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No. 39

The Osmiridium Deposits of the Adamsfield District

BY

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The Honourable C. E. JAMES. M.H.A.
Minister for Mines for Tasmania

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The Adamsfield District.

I.—INTRODUCTION.

(1)—GENERAL STATEMENT.

THE Adamsfield district was, until the discovery of important deposits of osmiridium in 1925, a totally uninhabited region. It was probably only visited by an occasional hunter, and to a less extent by prospectors.

The district had not been subjected to any kind of survey, and all plans and maps were merely sketch ones. A survey by chain, compass, clinometer, and aneroid was made during the investigation of the district. This was essential in order that a plan could be prepared on which to place the geological work. Connection was made with the most westerly sections (mineral) on the then mineral chart of Florentine Valley. The resulting map is a compromise between the results of the above survey and a few cadastral surveys of the district.

The field work was carried out during the period between the 18th October and 19th December, 1925.

(2)—ACKNOWLEDGMENTS.

The writer was accompanied on the trip by Messrs. T. Belton and C. Raynor as field assistants, and desires to express his appreciation of the assistance rendered and the energy displayed by them. He also desires to thank the numerous residents, miners, &c., for information given by them.

II.—PREVIOUS LITERATURE AND HISTORY.

The reports dealing with this and adjacent districts are:—

Twelvetrees, W.H.: Report on a Geological Exploration of the Country between Tyenna and Gell River, 1908. Report of the Department of Lands and Surveys for 1907-8.

Twelvetrees, W. H.: Report on a Journey from Tyenna to the Gordon River Crossing, Four Miles above the Mouth of the Serpentine, 1909. Report of the Department of Lands and Surveys for 1908-9.

Reid, A. McIntosh: Osmiridium in Tasmania. Tas. Geological Survey, Bulletin No. 32, 1920.

The Adamsfield district was, until the discovery of osmiridium in 1925, an uninhabited region, no attempt at settlement having been made, though hunters and prospectors probably occupied it temporarily.

Chas. Gould, while carrying out geological surveys and prospecting expeditions in the vicinity of Macquarie Harbour, had a post track to Hobart, which passed through the Adam River valley.

The district was undoubtedly visited by prospectors during the seventies, eighties, and nineties in the search for gold, and later for other minerals. A small amount of gold was probably found, but the presence of neither gold nor osmiridium appears to have been reported. Occasional evidences of old workings have been found, while at one point it was stated that an old crucible was unearthed.

During the nineties, when prospecting operations were actively carried on in Tasmania, numerous tracks were marked out in the vicinity of Adamsfield to serve various parts of South-Western Tasmania. These include those of Cullen and Cawthorne (1895), Innes (1896), Trappes (1896), Moore, &c. The South Gordon track from Tyenna was the only one that was opened up and kept open at one or more intervals. This track was opened for the late W. H. Twelvetrees in 1909, when he examined the country along the route, including the southern end of the serpentine belt.

In the previous year the same investigator had visited the northern end of the Thumbs, Clear Hill, and the Clear Hill Plains by travelling westwards along the south bank of the Gordon River.

In 1909 R. Marriott marked a track from a point on the Great Western pack-track due east of the saddle between the Thumbs and the Sawback Range. This track crossed the saddle and the valley of the Adam River, and skirting the Adam River Falls continued in a general westerly direction to meet the South Gordon track near the Gordon River.

In 1920 A. McIntosh Reid, Government Geologist, examined the southern end of the field and reported the presence of small amounts of osmiridium.

In December, 1924, a prospecting party, consisting of Messrs. E. Boden, A. Wright, A. J. Stacey, and C. B. Stacey, worked along the South Gordon track as far as the Gordon River, and then back along Marriott track to the Adam River valley, where they discovered osmiridium, first above the falls, and then later on the serpentine area near the Sawback. After a little preliminary prospecting they made their way to the South Gordon track, and met R. J. Stacey and party at the Florentine hut on Christmas Day. The parties had a discussion, and arranged to return in the New Year. The parties returned to Adam River valley in February, and carried out prospecting separately. As a result a reward lease (9457-M) was applied for by Messrs. A. J. Stacey, C. B. Stacey, and R. T. Kingston on 6th May, 1925. The area applied for was 40 acres, but this was reduced to 10 acres by the instructions of the Honourable the Minister for Mines. At a later date (26th May) R. J. Stacey also applied for a reward lease (9468-M). As in the above case, the area was reduced from 20 to 5 acres. This latter reward was situated approximately 3 miles south of the former.

