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THE OAKS AND EASTERN PORTION OF THE
ETHERIDGE GOLDFIELDS.
(REPORT ON)
WITH 3 MAPS AND 12 PLATES.

BY

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THE OAKS AND EASTERN PORTION OF
ETHERIDGE GOLDFIELDS.

I. INTRODUCTORY.

Though mainly within the Etheridge Goldfield, the country occupying the valley of the Einasleigh and Copperfield Rivers is physically separated from the remainder of the goldfield by the abrupt though flat-topped Newcastle Range, which maintains an elevation of nearly 1,000 ft. above the general level of the country. This part of the field, which surrounds the comparatively new Oaks Goldfield, separated merely for administrative purposes, has from time to time been the subject of passing geological observations by various writers, owing mainly to its being traversed by the roads connecting the principal portion of the Etheridge with the East coast.

The earliest of these writers—Richard Daintree, afterwards Government Geologist for North Queensland—communicated his discovery of the Lynd Copper Mine to the Royal Society of New South Wales so long ago as 1867, and included in his subsequent papers remarks on the general geology of the field. Since that time Dr. R. L. Jack, Mr. A. Gibb Maitland, and Mr. W. E. Cameron, of this Survey, have contributed to the knowledge of the geology of this as well as of the western portion of the field.

Mr. Cameron's two reports and map (1900 and 1909) on the Etheridge form the only connected description of the field, the previous records consisting merely of isolated observations made while visiting certain mining centres. Mr. Cameron's reports, however, do not extend to the eastern side of the Newcastle Range, except for a short reference to the Einasleigh Mine.

The geological map accompanying the present report, both on account of the limited time spent in the examination of so great an area as well as on account of the very imperfect and often erroneous mapping of all the topographical features other than the main rivers, must not be considered more than a rough sketch, from which the minor details have necessarily been omitted.

In the field work, as well as in the preparation of the accompanying plans, the writer had the benefit of the assistance of Mr. R. Macdonald, to whom the majority of the photographs are due.
II. GENERAL GEOLOGY.

The geological formations occupying the eastern Etheridge are five in number, and will be considered in the order of their ages. They consist of:

1. Metamorphosed Sediments.
2. Granite.
3. Porphyry.
4. Desert Sandstone.
5. Basalt (of two ages).

As the physiographical features depend in a marked degree on the geological structure the two subjects are discussed together.

1. METAMORPHOSED SEDIMENTS.

These rocks vary immensely both in composition and in degree of metamorphism. They consist typically, as at Einaasleigh and Kidston, of contorted gneissose, hornblendic and micaceous schist, having a general strike a few degrees east of north and a dip as a rule very steep if not perpendicular. The direction of both strike and dip is, however, far from constant. At the Daintree Mine in the south-east corner of the map some of the rock is practically a fine sandstone, and not a very coherent one, so slight has been the metamorphism, although close to it the finer and less siliceous sediments are somewhat micaceous. In the same neighbourhood occasional bands of limestone outcrop on the surface. In other localities the siliceous sediments have been converted into massive quartzite, which effectively resists the denuding agencies, and, as at Quartz Hill and at Mount Surprise, forms considerable elevations.

The more basic hornblende schists, popularly known as diorite, form only a small proportion of the total metamorphic rocks, and may possibly represent basic intrusions into the sediments prior to their alteration, as it all shows, to a more or less marked degree, the schistose structure.

2. GRANITE.

Associated with the more highly altered sediments, more or less in a lit-par-lit structure, are granite and pegmatite injections, which, though occasionally cutting across the strike of the schists, are, as a rule, so intimately interlaminated with the rock intruded as to render it impracticable to map them separately, were it desirable to do so, even where clearly exposed in the river bed. A casual examination gives the impression that the injected laminae are part and parcel of the enclosing rock, and merely a result of its alteration. A closer examination, however, does not confirm this view, though the injection was not improbably coincident with the metamorphism.
Allied presumably to these interlaminations are large areas of muscovite and biotite granite. Though not uniformly so, the granite in many places is markedly porphyritic, the felspar phenocrysts having an orientation in harmony with the metamorphic rocks, of which the granite contains frequent, sometimes large, inclusions. Where the orientation of the granite minerals is most marked and the inclusions numerous, it becomes really a matter of choice to which class of rock it should be considered to belong.

Whether the granite was originally formed by the complete metamorphism of portion of the sedimentary rocks other portions of which it subsequently intruded, or whether it is the result of the intrusion of entirely fresh material, observations have yet to show. That it is not simply the direct result of metamorphism in situ, as Daintree supposed, but has actually been intruded into the sediment, has been demonstrated by Mr. Cameron's observations on the western side of the Newcastle Range, where a precisely similar granite occurs. A close examination of the granite interlaminations on the eastern side of that range, moreover, supports Mr. Cameron's view of the intrusive character of the rock.

The granite and schist have weathered, as a rule, into gently undulating country, with the exception of an occasional granite "tor" and hill of quartzite or hornblende schist. Towards the heads of the drainage systems, as of Stockman Creek and the Oaks River, the country is ridgy, though not rugged.

Besides the typical undulating granite country, a considerable area in the southern portion of the accompanying sketch is occupied by a fine-grained micaless granite, which forms the exceedingly rough and barren country at and near the Copperfield Gorge, the weathering out of numerous perched blocks forming a notable feature of the landscape.

3. PORPHYRY.

Forming the main portion of the Newcastle Range, together with some outlying masses and numerous apophyses, a quartz-felspar porphyry constitutes a very important feature in the geology of the Etheridge. Dr. Jack at one time was inclined to view this rock of the Newcastle Range* as a more or less altered trachytic ash. That it is really in the main an intrusive rock, as was since pointed out by Mr. Cameron, the numerous dykes both large and small of this material leave no room for doubt.

In places—for example at the head of Eva Creek, and again five or six miles south-east of Kidston—portions of the rock are a more or less glassy rhyolite, sometimes spherulitic. On the western fall of Newcastle Range, on the Robertson waters, near and above

* Geology and Paleontology of Queensland and New Guinea, p. 523.
the confluence of the right and left hand branches of that river, Dr. Jack described a "lofty bluff of trachyte lava resting directly on a coarse volcanic ash, which passes in places into a conglomerate." This volcanic ash contains numerous fragments of the metamorphic rocks, and is obviously of elastic origin. Its relation to the usual intrusive form of the porphyry, such as occurs directly to the east of the sandstone capping the ash in this locality, has not yet been observed, though there is little doubt that it represents the extrusive material due to the same volcanic activity that gave rise to the porphyry intrusions.

