the great volcanic outbursts which took place around Oamaru during the deposition of the Mount Brown or Hutchinson quarry-beds.

“2. *Lower Eocene, Auriferous Series*.—This formation, as we have seen, consists principally of fine-grained sandstones, generally pyritous and highly decomposed, alternating with subordinate bands of harder and coarser sandstone, which sometimes pass imperceptibly into breccia beds. It is exposed in the denuded core of an anticline, both sides of which are overlain by the great volcanic breccia and tuff series just described.

“In his report on the Thames Goldfield in 1882, Mr. S. H. Cox, F.G.S., late Assistant-Geologist, makes the dip of the auriferous series north-west along the whole line of exposure from Kuranui Creek to Hape Creek (Geological Reports, 1882, pp. 10–12). The effect of this is to place the coarse breccias and tuffs as the lowest members of the auriferous series. At the Tararu end of the section these breccias are formed overlying the auriferous rocks, but Mr. Cox gets rid of this difficulty by calling in the aid of a hypothetical fault, the throw of which he says would not be less than 2,000 ft. (*l.c.*, p. 12), but it is evident that 5,000 ft. would be nearer the amount, as the two outcrops are separated by over a mile and a half. The hard sandstone and breccia band forming the apex of the anticline, which follows the trend of Waiotahi Hill, is shown by Mr. Cox on his map and section as lying on the highly denuded edges of the auriferous series. An important result of my survey of this line of section has been to place these rocks in their natural position.

“It is usual among most writers to speak of the reefs at the Thames as occurring in volcanic rocks. This, however is not the case. The gold-bearing rocks are closely hemmed on both sides of the field by coarse volcanic breccias, tuffs, and agglomerates, frequently intruded and interbedded with solid dykes and lavas, and this has probably led to the error. The whole of the auriferous series is of undoubted sub-aqueous origin. No doubt much of the material composing some of the