

APPENDIX B.

REPORTS BY GOVERNMENT GEOLOGISTS

REPORT BY MR. W. H. TWELVETREES, GOVERNMENT GEOLOGIST.

WESTERN EXPLORATION: REPORT ON
JOURNEY TO THE GORDON RIVER.

Launceston, 30th June, 1909.

SIR,

I HAVE the honour to submit my report on a journey from Tyenna to the Gordon River Crossing, about 4 miles above the mouth of the Serpentine.

I.—OBJECT OF THE EXPEDITION.

The object was to continue the geological exploration of the western country commenced last year, and particularly to obtain information as to the mineral resources and tectonic features of the country between Tyenna and the Gordon River. To facilitate examination the old Gordon track was reopened this year as a pack-track from the end of the Tyenna-road to the edge of the timber-belt on the Sawback range (17 miles), and thence as a foot-track for 29 miles to the Gordon Crossing, which is about 25 miles above Pyramid Island at the mouth of the Franklin River.

II.—PARTY COMPRISING THE EXPEDITION.

I was accompanied throughout the journey by Mr. H. D. Chancellor, and as far as the Boyd River by Mr. A. S. Atkins, who acted as topographer. At the Boyd, Mr. Atkins left the party, and, in company with Mr. Percy Marriott, pushed forward to the Gordon to return via the new foot-track marked out last month by R. Marriott, Jun., on the south side of the river from the Valley of Rasselas to the Gordon River at the crossing. Wickham Chaplin joined my party at the Boyd River as packer, &c. I wish to record my appreciation of the services rendered by all members of the expedition.

I beg to append a geological sketch map of the country traversed; also a topographical chart prepared by Mr. Atkins.

III.—EXPEDITIONARY METHODS.

Three tents were taken, so that one supply tent could always be kept behind those in advance. Later, a small light tent was added for the flying traverse on Marriott's track. Stores were horse-packed out from Tyenna as far as the track allowed, and afterwards by hand. Provision supplies were left in the old Gordon depot hut in the Florentine Valley, 30 miles from the Gordon, and a fixed camp was pitched at the Wedge River flat, 9 miles further on. The personnel was organised at the start on the assumption that a horse-track could be opened right through to the river, but by the time the Florentine was reached it was seen that it would be impossible to accomplish this during the season. The system of travelling was then changed, and hand-packing resorted to for the rest of the journey. The old Gordon track from the Sawback onwards, heavily encumbered by fallen trees, and in places hidden under a dense growth of bauera and tea-tree, was cleared sufficiently to allow swagsmen to pass along it; and once clear of the forest, the line of route was staked across the button-grass country to the Gordon by the track-cutting party.

The topographer was charged with the duty of taking the necessary observations for the construction of the chart. Mr. Chancellor assisted with prospecting and axe work; and I devoted my time to the geological examination of the country.

The work may be described as belonging to the class of exploratory surveys. As such, the instrumental work was, of necessity, crude, and did not aim at a greater accuracy than is required to avoid errors considerable enough to be shown on the scale of map adopted for publication. The topographical positions were fixed by prismatic compass intersections with the trigonometrical stations on the mountain summits, which the topographer ascended for the purpose. For the heights along the route we had to depend upon aneroids and a Casella's hypsometer. One of the hypsometer thermometers had only been recently received from the makers, and was in excellent working order. A small plane table which was taken proved to be unsuitable, as the sight alidade was too low for the lofty mountain peaks. A small telescopic or extension sight alidade would have been preferable. Moreover, the weather became too bad for the use of the table.

The difficulty of transporting supplies and camp impedimenta is the principal inconvenience experienced on such prolonged journeys. Distances are eventually reached where packers are obliged to consume a large proportion of their load; in this case, increasing the number of packers results in no relief. An individual or a

couple of men may perhaps push through and return without any serious difficulty, but the case is totally different when a party with full camp and instrumental equipment desires to move leisurely and take proper time for observations. We found that the only satisfactory way of coping with the difficulty was to form intermediate supply camps where provisions could be left and drawn upon as required.

IV.—PERIOD COVERED BY THE JOURNEY.

The expedition left Glenora on the 30th January, and arrived there again on its return on the 2nd April.

ROUTE FOLLOWED.

A start was made from B. Rumney's farm at the end of the Tyenna-road, and camps were made along the Gordon track at the 14-mile Creek, 4 miles out; at the Styx River, 10 miles; the Davey junction, 14 miles; the Boyd River, 21 miles; Wedge River flat, 25 miles; Hermit Valley, 35½ miles; and the Gordon River, 46 miles or 52 miles from the Tyenna Post Office.

The country round these camps was examined as far as was possible, but in this connection it may be mentioned that dense forest and undergrowth prevailed for a great portion of the route (about half the total distance). During the journey, 20 days were wet, and towards the end of March the weather appeared to have thoroughly broken. Snow fell at the Port Davey junction on the 10th March, and it fell again on the 25th, capping Mt. Wedge, the Frankland Range, and all the high mountains. The creeks in the Hermit Valley began to swell during the last week in March, impeding tree movement, and after the Gordon was reached, the weather conditions made it useless to remain out longer.

There is a small patch of button-grass country for about 4 miles at the Port Davey junction and the head of the Florentine, but this is succeeded along the track by forest, until, at the 28-mile, open country begins again, and continues (with occasional copses in the gullies) to within 100 yards of the Gordon River.

The grade of the track is fair after the rise to the south end of High Rocky has been negotiated, but there does not seem to be much reason for doubting that the steep ascents and descents which occur in that part of the route could be avoided by deviating somewhat from the present line. The grade could also be improved from McPartland's Pass to the Gordon.

The aneroid and hypsometer readings give the following approximate heights along the track:—Commencement of the track at Rumney's farm, 800 feet; at the 14-mile Creek, 1100 feet above sea-level; at the High Rocky-Styx Divide, 1900 feet; at the Styx Camp, 1700 feet; at the junction of the Port Davey track, 1700 feet; at the Florentine River, 1500 feet; on the Sawback Divide, 1700 feet; at the Boyd River Crossing, 1000 feet; at the Wedge River, 900 feet; at McPartland's Pass, 1250 feet; at the Hermit Valley, 1050 feet; at the Gordon River Crossing, 900 feet. The absence of proper control, of necessity, renders these heights only rough approximations.

The general height of the country along this route is lower than that of the uplands west of the Valley of Rasselas traversed last year. From the Sawback Divide west of the Florentine the track passes over land which gradually descends to a quite moderate elevation by the time that the Gordon is reached.

Mountain heights by aneroid were—Mt. Anne, 4400 feet; Mt. Müller, or High Rocky, 3900 feet; Mt. Wedge, 3500 feet; Mt. Bowes, 2800 feet.

VI.—GEOLOGICAL SYSTEMS.