South of Christmas Hill, and outside the accompanying map, the porphyry also occurs in several localities. A chain of hills, including Black Cap, Mount Rous, and the Pinnacles, is there associated with a granite similar to it in structure and appearance except for the possession of a crystalline base. Not improbably, they are the same rock, crystallised under slightly different conditions.

Where the porphyry occurs in narrow dykes, as at the Oaks, the porphyritic crystals are frequently absent, and the rock consists simply of the felspathic cryptocrystalline base. It is then not infrequently laminated parallel to the sides of the dyke—a result due presumably to flow structure and indicating the viscous condition of the magma. In the north-west of the map, near Macmillan Creek, a dyke connecting two aphyrytes with the main mass of porphyry has developed a columnar structure, the columns being horizontal, perpendicular to the sides of the dyke.

The main masses of porphyry, as well as the larger dykes, by reason of their powers of resistance to weathering, present a steep and often rugged face to the generally undulating country, formed by the granite and metamorphic rocks. Much of the country near the main masses, and especially from Teesdale south-east to and beyond the Oaks, is intersected by numerous small dykes.

4. DESERT SANDSTONE.

At elevations ranging in this part of the Etheridge from 2,000 to 3,000 ft. above the sea-level and from 700 to 1,000 ft. above the general level of the country, the highest hills are all capped by a layer of sandstone. This has been previously described by various writers from the time of Daintree, who named it elsewhere Desert Sandstone on account of the poor country which it forms. It is typically a fairly coarse, current bedded, horizontal sandstone, in places hardened to a quasi-vitreous quartzite. Though no recognisable fossils have been found in it, it has so far been provisionally classed, by reason of its mode of occurrence, as being identical with the Desert Sandstone (Upper Cretaceous) developed in other parts of this State. Though not now actually continuous with, it is obvious
Gneissose Schist, Copperfield River.

Edge of Basalt,
Table Mountain between Einasleigh Rivers.
that only denudation has separated it from, the numerous other similar outliers of sandstone to the south and south-west and from the main Woolgar Tableland.

5. BASALT.

Between the Einasleigh and Copperfield Rivers, and also near Old Carpentaria Downs Station, occur low basalt-topped tablelands, that between the rivers being the higher—some 400 ft. above the surrounding country. The basalt is about 30 ft. thick, and it is obvious that its present elevated position can only be due to the more rapid erosion of the surrounding country.

In striking contrast with the above, the valley of the Einasleigh, and in places of the Copperfield, has been flooded by a basaltic flow which in places the streams have not yet succeeded in cutting through, and to the margin of which they have often been diverted. Here and there throughout the gorge through which the Copperfield passes, some 18 miles south of Kidston, a narrow rim of basalt occurs along the sides. In this narrow gorge the erosive action of the stream must be very great, and the fact that it has only lowered the bed by 15 ft. below the level of the basalt is striking evidence of the recent age of that rock. Moreover, the weathering elsewhere has not yet removed many of the surface features of the lava flow.

On the Newcastle Range the Einasleigh-Georgetown road crosses a small patch of basalt resting on or intruded into the Desert Sandstone. Three miles west of Einasleigh, the conical Stockman Hill is composed of a fine-grained basalt. Surrounded by a level surface of basalt, it would at first be supposed that it represents one of those from which which rock was emitted. The fact that the basalt forming this hill, though slightly vesicular, is very much less so than that of the flats, and, contrary to expectations, shows no signs of fragmentary or scoriaceous material, renders it necessary to receive the supposition with reserve, as it quite possibly may be the denuded neck of one of the sources from which the older basalt was evolved.

Dr. Jack* elsewhere distinguished an older and newer volcanic series, the latter including the Einasleigh basalt; he was apparently unaware of the existence of the above examples of his older series.

Opposite the confluence of Junction Creek with the Einasleigh, the Hot Springs (148° F.) described by Dr. Jack† have been suggested as the dying gasp of the volcanic activity which gave rise to the enormous lava flows. Inasmuch as the Springs are two or three miles from the nearest basalt, and probably many miles from any volcanic foci, the suggestion is a very doubtful one. In the bed of the Gilbert River, some ten or twelve miles above Gilberton and outside the present map, some small springs issuing at a temperature of 94° F. are far removed from any signs of recent volcanic activity.

III. Auriferous Deposits.

I. OAKS GOLDFIELD.

HISTORICAL.

Though the surrounding country had received (at intervals, probably, during the previous 40 years) the attention of casual prospectors whose efforts had early succeeded in the discovery of gold at the Old Oaks Diggings, only 20 miles to the south-west, and at Christmas Hill, not to mention the more distant finds on the Gilbert and Etheridge waters, and, although a former sheep or cattle station was situated only 3 or 4 miles away, the alluvial gold existing in every gully on the sides of the three only prominent hills in the immediate vicinity was not discovered till early in December, 1907. That it should have escaped detection for so long is only evidence of imperfection in the methods of the independent prospector, and demonstrates how even those parts of the country considered to have been thoroughly prospected may yet be found to contain large and valuable mineral deposits.

Situated 7 miles from the Oaks Station, an out-station of Carpentaria Downs, the scene of the new discovery was from the first known as the Oaks Rush, though subsequently the township, at the desire of the inhabitants, has received the official name of Kidston. The Oaks Goldfield, proclaimed in April, 1908, is estimated at one period to have supported a population of over 1,500. As the alluvial workings became exhausted, and attention was turned to the less easily won reef gold, the population gradually became reduced to 500 or 600, at which number it has remained for some time. The township is situated on the left or western bank of the Copperfield River, which, though for portion of the year little more than a wide sandy bed, contains in the sand an abundant supply of water, either for domestic or mining purposes. Due to the elevation of between 1,700 and 1,800 ft. above the sea, as well as to the distance from the coast, the climate is dry and healthy.

The field was visited a few days after its discovery by Mr. W. E. Cameron, a brief report by whom dealing only with the alluvial deposits has been published.

ALLUVIAL.

The workings are situated on and around three prominent hills, known as Wise's, Mack's, and North's Knobs, of equal height, about a mile west of and some 200 ft. above the township. The numerous gullies draining from these hills have all, without exception, yielded alluvial gold. The majority of them being small and with very little wash, the gold in these was practically on the surface, but very

Surface of Basalt, near Einasleigh.

Kidston.

Welcome Battery, Kidston.
limited in quantity. From the main gullies, more especially Georgetown Gully, however, large quantities of gold have been won. Most of the gold was very fine, the coarsest being found in McCulloch’s gully, on the north-east side of North’s Knob. In addition to the washing of the detritus in the gully, much of the surface soil, especially to the west of Wise’s Hill, has been dry blown.