The news of the discovery gradually became known and attracted a few "diggers," and, as news of rich finds became public, a constant stream of men made their way to the field, thus resembling the old-time gold "rushes." Over 1000 miners' rights were issued at the Mines Office, Hobart, during the latter half of 1925, the record being over 100 in one day. During September and October there were probably a maximum of 800 men on the field at the one time. Early in 1926 it is stated that a slightly greater number of men were on the field.

Up till the end of October, 1925, there was a ready sale for the osmiridium at prices ranging from £30 to £32 15s. per ounce. From December onwards prices fell rapidly, and there was little or no demand for the osmiridium, due principally to an extraordinary quantity of

Russian iridium sponge being placed on the London markets. This absence of demand and low price, combined with the fact that all available payable ground had been pegged, caused a rapid diminution in the number of men on the field. The number gradually decreased during 1927 from 200 to 100 men, the latter figure also representing the population during the early part of 1928.

During 1926 and 1927 the producers combined to form the Tasmanian Osmiridium Producers' Co-operative Association in an effort to overcome the absence of buyers and the low price of the osmiridium. Prices, however, continued to be low during 1926 and 1927, and the association ceased operations at the end of 1927. In 1928 the State Government, accordingly, commenced the issue of licences to buyers again. The price rose quickly to over £20 per ounce, and from April to the present has remained between £25 and £30. A large number of miners were accordingly attracted to the field, and the population at present is stated to be well in excess of 200.

III.—GEOGRAPHY AND PHYSIOGRAPHY.

(1)—Location and Extent.

The Adamsfield district is situated in the north-eastern part of the County of Arthur, in South-Western Tasmania. It is 56 miles to the west-north-west of the City of Hobart.

The district examined consists of a tract of country between the Thumbs and Sawback Range on the east and Clear Hill and Ragged Mountains on the west. It embraces nearly the whole of the valleys of the Adam and Eve Rivers, and extends as far north as the Gordon River. The only township is that of Adamsfield, which came into being as a result of the discovery of osmiridium.

About 20 square miles of the country was surveyed and examined. The surveyed tract had a maximum length of 7 miles and width of 6 miles.

(2)—Access.

Ready means of access and transportation were lacking, and this constituted one of the greatest difficulties in the early development of Adamsfield.

The nearest settlement and railhead was at Fitzgerald, 15 miles east of Adamsfield.

The first means used was the South Gordon track as far as the 16-mile peg, and though the track was in bad order pack-horses were taken as far as the above point. The constant traffic during two or three wet months soon rendered the track impassable. From the 16-mile peg a foot-track of 5 or 6 miles was cut in a northerly direction to the field.

The next means of access was by the Great Western pack-track. This track led across the Florentine River, and then ran in a northerly direction towards the Great Bend of the Gordon River. From a point east of the Thumbs, the general course of R. Marriott's track was followed to Adamsfield. This necessitated a very steep climb over the southern end of the Thumbs. Pack-horses could proceed only as far as the Florentine River owing to the lack of a bridge over the river. The constant traffic quickly converted the surface of the track (it was originally corded, but all the timber had rotted) into mud with a depth of 1 to 2 feet.

The State Government then spent £5000 in putting the track into proper order. Practically the whole of the track as far as the Florentine River was re-corded, the latter river was bridged, and a new track of $5\frac{1}{4}$ miles was cut and made from the Florentine River to Adamsfield. Two weeks before Christmas, 1925, pack-horses were able to proceed right to the township of Adamsfield.

The track is still in excellent order, and likely to remain so for some considerable time. The present means of access is, therefore, a journey of 54 miles from Hobart to Fitzgerald by railway or road, followed by a journey of 22 miles from Fitzgerald to Adamsfield. The first 5 miles are by formed road (unmetalled for 4 miles), and the remainder by the pack-track, suitable for pack and riding horses. A considerable part of the track leads through virgin myrtle forests, which render the journey a very pleasant one from the scenic point of view.

