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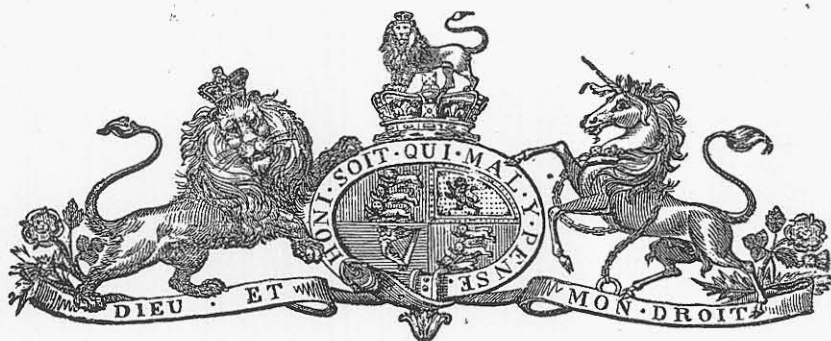


1860.

TASMANIA.

A REPORT OF THE EXPLORATION OF THE
WESTERN COUNTRY BY MR. GOULD.

Laid upon the Table by Mr. Henty, and ordered by the Council to be printed,
26 July, 1860.



Geological Survey Office, 26th June, 1860.

SIR,

I HAVE the honor to forward you an account of the exploration of the Western Country, conducted recently by myself according to your instructions; and to assist you in comprehending the physical structure and nature of the country explored, as well as the various routes pursued by the Expedition, I have prepared the accompanying Map, which embraces the whole of the country visited, and upon which, in addition to the topographical information acquired, I have expressed the geological structure by the assistance of distinguishing colours.

I have found it convenient to distribute the information obtained under several headings.

In the first section of the Report, which is in the form of a brief narrative, I have confined myself to a general description of the progress of the Expedition, of the country visited, and of the steps taken for the purpose of testing its reputed richness in auriferous deposits.

The second is devoted to a sketch of the geological structure of the district, and to the consideration of its mineral capabilities; while, in the last, I have appended a few general remarks upon those portions which are available for settlement, together with meteorological tables which may be of interest as furnishing some information as to the nature of its climate.

I have the honor to remain,

Sir,

Your very obedient Servant,

CHARLES GOULD.

The Hon. the Colonial Secretary.

NARRATIVE.

UPON the 2nd of December I received a communication from the Colonial Secretary, in which he informed me that I had been appointed by His Excellency to the command of the Expedition. I immediately commenced organising the party, and the arrangements necessary for its equipment, and supplies during the period allotted to the continuance of the exploration.

I considered it desirable to procure the conveyance by contract of a considerable proportion of the stores to the extreme limits of the settled districts: these were despatched upon the 7th. At the same time, anticipating that our drays would not have been preceded by others this season, and that their progress would therefore, probably, be impeded by fallen trees and other obstructions in the remoter portions of the road, I instructed Mr. C. H. Smith, whom I placed in command of a small party of men, to accompany the drays, and to furnish assistance to the contractor in clearing a passage for them.

During the ensuing week, the remainder of the stores, the dray belonging to the Expedition, carts, horses, &c. and the rest of the party, were successively despatched to the rendezvous at Lake St. Clair; and, having received His Excellency's instructions, I left Town for the purpose of overtaking them upon the 17th. I arrived at the junction of the Derwent with the Traveller's Rest

River about midday on the 19th, where I met Mr. Burgess, who had accepted the appointment of Surveyor to the Expedition, and whom I had despatched a few days in advance, for the purpose of ensuring the due arrival of the various portions of the party.

I had requested Mr. Burgess, in case of his succeeding in reaching the Derwent before myself, to ascertain whether any ford existed higher up the river near its exit from the Lake. He had not succeeded in doing so, and we therefore decided upon conveying the stores across the sheep-bridge at the ordinary ford; and, indeed, the river was at that time so high, that it was questionable whether they would have been conveyed across in a dry condition in the drays.

I learned from Mr. Burgess that the foremost party had found the road heavily encumbered with fallen timber, and that this had delayed its progress so much, that his own arrival had preceded mine by but a few hours.

A small portion only of the stores had been brought thus far, the remainder I had passed at various points along the road. Most of the drays had met with some accident in turn,—less serious, however, than might have been anticipated in so rough a country.

The marshes which alternate with the rocky portions of the road were, at that season of the year, so soft and boggy, that a strong team of bullocks could with difficulty drag a very moderate load. We were, therefore, forced to subdivide the latter, and to carry them up by degrees. It was not until the evening of the 22nd that the whole of the stores had been lodged in the tents pitched for their reception upon the west bank of the Derwent.

The whole party was now present, with the exception of one man who still remained at Marlborough. It consisted of twenty-two individuals, including Mr. Burgess and myself. Our rations were calculated to last for a little more than four months, and we were amply supplied with tools to enable us to prospect the country we were going into. From this point it became necessary to clear a road—(one had been marked for a few miles, many years back, but, excepting for short distances, we were unable to follow it) the ground being level, and tolerably open, we succeeded in doing so, without much difficulty, as far as the river which drains the Cuvier Valley. Here, however, the steepness of the banks, and the density of the scrub, which extends for some distance across the lower part of the Cuvier Valley, forced us to discontinue it, and thenceforward we only cleared a track of sufficient width to admit of the passage of loaded pack bullocks: we had previously commenced breaking-in the beasts to this new work, and, in a few days, rendered them accustomed to it.

The width of the belt of scrub just referred to is not very considerable, but its extreme density has hitherto proved a barrier to the extension of the sheep-runs upon this side of it into the valley beyond: this difficulty being now in a great measure removed by the existence of the track which has been cleared for the progress of the Expedition—and which affords an opportunity to the neighbouring sheep-owners of penetrating into, and examining, the valley for themselves—it is probable that no long period will elapse before its occupation by them is effected.

The breadth of the Cuvier Valley varies from half a mile to one and a half, and the total length is about ten. It lies between Mount Olympus on the one hand, and Mount Hugel on the other; and from the base of these mountains there is a gradual slope to the river in its centre. It is chiefly occupied by open marshes, which are bordered by the scrubs and forests upon the flanks of the surrounding ranges. In these the herbage consists of fine grasses intermixed with coarse tussocks of the button or kerseymere grass (*G. adustus*). They are drained by numerous open creeks, and contrast favorably, in point of dryness, with many of the sheep-runs which are at present occupied in their vicinity.

The soil being derived (at least in the lower portion of the valley) from the decomposition of greenstone, there are fair grounds for anticipating that the beneficial effects which are known to have resulted elsewhere in similar lands from their being stocked and occupied will occur, under such circumstances, in this instance also.

The amount of available land here is computed by Mr. Burgess to be about 5000 acres: the principal objection to it is its elevation, which varies from two thousand five hundred to nearly three thousand feet.

I had fixed upon the head of this valley as being the most convenient point at which to establish our depôt; and, upon reaching it, commenced in the first instance the erection of a log hut, and afterwards the conveyance of all the stores to it. This was effected by the united labour of the party, conjointly with that of the pack-horses and bullocks. The latter were then sent back to Marlborough, where Mr. Clarke (the owner of the station) had liberally consented to their remaining during our absence. I was enabled, during the time which these preparations occupied, to make several excursions in the direction of Mount Arrowsmith, Mount Hugel, &c.

Immediately above the depôt is a slight hill or saddle, which affords conspicuous sections of sandstones and shales lying almost horizontal, and extending continuously beneath the masses of greenstone on either side of the valley.

Upon ascending this my attention was directed by Mr. Burgess to the existence of a thin coal

seam, which he had discovered upon the occasion of his visiting the valley seven years before. It was much too thin to be of any economic value, but interesting from its position with relation to the strata below.