The output of alluvial gold, since the discovery of the field to the end of 1909, has been recorded as approximately 19,000 oz., and for the six months to June, 1910, an additional 1,750 oz. Since some of the gold won is never recorded, the returns are necessarily less than the actual output. The average value of the alluvial gold is £3 15s. per oz.

GEOLoGICAL FEATURES.

The main country rock at the Oaks is the highly metamorphised schist, which occupies so large a portion of the Einaleigh and Copperfield watersheds. Exposed in the river beds this formation is comparable in every way with the rock at Einaleigh. As elsewhere, intimately interlaminated with as well as occasionally cutting across the banding of the schistose rocks, granite and pegmatite injections in places form a considerable proportion of the total rock. The general strike is north and south, but is by no means uniform, the schist being often much contorted. Much of the schist itself is granitic, and consequently, when dealing with the partly weathered rock cut in many of the claims, it is a matter of choice whether the material should be classed as granite or schist. The supposed footwall in the Oaks Rush Company’s mine, as well as the country rock in the Wexford, the westernmost of all the claims, is a true granite. (See frontispiece.)

Owing to the similarity of weathering of the two rocks, it is impossible on the surface to map even roughly the boundaries, and an examination of their complicated and intimate relationship where exposed in the river demonstrates the improbability of this ever being achieved except in a most general way from the information obtained in future mining operations.

Intruded alike into the granite and the schist, in a manner apparently unaffected by the foliation of the latter rock, is a remarkable system of porphyry dykes. In the wider parts the dyke material is identical with the quartz-felspar porphyry of the Newcastle and other ranges. Where narrow, the conditions of cooling have not allowed the phenocrysts of felspar and quartz to develop and the rock consists merely of the felspathic base, which frequently has a lamination parallel to the walls of the dyke. Owing to the superior powers of resistance to the denuding agencies possessed by the porphyry in comparison with the enclosing rocks, the dykes may be followed on the surface with unusual facility, only presenting any
uncertainty on the hillsides, where they are occasionally obscured by the fallen material from higher up the hill. Where exposed in the river, the dykes cut sharply across the schistose rocks, apparently having neither caused nor undergone any alteration by the contact.

The general trend of the dykes is in a north-north-west and south-south-east direction, but individually they are very tortuous, and the numerous connecting branches, as well as those portions where the porphyry attains its greatest width, do not observe any conformity with this direction. The two most north-easterly of the series, visible in the river, cannot be traced on the eastern bank, though the dyke system, if not the individual dykes, continues in a south-east direction for 5 or 6 miles, where it joins a large porphyry intrusion forming there a rough range of hills. The south-westernmost of the dykes has not been traced north-west to its termination, though it extends at least a mile beyond the limits of the accompanying sketch. The country to the north-west, between the Oaks and the porphyry range near Teesdale, is intersected by numerous similar intrusions. Two miles south of the three knobs the summit of another hill is formed of porphyry, connected by dykes with the range south-east of Kidston.

Much of the porphyry, as well as its containing rock on and between the three auriferous hills at the Oaks, has been crushed and brecciated, besides being traversed by innumerable small quartz veins or “leaders.” The rock itself has in many places often been converted into a soft, silky, sericitic material, which, as well as the leaders, is liable to carry gold and other minerals. The leaders within limited distances possess a parallelism of strike, and, with numerous exceptions, of dip also. Over greater distances the direction of strike changes, forming an irregular and broken ring, towards the centre of which the majority of the veins are dipping.

The outer limit of this ring has yet to be determined, as also its inward extension, should the auriferous veins not occur over the whole area enclosed. On the eastern side of the ring, the only serious gap may yet be filled, as its apparent existence is not improbably due as much to the fortuitous circumstances controlling the prospecting operations as to the absence of the leaders and formation, here possibly not so highly auriferous as elsewhere. Both to the north and south of this gap, the veins worked show by their strike a tendency to curve round in the direction required to complete the circuit, a fact which certainly confers a degree of probability on its actual completion.

The veins at present being worked are all very small—seldom exceeding six inches in thickness, usually not more than three inches, and frequently very much less. In many of the claims the decomposed and altered rock, in juxtaposition with the veins, is also mined with profit, while in other claims there is an almost total absence
of secondary quartz in the auriferous stone, which then consists of the silky sericitic, often iron-stained, material impregnated with pyrites, galena, and zincblende below the oxidised zone. With this class of ore may be included the so-called "kaolin pipes," on which several of the claims are at work. These consist of a narrow shoot or pipe of soft sericitic material, irregular in outline and sometimes erratic in direction, but often containing high gold values.

Since the material sent to the battery from the majority of the claims consists largely, in some cases entirely, of sericitised or decomposed granitic rock, with only a small percentage of quartz, it is the character of the stone which forms to a new comer the most surprising feature of the Oaks Goldfield.

The remarkable system of porphyry dykes already referred to presumably has some indirect genetic connection with the deposition of the gold and other minerals, to which deposition the dykes are certainly antecedent. While not, as far as is now known, possessing any direct connection with, or influence upon, the deposition of gold in the leaders which traverse both these and the surrounding rocks, it is not improbable that, owing to their impermeable nature the porphyry dykes as a whole, will be found less auriferous than the surrounding rock; they have been slightly sericitised in places and impregnated with pyrites, assaying up to 19 grains of gold per ton, free from any quartz veins.

The causes of the still more remarkable—and, as far as the writer can ascertain, unique—annular or concentric fracturing and crushing are now unknown, and their discussion will probably never advance beyond the speculative stage. It is, nevertheless, safe to assume that the cracks and fissures so formed have been the channels and passages for ascending mineral-bearing solutions containing, or at least depositing, less silica than is usual in ore-bearing solutions, and it is to these solutions that the sericitisation of much of the felspathic rocks may be attributed. The actual movement giving rise to the fracturing cannot have been great, as the dykes, though themselves brecciated, have not been displaced to any notable extent.

With the alluvial gold a little carbonate of bismuth is said to have been obtained. Mr. T. J. Swaine informs the writer that this metal also is present occasionally in the retorted gold, rendering it extremely brittle when melted into a bar. None of the ore or concentrates which were thought by the miners to carry bismuth have been found to contain any with the ordinary chemical tests.