Apart from moraine sands west of the Upper Styx (possibly Tertiary or Pleistocene), five systems of the stratified rocks are distributed in belts along the route.

1.—Permo-Carboniferous.

These strata prevail at Tyenna and along the ranges to the Styx Divide, and on the shoulder of Mt. Müller. They consist of mudstone conglomerate, and belong to the Lower Marine division of the system. They ascend to about 3400 feet on Mt. Müller, and continue eastwards more or less uninterruptedly down to sea-level; but in this distance there are doubtless downthrows which interfere with an estimate of the total thickness of the beds.

2.—Silurian.

This only known (doubtfully) from a few pieces of fossiliferous rock picked up on the hill slope a mile past the 14-Mile Creek. It consists of yellowish gritty sandstone, full of brachiopods, resembling lithologically the Silurian rock of the Nelson River series.

3.—Ordovician.

From the head waters of the Styx to the Port Davey junction the Gordon River limestone occurs in one or more belts. This limestone is considered to be the base of the system. At the junction some of it was found to contain minute crustacean remains resembling certain Ostracods. Just west of the Port Davey track it appears to have a faulted contact with the Cambrian conglomerate of Junction Hill.

4.—Cambrian.

Soft conglomerates of this age occur between Tyenna and Mt. Müller, but owing to the absence of fossils and good rock exposures are difficult of interpretation. From the Port Davey junction across the Florentine Valley pebbly sandstones, quartzite, and conglomerate of Cambrian age are met with, and thence to the 28-mile, or edge of the button-grass, quartzite, slate, and sandstone belonging to the same system. The general dip of these strata is to the north-west, and they repose unconformably upon the Pre-Cambrian schists.

5.—Pre-Cambrian.

The Algonkian schists begin at the 28½-mile, and continue through to the Gordon Crossing. From the Hermit Valley the route follows more or less the line of strike. This rock-zone consists of foliated and sericitised quartzites, dipping generally to the south-west.

The above sequence roughly corresponds with that observed last year in the traverse of the country further north.

At a few points these systems are interrupted by igneous rocks, only one of which (serpentine) has any probable association with ore deposits.

(a) At Lord's farm, 2 or 3 miles out, the rich red soil declares the presence of basalt, though I could find no actual stones of this rock. It would presumably be the familiar Tertiary basalt common to a great part of the island.

(b) Diabase of Late Mesozoic age occupies the summits of High Rocky, Mt. Anne, and Mt. Wedge. It is flanked on High Rocky by Permo-Carboniferous strata, and at Mt. Anne apparently rests on quartzite. No coal-bearing strata were seen associated with this rock. It is a rock which, under the popular names of greenstone, bluestone, ironstone, trap, &c., is known throughout the greater part of the island. Curiously enough, it does not appear to prevail in Victoria. In Tasmania it crowns the central, eastern, and southern tiers, and forms the summits of most of the mountains in the north, east, and south. The only two mountains in the West Coast Range (Geologists' Range) with diabase caps are Mt. Dundas and Mt. Sedgwick; but it is found still further west as an intrusion at Mt. Heemskirk.

Its structure is intermediate between that of gabbro and basalt, and indicates its hypabyssal nature. Its poverty in glass and zeolites, and the lack of scoriaceous characters, also point to it being a non-effusive rock. Its marked contact effects, such as the conversion of adjacent sandstone into quartzite, and of shale into adinole or chert, as well as rendering coal in seams in its proximity hard and brittle, may be advanced in favour of its intrusive character. In fact, minor intrusions of it are frequently seen.

Mineralogically it is composed of lime-soda feldspar and augite, with magnetite and ilmenite in grains. Hypersthene, biotite, and olivine, are occasional constituents. Quartz is present in small quantity, often granophyrically intergrown with feldspar.

Manifestly it does not belong to the deep-seated division, nor is it a volcanic lava. Rather must we interpret it as having been thrust into the superincumbent strata as an intrusive sheet (sill or laccolite), pushing its way between the beds, displacing them with quiet, steady force, but unable to find its way to the surface as lava. If, however, any superficial outpouring of lava did occur, it appears to have been completely removed by denudation, for no Upper Mesozoic or Early Tertiary basalts are known in the island. It is possible that these diabasic crowns of Mts. Müller, Wedge, Anne, Field, &c., represent the higher points of the upper surface of the sill, and that the stratified rocks which surround them on their flanks are the survivals of the superincumbent sediments. On this theory the coal measures which are so frequently seen on the sides of such mountains do not pass through the mountain mass below the diabase, but suffer discontinuity, and terminate where they touch the igneous rock. On the other hand the base of the diabasic crown, as we see it, may be the floor of the sill, below which the coal measures will be found. The physiography of the country as observed on this journey rather favours the latter view. The question is still a debatable one.

The diabase is, as far as is known, unrelated to any ore deposits. It is not penetrated by any veins of quartz, and no mineral of value has ever been found in it.

(c) Serpentine occurs in two places—(1) At 4 miles from the beginning of the track, and 4 miles south of it, this rock is exposed in the River Styx below conglomerate, which is believed to be of Permo-Carboniferous age. (2) At the edge of the forest belt nearly a mile west of the Florentine River an ultra basic rock, since converted to serpentine, has intruded in the Cambrian quartzite. I have learned from the Messrs. Clark that they have also observed serpentine on the east bank of the Boyes River, north of Clear Hill.

To consider the Styx River serpentine first. It is reached by turning south from the track just west of the 14-mile Creek, and crossing a couple of ranges composed of conglomerate to where the Styx flows east over the serpentine rock, which also forms cliffs in the bank and passes into the hill below the conglomerate. The river here is 4-chain wide, and is flanked on the southern side by moss beds and a button-grass flat. It is a pretty stream with over-arching myrtle and sassafras, and babbling rapids flowing over the bars and among the boulders of serpentine. The serpentine was found here by the Clark Bros. a couple of years ago. To the south the ground rises to form the Jubilee Range, which is the watershed between the Styx and Weld Rivers. The serpentine extends to that range also, and to the Weld fall.

The rock is massive and dense, light green in colour, with darker streaks of the same colour, and carries disseminated grains of chromite. It is thoroughly serpentinised, and its microscopic structure is that of a rock the major constituent of which was olivine.

Serpentine in Tasmania is very generally associated with granite, and increasing evidence is coming forward in support of the view that both the basic rocks of which serpentine is the alteration product and our granitic rocks are differentiation results from the same magma. This genetic relationship explains their frequent juxtaposition in the field.

The occurrence, therefore, of serpentine in the Styx River gives colour to the reports of granite having been met with in the same stream. Loose stones of granite are definitely known to exist in the river, and there are plenty of granite stones in the 14-mile Creek and its tributaries, but these may have been derived from the waste of the Permo-Carboniferous conglomerate, which certainly does contain stones both of granite and quartz-porphry.