I observed here that the change in the geological condition was accompanied by a corresponding and marked alteration in the types of vegetation,—the peppermints, stringy-barks, wattles, &c. so abundant upon the trap soil adjoining, were, in great measure, replaced on the flanks of this hill by myrtles, (*F. Cunninghamii*), sassafras, grass trees, (*Richea pandanifolia*), and especially by scrub of the red or prickly grass tree, (*Cystanthus sprengeloides*.) The summit of the saddle was flat, and only covered with a few lichens, small ferns, heaths, (*Epacris serpyllifolia*), &c.; and in many spots the absence of vegetation indicated its liability to be covered during long intervals with snow, of which a large patch still remained unmelted (first week in January) upon the side of one of the hills adjoining.

We were not far distant from the verge of the great trappean plateau to the eastward; and the eyes, when turned in that direction, rested upon a confused mass of mountain summits of the wildest and most rugged character.

The gloomy recesses of the valley, which commenced almost at our feet, and deepened rapidly as it stretched northwards towards the Cradle, choked with dense forest, and bounded by precipices and rugged mountains, appeared so impenetrable and repulsive, that I immediately abandoned the intention which I had entertained of shaping the course of a portion of the Expedition in that direction.

Our track was therefore continued along the summit of the range running parallel to the Eldon Range, upon the south side. This consists of a chain of hills connected by a narrow and uneven ridge, while the summits are mostly in a pyramidal form, and composed of sandstones, shales, conglomerates, &c. usually uncapped by greenstone, though bearing evident traces of having formerly been covered by it. In two instances a slight thickness still remains which has survived the destruction and disappearance of the rest.

The range varies in height from 3000 to 4000 feet, and being free from heavy timber, and only occupied by scrub in the hollows between the hills, afforded us an open though very uneven route; while the numerous spurs diverging from it to the north and south afforded facilities for our descent into, and examination of, the valleys to which they conducted.

Leaving the superintendence of the road party to Mr. Burgess, I pushed forward for the purpose of obtaining an insight into the physical features of the country to the north.

For this purpose I paid a visit to the mountain designated upon the Map as the Amphitheatre. It is the eastern portion of the Eldon Range, and in form roughly approximates to that of a horseshoe.

Below the capping of greenstone which forms its summit, are horizontal layers of sandstone and shale, the contour of the outcrop of which, receding in the centre and advancing on both sides, gives rise to an appearance not dissimilar from that of an Amphitheatre, and hence the name. To reach it I proceeded westward for some distance before descending into the intervening valley; and by doing so was enabled to cross the latter at a low saddle which (if I may be permitted to use the expression) bridges it, and gives rise to the head waters of the Eldon River upon the one hand, and of the Murchison upon the other.

After descending through alternations of bare and open forest land, I found, on reaching the marsh which occupies this saddle, that I had passed from the stratified to the underlying metamorphic rocks: masses of foliated mica schist and quartz rock here and there protruded, although not so conspicuously as I afterwards observed them at a short distance down the valley on the west.

I soon found the sandstone series recommenced, and forming low irregular escarpments, alternating with marshy plains, led by successive and gradual ascents to the base of the steepest portions of the mountain.

Bad weather now setting in caused me considerable inconvenience. The whole country was shrouded in mist, which detained me several days, and prevented my obtaining as much information or so good a view of the distant country as I required. I was enabled, however, to plan out the route for some distance which we had subsequently to pursue.

Upon rejoining Mr. Burgess I found the track finished for some distance along the range; but seeing that it would still take a considerable time to complete it to the Eldon, and carry a stock of rations forward to that point, I determined upon engaging a portion of the party in prospecting the valleys to the south.

Upon approaching one of these, on the 21st of January, I was surprised to observe that it had recently been burnt out; and, upon consideration, identified it with the Collingwood Valley visited by Mr. Tully during the preceding season. From his description of it, I came to the conclusion that we had descended into it nearly at the farthest point reached by him, and were thus resuming the exploration at the very point where it had been left off.

We forded the River Collingwood, and camped close to the bank upon the other side.

The hills and spurs upon that from which we had descended were shrouded in dense forest, their tops alone being bare; and the valley itself, looking upwards, was occupied by dense tea tree scrub. In the opposite direction, however, it expanded to a considerable width, and was perfectly open.

The geological formation consisted of mica schists and foliated quartz rocks, the latter of which rose in bold and lofty hills along the south side of the valley.

The physical features here were most favourable for our trial; numerous gullies in descending from the range converged together, and enabled us, by sinking at and below their junction, to test with rapidity a considerable extent of country. Moreover, there was but little drift; and even in the centre of the valley, and within a few yards of the margin of the river, the bottom was reached in about twelve feet.

At the level of the river were soft micaceous schists, with quartz segregated in irregular masses of inconsiderable size; the schists, becoming more and more siliceous, gradually passed upwards into a dull opaque quartz rock with a laminated, almost slaty, structure.

The prevalent strike was from about N. 30° W. to N. 40° W., and the dip westerly. There was, however, occasional contortion, and consequent variation from those directions.

The river banks afforded abundant sections, and at many points along its course the beds were exposed in the stream itself, and, stretching across, gave rise to numerous alternations of pools and broken water. I was much struck with the absence of quartz reefs, or veins similar in character to those which traverse the ancient Cambrian and Silurian rocks. I observed but few, and those were small, and even doubtful in their nature.

The miners having sunk in those portions which were most favourable for the discovery of gold (if any existed there), and having been perfectly unsuccessful, I determined, upon the 28th January, on returning to the rest of the party and continuing our course to the Eldon.

The Collingwood Valley contains a considerable extent of land which appears to be available for pastoral purposes, and, upon account of its elevation being less, must enjoy a much milder climate than that of the Cuvier valley.

Upon the other hand the soil is of inferior quality, there being less disintegrated trap rock and more quartz detritus in its composition. The valley is somewhat difficult of access; it might, however, be approached by the route by which we descended into it, or else from the head of the valley of the King's River, to which I shall refer presently.

I overtook Mr. Burgess upon the afternoon of the 30th; he had completed the track to the termination of the range, and was upon the point of turning down into the valley below. We now descended about 2000 feet, the last 1500 of which were exceedingly steep.

Immediately after crossing the brow of the range we had entered a myrtle forest, which continues down into, and occupies the whole of, the valley.

It was dark when we reached the bottom, and we were unable to go on to the river, or even to find camping ground. We therefore bivouacked where we were, and on the following morning proceeded to the river, which we found to be close at hand.

In our descent I had remarked our passage to a geological formation entirely distinct from any that we had yet seen. Masses of a dark grey slaty rock exhibited themselves at intervals; and in a creek upon our left there appeared portions of a quartz vein remarkable for the beauty and distinctness with which it was crystallised.

In the bed of the river rolled pebbles of quartz containing pyrites were not unfrequent, and I therefore determined upon investigating the upper end of the valley first. The flat of the river was about a quarter of a mile in breadth here. Deposited over the substratum of boulders and pebbles is a layer of vegetable mould and soil, which, although rarely exceeding a few feet in thickness, suffices for the nourishment and growth of myrtles and sassafras trees of unusual dimensions. Native laurels and other shrubs were sparingly intermingled, and the ground densely covered with ferns, tree ferns, &c.

The river, dividing into several branches above our camp, reunited below; and upon one of the islands thus formed timber was stacked up in such vast quantities, and to such heights, as to prove that the river is occasionally flooded to at least twenty feet above its usual level. For the sake of economising the time and labour of the "prospectors," I directed Mr. Burgess to clear a track for them as far as possible up its course; and one was accordingly completed for a distance of about five miles. As we advanced the valley gradually contracted; and the river was closed in every here and there by cliffs and huge masses of mica slate.

The older slates and the metamorphic rocks are, as a class, so productive of minerals, that I considered it probable we might here make interesting and valuable discoveries. I consequently

devoted a considerable amount of my personal time and attention to examining the bed of the river, and of the numerous creeks tributary to it. I also gave special directions to the various sets of men engaged in sinking to carefully preserve any metallic or remarkable specimens which they might encounter.