**WORKINGS.**

Many of the leaders now being worked, though very rich, are so small as to yield little more than ordinary wages to the claim holder. Owing to this, as well as to the fact that in many of the claims the leader alone, the mullock alone, or both together, have been crushed
at different times, there is little advantage in recording the individual crushings returned at the various claims, even where the change of proprietorship has not rendered the compilation of complete records well nigh impossible. Only the more important crushings have, therefore, been mentioned in the following descriptions. The returns have not, unfortunately, been given in fine gold, the value varying between £3 5s. and £3 15s. per oz., and averaging probably nearly £3 10s. Since starting, the two batteries crushed, up to the end of June, 1910, 2,895 tons, for 4,893 oz.

In conducting their operations, the miners rely almost entirely on the prospect obtained by crushing and panning off a small portion of the ore. Since the battery returns show, even in the oxidised ore, sometimes an extraction of little more than 50 per cent. by amalgamation, and the sands are almost invariably of considerable value, too much reliance should not be placed on the paucity of colours in the prospecting dish, necessarily demonstrating the poverty of the ore.

In making an examination of the field, altogether a total of over 60 claims were visited. In order to avoid useless repetition, since so many of them present similar characters, they have been considered in groups. The numbers on the claims are merely for the purpose of reference to the accompanying sketch plan, and have no official significance.

Sunbeam (1).—Work is being done on one, and sometimes two, small leaders in and parallel with a porphyry dyke. About 8 in. of the stone is being crushed, 5 tons yielding in the battery 4 oz. 6 dwt. A 30-ft. shaft has been sunk in broken "formation," a crushing of 18 tons, together with about 1 ton of the leader, yielding 12 oz.

Dolly Grey (2) and Dead Dog (3).—In both of these claims work has been done on the "lode" formation—the crush breccia—somewhat ironstained from oxidation of the pyrites. Besides this formation in the Dolly Grey, a leader striking N. 10° W. and dipping at 15° to the west, up to 6 in. wide, and averaging 2 in., is being worked, as well as a second leader some 16 ft. to the west. Mr. Archbold, the proprietor of the Welcomo Battery, got out crushings to test the lode material from both these claims, and kindly supplied the information concerning them. Forty-eight tons from the Dolly Grey yielded 5 oz., worth £20, over the plates, the sands being worth 15s. per ton—or a total value of approximately 23s. per ton. Thirty tons from the Dead Dog yielded 3 oz., the sands being worth 10s.—a total value of approximately 17s. per ton. The easternmost porphyry dyke passes through the Dolly Grey claim, but is very broken and divides into two branches, the western one resuming its undisturbed course beyond Pegleg Gully.

Pegleg (4).—The shaft and open cut are on a leader running N. 20° W.; also two potholes in brecciated micaceous schist, from which, including a small leader, the crushing of 5 tons is reported to have
given 12 dwt. to the ton. The porphyry dyke is very broken in this claim also; in its continuation between Pegleg and McCulloch’s gully, a little work has been done on small leaders.

Some fair crushings were got out of the Turpin (5) claim, since abandoned, from portion of the crushed and decomposed material opened up.

*Hova* (6) or *Madagascar.*—The sinuous excavation in this claim follows one of the “kaolin pipes,” and is said to have yielded 200 oz. of gold. The sericitised rock constituting the pipe contains, in quartz vughs, much coarser gold than is usual on the field—a fact probably not unconnected with the coarser alluvial found in McCulloch Gully, at the head of which this claim is situated. The country rock (schist) is broken and disturbed, and the proprietor considers that, apart from the pipe, there is other good crushing stone.

*The Linde Tunnel* (7).—At the head of Prospector’s Gully, has been driven about 60 ft. in brecciated formation containing numerous small leaders, to meet a leader formerly worked from the surface. East of the Tunnel this runs E. 10° S., changing to E. 30° S. in the western drive, at the end of which the hanging-wall is porphyry. Two to three feet of stone has been stope out, and a crushing of 24 tons of the leader alone yielded £213 4s.; a crushing of the remainder of the stone is said to have yielded 17 dwt. to the ton. A crushing of 5 tons of brecciated formation from the mouth of the tunnel is said to have yielded 7 dwt. per ton.

In a series from the Linde Tunnel claim three claims—the *Lady Maria* (8), *Town View* (9), and *Rocky Knob* (10)—are situated on the eastern side of North’s Knob, and are working on small leaders, which here run north-west and south-east in porphyry as well as in decomposed granitic schist. In the Lady Maria a 70 ft. shaft is into sericitic material carrying sulphides.

*The Day Dawn* (11), *Bone of Contention* (12), *Rip and Tear* (13), *Whistler* (14), and *Try-her-again* (15) are situated on the same, or more probably parallel, lines of faulting to the south of North’s Knob. In the Day Dawn the work has been done from two shoots of slightly ironstained sericitic material, showing little or no quartz, lying in a fault plane, as the walls of which in places shew slickensides. The stone carries the best value where softest and most altered, and the two shoots are closer together at the bottom (about 65 ft. vertical), where they carry a little mundic. Both pitch to the west along the fault. The country rock is broken in appearance. Near Prospector’s Gully, but south of the Day Dawn Mine, a shaft 40 ft. deep has been sunk in decomposed granitic rock, heavily impregnated with pyrites and zincblende.

In the Rip and Tear another pipe of sericitic material has been
followed to a depth of 120 ft. This, like the pipes in the Day Dawn, is in an east and west (probably the same) fault, dipping to the south. The ore below 90 or 100 ft., in addition to pyrites, carries a little galena and zinblende, the gold values up to 5 oz. to the ton suffering no diminution with the present depth. "Prospects" are only obtained in the sericitised rock, though the rest of the formation is slightly mineralised.

In the adjoining claim—the Whistler—the hanging-wall is porphyry and the footwall as in the other claims, is a breccia, the gold being won from a sericitised shoot. None of these claims have put in any cross cut. Though a sample of the crushed breccia from the footwall in the Rip and Tear only assayed a trace of gold, it is probable that in the footwall, if not in the hanging-wall, other parallel lines would be found. The Try-her-again shaft is also sunk in brecciated formation on a pipe of the soft sericitic material.

The Shamrock Extended (16) has been sunk to a depth of about 90 ft. on a sericitic pipe, which, though irregular in direction, is roughly parallel to the schistosity of the country rock, here striking 10° west of north. The pipe dips irregularly to the north, the change from oxidised to sulphide minerals being sharp at 75 ft. A crushing of 6 tons from a bottom yielded over the plates 25 dwt. to the ton, and 14 cwt. of concentrates, worth £3 15s. per ton.

Along the saddle between North's and Mack's Knob, as well as on the eastern side of the latter, a series of claims—the Two Mac's (17), Ally Sloper (18), Eldorado (19), Never Despair (20), and Bon Accord (21)—are working small parallel, east-and-west leaders dipping to the south, from some of which rich crushings have been obtained. In the Two Mac's, Ally Sloper, and Eldorado the ground is very broken, but in the other two claims, except for the leaders, appears little disturbed.