Some granite, consequently, must have been exposed in Permo-Carboniferous times, and there is no reason why, wherever the Permo-Carboniferous covering has been removed, the granite should not be found exposed now. It is somewhat singular that stones of serpentine should be absent from the conglomerate, but an explanation of this may be that the exposed area of serpentine was small.

Ore deposits of some kind are generally met with in Tasmania in connection with the gabbro-granite rocks, and the existence of serpentine, therefore, in the basin of the Styx brings the metalliferous zone further south in this direction than has been previously known. The presence of the igneous rocks accounts for the lead and copper ores at the base of the Needles, the traces of tin ore reported to have been found in the Styx and Weld valleys, and the scattered prospects of gold yielded by many of the creeks in the district.

As some iridosmine has been found near the 14-mile Creek, it may be surmised either that serpentine is exposed somewhere on the Russell's Falls side of the watershed, or that the Styx serpentine was once in a position to shed its waste into the Russell's Falls valley. Mr. Clark found a loose specimen of serpentine in the 14-mile Creek.

The gold may be conceived as having existed in quartz veins which traversed the older strata, the degradation of which strata contributed to the formation of the conglomerate. If we could remove the conglomerate covering there would be exposed to view survivals of the older strata traversed at different points by gold-bearing quartz reefs.

A belt of intrusive ultra-basic rock converted to serpentine, a few chains wide, occurs on the track about 17 miles out, or a mile beyond the Florentine River, just before the great myrtle and horizontal forest of the Sawback Range is entered. Several boulders of the rock lie on the surface of the soil, and an outcrop of it here and there may be seen higher up the hill on the south side of the path. The apparent direction of the belt is towards Clear Hill. The rock is dark green in colour, and has a schistosity which is probably the result of differential movement during serpentinisation. It contains some chromic iron in grains scattered through its mass. The rock is completely serpentinised. Microscopically, much of the serpentine appears to have been derived from pyroxene rather than olivine.

The country which surrounds this belt is the most likely area for mineral which I was able to notice on this journey. It is in the highest degree probable that lodes exist in the vicinity. There is a rumour that a galena lode was discovered somewhere under Mt. Wedge when the track to the Gordon was first put through, and that specimens used to be brought to the camp on the Florentine. We searched all round the old camp fruitlessly for any specimens which would substantiate this. But the discovery of a lode in this neighbourhood is what might be expected. The first preliminary to prospecting would be to have a good burn to clear the ground, for nothing can be done in the way of search in its present state.

VII.—OBSERVATIONS MADE ALONG THE ROUTE.

The country will be described in some detail in the hope that the description will prove of use to travellers going out.

1.—Between Tyenna and Mt. Müller (High Rocky).

This part of the country is a wooded area of rising ground from Tyenna to the mountain range. The track starts from the termination of the Tyenna-road at Mr. B. L. Rumney's farm, 21 miles from Glenora. It proceeds south-west to the south end of Mt. Müller, and thence westerly to the junction with the track to Port Davey, 14 miles from Rumney's. Here it forks—one branch going off to Port Davey, 65 miles; while the main Gordon track continues to the Gordon River, 32 miles further west.

Rumney's selection is at the edge of the Tyenna forest, and on the border of a small button-grass plain, which, for a mile, skirts the flank of Pine Hill, and is clothed with this grass, bracken, heathy plants, and peppermint shrubs. Pine Hill, on the south side of the plain, is a ridge which consists of crystalline sandstone and chalcocised rock; the latter dense in texture, with a hackly fracture, and often of a bluish tinge. Some of the detrital stones are full of small circular cavities, which may have enclosed small pebbles. The white crystalline sandstone is occasionally fossiliferous. The impression of a univalve was sent to Mr. R. Etheridge, of the Australian Museum, Sydney, but proved to be valueless as an age criterion. The balance of evidence is rather in favour of the strata in this hill being of Permo-Carboniferous age.

Towards the west end of the hill stones of arkose grit are plentiful in the grass. At the 1-mile peg the track begins to wind round the end of the ridge, and dark-reddish Permo-Carboniferous grits are seen. A gully is then entered, timbered with stringy-bark, sassafras, and myrtle, interspersed with tree fern.

At 2½ miles is a clearing on Lord's selection, with deep basaltic soil. After leaving this, the track enters a lovely sassafras and myrtle forest, with large tree-ferns and some giant gum-topped stringy-bark trees, some of the latter 12 to 20 feet diameter at the butt. Along the track are loose stones of white pebbly sandstone, quartzite, and yellow pebbly slate. In places there is probably a covering of Permo-Carboniferous strata still overlying Cambrian beds. The bed-rock, however, is concealed below deep humus and soil from the softer strata. Mixed with this soil is the waste from the basalt, which makes this an undeniably fertile area.

The grade of the track is fairly level round the Pine Hill as far as Lord's. Then an ascent is made, followed by a descent to the 14-mile Creek, 300 feet above Rumney's, and 3½ miles along the route. The stones in this creek consist of yellow sandstone, hard quartzite, and granite. Two varieties of the latter are represented—one a biotite granite with glistening chatoyant orthoclase; the other a white binary granite composed of quartz and felspar only.

The prospecting dish in this creek yielded three or four fair-sized colours of gold, the residue being quartz sand and crystalline chromite: the latter mineral must have originated from serpentine. The gold, on the other hand, possibly had a two-fold source, viz., in quartz veins traversing the underlying Cambrian, and proximately in the overlying Permo-Carboniferous conglomerate. The proximate derivation of the chromic iron ore from the conglomerate also is not absolutely excluded.

Mr. C. A. Clark some time ago washed iridosmine from a tributary of this creek. A dish from the same hole on the present journey yielded a colour of gold and sand consisting of chromite, garnet, and quartz. A second dish also gave a flat piece of gold, much chromite, and pale pink garnet sand. All round were stones of biotite granite and of dark-grey, fresh-looking quartz felspar-porphry, with dense porcellaneous base, similar to those contained in Permo-Carboniferous mudstone conglomerate.

From the 14-mile Creek the track ascends for 2 miles in a south-westerly direction to the top of the Styx Divide, 1100 feet above Rumney's through a forest of myrtle, sassafras, leatherwood, and stringy-bark, with tree-ferns and a little white wattle. Some rock along the side of the track is a dark conglomerate carrying stones of hornblende quartz-porphry, sandstone, quartzite, and schist, in a somewhat argillaceous matrix. No fossils were seen in this rock, but from the lithological appearance the strata may be provisionally assigned to the Permo-Carboniferous. Associated with this conglomerate is a soft yellowish-brown fossiliferous pebbly mudstone, the age of which is difficult of determination. In one piece a fragment of a crinoidal stem was discovered, but of no value for age determination.