(3)—Topography.

(*a*) *General Description.*—The topography is generally of high relief, with smaller areas of comparatively low relief. The mountains and hills have a general north and south trend, and rise to heights of 4000 feet above sea-level. The more or less plain-like country occupies altitudes of 1300 to 1600 feet above the sea. The principal drainage is to the west by means of the Adam and Eve Rivers and the Gordon River. The drainage of the eastern part is effected by means of the Florentine River and its tributaries.

(*b*) *Mountains.*—The prominent mountains within the district are the Thumbs (3900 feet), Clear Hill (about 4000 feet), Sawback Range (2300 feet), and the Ragged Mountains. The Thumbs and Sawback Range form one general range, with a north and south trend between the valleys of the Adam and Eve Rivers and the Florentine River. Conical Hill occurs at the southern end, though somewhat to the east of the general line of the range. The name of Stacey Lookout was given to a prominent point on the Sawback Range after the discovery of the osmiridium by Stacey's party.

Clear Hill and Ragged Mountains form a similar range to the west of Adamsfield. The name of Ragged Mountains first appeared on the geological map by A. McIntosh Reid [1] for a mountain to the south-west of Adamsfield.

[1] **Reid, A. McIntosh: Osmiridium in Tasmania, Tas. Geol. Surv. Bull. No. 32, 1920.**

This mountain, or hill, is not conspicuous from Adamsfield, and the name of Ragged Mountain was, probably erroneously, applied by the miners to the unnamed range forming the southern continuation of Clear Hill. The Ragged Mountains do not retain their definite trend to the south, but form a tract of elevated hills and valleys. The western side of Clear Hill also forms a belt of elevated country, with prominent peaks, such as Wing Lookout, &c.

To the north of the Gordon River the continuations of Clear Hill and the Thumbs are represented by such prominent peaks as Stepped Hill, Dome Hill, and Mount Wright, and the more definite range known as the Denison Range.

To the east of the Thumbs the low range of hills known as the Tiger and Gordon Ranges separate the valleys of the Gordon and Florentine Rivers.

East of the Florentine River the prominent mountains are, from south to north—Mount Mueller Range, Mount Mueller or the Needles, Mount Stephens or Tim Shea (about 2900 feet), Wherrett Peak, Tyenna Peak, and the Mount Field Range of National Park.

(*c*) *Plains.*—The largest tract of plain-like country is that between Clear Hill and the Thumbs, and known as Clear Hill Plains. The surface has a uniform slope of several degrees from the foot of the Thumbs towards Clear Hill, but is dissected by the numerous tributaries of the Eve River. The extent of the plains is $3\frac{1}{2}$ miles by $1\frac{1}{2}$ miles. The southern continuation extends along the Adams River for 3 miles.

To the east of the Thumbs a narrow button-grass plain extends from the track towards the Great Bend of the Gordon River, and is known as the Gordon Plains. From the Great Bend northwards stretches the long plain of the Valley of Rasselas.

(*d*) *The Streams.*—The greater part of the district is drained by the Adam and Eve Rivers. Adam River rises by means of two main branches in the hilly country, to the south of Adamsfield, and has a general northerly course. The Eve River rises by means of numerous tributaries on the Thumbs, Clear Hill Plains, and Clear Hill, and flows in a general southerly direction.

The Adam and Eve Rivers join about 2 miles west of Adamsfield, and immediately on top of the Adam River Falls. The combined stream then has a general westerly course, and joins the Boyd and the Wedge Rivers before ultimately junctioning with the Gordon River. The Adam River Falls have been caused by the downstream part of the river corroding its course in the soft rocks (slates, &c.) of the Dundas series, while the conglomerates and quartzites of the falls have retarded the action of the river at that locality. The total fall of the water is 150 feet, and, if it were not for the accumulation of huge boulders at the bottom, a total fall of nearly 250 feet would occur. The falls and surrounding forests are scenes of great beauty.

The Gordon River crosses the northern end of the district, and one small tributary thereof drains the northern end of Clear Hill Plains. The river is flowing in a tremendous gorge, which in places has vertical walls rising to heights of several hundred feet.