In Mr. Keefe's claim (22), on the southern summit of Mac's Knob, the large porphyry dyke forming the backbone of the Knob is broken, and a shaft, almost surrounded by porphyry, has been sunk in a decomposed granitic rock on an east-and-west leader, 3 in. thick, dipping to the south. There are other parallel leaders which run through the porphyry. The claim is in a line with 19, 20, and 21.

In the Nil Desperandum claim (23) a shaft has been sunk in brecciated porphyry, the values being contained in a "lode" running east and west and dipping south, consisting of the same material, which has been impregnated by minerals since leached out. This contains very little quartz, and a picked crushing is said to have returned 2½ oz. to the ton. A sample from a hole in the porphyry on the southern slope of the hill assayed over 12 dwt. to the ton, a general sample of the porphyry on the surface in the vicinity, as well as another taken on the summit of the hill, excluding any leaders, both
assayed 19 gr. to the ton, demonstrating the auriferous character of the porphyry itself, as well as the care which will be necessary in determining the limits of any richer patch such as the above.

A leader, 1 or 2 in. thick, being opened in Mr. Doherty's Claim (24) is perpendicular and strikes N. 10° E. On the eastern side of the leader the country rock is crushed. Claims are far apart in this neighbourhood, and this leader shows a tendency to change from the east and west strike of the previous claims to the north and south of the next claim, the Golden Link, and beyond. Were the claims more numerous here, it is probable that the change in direction would be shown to be gradual, as is the case on Wise's Hill.

The Golden Link (25) or Spring Dolly claim is situated immediately to the south of a large porphyry dyke. The leader worked, the outcrop of which runs through the porphyry, is 6 in. in thickness and really composite of several small leaders dipping to the east. Crushings from it have yielded up to 6 oz. to the ton. In the north end of the 80-ft. level the oxidised leader is in formation carrying sulphides. The whole width of the drive is crushed material, but nothing has been done to test its dimensions or value.

The Merry Widow claim (26) was unfortunately at the time of the writer's visit not open to inspection. The Old Maid (27), Lucknow (28), Lord Nelson (29), Johnsonian (30), Last Call (31), and Sailor Bill (32) claims are all working on north and south leaders, many more of which are known to exist besides those actually being worked, though no effort has been made to crosscut for them. In the Lord Nelson the auriferous stone is a vein of soft sericitic material carrying coarse gold. The country in all is decomposed granitic rock.

The Oaks Rush Gold Mining Company (33) holds over six acres of ground of irregular shape, the combination of several adjoining claims. The Maori King shaft has been sunk on a north and south vein dipping to the east, which at 100 ft. is nearly ten inches wide and heavily mineralised. From the main vertical shaft crosscuts have been driven east and west at 100 ft. a total length of 105 ft. In the western end 20 ft. is in a hard granite, forming what appears to be the footwall of the decomposed and broken formation traversed by the remaining 85 ft. of the crosscut. On the footwall, which runs north and south, five or six feet of stone, including several small leaders, is being stope from an inclined shaft. The 85 ft. of formation shows numerous small leaders and iron-stained partings, and is said to carry gold throughout. A trial crushing of 31 tons, portion of 170 tons of stone obtained in driving this crosscut, all of which would have been crushed but for an accident to the battery, is reported to have yielded the splendid return, considering the width of formation, of 34 oz. From the stope 183 tons yielded 562 oz., 138 tons of "seconds" yielding 132 oz. Since its formation the Oaks Rush Company has produced a total of 936 oz. from 566 tons.
The Wexford (34) is situated on the flat west of the Oaks Rush Company's ground; the workings, 90 ft. deep, are on a vein in granite running 10° south of east. The position and direction of this vein, as well as its solid walls, are features which point to its being outside the zone in which the other claims are situated.

The Eureka (35) claim is working on a nearly perpendicular north and south leader, which has increased from 1 in. at the surface to 8 in. at 80 ft. A crosscut 15 ft. to the east at 60 ft. has cut another leader besides eight smaller ones.

The adjoining claim to the south, the May Queen (36), is probably working on the same vein here 5 in. thick and having a very slight inclination to the east. Two other smaller leaders have been worked 10 ft. east of the main one, and a shaft has been sunk on them to 100 ft. At 50 ft. a crosscut, in 20 ft. east from this, is in sericised and broken granitic formation traversed by numerous small leaders and partitions, and is said to carry gold throughout. The crosscut is nearly in a line with that in the Oaks Rush Company mine, and demonstrates the continuation of the auriferous "formation" in this direction. A specimen found on the mullock tip shows wire gold in a quartz vugh.

A leader worked in the Perseverance (37), running north 20° west dipping to the east, is on the beginning of the curve to the east and west exhibited by the veins on the western and south-western side of Wise's Hill. The Last Chance (38) and another claim (39) were both working on veins of sericitic material; that in the Last Chance running north and south is 3 ft. wide without distinct walls.

The Straight Shot (40) shaft is sunk in crushed granitic rock, with a leader on both hanging-wall and footwall, dipping south-west.

The Boomerang (41), the Lilian Jane (42), Nameless (43), and Comet (44) veins, south of the above, are working in leaders and formations similar in every way.

In the Little Wonder Extended (45) there are three parallel drives in a west-north-west and east-south-east direction, only a few feet apart. In the stope above one of these there are eight leaders in a width of 2 ft. 6 in., the crushing of stone from this width is said to have returned 27 dwt. to the ton. Crosscuts have been put in each way a total length of about 60 ft., and show innumerable small leaders in decomposed and sericitised granite. A crushing of 86 tons from these crosscuts is reported to have returned 90 oz. of smelted gold. The leaders are almost vertical, having a slight dip to the north-north-east.

In the Central (46) a leader running west-north-west is in crushed porphyry and granite; in the Apex No. 1 West (47) a leader is in decomposed granite; while one in the Apex (48), on the summit of Wise's Knob, is in brecciated porphyry.
The Chance (49) and Great Eastern (50) are on the same leader running E. 10° S. Below 40 ft. in the Chance the leader is in porphyry.

In the Mountain King No. 1 (51) about 3 ft. of stone is being mined, including a nearly perpendicular east and west leader in porphyry, and is said to return 1 oz. to the ton.

In the Mountain King No. 2 a 2-in. leader in crushed granite and porphyry gives some of the richest returns on the field. An east and west leader, which dips to the south is being worked in a claim (53) to the south of the above, and shows the zone of auriferous veining to extend at least this far.