Some stones of yellow brachiopod-bearing sandstone were picked, but on submission to Mr. Etheridge, the genera could not be determined. The rock and fossils, however, appear identical with those of Silurian age in the Nelson River basin.

In the creek west of the 14-mile Creek are stones of basic rock (either basalt, or more probably, diabase), which indicates an exposure on the range. The disintegrating of such rock would contribute to the fertility of the soil.

At the top of the divide the Russell's Falls valley is left behind, and the track enters the basin of the Styx, passing west along the south end of Mt. Müller, and crossing various small streams, which form the head waters of the Styx River. The Russell's Falls valley, of which we now lose sight, is wide, and obviously mature, apparently being rejuvenated, with its floor sinking through earlier alluvial deposits. It is closed in to the west at its head by the chain of mountains comprising Mt. Humboldt, Wherrett's Look-out, Tim Shea, Needles, and Mt. Müller (High Rocky). The latter sweeps round south-westerly in a crescentic curve to Frodsham's Pass, west of the junction of the Port Davey and Gordon tracks.

Of these summits, Mt. Humboldt, Wherrett's Look-out, and High Rocky, are crowned with columnar diabase, and flanked by Permo-Carboniferous strata on their upper slopes. Tim Shea is capped with conglomerate, which on last year's journey, from the Permo-Carboniferous detrital arkose on its flanks, I judged to belong to this system. From observations made this journey, I think the possibility exists of the Tim Shea conglomerate being of Cambrian age. The Needles, from inspection at a distance, appear to be quartzite.

The broad valley of the Russell's Falls River collects its head streams from this important mountain range. The river has carved its channel down through the Permo-Carboniferous strata at its head into the Cambrian quartzites and slates, and again enters the younger Palaeozoic strata on its way to the Tyenna Valley. Judging from the height to which the marine Permo-Carboniferous strata rise on these mountains, they must at one time have been widely spread, and probably attained a thickness of 2000 feet. The Ordovician limestone ascends to about 2000 feet on High Rocky.

From the summit of the divide, 3 miles from the 14-mile Creek, the track begins to descend through forest country carrying myrtle, gum-topped stringy-bark, horizontal, leatherwood, celery-top, and a few King William pines. No solid rock is visible, but stones of mudstone conglomerate, diabase, and limestone lie scattered in the soil. The track crosses what are called the east and west forks of the Styx River. Our Styx camp was pitched on the west fork, 9 miles 70 chains from Rumney's, at the edge of the myrtle and horizontal timber, about 1700 feet above sea-level.

2.—Between Styx Camp and Port Davey Junction.

Beyond the Styx is nearly a mile of open spar country (dead tea-tree and peppermint), and honeysuckle, with button-grass and bauera. The bed-rock is not visible, but the soil is sandy, with huge boulders of silicified conglomerate, sandstone, and diabase embedded in the surface. The diabase has been derived from Mt. Müller. The conglomerate has apparently come from the distant crescentic ridge proceeding south-west from that mountain. Some of the boulders measure 10 feet cube. They are both rounded and angular, and it is difficult to attribute their occurrence to any other agency than that of ice. They lie confusedly scattered in all directions over the plain through which the track passes. Possibly they are the terminal moraine material of a glacier which once descended from the western or south-western face of Mt. Müller.

At about half a mile from the Styx River boulders of brown iron ore (limonite) are profusely scattered over the plain. About 150 feet north of the track the Great Western Railway Company opened a trench 40 feet long, 2 to 5 feet wide, and 6 feet deep, exposing concretionary limonite in yellow sand, but the trench was not extended far enough to prove any possible wall to the formation.

The iron ore cut into is somewhat impure, and the formation has no regular dip, but is irregularly arched, and has in it both vertical and horizontal layers. Hard boulders of limonite lie on the surface, but the trench is in soft sandy material.

South-west of the track here is a knoll of boulders of limonite, bearing a suspicious resemblance to the outcrop of a line of lode, but closer examination shows patches of soft white sandstone, or even unconsolidated sand enclosed in the ore. Below the knoll to the west are large blocks and boulders of conglomerate, and white sandstone similar in character to the sand pebbles which occur in the iron ore. These sandstone boulders are water-worn into fantastic shapes, with pot-holes. The sand in the ore must have been derived from the strata from which the boulders were dislodged, and was probably deposited in a lake the water of which drained into the valley of the upper Weld, which lies here in a panorama below us.

Lower down the hill to the west, boulders of iron ore continue to occur in the soil, and for half a mile further west where in the myrtle and horizontal forest the Great Western Railway Company trenched and drove an abortive adit for about a chain to prove the ore-formation underground. The adit is driven in from the track in a south-easterly direction across ferruginous chocolate-coloured greasy clay slate, dipping about 45° S.E. At 10 feet behind the end, soft white clayey slate, with a greenish tinge, was passed through and in the end itself white indurated sandstone forms the face. No iron ore appears to have been met with.

Some of the loose specimens of limonite on the track show veins of quartz traversing them, and would appear to belong to the conglomerate beds, but most of the iron ore blows in this part of the country are, as far as I am able to judge, not lode outcrops, but deposits of bog iron ore, possessing no value as repositories of valuable metals, and too impure to be used for the manufacture of iron.

A couple of hundred feet beyond the entrance to the adit the track crosses Black Creek. On the north side of the creek Ordovician limestone begins, and 300 feet west of the bridge, in a dry gully in fissured limestone. Following this down southwards the strike and dip of the limestone can be observed plainly. It strikes north-east and dips south-east at an angle of 70°. The slate in the adit mentioned above conforms with it in strike and direction of dip, but overlies it at a lower angle. It would therefore seem to occupy a higher horizon in the Ordovician than the limestone.

The track now passes over several forks of the Weld River in a south-westerly and westerly direction for a mile through a belt of forest of myrtle, gum-topped string-bark, celery-ton pine, horizontal, laurel, tree-fern, grass-tree, &c. Some extremely picturesque glades are passed through. The bed-rock through this belt is limestone, belonging to the Gordon River series.

At about 2½ miles from the Styx, button-grass and peppermint country is entered, and continues to the 17-mile. On emerging from the forest belt a depressed valley head of button-grass is passed south of the track, and close to the latter is a small knoll of boulders of white crystalline sandstone. Similar stones are seen scattered on the slope of the hill to the south-east. This sandstone belt is either the emergence of Cambrian strata from below the limestone, or more probably an intercalated bed in the limestone. Undulating open land covered with button-grass continues from here for 1½ miles to the junction with the Port Davey track. A narrow fringe of myrtle is passed through on the way. Below the thin covering of button-grass soil is quartzite, sandstone, and conglomerate gravel, shed from the hills on the north. The bed-rock changes again to limestone at about ¼-mile east of the junction. Outcrops of this rock are seen east of the Port Davey track, striking north-west-south-east, and dipping south-west. The limestone continues down that track towards Mt. Bowes for fully a mile. It is seen in situ at the creek near the junction huts, and further south near its contact with dark slate, which strikes N. 45° W.