Nothing, however, with the exception of pyrites, which occurs abundantly, was met with either by them or by myself; and feeling convinced, after the lapse of a fortnight, during which the various creeks and branches of the river had been successively and carefully examined, that there was no probability of the discovery of gold in any remunerative quantity, or apparently of any other valuable mineral, I determined upon abandoning the search in that direction, and proceeded down the river to its branch which comes from the north side of the Eldon.

The valley of the latter is much more open, at least upon the west bank of the stream, there being no myrtle forest, and the valley itself less contracted at the base. Cliffs of mica slate and quartz rock enclose it on that side. They are often perpendicular for a considerable height, and their summits I estimated to be about one thousand feet above the valley. Behind them, and rising from the somewhat irregular plateau of which they form the escarpment, is a second and considerably loftier range.

Upon the east there is a more gradual slope from the river up to the summit of the Eldon, which towers four thousand feet above it.

The diluvium was much thicker here than in the last valley. It was, however, also entirely local, and composed of the *debris* of the metamorphic schists adjoining.

In sinking one of the holes, and about half-way down it, a layer of brown or bog iron was met with, which had evidently been deposited from water infiltrating through the pebbles while impregnated with iron.

In sinking here much more water was encountered, and it became necessary to work continuously in order to keep it under: the day of twenty-four hours was accordingly divided into three shifts, or periods of eight hours each, and the men worked in parties in turn.

I found the difficulties of following the course of this stream upwards to increase rapidly. It soon became necessary to clamber over enormous masses of rock, both solid and detached; the scrub became denser, and more and more resisting, from the increased abundance of vine and *Bauera*. I saw that it was impracticable to make a track for the carrying parties, whose powers were already sufficiently taxed to keep us supplied with rations at the considerable distance which we had reached from the depôt; I therefore continued no further than the point where the creek turns abruptly to the eastward. Nor did I consider it advisable to push our investigations further to the west or to the south, the aspect of the country in those directions being still more unpromising.

The river formed by the junction of the North and South Eldon stretches away southward along a valley of considerable width, in which are marshes, computed by Mr. Burgess to occupy an area of about 6000 acres: the climate here must be very temperate; the height of the barometer at the junction, during our stay, varied from 28.55 to 28.99; and I computed the elevation to be about 880 feet above the level of the sea.

I now determined upon entering the unknown country on the north of the Eldon range; and for this purpose returned a considerable distance along our track, and then passed across the range itself, between the points indicated upon the Map as the Eldon Bluff and the Amphitheatre. The latter I have already alluded to; the former is the abrupt termination of the main portion of the range: it has a peculiarly massive and square appearance.

Perpendicular cliffs of greenstone uplift themselves to a height of many hundred feet from above the forest-shrouded basement of sandstones, &c. upon which they are supported, and which is prolonged in several directions into spurs with precipitous sides, partially enclosing, like lofty walls, several irregular basins, with ridges and rocks of mica slate and quartzite projecting, conspicuous through their whiteness, from among the rush-like grasses by which they are surrounded. An extremely picturesque though small lake (which I have had the honor of naming after Lady Young) lies at the foot of the Bluff; and around its margin the coarse herbage is replaced in patches by other of a finer and more nutritious quality. Kangaroos and wombats abound; and upon this account, as well as in consequence of the shelter afforded by the situation, the Aborigines, when in this portion of the western country, probably selected it as a favorable spot for their encampments, since I found traces in many places of the country having been burnt by them years ago, and in one the remains of a kind of hut,—although it is possible that the latter may not have been built by them, but by some of the prisoners who have at various periods effected their escape from the settlement at Macquarie Harbour.

Of the two spurs turning away from the north side of the Bluff I selected the easternmost one for our route; and, while Mr. Burgess was engaged in clearing and marking the track along it, I made a short exploration of the country beyond the other, which stretches in a north-westerly direction towards a lofty mountain which we had previously observed from the summit of the Eldon Peak, and which I had distinguished by naming it Mount Murchison.

Accompanied by one man, and taking a week's rations, I started from the Camp under the Bluff upon the 27th; and, keeping close round the edge of the Bluff, continued for some distance to traverse the fossiliferous stratified deposits, which project in every direction like a fringe from beneath the basaltic crest of the Mountain.

After some miles I came to their termination at a slight escarpment, down which we descended, and came once more upon the metamorphic schists.

I had anticipated meeting with a continuation of the Silurian deposits which occupy so considerable a portion of the valley upon the other side of the range: they failed to extend so far, however, and the eye rested in every direction upon white projecting quartzose rocks. The summit of the spur I was proceeding along was broken and uneven, and at first varied in breadth from half a mile to a mile: this diminished as it rose gradually to the north west, terminating in an elevated and conspicuous mass of rocks immediately opposite Mount Murchison.

For a few miles after our descent from the stratified beds, and while we still continued within a moderate distance of the greenstone-capped Eldon, the soil appeared to be tolerably fertile, the growth on it being luxuriant, although chiefly consisting of the reputed useless button grass. In proportion, however, as we increased our distance it appeared to deteriorate. Stunted tea-trees became largely intermixed, and in places predominated; and it appeared almost incapable of supporting any animal life.

Descending many hundred feet from the rocks at the termination of the spur, we arrived at a thin belt of myrtle scrub concealing a deep ravine, at the bottom of which a small creek flowed to the eastward; and beyond it was a mixed scrub of tea-tree, honeysuckle, cutting grass, *Bauera*, &c. which so retarded us that we were unable to travel more than about three miles in the course of the day.

We had now reached the foot of the mountain; its flanks were defended by dense forest and scrub, high up from amidst which the summit rose in walls and jagged peaks of quartzite. Some of the spurs declining to the west, offered a more open, but at the same time much more circuitous, access. Time did not permit of our ascending it, and I was forced to return. Upon this occasion I was much inconvenienced by a bush fire, which compelled us to pass one night upon some bare rocks on the summit of a hill. We also experienced severe weather as we returned along the exposed and lofty spur.

The appearance of the country that I had just examined was not sufficiently favourable to induce me to send any of the prospectors in that direction.

I now divided them into two parties, the first of which I despatched under the superintendence of Mr. Smith some distance down the valley of one of the tributaries of the Murchison; the other proceeded onwards in the track of Mr. Burgess to the river itself,—which I myself reached upon the 23rd, and found, to my surprise, was one of considerable width and importance.

It became evident immediately that, unless the structure of the country beyond was such as to hold out considerable inducement to us to prospect it, it would be unadvisable to take any large proportion of the party across, as, in case of unfavourable weather setting in, it would completely cut us off from return, and from our supplies. I therefore retained the prospectors who came with me upon this side of the river, and directed them to sink in the beds of the creeks tributary to it, and in the river drift itself.

I determined that two short explorations should be made of the country upon the north: the one I made personally, the other I entrusted to Mr. Burgess. Each of us took with him a single companion.

After waiting some days for the purpose of securing a favourable one on which to start, I did so on the 26th. Mr. Burgess started also on the following morning. The routes we pursued are indicated upon the Map.

Immediately across the Murchison from our camp a hill rises to the height of about two thousand feet above it; and, although in starting I attempted to travel round it, I was soon compelled, by the number of deep ravines which indent it, and the thickness of the scrub, to ascend to its summit and keep along the ridge,—from which there was, apparently, an unbroken and open road to the Cradle.

I was soon, however, arrested by a deep valley, which not only completed the insulation of the hill I was on from the adjoining high land, but was occupied by an impenetrable scrub, which compelled me to turn eastward and descend into the valley of the small river draining the south side of the Eldon Bluff.

Here I found a marsh of very limited extent bosomed among the hills which converge towards it from every direction, while the river traversing it lay far below in a gorge occupied by myrtle forest.

The schists exposed in its bed were violently contorted; and I judged from the abundance of the boulders of granite, which I found on ascending its channel for a short distance to increase both in dimen-

sions and in numbers, that we were near their junction with a mass of the latter rock: it was evidently in the opposite direction to that in which I intended proceeding, and of limited extent.

