

With the exception of Marsh's and Growler's Hill reef, all the others which I examined underlie to the west across the country, which dips east. The chutes of gold do not extend to any great depth, and "pitch" in a north or south direction, in most cases very nearly horizontally. If the reef owes its richness to the fact that it is in conjunction with certain portions of country rock, whilst when in conjunction with other portions of the country rock it is poor, we have an easy explanation why the chutes of gold seem to end suddenly. It would appear that the Poverty reef, for instance, down to a depth of about 450 feet, must have crossed country which was favorable to the disposition of gold, whilst below that depth the country was unfavorable. I have been unable to obtain any information as to whether there was any change in the country rock where the rich chute was passed and poorer stone worked; hence I cannot state as a fact that the change of the reef from rich to poor is owing to a change in the country rock, but such a possibility should be taken into consideration. In such a district as Tarnagulla, where most of the reefs cross the country, it is of little use sinking a shaft, cross-cutting for the reef, driving a few feet, and then, because it is poor, ceasing work. The drives are probably 100 feet apart, the amount of reef actually tested is about 7 feet, leaving 93 feet untried. It is necessary that connexions be made on or in the reef from level to level, then any chute of auriferous stone, however small, is likely to be found.

REPORT ON THE BEAUTIFUL VENICE AND OTHER REEFS AT REDCASTLE.

(By Ernest Lidgley, Field Geologist.)

From all the information which I could obtain during my visit it would appear that many reefs have been worked in this district, giving returns up to 10 ounces per ton. The main features appear to be that the reefs, usually of laminated quartz, run with the country; mostly underlie to the west; the chutes of gold very short, ranging from 6 to 50 feet. The longest chute I could hear of being the Beautiful Venice, and that is only 50 feet in length. The country rock, Upper Silurian slates and sandstones, traversed in places by decomposed feldspathic dykes, containing auriferous quartz veins. Dykes too much decomposed to accurately determine their variety, but probably either diabase or diorite. Country rock, reefs, and dykes are frequently faulted both by slides and cross-courses, rendering profitable mining uncertain.

The Beautiful Venice reef was worked many years ago to a depth of 150 feet. The chute of gold was about 50 feet long; the quartz 18 inches thick. I was unable to see any of the men who originally worked here, so could not gain definite information as to the actual work done before the mine was closed.

The company who are at present working this reef have sunk a main shaft 217 feet to the west of the surface outcrop of the reef, to a depth of 284 feet. From a depth of 224 feet to the bottom was all broken country. A cross-cut has been driven eastward. At 71 feet the broken country was passed, and at 138ft. 9in. what was considered to be the lode was met. This has been followed on a curve for about 80 feet with a little quartz all the way but no gold. On my visit there were about 3 inches of laminated quartz containing pyrite, but on crushing in a panklast and panning off no gold could be discovered. This track was also followed to the north for a few feet, with a little quartz but no gold.

After a careful examination of the workings I am of the opinion that the broken country met in the shaft from 224 feet to the bottom was caused by a "slide" or ground fault. That the curved track driven on to the south of the cross-cut is the result of a "cross-course" or "heave."

The track met at 138ft. 9in. may be the continuation of the Beautiful Venice reef, but being so close to the junction of the "slide" and "cross-course," it is difficult to say. It would thus appear that the present level is in a difficult position for working the reef. If work is continued south-westerly along the faulted country, it will mean driving probably 150 feet along the cross-course, then for 200 feet along the wall of the slide and along the second cross-course to cut the continuation of the Beautiful Venice reef. All this driving will be in broken country, and will require timbering. Another method would be to start a drive from the shaft southwards to strike the reef south of the second cross-course. This will mean about 530 feet, much of which will be in broken country. The best thing that I can recommend doing at this level is driving northwards on the track of the lode on the chance of meeting with another chute of gold.

If the shaft were sunk another 100 feet, it would then be clear of the broken country caused by the slide, but it is doubtful if the reef when discovered will be worth the expenditure of the necessary money, seeing that the chutes of gold are so short.

Chapman's reef to the north of the Beautiful Venice has been worked for some distance. The chutes of gold have usually been from 6 feet to 20 feet in length. The reef also contains antimony.

Another similar reef has been worked about 125 feet south and parallel to Chapman's, with the same characteristics, chutes of gold rich but short. There is another similar reef to the north of Chapman's.

The Curly Dog reef has been worked to a depth of about 150 feet. There are several shafts reported to be 200 feet deep, but the chutes of gold are very short.

The country to the north of the Curly Dog reef has been much faulted, and instead of the normal strike of slightly west of north, it is nearly east and west.

I also visited a dyke which is being worked by Reid and party and others. It is a decomposed feldspathic dyke, but too much decomposed to determine accurately. One shaft is down 90 feet. There are several shallower shafts. In places this dyke is 20 feet wide.

The Welcome mine is situated at the south-east corner of the parish of Redcastle, county of Rodney. It is about 15 miles from Heathcote on a fair road, 3 miles of which is heavy sand. There are three main reefs—the Old Welcome, Little Welcome, and North Welcome. The Old Welcome has a strike of N. 20° W. Underlie to the west at from 60° to vertical. Width from 1 to 16 feet. The outcrop is traceable along the surface for about 25 yards. The country rock is Upper Silurian, slate, and sandstone, the strike and dip of which vary from N. and S. to E. and W. The reef crosses the strata; the foot-wall having about half-an-inch of flucan, whilst the hanging-wall has apparently not been reached. On the foot-wall side the strata dip regularly to the north at about 50°, whilst on the hanging-wall side the beds

are undulated and sharply folded. The reef evidently fills a fissure, but there are not sufficient data to show the amount of movement of the rock mass on the different walls of the reef; it is probably considerable.