The track from the Styx to Port Davey junction sweeps round the inner curve of the continuation of the High Rocky massif, and then crosses this range through Frodsham's Gap into the Florentine Valley. This strip of country shows no indication of mineral.

3.—At Junction with Port Davey Track.

At 14 miles 18 chains from Rumney's, a track to Port Davey branches off from the Gordon track south-easterly round Mt. Bowes, and then southerly or west of south between Mt. Wedge and Mt. Anne.

Half a mile down this track are the Junction huts. These are a very convenient resting-place for travellers, and a good base for expeditions. They are built with logs and are in good condition. The living hut is 15 feet by 12 feet, with bunks for eight men. The store hut is

10 feet by 12 feet, and is fitted with shelves for stores. There is also a three-stall stable, open one side. The huts are pleasantly situated in a light belt of myrtle, peppermint, sassafras, pine, laurel, &c., and near a good creek, one of the upper feeders of the Weld River.

A mile south of the huts the track passes through myrtle forest with good soil, which, as far as I could see, has been derived from clay slate and limestone.

About 2½ miles south of the junction button-grass country begins, and at the 3-mile peg is the best place for starting to ascend Mt. Bowes.

Mt. Bowes is here a bare hill, rising to about 2800 feet above sea-level. Its rock belongs to the Cambrian system, and is a pink to white crystalline sandstone or quartzite, massively bedded and lying rather flat at the summit, with a south-westerly dip. The bearing of the outcrops is not always coincident with the true strike, but the latter appears to be about N. 25° W. The summit of this hill commands a wide view, and the ascent, which is easy, should not be omitted by explorers wishing to have a general view of the surrounding country. There can be seen to the south-east, Adamson's Peak and Mt. Weld; to the south, Mt. Anne, a striking diabase-capped mountain in the near distance; to the south-west, the Arthur Range, and Lake Pedder; to the west the Frankland and Wilmot Ranges, walling in the horizon; to the north-west, Mt. Wedge, close at hand; further off, the Hamilton and Prince of Wales Ranges, and a range with a bold castellated crest peeping up in the extreme distance north-west, probably the Surveyors' Range; northwards, the Denison, Thumbs, Clear Hill, Wing's Look-out, Wold's Craig; and working round easterly, Mt. Humboldt, &c.

The creek at the junction huts was tried for gold, but yielded no prospects.

Twelve miles along the Port Davey track is the Huon bridge. Mr. Atkins ascended Mt. Anne from near here to within 150 feet of the summit, which would be (by aneroid) about 4400 feet above sea-level. He reached the crest above Judd's Charm, which is an immense cirque of precipitous rock with sheer walls, which were estimated to descend 2000 feet. It is one of the most striking sights in Tasmania, but difficult to get at. The columnar diabase crown of Mt. Anne appears to rest immediately on quartzite. Some purple or chocolate slate occurs on the south side of Mt. Bowes, and samples of sericitic schist were brought in from between there and Mt. Anne.

Immediately west of the Junction is the pass or gap through which the Gordon track passes over into the valley of the Upper Florentine. In the gap itself are the remains of Frodsham's old camp on his line of route to Dawson's-road. The Junction Hill rises on the south side of the gap, and the Junction ridge on the north side. The former rises to about 700 feet above the track, and is composed of pebbly sandstone, quartzite, and occasional bands of coarse conglomerate striking N. 10° E., and dipping north-west. These strata are Cambrian. The Gordon River limestone at the Junction is unconformable with them, both in strike and dip. The main source of the Florentine River heads from the valley at the west end of this hill.

The ridge on the north side of the pass consists of the same rocks which, with the same strike and dip, continue northwards in a series of high outcrops, sloping down at angles of 30° and 45° into the Florentine Valley. The highest point of this ridge is 2700 feet above sea-level. Colours of gold have been found in a valley descending west from the northern part of this ridge. The range is covered with stunted peppermint, tea-tree, she-oak, honeysuckle, and heathy plants, alternating with stretches of button-grass. Towards High Rocky the eye wanders over dense forest.

Some of the limestone east of the Junction shows an oolitic structure, with occasional minute ovoid and spherical forms on the weathered surface of the stone, indicative of organic character. A specimen was sent to Mr. F. Chapman, Melbourne, for determination, and the following note has been received from that gentleman:—

"The granular bodies in the limestone are somewhat diverse in character. A fair proportion are certainly oolite grains in various stages of formation. The globular, ovoid, and irregular bodies with a thin, even, horn-coloured investment are decidedly not foraminiferal, but are, I am inclined to think, Ostracoda of various genera. On comparing a section of the rock with one from the Chazy formation of Ontario in my cabinet, containing Ischilina and other leperditoid forms, one is struck with the general resemblance between them. Moreover, the fibrous structure of the crustacean carapace tends to give rise to secondary crystalline structure within the shell, such as are seen in sections of your limestone. One of the elongate bodies might well be a Macrocypris or allied form, but the majority are of an ovoid type."

4.—Florentine Valley.

The Gordon track continues across the head of this valley 8 miles south of the Great Western Railway track followed last year.

The valley bottom is timbered with myrtle, peppermint, horizontal, sassafras, and gum-topped stringybark. From the track on the button-grass slope of Junction Hill a full view can be obtained of the valley as far north as the Tiger Range. The track descends to the river 2 miles beyond the Junction, when it crosses the stream by a bridge, 1500 feet above sea-level. On the west side of the river is the Florentine dépôt hut, built of logs, with paling roof. This serves as a shelter and store for travellers along the Gordon track. It has no fireplace, and for the present travellers would find it more convenient to stay at the Port Davey junction huts.

The western boundary of the Florentine Valley is the Sawback, a serrated range of quartzite, which starts at the south end of the Thumbs, and continues without interruption southwards as far as the Gordon track. One prominent peak in this range, known as the Prince of Wales' Cap, is remarkable for its graceful outline. The strata are steeply inclined in an easterly direction, often nearly vertical, and cross the range at an oblique angle from the north-west. The range is thickly wooded, and is difficult of access at this end.

After crossing the river we pass through open peppermint tea-tree, bauera, broom, and button-grass country for nearly a mile, gradually ascending the slopes of the Sawback, until we enter the great myrtle and horizontal forest of that range. Just where the track passes into the forest it crosses a belt of serpentine about 3 chains wide. Several boulders of the rock lie on the surface of the soil, and an outcrop here and there may be seen higher up the hill on the south side of the path. Its apparent direction is towards Clear Hill. Its occurrence here is significant, and, as said above, the existence of mineral lodes in the neighbourhood is very likely.