Upon ascending the high land on the east side of the river, by means of a moderately sloping spur, I came upon open plains extending south and south east from the Cradle. The herbage on them was very poor in quality, and the ground excessively wet.

There were a number of small lakes, around which were scrubs of pine, red grass-tree, and of a small species of myrtle (*F. Gunnii?*).

This land is so elevated and exposed as, in my opinion, to unfit it for occupation.

The Cradle, like most of the neighbouring mountains, is of compound structure; at the base are quartzose schists (probably metamorphic), which are overlaid by a thin deposit of the conglomerates, or upper palæozoic beds, and these again are surmounted by a considerable thickness of columnar greenstone.

A narrow, wall-like, and flat-topped spur unites it with Barn Bluff. Upon the east this is prolonged into several arms forming basins similar to those which I have described as existing near the Eldon Bluff. The sides of these, remote from the range, are open, and their edges fall abruptly in precipices and cliffs into the valley below.

Between the Cradle and the Middlesex Plains a gradual amelioration takes place in the character of the soil consequent upon the greater abundance of trap rock. Open forest land alternates with marshes and plains rich in herbage.

I reached the stock-keeper's hut at the Middlesex Plains upon the evening of the fifth day, and had thus completed the exploration from the settled districts on the one side to those upon the other.

I hastened to return, being anxious to cross the mountain range before the setting in of bad weather. On the night succeeding my arrival at the camp where Mr. Burgess was awaiting me, the Murchison became heavily flooded, the fallen trees by which we had crossed it were all swept away, and all communication with the opposite bank completely interrupted.

We had now a succession of bad weather for nearly a fortnight, commencing as usual with rain and ending with snow as the wind drew round to the south. The season was rapidly advancing, and I therefore, during this time, concentrated the party again at the log hut; but, being unwilling yet to finally abandon the exploration, conducted a portion of it to prospect the country near Lake Dixon. A great number of holes were sunk, but, as in all the other instances, without resulting in any discovery. Mr. Burgess was meanwhile engaged in taking soundings of Lake St. Clair, and in superintending the return of the remainder of the party, and the conveyance of the baggage, &c. to the Mount Charles hut, where I rejoined him upon the 18th, and on the following morning started again for the settled districts.

I cannot conclude this Narrative without expressing the obligation which I feel myself to be under to Mr. Burgess for the very able and obliging manner in which he co-operated with me upon the expedition, and the highly valuable nature of the professional services which he rendered to it.

The acquaintance with the country which Mr. Burgess had obtained in the course of his previous expedition to the Eldon range enabled him to point out at once the route by which it would be most readily reached, and thus to obviate a serious loss of time which would otherwise probably have occurred in our penetration of this wild and difficult country. I must also express my extreme satisfaction with the indefatigable exertions of Mr. Ibsen, the second officer of the party, who had especially onerous duties to perform; and my thanks to Mr. Smith for his execution of those allotted to him: nor can I omit to mention the praiseworthy conduct of the men generally engaged upon the Expedition, and often under circumstances of great hardship and privation.

CHARLES GOULD, *Government Geologist.*

EXPEDITION TOWARDS THE MACKINTOSH RIVER.

(*Mr. Burgess's Report.*)

ON the 28th April I crossed the Murchison River, and proceeded in a north-westerly direction to a saddle in a range to the northward, and thence northerly along a valley to the Granite Rivulet,—a stream of about half a chain in width, with a good flow of water, situated about four miles from the Murchison. I followed it in a westerly direction about a mile, when I found it flowing through granite rocks. To this point I had seen no change in the geological formations, the rocks being the same as in the country further to the southward, and the land of the poorest description, consisting of hills covered with heath and small tea-tree, and precipitous gullies almost inaccessible, and filled

with myrtle forests. I traced the granite to the westward for about two miles, the river forming nearly the boundary between it and the mica slates. I then crossed the river, and went on in a north-westerly direction over some small marshes, covered with tea-tree scrub, to the top of a range running towards the Mackintosh, and followed to within about four miles of that river.

With the exception of the granite, which consists of a hill about six miles in length and two miles and a half in breadth, there is no difference in the geological formation from that farther to the southward. The Granite Rivulet flows to the Mackintosh through a valley of about 4000 acres to the westward of the range I was upon, half of which is open, and appears to be of a character suited for occupation for pastoral purposes. This is the only land I saw that was worth mentioning as likely to be of any value for either agriculture or grazing. There may be a large tract farther to the westward, between the Mackintosh and Arthur Rivers. As the country appears to be more level in that direction, and its height above the sea cannot be more than three or four hundred feet, I think it could be approached from the Surrey Hills without difficulty, as also by following the Pieman's River, which is navigable for a long distance up, and forms the outlet of the Mackintosh and other large rivers in that part.

GORDON BURGESS.

PHYSICAL AND GEOLOGICAL STRUCTURE.

THE area examined by the late Expedition is limited upon the east and west by mountain ranges; the one consisting of the broken and rugged summits of those at the edge of the plateau of trap rock which supports the Lake District upon the east, while the other is a continuation of the range extending northward from Mount Sorell: both are wild and rugged, the former particularly so, the latter being interrupted by several passes or valleys which permit of an easy passage across it to the coast.

Upon the north the exploration was carried as far as the Cradle and Barn Bluff mountains, and the high lands stretching westerly from them; while upon the south it was completed to the district examined by the expedition of the year preceding.

By far the larger portion of this country is mountainous and barren, and, from its elevation, exposed to great severity of climate.

The loftiest and most conspicuous range in it is that of the Eldon, which extends nearly due east and west for about 15 miles. Separated from it by a deep valley, bridged at one point by a narrow connecting saddle, is a parallel secondary range which unites on the east with that of Mount Olympus and the mountains in its vicinity. South of this are Mount Gell, Mount Hugel, Mount Arrowsmith, and the Frenchman's Cap; and the intervening country is occupied by spurs separated from each other by deep and thickly wooded valleys.

The only open country to any extent upon the south of the Eldon Range is that included in the valleys of the King's River and the Rivers Cuvier and Collingwood. Upon the north the country is equally broken, and is occupied by spurs and extensions of the surrounding ranges.

This district is occupied by the following formations:—

- Igneous Rocks* — 1. Greenstone and Basalt.
- 2. Granite.
- Stratified Rocks*—1. Upper Palæozoic.
- 2. Lower Palæozoic.
- 3. Metamorphic.

Greenstone.

Greenstone occurs only in the eastern portion of the district, excepting on the Eldon range; it is generally at great elevations, and in the form of a capping to the stratified deposits subjacent.

It has the appearance, in most instances, of being present in the form of outliers from the great mass of trappean rocks upon the east; for the regularity and undisturbed condition of the stratified formations below counteract, in most instances, the idea of its having been ejected through, but conveys the impression of its having flowed across, their exposed surfaces from east to west.

In one instance, however,—viz. in the narrow valley west of Mount Hugel—there appears to be a dyke of considerable width which cuts through the palæozoic and metamorphic rocks, and probably by its overflowing formed the considerable thickness of trap rock which crowns Mount Gell, &c.

The structure of the greenstone is tolerably uniform throughout the district: it is usually more or

less columnar, but occasionally amorphous, and sometimes flaky; it is generally coarse grained, and sometimes passes into greenstone porphyry; it has the appearance of being perfectly devoid of mineral veins.

Boulders of greenstone occasionally occur of great size, and in considerable quantities, at distances remote from points where it exists *in situ*: this is the case near the outlet of the Cuvier Valley, upon Mount Arrowsmith, in the Collingwood Valley, and less frequently in other spots. The junction of the greenstone and underlying rocks occurs at elevations which vary considerably in short distances,—not more so, however, than we might anticipate in the case of one rock resting unconformably upon the irregular eroded surface of a pre-existing one.