The reef itself is known as a "mullocky" reef, consisting of folded and contorted beds of slate and fine-grained sandstone, traversed by innumerable small quartz veins. I could obtain no definite information as to the returns obtained from the reef when first worked, but was informed that the owner of a battery near by carted and crushed 1,100 loads of the material thrown away by the original proprietors for a return of 5dwt. of gold per load. The chute of gold pitches to the north at about the same angle as the dip of the strata. Mr. W. Bock, the mining manager, informed me that this is characteristic of all the reefs in this district which cross the strata. When the beds dip to the south the pitch of the chute of gold is to the south, and when the dip of the beds is to the north the chute of gold pitches north.

On the hanging-wall side of the reef the beds are folded, but with a general dip to the south. The length of the chute worked is apparently 25 yards; the depth to which work has been carried is uncertain, as the old workings are partly filled, but probably about 180 feet. Several shafts have been sunk, and the whole of the stone stoped for at least 100 feet. The gold itself is fairly coarse, and the stone, as far as worked, contains very little other mineral. I saw in some of the country rock a little pyrites, and was informed that no antimony occurs in the reef. At the north end of the old workings a fault occurs, having a left-hand heave, with a displacement of about 40 feet.

The North Welcome reef has a strike of N. 73° W., nearly vertical; width 6 inches to 1 foot. The outcrop is traceable for a distance of nearly 20 chains, many shafts having been sunk, some to a depth of 170 feet. This reef also crosses the strata, but the beds on both the hanging and the foot wall appear to have the same dip, which is to the north. The pitch of the chute of gold is to the north, corresponding to the dip of the beds. In places there is an ironstone casing on both walls, from which prospects of gold can be obtained.

The Little Welcome reef has a strike of N. 30° W.; underlie nearly vertical, width 6 inches of quartz. This reef also crosses the strata, which is similar to that forming the walls of the other two reefs, with a regular dip on both walls to the south-west. The chute of gold was about 30 feet long, and was worked to a depth of 70 feet. The present company are sinking a main shaft 8ft. x 3ft. 6in. with three compartments, and at the time of my visit were down 206 feet. They had intended opening out either 250 or 300 feet, but I would suggest sinking to 300 feet. Winding is done by a whim, there being no water in the shaft. The country rock in the shaft has a strike of nearly north and south, with a dip to the west, fairly hard, but reasonable ground for working. The sinking is being done by contract, the cost from 150 to 250 feet being £2 per foot, the contractor finding everything except timber and haulage. The legal manager estimates that the total cost of sinking the shaft to 250 feet, including cost and erection of whim, rope, forge, office, tools, and labour complete will be £570, unless a heavy flow of water be met.

The site for the shaft appears to have been well chosen, as it should command, with a minimum of driving, the three reefs.

The water supply of the district is bad, there being only a light rainfall, and the soil porous; but a dam could easily be built to conserve sufficient water when it does rain.

REPORT ON REEFS AT HARRIETVILLE.

(By James Stirling, Government Geologist.)

During my visit to the Australian Alps I inspected the following reefs:—

THE CRESCENT MINE.

The original discoverer of this reef was Richardson, a well-known prospector in the Ovens district. It is situated on the western branch of the Ovens River, about 8 miles south from Harrietville, and 1½ miles from the Harrietville to Omeo track. After the original discovery by Richardson—and he had obtained 48oz. 15dwt. from 65 tons, or an average of 15 dwts. to the ton—the mine passed into the hands of the Crescent Company Limited of London, having been purchased by Mr. Davey as their representative. The original shaft on the western side of small gully disclosed a considerable body of lode stuff, with well-defined hanging-wall. In addition to the slate and sandstone mixed with the quartz, there is a considerable proportion of felsitic matter, suggestive of a dyke formation. In order to test the lode on its northerly strike, a tunnel was driven to the west through the spur at a point about 40 feet below the original workings, and drives extended north and south along the lode track. The tunnel itself is 130 feet long, and the southern drive along hanging-wall side of lode 180 feet. A small flucan, or dig, visible at the original prospector's shaft, extends to the lower levels. About 40 feet west of hanging-wall a well defined seam of quartz has been followed south, the quartz carrying payable gold, which is stated to have averaged 2½ ounces to the ton. In driving to the north a volcanic dyke was met with which appears to have some connexion with the faulted rock forming the greater part of the lode itself. At a cursory glance it resembles basalt, but may prove, on microscopic examination, to belong to the Limburgite group found in association with auriferous quartz reefs elsewhere, as at Bendigo. A tunnel is now being driven to intersect the lode track at lower level, but up to the time of my visit had not cut it, although the presence of a considerable amount of water coming in near the face suggested proximity of such. The character of the strata on spur and sideling to south of the Crescent line is strongly suggestive of a continuation of the lode formation in that direction.

THE VICTORY.

This lease area and its containing reef formations, which strike N. 20° W. and dip to west, lies to the west of the Crescent on the opposite side of the Ovens River, and right on the mining track cut by this Department. The original discovery was also made by Richardson and party, on what is now known as the north end of the western reef; they subsequently discovered another parallel reef now known as the Eastern, and after taking out trial crushings from a drive 50 feet in length, of 28 ounces for 16 tons, and 18 ounces for 19 tons from the Eastern reef, sold to the Crescent Company. Since the latter have