

"It is evident that an agent more potent than the mere percolation of surface waters has operated in the decomposition of the rocks on the Thames Goldfield. And, as the uprising of deep-seated thermal waters was a fact, as testified by the presence yet of sinterous and chalcidonic quartz at Otonui and the altered and mineralised deposits of the Look-out Rocks, not to mention other evidences of thermal action, it may with safety be assumed that such was an important factor in bringing about the changes that to great depths in the crust of the earth have taken place. The rock decompositions noted and specified are thus probably referred to their actual cause, but it is yet matter of debate whether the whole or any material part of the gold was brought by thermal waters from great depths in the earth.

"A theory prevails that the gold has, as it occurs in the reefs, been mainly derived from the adjacent rocks by lateral secretion, and this, it is held, is partly proved by the fact that the undecomposed andesites forming the hard bars of the Thames Goldfield contain a percentage of gold. This percentage, however, is small; and, in opposition to the theory that the gold has come from the rocks adjacent to the same horizon at which it is found in the reefs, it is maintained that, though the rocks were leached to the last fraction of a grain of all the gold which they contain, the supply would be insufficient to equal in amount the gold that exists in the reefs. Where reefs are abundant, as at the Thames, and all more or less gold-bearing, some very richly so, the narrow bars of country that thus necessarily separate and divide them from one another could not have been the source of supply, and thus as a consequence some of the gold must have reached into the higher parts of the reef from below.

"But we have equally to determine where and what is the source of the gold that comes from below. Was this also leached from the rocks bounding the lower part of the reef fissure, the thermal pipe, or whatever other means the water had of rising from great to lesser depths in the crust of the earth? And by such means was there likely to be impoverishment of the lower parts of the reefs that may descend to such depths?

"This is the very crux of all the matters that have to be determined in connection with deep sinking at the Thames, and it must be carefully considered in all its bearings.

"It has been said that great thickness of volcanic rock, barren of quartz and gold, underlies the productive zone or plank of the Thames Goldfield west of the Moanataiari Slide; and in proof of this our attention is directed to this non-productive country both to the north and the south of the central part, and it is undeniably true that between Shellback Creek and Tararu Creek the hills abutting on the shore-line flat have not been productive of gold, and the Tararu breccias between Tararu Creek and Rocky Point show no indications whatever of the presence of reefs. Of the other or southern boundary of the field the story is somewhat similar, and beyond Hape Creek gold is said not to be present, because the rocks in that direction occupy a position considerably below or above the auriferous zone. These facts I admit, but not the inferences, in as far as they may be made applicable to the middle and richer part of the Thames Goldfield. It is perfectly true that underneath the zone of productive country that has been worked most of the reefs have become too poor to work, not yielding anything like the high returns they formerly did, and that it must be considered that for some considerable depth below the productive zone no great improvement may be expected.

"Formerly I thought that this underlying zone of poor productiveness practically barred the likelihood of deep sinking proving a success, but the further attention that I have lately been compelled to give the subject convinces me of possibilities to the contrary, and this without admitting the favourable character or the likely productiveness of the Tararu Creek breccias and overlying rocks to Shellback Creek, or even to Kuranui Creek.

"A rule is a rule, but there is no rule absolute in human experience of this sort, nor one without its exception. It has been customary to regard the breccia ash-beds of the Thames as being unfavourable country for the yield of gold in reefs which may chance to be confined between walls of this rock, and as this dictum springs from and is the result of a lengthened experience it deserves respect, and as respects ground hitherto worked it may be regarded as an approximation to the truth. But it does not apply everywhere, and it need not necessarily apply to the Thames district at deep levels, supposing the rocks in question are actually present. It has also been mooted that at no great depth below the levels now reached further sinking will have to be undertaken in slate rock. To my mind, there is little likelihood of such being the case, and the chances are so remote that I forbear to discuss the question.

"Why reefs when they pass through breccia bands should be poor in gold or without gold I am unable to say. The original magma of these breccias and the solid lava-streams with which they are associated must have been the same, and the breccias themselves show ample evidence of being none other than the material of broken-up lava-streams that have cooled at the surface. How, then, were they deprived of their gold? It is said that they contain none. Are we to suppose that all those breccias were desiccated of their gold by intense heat in the pipe-walls of a volcano? And if this did take place in part, can it be supposed that all the breccia material was treated in this way?

"The speculation is not even probable. How was the gold lost by decomposition and percolation of waters since they occupied the position in which they are now found? This is exactly what has happened to the solid lava-streams now converted to the sandstone of the miner. Altogether, I see no solution of this problem except that the breccias are in no way different, in respect of contained gold, to the decomposed lavas, both having possessed it and both having lost it. But it is a fact, reported on the best of authority, that in some parts of America breccias of this character carry reefs rich in gold, not in a solitary case, but as a characteristic of the field. There cannot therefore be a reason that the precipitating agents could not operate, or operated under unfavourable conditions. Therefore we may dismiss the rule as applying only to shallow