The occurrence in such numbers of the boulders of greenstone to which I have alluded as happening in certain situations is difficult of explanation, if we confine ourselves to considering their position as resulting from the ordinary action of denudation.

If, however, we permit ourselves to speculate (as has been suggested by the Rev. W. B. Clarke) upon the possibility of their having been transported by glacial action, we should be enabled to obviate those difficulties by the adoption of a not improbable solution. It unfortunately happens that, in those localities where appearances are most corroborative of such a theory, the nature of the existing formations is such that the most important links in the evidence are inevitably absent.

In the Cuvier Valley I was struck, both in going and in returning, by the similarity to the terminal moraine of a glacier presented by an enormous accumulation of boulders which chokes the lower end of the valley, and, somewhat like a dam, extends completely across it, with the exception of the point where it is broken through by the river.

Here, however, the evidence ceases; the nature of the sandstones and conglomerates which line the valley being far too friable to allow us to expect that they could exhibit the grooves, scratched and polished appearance, and other indications which would be retained upon the surfaces of any harder and more enduring formations which might have been exposed to the conditions suggested; viz., the slow but irresistible action of enormous masses of ice in motion; while the surfaces of the possibly transported boulders of greenstone itself, although it is of such superior hardness, have been completely weathered, from the comparative proneness of one of its constituents (felspar) to decomposition.

Such being the case, and the time which I was enabled to devote to the investigation of this very interesting question having been necessarily limited upon account of the special nature of the Expedition, I am at present only in a position to allude to the above theory as a possible explanation of the facts referred to, rather than as one supported by any very convincing evidence.

I have alluded in the Narrative to the very considerable depth of Lake St. Clair, which has been ascertained by Mr. Burgess to amount at one point to as much as 550 feet. This circumstance is remarkable when we contrast it with the limited area of the lake, and is at first sight not readily susceptible of explanation. I had no opportunity of visiting the lake myself, and my information respecting it has been acquired from Mr. Burgess's description.

The associations of the lake, its extreme depth, the height and steepness of the mountains which border it, and especially the presence of the masses of igneous rock with which they are crowned, have commonly led to the not unnatural impression of its being the crater of an extinct volcano. Such, however, is not the case,—the similarities are fancied and unreal.

Sandstone strata crop out from below the greenstone upon the lake side of Mount Olympus, and are continuous with those which form the flanks of that range upon the side towards the Cuvier valley: these beds are nearly horizontal, and may be observed appearing again from beneath the trap rock which forms the summits of the mountains upon the eastern side of the lake.

I think that it is hardly necessary for me to observe that this structure is incompatible with that of the walls of a volcano, or to refer, in addition, to the absence of the scoriæ, ashes, &c. which would otherwise be found in the vicinity of the lake.

I believe the following to be the real explanation; viz.—that the valley existing between Mount Olympus and Mount Ida has been converted into a lake by the formation of a dam extending completely across it,—just, in fact, as the lower end of the Cuvier Valley would also have been converted into a lake, had the barrier existing in it been equally continuous from one side to the other.

The country for some distance south of Lake St. Clair is occupied by trap rocks, of which there exist two varieties of distinct age. The first consists of greenstones, which are probably contemporaneous with those upon Mount Olympus, the Eldon Range, &c., and project in the form of massive and elevated tiers from intervening plains of greenstone and basalt of much more recent date; and it is the extension of the latter into the previously excavated valley of Mount Olympus which has caused the damming back of the waters, and the production of the lake.

Granite.

Contrary to my anticipations, I found granite to be very sparingly developed throughout this district, it only having been met with *in situ* in one locality, where it occupied but a limited area.

Count Strzelecki mentions the occurrence of granite associated with protogene at the Eldon Range, and states that it forms the base of the dividing range between Lake St. Clair and the Frenchman's Cap.

I am less able to speak positively with regard to the latter instance, but am convinced that he is mistaken as respects the former.

As the country was even more inaccessible at the time of his visit than it is at present, and altogether unsurveyed, it is not improbable that he may have mistaken the position of the Eldon Range, and have intended his remarks to apply to some range further north.

As, however, granite is an occasional constituent of the breccias at the base of the upper palæozoic series, and occurs in masses of some size liberated by the denudation of these beds, it is possible that his error may have originated from the discovery of specimens whose position was due to that cause. I myself have found granite in the Cuvier Valley, on the summit of the range south of, and parallel to, the Eldon, and in many other positions which left no doubt as to the source from which it had been derived.

I met with no granite in the localities to the south which I had an opportunity of visiting; viz. Collingwood Valley, Mount Arrowsmith, &c.

Upper Palæozoic.

Beds containing species of *Spirifer*, *Productus*, &c., and evidently the equivalent of similar ones extending over a large portion of Tasmania, project from below the greenstone, and are continued along the summit of the spurs of several of the loftier and more important ranges. They are usually but little disturbed, and indeed almost horizontal; the amount of the dip in no instances exceeding a few degrees. They rest unconformably upon the upturned edges of the lower palæozoic and metamorphic schists below; and their lines of stratification constantly contrast strikingly, even at a distance, with those of the nearly vertical schists and columnar greenstones between which they are situated.

The series, taken in an ascending order, appears to be as follows:—At the base are coarse breccias composed principally of fragments of metamorphic and palæozoic schists; succeeding these are conglomerates, grits, and sandstones, passing upwards into highly fossiliferous mudstones, clay-slates, &c. &c.; above which rest in perfect conformability a considerable thickness of shales, with one or two very thin coal seams. The latter fact is of considerable interest from its bearing upon the question as to the age of the coal-beds of Tasmania.

These beds have been altered by the contact of the igneous rocks in degrees dependent upon their nature. The sandstones and conglomerates appear to have been but slightly affected; the shales are rendered hard, and are often exfoliated. Claystones present the appearance of having been burnt, and are traversed by system of joints at right angles, which cut them into parallelograms and cause them to assume a tessellated appearance.

Casts of fossils are very numerous, especially in the argillaceous sandstones and claystones: none were met with in the upper shales. Those obtained are, with few exceptions, identical with species described in Count Strzelecki's work, and appear to have strong affinities with carboniferous forms. Professor Morris, in his general observations upon them in the work referred to, considers them of carboniferous age, an opinion which is supported by the presence of *Producti*, *Fenestellæ*, and of species of *Spirifer* allied to British ones. Mr. Salter has, however, pointed out that a few species of the latter genus are of the broad-winged type so characteristic of the Devonian formation; and I have therefore preferred retaining for them at present the general appellation of upper palæozoic until a more detailed examination in various parts of the Island, and a more extended acquaintance with the fossils contained in them, may enable me to determine whether an exact parallel can be drawn between these and European formations.

Lower Palæozoic. (Upper Silurian.)

These beds occur at the base of the western half of the Eldon Range, and extend southwards to the Collingwood Valley, beyond which I had no opportunity of tracing them. They rest unconformably upon metamorphic schists, and appear to occupy the trough of a synclinal in the latter, and to partake in common with those of such a disposition.

It is with difficulty, however, that correct observations can be made upon their dip, on account of the cleavage which affects the upper members of the series, and the contortion of the lower ones.

This formation consists of a considerable thickness of dark grey mudstones and clay-slates rarely alternated with arenaceous, and towards the base calcareous, bands, and limestones.

Succeeding these are highly micaceous beds, siliceous grits, and clay-slates, the latter resting unconformably upon the metamorphic rocks.

The upper beds are fossiliferous, and contain several species of *Orthis*, a *Calymene* closely allied to the *C. tuberculosa* of Britain, species of *Cardiola*, *Strophomena*, *Atrypa*, a small *Orthoceras*, and a simple cup-shaped coral belonging to the *Cyathophylloids*.

The total number obtained is, however, too inconsiderable to admit of the determination of the age of this formation with extreme precision; but, from the character of the fossils which I have enumerated above, and from a consideration of the relation of these beds to other palæozoic strata existing in Tasmania, I believe that we may for the present, without much hesitation, consider them as the equivalents of the Upper Silurian deposits of Europe.