The Stars and Stripes (54) shaft and drive is in a broken formation of porphyry and granite traversed by small leaders.

A group of claims (55 to 59), known as the Greenhead, lying to the east of Wise's Hill, shows the tendency of the system of leaders to turn northwards. Between these claims and those on the east of North's Knob no other claims have so far been opened, thus leaving a considerable break in the circle. The claims now working in the Greenhead group are on a parallel line to the original Greenhead, which is deserted. The leader on the claim furthest to the north-east dips to the south-east, while at the south-west end there is a slight dip to the north-west.

At the Two Bobs (60), on the northern side of Wise's Knob, is a vein varying in thickness from 1 in. up to 2 ft., of soft sericitic material, with an inclination from the horizontal of only 1 in 7 to the south-east. Some excellent crushings have been obtained from this claim.

A deserted shaft (61) east of Snake Gully has been sunk on a narrow vein of lead ore. The shaft being inaccessible, it was impossible to form any opinion as to the character of the deposit.

CONCLUSIONS.

It will be observed from the foregoing account that, with only four notable exceptions, work in the various claims is confined to the exploitation of single leaders, or, at most, several leaders in a width of two or three feet. In many of the claims the leader, though rich, is so narrow that the actual returns yield little more than ordinary wages to the miner. Few of the claims are more than 100 ft. in depth, and this may be regarded as the limiting depth to which the great majority of them will be worked with the present appliances, though it is satisfactory to note that the values show as a whole no general diminution with the depths yet attained. Operations therefore, under the present system of small holdings cannot be expected to continue, in the great majority of the claims, beyond the time necessary to work the larger leaders out to about the 100-ft. level.
The four crosscuts, situated in various parts of the field, in the Linde Tunnel, the Oaks Rush Company's mine, the May Queen, and the Little Wonder, as well as the crushings of the breccia formation from the Dead Dog and Dolly Grey, all show a great and so far undetermined width of auriferous stone, though its value in some of these still requires testing. The determination of the limits within which this auriferous material is sufficiently rich to work will require careful prospecting. Inasmuch as both its position on the hill and the softness of the stone, at least to the 100-ft. level, should permit of unusually low mining and crushing costs, and that the ore to that depth yields a good extraction by amalgamation and cyanidation, an exceptionally low grade of ore should be payable if treated in sufficient quantities. It is certainly to be regretted that the present operations consist almost entirely of "picking the eyes" out of a deposit demanding a more than usually careful and thorough prospecting development—a deposit which, should that prospecting prove as successful as the little work already done seems to indicate, may yet rank with the chief mining centres of the State.

2. OLD OAK DIGGINGS.

Situated about 20 miles south-west from Kidston and close to the Newcastle Range, several gullies and one leader near the head of the Oaks River have been worked. The country rock is schist. No record of this diggings can be found, but it is said to have been discovered in the early seventies.

3. CHRISTMAS HILL.

Alluvial gold has been worked in the gullies running from a low rounded hill some 22 miles south-south-west of Kidston, on the divide between Christmas Hill Creek (a tributary of the Copperfield) and another creek, variously named, running into the Gilbert River. The main alluvial workings are on the north and north-east side, but some gullies on the south-west side of the hill have also been worked. On this side, besides some trenching on another line, a remarkably rich auriferous vein running north-west and south-east, known as the Susan, has been worked for a considerable distance along its outcrop. It is said to have varied in thickness up to six inches, but to have averaged only three inches, it not having been worked below the oxidised zone.

The majority of the stone was carted to the battery at Mount Hogan. The country rock is schist, granitic at the north-west end of line. At the south-eastern end two or three shafts have been sunk apparently on a line parallel to the Susan. At this end of the line as well as on the north-west side of the hill are outcrops of porphyry. On the summit a shaft has been sunk, to judge by its size, with ambitious intentions. It has not, however, attained any
Workings on Western Side of Wise's Knob.

New Einasleigh Copper Mine.
considerable depth, and is said to have been put down to test the
formation, which is supposed to be auriferous. On the northern side
of the hill some excavation has been done on small bunches of cellu-
lar quartz carrying gold. West of the hill a white "buck" quartz
outercrop carries a little gold where ferruginous.

In the Warden's Annual Report for the year 1884 reference is
made to a rich leader, going 25 to 30 oz. to the ton, at Christmas
Hill, the stone then being crushed by a one-stamper mill impelled by
a horse. In 1890 there were four men, but no mill, and in 1891
crushings were recorded of 47 tons for 34 oz. and 28 tons 10 cwt. for
56 oz. The total crushings from 1885 to 1891 were 174 tons for
807 oz. In 1892 a small battery (now at Kidston) was erected, but
owing to insufficient water was never in active operation. In 1898
25 Chinamen were working in the gullies.

4. MOUNT ADLER.

In May, 1909, the reported discovery of gold caused a small rush
to the scene of the discovery about 6 miles north of Einasleigh. Gold
was only found in and on the sides of one small gully, and probably
not outside the original claim. This was at the foot of a range of
porphyry hills—the continuation of that at Einasleigh. The country
is schist and is traversed, where the gold was found, by small
porphyry dykes in addition to the main one. No leader was found
from which the gold was derived, possibly because the prospectors
were looking for a quartz vein while the gold may occur perhaps, as
at the Oaks, in a soft decomposed material.

IV. Deposits of Copper Ore.

1. EINASLEIGH.

The Einasleigh Mine, situated at the confluence of the Einas-
leigh and Copperfield Rivers, now being worked by a company known
as the New Einasleigh Copper Mines, Limited, was first discovered
prior to 1867 by Daintree. At the time of the discovery the river,
since named the Einasleigh by the Jardine expedition, was thought
to be identical with Leichhardt's Lynd, and Daintree accordingly
named the mine the Lynd Copper Mine. In a crosscut at the 30-ft.
level he described* a width of 23 ft., chiefly of spongy metallic copper.

Geological Sketch Map of Einasleigh and Vicinity.
The hardwood door covering his shaft, to prevent its being filled by the sand and gravel washed down by the annual floods is still in existence.

The mine has been worked at intervals since Daintree's time, chiefly during the last ten years, the great distance from the coast, previous to the arrival of railway communication, proving, however, too great a handicap for its profitable exploitation.

The country rock of gneissose schist is well exposed in the bed of the Einasleigh River, beneath which the main workings are situated. The river here skirts the eastern margin of a basalt coulee, across which the Copperfield River flows for a short distance immediately above their junction, forming a waterfall and narrow gorge where it descends from the surface of the basalt.