The country immediately east of the Thumbs is drained by Myrtle Creek and its branches. This creek flows in a southerly and then easterly direction to join the Florentine River. The latter stream flows in a general northerly direction to join the Derwent River.

The main portion of the osmiridium-bearing part of Adamsfield is situated in the valleys of two tributaries of the Adam River, viz., Main and Lavelle Creeks. These creeks and their tributary gullies have only small catchment areas, and so the water-supply is low for mining purposes.

(4)—Climate and Meteorology.

The climate of Adamsfield is a typical West Coast one, with a cold and wet winter. Snow falls fairly frequently during this season, and may accumulate to a depth of one foot, but it does not remain on the low ground for any length of time.

Rainfall data is not collected at Adamsfield, but judging by the records for the nearest stations (Tyenna), the annual rainfall must be approximately 50 inches at least.

(5)—Vegetation and Timber.

The greater part of the district is covered with a growth of button-grass (*Mesomelæna sphærocephela*) and associated shrubs. The only trees of any size on these plains are the peppermints and white gums, which form small scrubs in the midst of the plains, or along watercourses crossing them.

To the east of the district examined occur the fine eucalypt forests of Mount Field and the Florentine Valley, with, in places, more or less pure myrtle forests. Apart from these, the best forests in the district examined are those along Myrtle Creek, and on Football and Township Hills at Adamsfield. The forests along Myrtle Creek consist mainly of large myrtles (*Fagus cunninghami*), with associated trees such as sassafras (*Atherosperma maschatum* , leatherwood (*Eucryphia billardieri*), celery-top pine (*Phyllocladus rhomboidalis*), tree ferns (*Dicksonia*), &c. The myrtles in this forest range up to 5 feet in diameter.

The forests on Football and Township Hills consisted chiefly of brown-topped stringy-barks (*E. obliqua*) and a lesser number of large, white gums, with also myrtles and associated trees. The stringy-barks in the immediate vicinity of the townships and claims have been felled and split, and used for constructing huts, sluice-boxes, &c.

Many of the swamps along the smaller streams were covered with a thick growth of tea-tree, while along the flats of the Adam and Eve Rivers larger trees of manuka were prominent.

It is interesting to note the effect of rock-formations on the vegetation. The areas occupied by serpentine had a totally different covering (of peppermints, tea-tree, honeysuckle, &c.) to other rocks. The brown-topped stringybarks were confined to the areas of Silurian sandstones. The areas of quartzite, conglomerate, and gravels supported a growth of button-grass, with occasional peppermint scrubs.

IV.—GEOLOGY.

(1)—Summary.

The oldest rocks occurring within the district are those of the Dundas series of the Cambro-Ordovician system. These are overlain by the Silurian system, including the West Coast Range conglomerate series, a quartzite series, limestone series, and the Queen River sandstone series. A large dyke of ultra-basic rocks (chiefly serpentine) intrudes the Silurian rocks. The button-grass plains are largely occupied by gravels of Pleistocene age, while along the courses of the present streams recent alluvium occurs.

A geological map of the district is given on Plate I.

(2)—The Sedimentary Rocks.

(*a*) *Cambro-Ordovician System (Dundas Series)*.—The rocks of this series consist of slates, cherts, and fine-grained breccias. The slates are the typical purple slates of this series, and are thinly laminated with numerous transverse joints. The cherts are the usual dense variety, and exhibit a range of colours, including white, greyish-green, brown, and red. Fine-grained breccias or sandstones, composed of felspathic material and quartz, occur, and are very similar to the felspathic breccias of this series in the Magnet district. [2]

This series occupies only a very small part of the surface examined, viz., that below and to the west of the Adam River Falls. They must have a considerable extent to the north and south of this locality along the western side of Clear Hill and Ragged Mountains. The width of this belt (from east to west) may also be considerable.

In the small area examined, the strikes and dips of the rocks could not be accurately determined. The general strike appeared to be 340°. The dip of the slaty cleavage was easterly at high angles, but the junctions of the slates and cherts suggested a westerly dip for the series.