They are frequently affected by a species of imperfect, nearly vertical cleavage, which renders it difficult, and in many cases impossible, to ascertain their true dip. They are traversed by a few quartz veins. The grits and clay-slates below are highly contorted, and, as far as I could ascertain, non-fossiliferous; they are also occasionally traversed by quartz veins,—inconsiderable, however, both in point of size and number.

The slates themselves and the quartz often contain pyrites.

Metamorphic Schists.

By far the largest portion of the district is occupied by metamorphic rocks; these are principally varieties of mica schist and quartz rock, which appear to alternate with and pass in to one another.

The mica schist consists of quartz and mica in varying proportions; these minerals are sometimes arranged in alternate laminæ, while at others the quartz is aggregated into nodules which are imbedded in soft micaceous or occasionally chloritous schist. Those varieties, however, are the most abundant in which the quartz preponderates over the mica, and they frequently pass into an almost homogeneous quartz rock. The greater part of these beds possess a wavy, foliated structure, with a lamination in general definite directions.

Although quartz enters so largely into their composition, it usually appears to be merely interlaminated, and seems rarely to be present in the form of veins or reefs. It frequently contains pyrites, and in some instances cavities in it—due to the decomposition of the latter—are filled with native sulphur. On the sides of the hill facing Mount Murchison I procured specimens of red hematite. As far as I had the opportunity of observing, it appeared to be interstratified with micaceous beds, and not to traverse them in the form of a lode. This would have been a valuable discovery had the ore existed in somewhat greater abundance, and had the locality where it occurred been less inaccessible.

Whenever there is a general uniformity in the dip I have indicated it upon the Map by arrows, from the direction of which it will be perceived that an anticlinal runs from Mount Arrowsmith in the south to High Tor in the north. This is possibly due to an axis of granite existing at some depth below, and appearing at the surface at the place indicated upon the Map, and at that recorded by Count Strzelecki. No minerals are found in these schists, with the exception of those mentioned above and a few small garnets, which were obtained by Mr. Burgess from near their junction with the granite.

In making a few general remarks upon the mineral capabilities of this district, and especially upon the suggested existence in it of a gold-field, I shall commence by observing that, judging by the practical results of the late expedition, it must, I think, be obvious that gold cannot exist there in remunerative quantities.

The men whom I engaged as prospectors were both competent and zealous; most of them had spent some considerable time at the Victorian gold-fields, and two of them had been working for several years at Fingal.

The absence of any considerable thickness of drift permitted of a far larger number of holes being sunk than could have otherwise been the case,—and, with one or two exceptions, these holes were all fairly bottomed.

The courses of many of the smaller creeks were partially diverted, holes sunk in their beds, and the bars and ledges across them carefully examined; and, lastly, the whole of the points investigated were carefully chosen in the most advantageous position, while the unusual fineness of the season, favored our operations in the highest degree. Yet, with all these circumstances in its favour, the party was (with one exception) unsuccessful in discovering even the slightest trace of gold;—and this, I believe, could not have happened had gold existed there in even a very moderate amount.

In seeking for an explanation of a result so different from that which had been generally anticipated, I conceive that it will be found that a misapprehension has existed with respect to the nature of the schists which are so largely developed in this hitherto unexplored region, and which are altogether

different from the lower Silurian and the Cambrian formations which contain the rich auriferous quartz veins in the adjoining Colony of Victoria. The former are crystalline azoic metamorphic schists, and the bulk of the quartz contained in them is present as an essential constituent, as much so as it is in granite or in any other rock of which it is a component mineral. On the other hand, the schists of the most important Victorian gold-fields are non-crystalline and fossiliferous; and the quartz which is contained in them exists in the form of reefs or veins whose origin is subsequent to the date of the deposition of the formation, and has been caused by fortuitous circumstances.

While pointing out the dissimilarity of these formations, I must observe that the metamorphic rocks throughout the world are frequently metalliferous, and even gold-bearing; and that it was therefore perfectly reasonable to speculate upon the possibility of their being so in this instance also.

I myself was much impressed with the importance of thoroughly investigating them, and feel convinced, from the uniform want of success which attended our efforts, that there is no chance whatever of discovering gold in remunerative quantities in the district visited by us.

This opinion is strengthened by the circumstances to which I have before alluded, of there being few quartz veins of any extent intersecting these schists; nearly all the quartz present being inter-laminated with them, and, if I may be permitted the expression, structural. With regard to the Silurian formation, the extent occupied by the lower beds is very limited; and the upper ones, which constitute the bulk of it, are almost devoid of quartz veins. I cannot help considering, also, that the absence of granite, and of other igneous rocks in any abundance, is a very unfavourable condition.

Again, since the greater or less abundance of the gold existing in *alluvial deposits* may be assumed as a fair test of the average auriferous value of the *rocks* from which they have been derived, I think it improbable that rich, or even merely payable, quartz veins can exist in the vicinity of spots so carefully examined, and without the slightest success,—unless indeed the gold should, as has been suggested by the Rev. Mr. Clarke, be present in a microscopic state of subdivision, *saturating* the quartz, and inseparable from its matrix by the ordinary mechanical appliances, when recourse would be necessitated to the expensive process of reducing the quartz by chemical re-agents.

It is certainly remarkable how constantly the specimens of quartz forwarded to the assayers are reported to contain gold, while none can be found in the drifts adjoining the reefs from which they have been taken. Of four specimens of quartz obtained near Lake Dixon, and forwarded to Mr. Hodgson to be assayed, three are reported to contain gold at the rate of 5 dwts. 3 grains, and the other of 6 dwts. 10 grains, to the ton: none whatever could be found by the prospectors, although a great number of holes were sunk in the immediate neighbourhood of the heap of quartz from which they were taken.

By the single exception alluded to, in speaking of the want of success upon the part of the prospectors, I referred to one who, some time after his return, produced one or two small specimens of quartz containing gold, which he *said* he obtained in the western country: his account, however, was very inconsistent.

CHARLES GOULD, *Government Geologist.*

SECTION 3.

In the second copy of the Map which I have the honor to forward, I have roughly indicated by colours those portions of the district which are available for occupation. These have been incidentally referred to in the course of the Narrative, and I shall therefore feel it necessary to make but few remarks respecting them.

The most important are the valleys of the Cuvier River, and of the Collingwood and King's Rivers. The first must be occupied in connection with, and from, the country to the south east of it. In the case of the other two, however, the difficulties of access are so great that I fear they will be unavailable for settlement, unless some route is secured to them from the sea-coast. A passage from one to the other of these valleys would not be difficult; and if they were connected at the same time with the plains upon the Loddon and Surprise, a considerable extent of country would be opened for occupation; while, if the track completed by the Expedition as far as the head of the King's River was continued through either of the valleys west of it, a communication would be established between the coast and the settled districts,—and the route thus opened could be maintained at a very trifling expense, and made available for pack-horses and bullocks with but little difficulty.

I have appended a few general remarks made by Mr. Burgess, together with an approximate Table of Heights, and a series of Barometrical observations, &c. taken as constantly as it was possible to do so.

CHARLES GOULD.

Inserted after page 14 (not included with this copy):

3 charts -

1. "Map of a Portion of Western Tasmania; Explored during the summer of 1860 by an Expedition under the command of Charles Gould B.A.F.G.S., Government Geologist."

[This chart maps specific geological features of "The Eildon Range"]

2. "Sketch section to illustrate Map"

[This insert provides approximate heights of ranges, and a "Diagrammatic section of Lake St. Clair".

3. "Map of a Portion of Western Tasmania; Explored during the summer of 1860 by an Expedition under the command of Charles Gould B.A.F.G.S., Government Geologist."