5.—Between Florentine and Boyd Rivers.

After leaving the belt of serpentine the track passes west over a saddle in the south end of the Sawback Range at about the same height as Frodsham's Pass on the east side of the valley. Here we are in myrtle, sassafras, and horizontal forest, with tree-ferns, and the track descends, winding round the spurs of Mt. Wedge, with an easy grade. The path is at present encumbered greatly with fallen trees, but is well cut. At intervals, small open spaces with button-grass, bauera, and light peppermint are passed through, until at about 7 miles from the Junction, or 21½ miles from Rumney's, the Boyd River is reached. This is 20 to 25 feet wide, and has a ford which at low water is not more than a foot deep. There is also a good log crossing. The elevation above sea-level is about 1000 feet. The sand of the river-bed yielded no prospects of gold, but a good deal of titaniferous (?) iron ore was left in the dish, most likely released from the sandstone strata, as specks of it were seen in the latter.

The main valley along which the track descends from the Sawback Divide is at right angles to that range, and is bounded on the north by a westerly projection from the Sawback, terminating in the Ragged Hill. The soil is largely argillaceous and ferruginous, and the land will in course of time inevitably be taken up for clearing and grazing. Most of the forest growth is myrtle and horizontal, but there are numerous scattered giant trees of gum-topped stringybark.

No bed-rock is seen in this stretch of country, but judging from the soil, from loose stones, and from such evidence as can be obtained from material entangled in the roots of fallen trees the strata consist of quartzite, yellow sandstone, and slate. These are no doubt members of the Cambrian, but what position they occupy in it is difficult to determine.

At the Boyd is an alluvial flat rather closely timbered with gum poles. From the flat a good view of Mt. Wedge is obtained 2 or 3 miles to the south. Mt. Wedge was ascended by Mr. Atkins and P. Marriott from the 29-mile, and found to be about 3500 feet above sea-level. It is covered with forest nearly to the top. It is crowned with columnar diabase. The ascent is arduous, and we could not hear that any one had made it before.

We have here a triangle with a diabase-capped mountain at each apex, Mt. Wedge, Mt. Anne, Mt. Müller, and Mt. Field may be named further north. The observer cannot fail to notice that the diabase appears on each of these mountains at approximately the same height. This height is the 3000-foot line. Above this line are the sheer columnar cliffs which descend from the mountain summits. Bearing in mind that the microscopical structure of the diabase is that of a hypabyssal (not plutonic) rock, and that its columnar architecture, with columns perpendicular to its cooling surfaces, denotes its tabular extension, it is difficult not to avoid the conclusion that this occurrence is that of

a sill or intrusive igneous sheet, the overlying beds which once covered it having wasted away and disappeared. The great valleys now intervening between these mountains were excavated first through the overlying beds, then through the diabasic sheet, and finally into the underlying ancient strata in which we find their present floors.

6.—Between the Rivers Boyd and Wedge.

After leaving the Boyd River the track proceeds westwards, crossing the flat covered with tea-tree, bauera, and broom-grass, with peppermint and white gum, and then ascends a stringybark ridge, the solid rock of which is not visible, but which from loose stones appears to be Cambrian yellow slate and soft friable sandstone. After continuing through this for a third of a mile, a pointer is passed where Cawthorn's track (marked in 1894) is crossed by the Gordon track—a patch of button-grass. A few loose stones of quartz conglomerate are seen here. From this point there is a fine view of Clear Hill, which is a commanding feature in the landscape. The path proceeds down into a button-grass opening. At a mile or a mile and a half west of the Boyd is a bridged creek, 8 to 12 feet wide, flowing south, fringed by myrtle forest with high gum-top and stringybark. This is at the same level as the Boyd River where crossed by the track. The path now rises through stringybark, then tea-tree and bauera. Dense pink, chocolate, and white quartzite occurs as loose stones. A small strip of horizontal forest comes in, and then button-grass on a small hill south of the track (Observation Hill). A stretch of bauera intervenes between here and the top of the ridge overlooking the valley of the Wedge at 1350 to 1400 feet above sea-level.

On the west slope of this ridge near the summit is a solid exposure of dense white quartzite dipping steeply south and striking east-west. This is within 100 yards of the 24-mile mark (cut in tree on west side of track). The path descends through gum, tea-tree, honeysuckle, horizontal, &c., to a button-grass plain east of the Wedge valley marsh, about 950 feet above sea-level.

This plain is fringed on the west and north by a narrow belt of peppermint on the edge of the marsh. Mt. Wedge is several miles south-east from here, presenting a singularly bold outline. The surrounding hills, rising a few hundred feet, are composed of compact dark and white quartzite, which passes below the plain. The Wedge valley marsh is densely overgrown with tea-tree, broom-grass, reed, and bauera, with thinly scattered peppermint. A wash of large well-rounded quartz and quartzite pebbles is seen near the banks of a stream running through the flat, and is probably of some depth. Across this stream is a ¼-mile strip of myrtle forest, and just past the 26-mile is the Wedge River, a deep stream, 40 feet across, with brown button-grass water running between steep banks, and with a good log crossing (bridge destroyed), in the myrtle, sassafras, and tree-fern forest, 900 feet above sea-level. The 24-mile mark is on a sassafras tree about 150 yards east of the Wedge River crossing on the south side of the track. At 150 feet beyond the bridge the track enters a flat, covered with button-grass and tea-tree, about 200 feet wide, and crosses it in a westerly direction.

7.—Between Wedge River and McPartland's Pass.

The track ascends from the Wedge valley about 200 feet into peppermint forest, and then bears north-west through stringybark, sassafras, myrtle, and tree-fern. During this ascent, a soft yellow sandstone, tending to becoming argillaceous, is met with. The track winds north-west round the hill spur, then bears south-west, and eventually south. At about 27 miles is a patch of tea-tree, bauera, and peppermint. A view of the south end of the large, open, low-lying Denison Plains is obtained from here. At Slaty Creek, on the road, a nice-looking black slate is exposed. The track continues south through bauera and peppermint not far from the edge of the plain. After passing through a strip of forest it comes out on the button-grass plain, and crosses the edge of this in a south-west direction. A short distance out on the plain, the 28-mile mark is seen on a tree (the last figure obliterated by fire). The plain appears to be bounded on its west side by hills of schist running north.

Not a quarter of a mile from this the Pre-Cambrian platform of schist rises from below the Early Palaeozoic strata. Stones of soft sericitic schist, with quartz laminae, are seen on the track, and a good deal of loose barren quartz, evidently released from the schist, lies on the surface of the ground.

The high ground on the northern side of button-grass plain (McPartland's) is followed south-west to McPartland's Pass. Soft sericitic schist, slightly greenish, is exposed on the track near the 30-mile. It is traversed by veinlets of quartz carrying scattered crystals of pyrites. This is one of those occurrences which we meet with in

the schistose rocks every now and then, but which do not seem to be associated with any definite ore-formations.