The above rocks form part of the Dundas series of slates and breccias as developed in the western and north-western portions of the State. On stratigraphical and general lithological grounds they are referred to the Cambro-Ordovician system. The only evidence of age in the district under review is the fact that they are unconformably

(2) Nye, P. B.: The Silver-Lead Deposits of the Waratah District, Tas. Geol. Surv. Bull. No. 33, 1923.

overlain by the West Coast Range conglomerate series of the ragged Mountains and Clear Hill, which form the base of the Silurian system in Tasmania, and are therefore Pre-Silurian. They are undoubtedly younger than the Proterozoic schists reported further west, and therefore must be of Cambro-Ordovician age.

(*b*) *Silurian System.*—The rocks of this system occupy the greater part of the district, and are divisible into several series.

(i) West Coast Range Conglomerate Series —The rocks of this series consist of conglomerates, grits, and quartzites. The conglomerates are generally coarse-grained, containing pebbles up to many inches in diameter. The pebbles are rounded and waterworn, and consist essentially of two rock-types—quartz and quartz schists. The conglomerates and included pebbles have a faint red or pink colour. The grits and quartzites are interbedded with the conglomerates, the quartzites being more plentifully developed towards the top of the series. The quartzites are dense white types.

The conglomerate series occurs in two separated areas in the form of narrow tracts, with a general north and south extension. The western area is that forming the summit and eastern foothills of the Ragged Mountains and Clear Hill. The eastern outcrop occupies a similar position with regard to the Sawback Range and the Thumbs.

On the Sawback Range the rocks have strikes ranging from 0° to 15°, and dips to the east ranging from 70° to 80°. On the summit of the Thumbs and the eastern side thereof the strikes range from 330° to 360°, and the dips to the east from 50° to 60°. An anticline occurs on the west side of the Thumbs, but the western limb is truncated by a fault. On the Ragged Mountains and Clear Hill the strikes range from 320° to 360°, and the dips are to the east at angles of 40° to 50°.

The total thickness of this series could not be ascertained. It amounts to several hundred feet at least, and may reach many hundreds of feet.

In the vicinity of Adam River Falls, the conglomerates overlie unconformably the Dundas series. They are, in turn, overlain conformably by quartzites followed by limestones. They are lithologically very similar to the West Coast Range series (basal Silurian), and are correlated with that series.

(ii) Quartzite Series.—This series consists principally of white quartzites, with lesser amounts of silicious slates. The quartzites contain numerous casts of a gasteropod. They occur on the eastern flanks of Clear Hill, on Clear Hill Plains towards the River Gordon, at the head of Adam River, and on the eastern flanks of the Sawback Range and the Thumbs.

This series is conformable with the underlying conglomerate series, and has similar strikes and dips to that series in the areas in which they were noted above. In addition, the quartzites are found to be horizontally bedded or dipping at low angles to the east at the north end of Clear Hill Plains, while at the head of Adam River the strikes and dips are indeterminable.

This series is conformably bedded between the underlying conglomerate series and the overlying Gordon River limestones. It is therefore of Silurian age, and almost certainly corresponds to the tubicolar series in north-western parts of the State. At Adamsfield the tubicolar casts are absent, but numerous casts of a gasteropod are present. The series has a maximum thickness of 1300 feet.

(iii) Gordon River Limestone Series.—This series consists of dark-grey to bluish limestone in massive beds. The limestone occurs on the plains to the east of the Thumbs, and further east in the valleys of the Florentine and Little Florentine Rivers. Each of these occurrences represents a tract of country about 1 mile wide, and with lineal extensions in north and south directions. Limestone also occurs at numerous localities throughout the valleys of the Adam and Eve Rivers.

In the area between the Thumbs and Myrtle Creek the limestone conformably overlies the quartzite series referred to above, and has strikes ranging from 350° to 15°, and dips to the east at angles of 60° to 80°. The limestone in the Florentine Valley has similar strikes, but the dips are to the west. These two tracts, in fact, represent two limbs of a syncline of the same limestone beds. In the Adam and Eve Valleys the limestone is either horizontally bedded or dips at low angles either to the east or west, with the exception of those outcrops adjacent to the serpentine, where the dips are at high angles to the east or west.