The ore-bodies, the existence of four of which at least have so far been proved, occur as more or less lenticular masses, their longer axes being parallel to the strike of the country rock, with which as a rule the ore-body possesses sharply-defined walls. That the ore occurs in separate lenses, and not in a line of fissure, is shown by the absence of any outcrop of such fissure in the bare rocks exposed in the river. The relative position also of the lenses so far proved to exist does not show the linear arrangement usual with lenticular deposits even where there is no distinct line of fissure, but presents rather a lateral arrangement, though some pyritous rock proved by boring in the river may possibly be the cap of another lens more or less in the line of strike to the north.

The main ore-body now being worked does not reach to the surface, the outcrop which Daintree discovered apparently being portion of a distinct lens. Except for this outcrop, and perhaps a little iron-stained rock in the river where the boring above mentioned took place, there are no indications on the surface of the large deposits of copper ore now proved to exist underground.

Excluding the shallow work done in the early days on the outcrop on the edge of the river, the development has taken place from two shafts sunk through the basalt. From the main shaft four levels have been driven through the ore-body at 120, 170, 270, and 370 ft. The No. 2 level connects with the south shaft now used for the introduction of river sand for filling purposes as well as for ventilation. The ore-body, the outcrop of which was worked from the surface, has also been worked for a few feet above No. 1 level, about 30 ft. of ore being left undisturbed to prevent the entrance of flood.
waters from the river. It may be remarked that even in flood time, except for a little water entering the shaft beneath the basalt, the mine is perfectly dry.
The main workings are on a lens which has been opened in the Nos. 2, 3, and 4 levels. This lens apparently does not extend to the surface, and lies to the south-east of the lens the outcrop of which has been worked. It attains its greatest development about the third level, where it varies up to 50 ft. in width by some 200 ft. in length. In No. 4 level the lens attains a width of 30 ft., and appears to be cut off by a fault at the southern end. In the northern end of this level another, or perhaps part of the same, lens is separated from the main body. Ore has also been disclosed by boring from the end of the north drive of No. 2 level.

The ore at present being mined occurs between well-defined walls, and consists of a mixture of copper pyrites, pyrrhotite, and quartz in varying percentages; garnets are occasionally present, as
well as a considerable amount of hornblende and a little calcite and gypsum. The ore containing hornblende is merely an imperfect replacement of the hornblende schist occurring in the country rock. Mr. H. G. V. Adler, the general manager, informs the writer that as a rule the percentage of copper increases with the width of the ore-body.

At present the ore as mined is being hauled to the Chillagoe Smelters (120 miles), shipments averaging a little under 7 per cent. of copper. The present output is 900 tons a fortnight. From April, 1909, to the end of January, 1910, a total of 8,719 tons was shipped for a return of 592 tons of copper, worth £31,293.

A very up-to-date dressing plant and equipment of ore bins, approaching completion, is intended to treat the more siliceous and lower-grade ore. The accompanying plan and section of the mine, due to Mr. W. Webster, are produced through the courtesy of Mr. Adler, who himself took great trouble in pointing out the various features of his mine.

On the eastern bank of the river a range of hills is formed by the outcrop of a large porphyry dyke, and the question as to what influence, if any, this intrusion has had in the formation of the ore deposits will be considered later in conjunction with the minor occurrences. Some exploratory work has been done on the eastern bank of the river a little to the north of the Einasleigh Mine. Drives have been put in on two slightly gossany copper-stained outcrops of indefinite form in the schist. In one of these drives, which has been driven in to and then along the contact of the porphyry with the schists, all trace of ore deposition appears to have been cut off by the intrusive rock.

2. TEESDALE.

Ten miles south-west of Einasleigh, at and near Teesdale, several mining leases have been taken up, but are now mostly abandoned.

The only reason for taking up some of these leases can have been for speculative purposes, as there is nothing on them to warrant any mining operations, nor have any taken place. A great deal of genuine prospecting work has, however, been done by the Chillagoe Company on their leases, unfortunately without satisfactory results.

The country rock is schist, in which the little payable ore that has been discovered occurs in short veins and irregular bunches. No definite lode, rich or poor, has been proved, though there is a large body of rock slightly impregnated with cupriferous minerals.

The No. 1 Hill Shaft was sunk on a narrow shoot of rich carbonate ore extending only a few feet from the shaft. This is 140 ft. deep and
EINASLEIGH.

EINASLEIGH RIVER.
WITH NEW EINASLEIGH MINE IN DISTANCE.
at 100 ft. passes through a wall of hornblende schist dipping at about 45° to the south. Crosscuts were put in at 100 ft., and a winze was sunk from the south crosscut to meet the wall, but failed to meet any payable ore. The hornblende schist, like the remainder of the country, carries a little copper pyrites. Almost throughout the workings the sulphate efflorescences on the roof and walls of the drives demonstrate the cupriferous character of the rock. The impregnation has however been very slight and without definite boundaries, though some of the joint faces are slickensided. The crosscut at the end of the western drive appears to have passed beyond the impregnated zone.

The No. 2 Magazine Shaft has been sunk beside a large quartzite outcrop. This quartzite contains, in bands parallel to its length, magnetite in sufficient quantity and polarity to strongly affect the compass when in proximity thereto. This shaft was not open to inspection, but developments are stated to have been similar to the Hill Shaft.

In the Creek Shaft, also close to a quartzite and magnetite outcrop, levels have been driven north and south at 100 ft. without any encouraging results.

The railway cuttings near Teesdale expose gneissose and hornblende schists as well as occasional bands of coarse pegmatite and, close to the main porphyry of the Newcastle Range, occasional narrow dykes of that rock. The main mass of porphyry, about half a mile south-west of Teesdale, is the nearest porphyry to the workings, excluding possibly some minor dykes that may have escaped observation.

3. STOCKMAN’S CREEK.

About 6 miles north-west of Teesdale, close to the Carpentaria Downs boundary fence and to Stockman’s Creek the Chillagoe Company is testing another cupriferous deposit. In this case the impregnated rock is granitic, and has been altered into a soft sericitic material in which copper and iron pyrites and galena are embedded. In the bottom of the shaft (50 ft.) these minerals are only partly oxidised. Insufficient work had been done at the time of the writer’s visit to form any opinion of the quantity of ore likely to be available, but the ore would be easily mined and concentrated if of sufficiently high grade to allow of profitable workings. The ore in appearance is not unlike some of the ore at the Oaks, but is not auriferous.

