

inches to 3 feet—average, about $1\frac{1}{2}$ feet—and it consisted of quartz and mullock, the former much predominating. The gold occurred in shoots, dipping north-westward in strike, similar as in the Homeward Bound Reef. There have been several hundred tons of stone crushed, with an average yield of about 1 oz. of gold per ton—the yields having ranged from 7 dwts. to 2 oz., and, from some narrow parts of the reefs, even to 3 oz. of gold per ton. About three chains N.W. from the mouth of the adit, on a low rise, bounding the gully which runs up to the above workings, some open workings have been carried on, and small shafts sunk on what appears to be the continuation of this reef, and from these also some good gold is said to have been obtained. The cause of the desertion of the reef by the Great Eastern party, who worked it first, and by the Energetic Company, who worked it subsequently, is said to have been partly bad management, partly want of enterprise in erecting the necessary pumping machinery for opening it in depth—a trial which it, in my opinion, certainly deserves.

West of England Reef.—This was formerly worked by the Sons of Temperance Company by an adit, open cuttings, and shafts about eight chains northward from the mouth of the adit, on the Homeward Bound Reef. It strikes E. 15° S., and dips northward at an angle of 56° . Its thickness ranged in the old workings from 6 inches to 18 inches, and it pinched and expanded at very short distances. The gold occurred in a shoot that dipped westward in strike. A considerable quantity of stone was crushed, which yielded from 6 dwts. to $1\frac{1}{2}$ oz. of gold per ton. The reef has been traced by shafts several chains westward under the alluvial of a flat adjoining the workings; and as the gold struck was found to dip in that direction, it might not turn out a bad speculation to properly prospect it there, though on account of the water, no doubt to be met with, a horse-whim would likely be required in sinking below a shallow depth.

Surprise Reef.—This is a small reef only about one foot thick, and has not been much opened. 63 to 80 tons of stone crushed yielded from 14 dwts. to $1\frac{1}{4}$ oz. of gold per ton—a return which did not pay, as the expenses were too high at the time.

Queen of the Isles Reef.—It lies between the Great Eastern and the Homeward Bound Reef, near the line of former, and was worked several years ago by the Ida Valley Company to a depth of about 40 feet. Its thickness ranged from 1 to $2\frac{1}{2}$ feet, and about 100 tons crushed from it paid from 10 to 17 dwts. of gold per ton. There has been nothing done on it since the company broke up.

New Reef.—This has lately been discovered by Mr. Withers, who is sinking a shaft on it. Its position is about three-fourths of a mile northward from the Homeward Bound Reef. Whilst dipping nearly vertical it runs N.E., a course crossing the lines of all the other reefs. It consists of coarsely crystalline quartz, is about 7 inches thick, and has one good wall. A crushing of 23 tons gave the handsome return of $1\frac{1}{2}$ oz. of gold per ton. This reef crops out within a zone of country perhaps over a mile in width, which is full of a number of small reefs or spurs, 40 feet and less apart, running more or less parallel, of which many have been opened and proved auriferous.

Before leaving this district, I may mention what Mr. H. J. Cope informed me of, namely, that at Sutton, Strath Taieri, a large reef has some time ago been worked by McIvor and Co., called the Recassoli Reef. This was about $7\frac{1}{2}$ feet thick, and consisted of 6 feet of white quartz, with 18 inches of mullock running alongside. The first crushing paid 2 oz. 9 dwts.; the second, 1 oz. 13 dwts.; and a third of 20 tons, 13 dwts. of gold per ton, which latter did not cover expenses. The crushing machine used consisted of an atmospheric two-stamp battery, driven by steam. The mullock vein, which was the gold-bearing portion, ran out in depth; of the white quartz, none was tried. From the fact that the gold, after retorting, turned out black, it is, no doubt with truth, surmised that some bad metal was in the stone, which caused a loss of gold during crushing.

APPENDIX 11.

REEFS OF MACRAE'S FLAT.

To this locality I was kindly conducted by Mr. Warden Robinson, of Naseby. At the head of Macrae's Flat, there have been at one time several so-called reefs prospected and proved auriferous (Golden Bar Reef, Moonlight Reef, &c.); but according to description, they seemed to have only formed bunches, or "blows," between the beds of the country, running out in strike and dip. The only reef on which some extensive workings have been carried on is the Duke of Edinburgh Reef, and about the history of this and the old company who once worked it I received every information from Mr. A. Simpson, a former employé of the company. The reef, where exposed, in a small cutting from a gully near the old main workings, is 3 feet thick, strikes W. 20° N., and dips northward at an angle of 35° to 40° , lying between the beds of a rather soft blue phyllite that forms the country rock. The foot wall, or underlying rock-bed, is well defined and smooth, but the hanging one is broken and traversed by small quartz leaders, dipping towards the reef, which latter is composed of about 15 or 18 inches of quartz on the foot wall, and nearly 2 feet of mullock, traversed by quartz strings, on the hanging wall. The quartz is good-looking, and abundantly impregnated with pyrites. As regards the old workings, which consist of open cuttings and shafts, now more or less collapsed, they extend, with a few interruptions, for 12 to 15 chains in length; but the greatest depth reached at any point was, according to Mr. Simpson, only 40 feet. The quartz, which was principally selected for crushing, ran from 10 to 18 inches in thickness, and paid from 7 dwts. up to 2 oz. of gold per ton. It was nowhere lost in depth. The reef, as such, is traceable for more than a mile in strike, and crosses two small gullies, which, from the crossing line downward, have proved very rich in gold, a clear proof that the denuded portion of the reef must have been richly auriferous also, and indicating the chance of the latter being there payable in depth. The company's crushing mill was a very good one, but, judging from the coarseness and pyritous nature of the tailings, and that, according to Mr. Simpson, a large quantity of quicksilver was lost, a great deal of the gold, which was very fine, must have been lost also. On account of the scarcity of water in the locality, the company had a fine reservoir constructed in the gully below the reef, from which an adit led the water to a shaft, 50 feet deep, sunk close to the machine, and furnished with pumps for supplying the batteries. Considering the nature, extent, and auriferous character of this reef, and the no doubt considerable loss of gold during former crushing, there is, I think, some