The thickness of the limestone beds to the east of the Thumbs is approximately 60 chains, while that at Adamsfield is indeterminate, only the upper part being exposed. Both limestones are apparently of Silurian age. The former overlies the conglomerate and quartzite series, and underlies soft, white sandstones. That at Adamsfield underlies friable white and greenish sandstones, apparently of the Queen River series. Whether the Adamsfield limestone represents the upper part of the Myrtle Creek and Florentine limestone is somewhat difficult to decide. There is a general difference in appearance and in the fossil content. The former contains numerous casts of gasterpods and orthoceras, while the latter contains brachiopods, although, of course, all beds were not exposed for examination and collection of fossils.

(iv) Queen River Slate and Sandstone Series.—This series consists of sandstones and shales. The sandstones are fine to medium in grain, and are very friable. Those on Adamsfield are green and white in colour, and those to the east of Myrtle Creek are white. The shales are soft, light-coloured types, interbedded with the sandstones.

These rocks occur chiefly in the Adams River valley, and form a number of small low hills, such as Township Hill, Football Hill, Marriott Hill, and other smaller ones along the eastern foothills of the Ragged Mountains. Another area where similar rocks occur is that between Myrtle Creek and Florentine River, and forming the southern end of the Tiger Range.

At Adamsfield the rocks are horizontally bedded or dip at low angles (5° to 15°) in general easterly or westerly directions. The structure is probably a number of wide, open folds, with axes with north-south trend. In the vicinity of the serpentine the dips are at higher angles, probably due to faulting associated with the intrusion.

The fossils obtained from these rocks consist of gasteropods, brachiopods, trilobites, and cephalopods. These, with the fossils from the rocks described above, are now being examined by Mr. F. Chapman, palæontologist to the National Museum, Melbourne. As the rocks succeed the series described above, they are probably of the Silurian system. They are to be correlated with the friable sandstones and shales at Heazlewood, Middlesex, Zeehan, and Queenstown, and therefore probably belong to the Queen River slate and sandstone series.

(*c*) *Pleistocene*.—The button-grass plains of the valleys of the Adam and Eve Rivers are occupied by gravels. These are medium to coarse in grain, and consist of waterworn pebbles of quartz, quartzite, &c. They are coarsest in the Clear Hill Plains, where occasionally boulders up to 3 feet in length occur. Beds of clay are interbedded with the gravels.

The most extensive development of these deposits occurs on Clear Hill Plains. They form a plain with a gentle slope of 3° to 5° from the foothills of the Thumbs towards Clear Hill. The surface of this plain has been dissected by the Eve River and its tributaries, which traverse the plain in a general westerly direction, and have shallow gorges along their courses. The maximum thickness of these deposits is 60 or 70 feet.

The gravels rest unconformably on rocks of the Silurian system. Their position in the wide valleys of the Eve and Adam Rivers indicates that they are geologically young. This is confirmed by the youthful state of the erosion to which they have been subjected. Numerous other similar deposits occur in other button-grass plains in South-Western Tasmania, and are considered to belong to the Pleistocene period. The gravels on Clear Hill Plains show no sign of ice action or formation, but are fluviatile in origin. They are therefore considered to belong to the glacio-fluviatile phase of the Pleistocene ice age.

Similar gravels occur in less extensive areas in the Adam River valley.

(*d*) *Recent.*—Recent gravels and alluvium occur along the courses of the present streams. The most extensive developments exist along the Adam and Eve Rivers upstream from their junction, where alluvial flats occur. The alluvium is probably restricted to shallow depths, and heavy gravels may form the bottom parts of these flats.

Along the tributaries of these rivers the deposits are much smaller in extent, and consist of gravels of many different types. In the vicinity of the township of Adamsfield these deposits contain osmiridium.

(3)—The Igneous Rocks.

Devonian.—A large dyke-like body of ultra-basic igneous rocks outcrops along the western foothills of the Sawback Range. At its northern end the dyke has a width of 65 chains immediately to the west of the saddle between the Sawback Range and the Thumbs. Going south the width rapidly decreases to 25 chains, and then remains constant for several miles. Near the 17-mile peg, on the South Gordon track, about 6 miles to the south, the dyke is reported [3] to be at least 10 chains wide. The dyke

[3] Reid, A. McIntosh : Tas. Geol. Surv. Bull. No. 32, 1920.

probably continues further to the south, as serpentine is stated to occur on the Port Davey track, but no details are available. The general trend of this long dyke is north and south.