In the recess in the Newcastle Range drained by Stockman’s Creek several other outcrops of copper ore have been discovered. Only one, the Mountain View, appears to occupy a true fissure and except for a few small rich bunches of oxidised ore neither this nor any of the other outcrops offer much encouragement for further work. The bunches are probably segregations from the slightly cupriferous
surrounding rock, and as none of them have gone down more than a few feet, they are possibly merely surface concentrations. Occurring in the schists, their form depends on the banding of the surrounding rock.

Similar in every way to the Stockman Creek outcrops are the Kaiser Bill, 6 miles south-west, and the A1, 4 miles north of Einasleigh. Near the latter an iron-stained outcrop in the river bank suggests the feather-edge of a lens. Owing to the absence of any copper stains, this has not been tested, though more deserving of attention than the small bunches of carbonate on which work has been done.

4. MACMILLAN CREEK.

Similar bunches of copper ore have been found in the neighbourhood of Eva and Macmillan’s Creek. At the Dorothy a tunnel has been driven 130 ft. into a hill under one of these outcrops. A little ore containing lead as well as copper was cut in an indefinite formation, insufficient in quantity to warrant further work.

The abandoned mineral leases 50 and 51 are on an outcrop of copper ore parallel to the strike of the schistose country rock. The ore varies up to 10 in. in width, and extends over a considerable distance. In the hole sunk upon it the ore dips to the south at 50°. In abandoned Mineral Lease 52 the creek has cut its way through a quartzose and felspathic rock showing occasional copper stains. No work has been done on it nor is any warranted.

5. MOUNT JARDINE.

At Mount Jardine, 12 miles north of Einasleigh, a little mining has taken place. A small range of hills here is formed by the outcrop of a large porphyry dyke, and the ore—both copper and lead—is found actually in the porphyry. Besides crystals of copper and iron pyrites and galena disseminated through the mass, the ore also forms a stockwerk of small anastomosing veins. The deposit is not extensive, and the little work that has been done has not proved ore rich enough to be payable.

6. DAINTREE.

About 40 miles south-east of Einasleigh the Daintree Mine was discovered by Messrs. McClelland and Power in July, 1908. The country rock is schist, and there are two large outcrops of quartzite, in or near which the ore has been found. In one place this quartzite is soft and crumbly, being so little altered from the original sandstone, even though the finer sediments have been converted into micaceous schists. Much of the rock is copper stained. There are three or perhaps more outcrops of rich narrow shoots of oxidised ore,
parallel to the schistosity of the country rock, the direction of which, owing to its contortion, varies greatly in a short distance. The outcrops show a very large area of cupriferous rock, and the property was held under option by the Chillagoe Company, who thoroughly tested it by six shafts and approximately 2,000 ft. of boring. Four shafts were sunk on the main outcrop in a north-east and south-west line at intervals over a length of over 120 yards; 120 yards N.N.W. of the northernmost of these, two other shafts 40 yards apart have been sunk on another outcrop.

Apart from the small rich veins of ore, Mr. E. J. J. Rodda, who supervised the operations for the Chillagoe Company, informs the writer that the work proved an immense body of lightly mineralised stone of too low a grade to be of value, the heaviest sulphides being found under the northern outcrop. The Chillagoe Company having surrendered their option, the original prospectors are now mining the rich ore shoots.

In a situation so remote (40 miles from the railway) 20% of copper is required to pay expenses. Even with this restriction there should be, in a small way, a considerable tonnage of “pickings.” In one of the shafts—No. 2, counting from the south-west—the crosscut to the west has passed through some epidote rock containing a considerable proportion of pyrites. Beyond this the crosscut enters the soft “quartzite”; the eastern crosscut is in soft schist.

Five or six miles south-east of Kidston a small outcrop of copper ore has been opened but proved similar to the small bunches elsewhere.

7. GREAT EASTERN.

At the Great Eastern Mine, about 12 miles west of Kidston, on the Einasleigh-Percyville road, a shaft has been sunk on the side of a hill formed by the outcrop of a porphyry dyke intruded into granite. The shaft, as well as some open cutting, has been sunk in the granite. Any ore that was in the open cut has been removed, and the shaft was not accessible. The deposit is apparently not a definite one, and, to judge by the little ore left on the surface, too low grade to be worked profitably in so remote a situation. The granite matrix of the ore has been sericitised and bears a strong resemblance to that on Stockman Creek, six miles from Teesdale, and to some of the ore at the Oaks.

From consideration of the above deposits of the copper ore, it is impossible to trace anything more than a chance association between the majority of them and the numerous porphyry intrusions. Some—as for instance the Daintree—are far removed from any dyke, and present characters similar to the others. In the case of Mount Jardine, as well as the Great Eastern and the occurrence six miles from Teesdale, which are deposits of a somewhat different type to the
remainder, and which bear some resemblance to the auriferous deposit at the Oaks, there is possibly some connection with the porphyry intrusion. It must be observed, however, that the difference in character of these deposits may be only due to the difference in the country rock, which in two of the cases is not schistose and in the other not markedly so.

The ore lenses in the Einasleigh Mine are distinguished from the other deposits by their better definition as well as by their size and richness. Though there is no reason to assume it to be the case, since in some localities the porphyry intrusions are probably associated with mineral deposition, it is quite possible that the Einasleigh deposits also have some genetic connection with the large porphyry dyke on the eastern side of the river. Assuming such a connection, the question arises as to the advisableness of future prospecting operations being directed to the search for fresh and perhaps deeper ore lenses to the east of those already found, a direction to which the echelon arrangement of the two lenses that have been worked would also encourage prospecting.

V. Wolfram and Molybdenite.

About 12 miles due south of Kidston and about half a mile from the eastern bank of the Copperfield River, where it runs through a gorge in exceedingly rough, hilly country, a little work has been done on an outcrop of a quartz reef over half a mile long. This reef varies up to 2 ft., and is seldom less than 1 ft. in width. It consists of white glassy quartz through which is disseminated throughout the whole length both wolfram and molybdenite.

As far as can be judged from the surface and what can be seen of the workings, these minerals are fairly evenly distributed, and do not occur in solid bunches. This distribution of the minerals would necessarily preclude any mining except in conjunction with the battery and concentrating plant, and was probably the reason for the abandonment of the workings. Efforts had evidently been made to assist concentration on a small scale by roasting the ore previous to dollying it.

Such a constant lode, admirably situated as regards water supply, though 50 miles from railway communication, is well deserving of the attention of mining capitalists, to determine whether the percentage of valuable minerals would allow of its being worked at a profit with a suitable plant. A little alluvial tin was obtained in a neighbouring gully.

Brisbane, December, 1910.

By Authority: Anthony James Cumming, Government Printer.