[This chart maps potential pastoral and agricultural areas of land]

THE marshes to the southward of the junction of the Eldon Rivers are of a better class than most of those I have seen in the western country. The button grass constitutes the principal herbage here as in other parts, and, as it has not been burnt for a very long time, if ever, grows to a great size; but in some places I found it was disappearing, and leaving patches covered with native trefoil and fine grass. About two or three hundred acres of these marshes consist of the common sedges of the settled districts. There are very few crab holes and blind creeks, which I consider are indications of their being comparatively dry at all times. The extent of these marshes is about 4000 acres on the eastern bank of the Eldon River, and 2000 acres in a valley opposite running towards the coast.

There are about 1500 acres of land fit for agricultural purposes in the valleys of the North and South Eldon covered with myrtle forests, with very little underwood, but ferns growing all through; the soil is rather sandy, but good, and would, I have no doubt, in so moist a climate grow very good crops.

The difficulty of access to the above lands will, I fear, prevent them being taken up, and they are not of sufficient extent to justify the expenditure which would be necessary to make a road to them.

GORDON BURGESS.

NOTE.—The surface of a considerable portion of the open lands in the western country, and especially of the marshes, is frequently perforated with the holes burrowed by a small species of crayfish (*Astacus* —?) which exists in innumerable quantities. The animals themselves are seldom visible, but remain concealed in the water at the bottom of their burrows. From the fact of the position of the latter being entirely independent of the proximity of any lakes or streams, the crayfish are commonly known to the shepherds by the name of land crabs. The ground is, in some instances, completely undermined by them; and they often originate the underground or "blind" creeks which are so dangerous in sheep-runs. I have found this species upon the summits of hills nearly four thousand feet above the level of the sea.

C. G.

TABLE OF HEIGHTS.

Trigonometrical Stations.

	FEET.	
Frenchman's Cap.....	4756	} <i>Sprent.</i>
Eldon Peak	4739	
Cradle Mountain.....	5069	

Heights deduced from Observations with an Aneroid Barometer.

Ford at the River Derwent.....	2325
Lake St. Clair	2415
Lake Petrarch	2578
Log-hut (Cuvier Valley).....	2901
Camp (south of Amphitheatre)	2959
Lake Augusta (Eldon Bluff)	3014
Mount Hugel	4700
Eldon Peak	4701
Amphitheatre	4539
Hill east of Pyramid Hill	3972
Camp in Collingwood Valley	1068
Camp on the South Eldon	974
Camp on the River Murchison	958
Summit of Pyramid Hill	3900
Summit of Camp Hill	3448
Junction of North & South Eldon	880

ANEROID OBSERVATIONS.

PLACE OF OBSERVATION.	TIME.				MEAN.		WIND.	REMARKS ON WEATHER.
	Day.	Hour.	Bar.	Ther.	Bar.	Ther.		
	1859.		o	o				
Camp at the Derwent	Dec. 22	9-15 a.m.	27-74	61	27-74	61	—	Days fine.
	23	8 a.m.	27-52	59	27-51	66-66	—	
		9-45 a.m.	27-51	70	—	—	—	
		10-20 a.m.	27-50	71	—	—	—	
	24	5-25 p.m.	27-64	74	—	—	—	
	25	10-30 a.m.	27-75	78	—	—	—	Day fine, lightning in the evening, rain through the night.
	26	6-45 a.m.	27-63	53	—	—	—	
	27	8-45 a.m.	27-47	58	27-52	63-50	—	
		3 p.m.	27-55	69	—	—	—	
Top of Mount Hugel....	28	—	25-38	70	—	—	—	
Lake Petrarch	29	10-45 a.m.	27-17	68	—	—	—	Days fine.
		11-15 a.m.	27-18	72	—	—	—	
		4-15 p.m.	27-20	65	—	—	—	
Camp at Lake St. Clair....		6-50 p.m.	27-58	60	—	—	—	
	30	10 a.m.	27-76	56	—	—	—	
Ford at the Cuvier River ..		11 a.m.	27-80	64	—	—	—	
Lake Petrarch	31	6-15 a.m.	27-64	68	—	—	—	
	1860.							
Log hut	Jan. 1	10-30 a.m.	26-76	70	—	—	—	Day fine.
	2	2 p.m.	26-76	73	—	—	E.	Day fine, fresh breeze in the evening.
		5-30 p.m.	26-75	67	—	—	E.	
	3	8 a.m.	26-82	59	—	—	E.	Fine but hazy.
		1-5 p.m.	26-91	65	—	—	E.	
	4	6 a.m.	26-82	53	—	—	E.	Very fine.
		10 a.m.	26-92	63	—	—	—	
		7-55 p.m.	26-89	68	—	—	—	
	5	5-30 a.m.	26-83	52	—	—	—	Fine.
		10-10 a.m.	26-85	65	—	—	—	
	6	7 p.m.	26-93	52	—	—	—	Fine and warm.
		6 a.m.	26-87	60	—	—	—	
Camp at base of Pyramid Hill		7-45 a.m.	26-97	65	—	—	—	Fine.
Summit of Pyramid Hill..		10-15 a.m.	25-87	72	—	—	—	
		4-30 p.m.	25-75	67	—	—	—	
	7	—	—	—	—	—	—	Rain nearly all day.
	8	—	—	—	—	—	—	Rain nearly all day.
	9	—	—	—	—	—	—	Rain in the forenoon.
Camp at base of Pyramid Hill	10	—	—	—	—	—	N.W. strong	Fine.
	11	7 p.m.	26-59	60	—	—	W.	Rain.
	12	7 a.m.	26-52	53	—	—	W.	
		9-15 a.m.	26-74	64	—	—	W.	
		7 p.m.	26-46	49	—	—	W.	
	13	7 a.m.	26-60	46	—	—	W.	
		Noon	26-46	—	—	—	W.	Rain, snow, and hail.
		4 p.m.	26-48	—	—	—	W.	
		6 p.m.	26-32	47	—	—	W.	
	14	4 a.m.	26-10	41	—	—	W.	
		7 a.m.	26-19	43	—	—	W.	
		Noon	26-25	44	—	—	W. S. W.	Sleet in the morning, afternoon fine.
		6 p.m.	26-46	41	—	—	S. W.	
	15	7 a.m.	26-32	39	—	—	S.	
		Noon	26-96	48	—	—	S.	Cloudy, dry.
		7-30 p.m.	27-07	47	—	—	Calm	
Camp below the Amphi- theatre.....	16	6 p.m.	27-09	45	—	—	Calm	
Summit of the Amphitheatre		11-30 p.m.	27-12	47	—	—	Calm	Light showers about mid-day.
Camp at base of Pyramid Hill	17	—	25-55	54	—	—	Calm	
		9 a.m.	27-00	56	—	—	—	
		11 a.m.	26-59	57	—	—	—	Morning foggy ; day fine.
		1 p.m.	26-40	—	—	—	—	
Camp below the Amphi- theatre		8 p.m.	26-41	56	—	—	—	
Range west of Pyramid Hill		—	27-26	53	—	—	—	Fine.
	18	3-15 p.m.	26-27	64	—	—	—	
		7 a.m.	26-28	—	—	—	—	
		9-15 a.m.	26-70	50	—	—	—	
		7 p.m.	26-50	—	—	—	—	
	19	—	—	—	—	—	—	
	20	6 a.m.	26-56	—	—	—	—	Morning foggy ; day fine.
		1 p.m.	26-54	—	—	—	—	
Camp in the Collingwood Valley	21	3 p.m.	28-48	80	—	—	—	
	22	—	—	—	—	—	—	Fine.
	23	—	—	—	—	—	—	Day dull and threatening with rain.
	24	1 p.m.	28-67	60	—	—	—	Fine.
	25	9 a.m.	28-35	60	—	—	—	Rain all day.
	26	7-30	28-62	59	—	—	—	Showery all day.