In the plain to the south some pyritiferous black slate occurs, which, however, has not yielded any gold.

Now that the schist region is reached, the scenery takes on a desolate and savage aspect; and the bare white crags and peaks lend to the view a wild picturesqueness not possessed by the wooded hills composed of the Palaeozoic strata further east. The highest point of the track over the button-grass is 1400-feet above sea-level, and commands a fine view of the low plains to the south. This plain is level, and runs right up to the base of the mountains all round. The range on the south side of the plain with a bold and characteristic outline I have called the Sentinel Range. To the south-west there is a recess in the mountains, from which emerge on the plain a few rounded hillocks or hogbacks, with smooth slopes and forms, which from a distance suggest ice action. The Gordon track keeps on the north side of the plain, while Cullen and Cawthorne's track crosses it and enters the pass on the south side of the latter. The pass is 1250 feet above sea-level.

8.—McPartland's Pass and Hermit Valley.

The pass is entered at about 31 miles, and is a narrow gap between schist mountains. The schist is sericitic and quartzitic, striking N. 15° W., and dipping south-west. The vegetation is button-grass, stunted tea-tree, dwarf honeysuckle, &c. At the entrance to the pass is a copse of peppermint, tea-tree, bauera, laurel, &c. Its general direction is westerly, and in about a mile it opens out into the Hermit Valley—a fine, button-grass plain, well watered by creeks, and surrounded by white-topped craggy mountains, forming a sequestered retreat, in consonance with its name. The track winds round this plain for 3 miles, and towards the western end the 35-mile mark is seen. Before reaching this, the staked path passes over a transverse saddle, and the outlet of the valley to the west contracts to a narrow flat vale of button-grass, tea-tree, and bauera.

The general northerly trend of the ranges is here broken by transverse spurs, producing a confused network of mountain ridge. The schists usually strike from N. 15° to 30° W., and dip to the south-west. But minor changes of strike are frequent owing to curvatures in the foliation.

There is no sign anywhere of the Archæan fundamental complex. All these schists belong to the Algonkian, and are essentially altered sandstones. Their degradation must have furnished the material of the Cambrian quartzites and conglomerates developed so extensively further east. The numerous laminae and veinlets of quartz have supplied the pebbles of those formations. Whence their own sand grains have been derived, there is no evidence to show, but the constituents of these schists must certainly represent the waste of antecedent rocks. These ancient rock-masses show us that the same processes of sub-aerial denudation which we can trace in the younger systems, and which we may witness in operation any day on the sea-shore, were in operation also when the world was young—in times of a remote, undefined antiquity.

The summits of the schist mountains are frequently characterised by the presence of quartz in considerable quantity. This has resisted weathering and removal, while the softer sericite has weathered away. The quartz may often be looked upon as residual quartz schist, and not as epigenetic veins. On the other hand, veins of quartz also occur, intersecting the schist. Even these may be segregation veins related to the foliation process. Some of them have been slightly faulted by movement subsequent to foliation.

9.—The Serpentine River Valley and the Gordon River.

The track from the Hermit Valley into the valley of the Serpentine runs west of north over the spurs of button-grass-covered mountains, with alternating copses of peppermint and tea-tree. Its course lies through swamps between ridges of schists. The following is a concise description of the features of the country along the 10 miles of track from the Hermit Valley to the Gordon.

At the west end of the Hermit Valley is the Stillwater River, formed by the junction of two streams, the northern one of which is crossed by the track a little east of the 36-mile mark. The path crosses west over button-grass and tea-tree swamp into a strip of myrtle forest. Then come alternations of open peppermint, tea-tree, and button-grass. At a little past the 36-mile the schist strikes north-west, with a north-east dip. The track then turns north-west. The Frankland Range is here full in front, and the broad plain is entered, through which the Serpentine River meanders in its remarkably sinuous course from Lake Pedder to the Gordon. The 38-mile mark is on this plain, and the 39-mile towards its north end. The track winds and undulates over the

foot of spurs from hills to the north, and the 40-mile peg is still on button-grass. The strike of the schist on the hills is N. 15° W., with a south-westerly dip; but on the track before entering a belt of peppermint, sassafras, manuka, &c., some green sericite schist, bearing north-west, has a north-east dip. After leaving this timber open country is entered, and a siding followed above a low flood-plain on the east side. The path to the Gordon now follows a northerly direction. On this siding is a formation of oxidised schist, which might be worth trenching upon. At the northern end of the siding is the 41-mile peg, and the track then leads down into a north-west-south-east grass valley, whence the first sight of the top of the Prince of Wales Range north of the Gordon is caught. The 42-mile peg is at the north end of this valley. Schist hills are on each side, and the 43-mile mark is still in the valley. The path ascends and follows the crest of a razorback ridge N. 20° W. between a narrow button-grass valley on the east, and a valley timbered with peppermint on the west. The 44-mile is reached during the descent at the north end of the Razorback, where the outcrops of schist dip south-west. A swamp of button-grass and stunted tea-tree is entered, then a belt of manuka and peppermint, followed by button-grass along a siding track. The 46-mile peg is seen on entering bush of peppermint, bauera, manuka, horizontal, myrtle, and laurel, in the river swamp; and on the succeeding plain is the junction of Marriott's track, staked this year from the Tiger Range, with a pointer indicating 41 miles to Tyenna-road (Rolls') by that track, and 48 miles to the same point by the Gordon track. A descent is then made to the timbered flood terraces on the bank of the Gordon, and in a few hundred yards the river itself is reached at about 900 feet above sea-level. A narrow belt of gum and manuka fringes the Gordon, which is here about 170 feet wide. The north side is steep and high. The ford is about 3 chains lower down than the point where the track strikes the river, but a little higher up in the opposite direction is said to be the shallowest place for fording. I found the river in half flood, and absolutely unfordable. I turned homewards on the 28th March, and reached the end of the Tyenna-road in four days.

VIII.—RESULTS OF EXPEDITION.

Information has been gained from the points of view severally of:—

- (a) General Geology.
- (b) Economic Geology.
- (c) Utility of the Gordon track.

(a) General Geology.

Generally the observations made last year have been confirmed. The foundations rocks of Tasmania (or at least the lowest accessible to us), on which the Palaeozoic strata have been laid down are Algonkian schists which form the country west of the Denison Range and the lower Wedge. These were foliated and exposed to sub-aerial denudation prior to the deposition of the Cambrian sediments. Much of the quartz which is so plentiful in them is due probably to the segregation of silica during the foliation process. The schists are composed generally of silica, in which the boundaries of the individual grains are often visible to the naked eye, showing very little alteration of the original compacted sandstone. Sericitic mica is very generally developed in these rocks, and the less quartzose sediments have been converted into greenish sericite schists. Curves in the foliation produce variations in the strike of these, and consequently the dip also varies in one and the same mountain system. Viewing the schist region east of the Serpentine as a whole, the average strike is north-west-south-east, and the dip south-west.