PLACE OF OBSERVATION.	TIME.				MEAN.		WIND.	REMARKS ON WEATHER.
	Day.	Hour.	Bar.	Ther.	Bar.	Ther.		
Camp in the Collingwood valley	1860. Jan. 27	°	°	—	—	—	—	} Fine.
Base of Camp-hill	28	8 a.m.	26.79	46	—	—	—	
Summit of Camp-hill	29	11 a.m.	26.28	73	—	—	—	
Main Camp at the S. Eldon River	30		29.14	—	—	—	—	} Fine.
	31	8 a.m.	29.15	52	—	—	—	
		6 a.m.	28.97	53	—	—	—	
	Feb. 1	10 a.m.	29.15	52	—	—	—	} Rain in the night and the early part of the morning, day fine.
		6 p.m.	28.97	—	—	—	—	
	2	8.30 a.m.	29.15	50	—	—	—	
	3	6 p.m.	29.18	—	—	—	—	} Dry, but dull.
	4	7 a.m.	29.04	—	—	—	—	
	5	—	—	—	—	—	—	
	6	—	—	—	—	—	—	} Fine.
	7	—	—	—	—	—	—	
	8	—	—	—	—	—	—	
Summit of the Eldon Peak	9	9.45 a.m.	25.33	59	—	—	N.E.	} Days fine.
	10	—	—	—	—	—	—	
	11	—	—	—	—	—	—	
	12	—	—	—	—	—	—	} Days fine.
	13	—	—	—	—	—	—	
	14	—	—	—	—	—	—	
	15	—	—	—	—	—	—	} Heavy fall of snow on the hills, cold rain.
	16	—	—	—	—	—	—	
	17	—	—	—	—	—	—	
Main Camp at the S. Eldon River	18	—	28.43	—	—	—	—	} Rain and snow.
	19	—	—	—	—	—	—	
	20	—	28.92	—	—	—	—	
	21	—	28.95	—	—	—	—	} Forenoon foggy and dull, rain in the afternoon.
	22	—	—	—	—	—	—	
	23	—	—	—	—	—	—	
	24	—	—	—	—	—	—	} Morning dull and foggy, clear in the afternoon.
	25	—	—	—	—	—	—	
	26	—	—	—	—	—	—	
Junction N. & S. Eldon ..	27	—	29.07	57	—	—	—	} Days fine.
	28	—	28.99	60	—	—	—	
	29	—	28.85	60	—	—	—	
	Mar. 1	—	28.59	65	—	—	—	} Weather very hot and close.
	2	—	28.55	60	—	—	—	
	3	—	—	—	—	—	—	
	4	—	—	—	—	—	—	} Fine.
	5	—	—	—	—	—	—	
	6	—	—	—	—	—	—	
Camp below the Amphitheatre	7	7.30 a.m.	27.98	48	—	—	—	} Weather cloudy, a little rain in the afternoon.
	8	—	—	—	—	—	—	
	9	—	27.26	65	—	—	—	
Eldon Bluff Camp	10	—	27.16	65	—	—	—	} Morning foggy, day dry.
	11	—	27.28	60	—	—	—	
	12	7 a.m.	27.12	64	—	—	—	
Camp below the Amphitheatre	13	noon	27.12	61	—	—	—	} Day foggy, rain in the night.
	14	6 p.m.	27.12	46	—	—	—	
	15	7 a.m.	27.08	54	—	—	—	
	16	6 p.m.	27.04	54	—	—	—	} Rain, strong S.W. wind.
	17	10 a.m.	27.14	55	—	—	—	
	18	—	—	—	—	—	—	
	19	10 a.m.	26.95	52	—	—	—	} Days fine.
	20	6 p.m.	26.90	60	—	—	—	
	21	10 a.m.	26.78	60	—	—	—	
	22	5 p.m.	26.64	63	—	—	—	} Morning dull and showery, cleared off towards noon.
	23	3 p.m.	26.50	50	—	—	—	
	24	—	—	—	—	—	—	
Camp 2 miles N. of Eldon Bluff	25	9 a.m.	26.57	43	—	—	N.S.W.	} Rain.
	26	noon	26.64	50	—	—	S.S.W.	
	27	6 p.m.	26.76	43	—	—	S. by W.	
Camp at the Eldon Bluff ..	28	noon	26.44	40	—	—	—	} Hail and snow.
	29	9 a.m.	26.88	42	—	—	—	
	30	noon	26.90	50	—	—	—	
Camp 2 miles N. of Eldon Bluff	31	7 a.m.	27.02	46	—	—	South	} Fine.
Camp 2 miles S.E. of River Murchison	1	7 p.m.	27.43	49	—	—	Calm	
	2	—	—	—	—	—	—	
Camp at the Eldon Bluff ..	3	noon	26.90	50	—	—	—	} Day dull, but dry.
	4	6 p.m.	26.92	46	—	—	—	
	5	noon	26.80	50	—	—	—	
	6	—	—	—	—	—	—	} Forenoon squally; afternoon still.
	7	—	—	—	—	—	—	
	8	—	—	—	—	—	—	
	9	—	—	—	—	—	—	} Fine.
	10	—	—	—	—	—	—	
	11	—	—	—	—	—	—	

rain

PLACE OF OBSERVATION.	TIME.				MEAN.		WIND.	REMARKS ON WEATHER.
	Day.	Hour.	Bar.	Ther.	Bar.	Ther.		
Camp at the Eldon Bluff..	1860:		°	°	—	—	—	
	Mar. 23	noon	26.72	44	—	—	—	Stormy and rainy.
		6 p.m.	26.80	48	—	—	—	
	24	7 a.m.	26.88	40	—	—	—	Dry.
		6 p.m.	26.80	54	—	—	—	
	25	9 a.m.	26.82	52	—	—	—	
		noon	26.74	52	—	—	—	Wet day.
		6 p.m.	26.66	50	—	—	—	
	26	10 a.m.	26.77	44	—	—	—	Forenoon rainy, afternoon dry but dull
		3 p.m.	26.85	46	—	—	—	and windy.
Camp on the River Mur- chison	27	—	—	—	—	—	—	Fine.
	28	11 a.m.	29.20	50	—	—	—	ditto.
	29	—	—	—	—	—	—	Showery.
	30	—	—	—	—	—	—	Rain.
	31	—	—	—	—	—	—	Fine.
	April 1	—	—	—	—	—	—	Fine.
	2	—	—	—	—	—	—	Dry, very windy.
	3	—	—	—	—	—	—	Rain in the afternoon
	4	—	—	—	—	—	—	Fine.
	5	—	—	—	—	—	—	Rainy.
Log hut Cuvier Valley .. Camp at Lake St. Clair....	6	—	28.64	—	—	—	—	ditto.
	7	—	—	—	—	—	—	Heavy rain all day.
	8	—	—	—	—	—	—	Heavy rain.
	9	—	—	—	—	—	—	ditto.
	10	—	—	—	—	—	—	Rain all day.
	11	9 a.m.	25.80	46	—	—	N.W.	
		2 p.m.	26.62	51	—	—	—	Heavy rain all day.
	12	8 a.m.	26.83	36	—	—	S.W.	
		2 p.m.	26.90	39	—	—	—	
		6 p.m.	26.94	44	—	—	—	Heavy snow storm.
Mount Charles hut	13	7 a.m.	26.88	36	—	—	W.	
		noon	27.07	50	—	—	S.W.	
		6 p.m.	27.08	38	—	—	ditto	Snow.
	14	7 a.m.	27.28	42	—	—	S.W.	
		2 p.m.	27.44	46	—	—	Calm	
		6 p.m.	27.46	44	—	—	ditto	Rain in the forenoon, cleared up in the
	15	noon.	27.52	48	—	—	N.E. light	afternoon.
		6 p.m.	27.52	49	—	—	—	
	16	7 a.m.	27.53	43	—	—	N.N.W.	
		7 p.m.	27.51	43	—	—	—	Dry but dull.
	17	7 a.m.	27.51	39	—	—	Calm	
		7 p.m.	27.54	52	—	—	ditto	
	18	7 a.m.	27.54	42	—	—	ditto	Fine.
		1 p.m.	27.51	68	—	—	ditto	
Mount Charles hut	19	9 a.m.	27.60	62	—	—	—	