East of the 28-mile (i.e., east of McPartland's Plain) the Cambrian sandstones rest upon the schist floor, and extend eastwards to the Port Davey junction, at which place the lower beds of the system, consisting of pebbly sandstone, quartzite, and conglomerate, appear to have been brought into faulted juxtaposition to the Ordovician limestone. The latter continues eastwards to Black Creek, occupying, on the whole, lower ground than the Cambrian exposures.

Further east, round Mt. Müller, the Permo-Carboniferous strata repose on the older Palaeozoics, and extend through Tyenna to the Derwent.

This journey has therefore defined with some certainty the geological sequence, and made clear much that was hitherto doubtful.

(b) Economic Geology.

The country in the neighbourhood of the route does not, on the whole offer much hope of discovery of ore deposits. The Cambrian strata round High Rocky and the Needles (on the east side) appear to be traversed by copper and lead ore bearing lodes, and these were

(7)

discussed in last year's report. The other locality where there is reason to suppose that lodes may be discovered is in the vicinity of the Serpentine, at the head of the Florentine; and here it is likely enough that prospecting may result in finding either copper or silver-lead ore. The probability of gold-quartz reefs being discovered anywhere is very small. Colours of gold have been obtained from some creeks, but the metal has for the most part filtered through the Permo-Carboniferous from older systems, and nowhere appears to be abundant. The schist country, as far as could be judged, is monotonously barren of mineral. A little disseminated pyrites occurs in it now and then, but very little gold has been liberated, and no fracture systems were observed in the schist which could indicate lode action. Some actinolitic schist along Marriott's track deserves some attention. In general, the country from a mining point of view is disappointing. Apart from the serpentine occurrence, no igneous rocks of the type related to ore deposits were seen. It must be borne in mind, however, that these remarks refer only to the country within reach of the line of route, and that closer and more extended search may result in finding more exposures of the eruptives, even if not on a very extensive scale. As far as can be deduced from the available data, the line along which serpentine or granite may be expected to emerge is a Boyes River-Mt. Anne line, crossing the head waters of the Florentine and Huon.

(c) *Utility of the Gordon Track.*

Viewed simply as a means of reaching the West Coast, this route cannot compete with the present overland route *via* the Ouse and the Iron Store; but the latter track is at a high elevation for a great portion of its course, while the greater part of the Gordon route does not exceed 1000 feet above sea-level.

If, however, the object is to tap the scenic beauties of the Gordon River and its vicinity, the track followed this year has the advantage, always provided that a track is made to meet it north of the Gordon, and proper communication established with Macquarie Harbour.

Mr. Surveyor Innes, in 1896, failed to find a practicable route from Tyenna to the West Coast *via* the Gordon valley, being arrested by the formidable Frankland and Wilmot Ranges; and consequently he recommended a route much further south, *via* the Huon Plains, and round between the Arthur and Frankland Ranges, eventually either striking the Gordon in the vicinity of Butler's Island, or continuing to Birch's Inlet on Macquarie Harbour. The great difficulty which he experienced was caused by the rough nature of the Gordon banks at the North end of the Wilmot Range; but I am informed—and from the present Gordon track I could see—that the obstacles can be avoided by crossing the Gordon east of the Serpentine and going round the Hamilton Range on the north side of the river.

The ranges and valleys north of the river trend north and south, and the best way of exploring them is to enter the valleys from the north and south ends, and not by difficult tracks across the ranges. The Gordon track would give access to these. A good deal of the utility of the track depends upon whether the valleys of the Denison, Jane, and Franklin Rivers contain ore deposits.

Sooner or later, no doubt, there will be overland communication between Hobart and the south end of Macquarie Harbour, and as far as I can judge at present, the line of route will most probably be along the present Gordon track. The grade is, with the exception of the part round High Rocky, fairly easy, and up to the 28-mile most of the land will eventually be taken up for grazing. On the other hand, on the Great Western line the general elevation of the land is too high, and settlement will never extend west of the Valley of Rasselas.

A pack-track now exists from Tyenna to past the Florentine bridge on the Gordon track; but if this is to be extended, a connection must be established on the north side of the Gordon. With the work done this year, foot travellers can go right through to the Gordon Crossing and explore the country in the vicinity of the track without difficulty. Anyone wishing to prospect the country round the Serpentine at the Florentine can have his stores packed out by horse to the spot from Tyenna.

I may mention that the old track from Tyenna to the Humboldt Mine is much overgrown, and that if it were kept open, it could be used by prospectors in the mineral belt at the eastern foot of the Needles and High Rocky.

IX.—CONCLUSION.

The work done this year has disclosed the nature of the country between Tyenna and the Gordon sufficiently to enable an opinion to be formed with respect to its probable value for mineral, and I think that sufficient knowledge has now been gained to render a further expedition along this line of route unnecessary, at least

as far as the farthest point reached. In fact, the justification, from a mineral point of view, for further expenditure south of the river depends now upon what may eventually be discovered north of it. As regards the northern side, I am disposed to think that the area most likely to reward search is the country lying between the North Lyell Railway and the Franklin River, and this country is perhaps too far west to be considered in connection with railway exploration. It would rather come within the sphere of the normal West Coast operations of the geological survey. I do not anticipate that much mineral will be found east of that belt. Also not much is known of the country west of the Frankland Range, except that copper ore has been reported from the coast-line, and quartz-tourmaline stones from near Moore's Look-out. I have also been told that granite occurs on the Wanderer River. However, this has not a vital bearing on the question of the Gordon track as at present laid out, as the country in the County of Montgomery can be best approached from the Lower Gordon or Birch's Inlet.

At all events, we are now in a position to draw conclusions as to the likelihood of the country in the vicinity both of the Gordon track and of the Great Western Railway route ever developing into a mining field of any importance. As said above, there are possibilities in the neighbourhood of the serpentine at the Florentine, and also at the Humboldt Mine; but apart from these, I have not been able to see anything that would lead me to anticipate that other than sporadic occurrences of ore will be found.

On the other hand, the Gordon route to the West Coast deserves serious consideration from the tourists' standpoint, and in connection with future settlement. A future generation will certainly make use of much of the land as far as the 28-mile. If at any time this road is made a main route through the island, it will give access to land which will, when cleared, be fit for grazing and cultivation, besides opening up the Gordon scenery and connecting Macquarie Harbour with the capital by a direct line of communication.

I have the honour to be,

Sir,

Your obedient Servant,

W. H. TWELVETREES,
Government Geologist.

E. A. COUNSEL, Esq., Surveyor-General.