Serpentine forms the greater part of this dyke. The fresh rock is generally almost black in colour, but the lighter green and bluish varieties also occur, particularly in the claims on Main Creek. The surface outcrops are either black, or are dirty white or yellow, due to weathering agencies. The remaining part of the dyke consists of narrow veins and small bodies of coarsely crystalline orthorhombic pyroxene. The pyroxene is light greyish-green in colour, with a vitreous lustre on fresh surfaces (cleavage planes). An analysis of a typical sample in the Mines Department Laboratory, Launceston, gave the following results:—

	Per cent.
Silica	55·36
Ferric oxide	2·82
Ferrous oxide	3·02
Alumina	5·28
Titanium dioxide	Nil
Lime	Nil
Magnesia	32·10
Ignition loss	1·30
	99·88

The magnesia : ferrous oxide ratio is 10 : 1, so that the mineral is enstatite. As is common with enstatite in Tasmania, the alumina content (5·28 per cent.) is high.

The serpentine and enstatite contain abundant chromite in the form generally of small crystals up to one thirty-second of an inch in size. The alluvial deposits yield crystals and worn pieces up to one-eighth of an inch, and occasionally in pieces up to 4 inches in diameter. Larger veins and lenses of chromite appear to be absent. It is worthy of note that magnetite, ilmenite, and picotite appear to be absent.

The original ultrabasic rock, from which the serpentine was derived, appears to have been completely altered to the latter rock, as no specimens were obtainable in any part of the field that gave the slightest evidence of the original rock type. Sections examined under the microscope might possibly give some evidence, but owing to lack of facilities none were obtained. A section of the serpentine at the 17-mile peg on the South Gordon track was described by the late W. H. Twelvetrees [4] as follows:—"It contains some chromic iron in grains scattered through its mass. The rock is completely serpentinised. Microscopically, much of the serpentine appears to have been derived from pyroxene rather than olivine." An examination of this section shows that the serpentinisation is complete, and that no evidence of the original rock type remains. It is probable that the rock was a peridotite similar to those shedding osmiridium in the north-western districts.

The veins and small bodies of the enstatite probably represent veins of residual magma intrusive into the ultrasic rock, and not unaltered portions of the original rock.

(4)—The Metamorphic Rocks.

Regional metamorphism has been responsible for the production of the slates and cherts in the Dundas series and the quartzites and quartzitic conglomerates in the Silurian system. This metamorphism was probably produced by more than one period of earth movements. The last period appears to have occurred after the deposition of the Silurian sediments as far up in the system as the limestones, and probably before that of the Queen River series, as the latter do not seem to have been subjected to such metamorphism.

Contact metamorphic effects around the serpentine are almost absent. The only locality where any metamorphism is evident is at the extreme north-eastern end of the intrusion, where there occurs red and green jasperoid rocks veined with quartz, and also bodies of cellular quartz and jasper. The adjacent white quartzites also contain veins of quartz. It would appear that these occurrences are near the boundary of the serpentine, which boundary is, however, not visible, and represent metamorphosed quartzites, &c.

(5)—Structural Geology.

(*a*) *General*.—The geological structure of the district is rather complicated. It consists essentially of Lower Palæo-

[4] Twelvetrees, W. H., Western Exploration: Report on Journey to the Gordon River; Ref. Sec. Lands (Tas.), 1908-09, p. 26.

zoic sedimentary rocks which have been highly folded and faulted. The axes of folding and faulting have general meridional directions. The hills and valleys have the same general trend, and in them have been deposited thin layers of gravels. Only one igneous intrusion occurs within the district.

(*b*) *Folding.*—The Dundas series to the west of the district are probably highly folded, but no attempt was made to elucidate their structure.

The West Coast Range conglomerates on the Clear Hill, Ragged Mountains, Sawback Range, and the Thumbs have a general north and south strike, and dip to the east at high angles. On the western side of the Thumbs below the summit an anticline is visible in the conglomerates. The quartzites on Clear Hill and the eastern side of the Thumbs succeed the conglomerates, and have the same general strikes and dips as the latter, but in the northern part of Clear Hill Plains they are horizontal. The limestones and sandstones of the Adam River Valley are either horizontal or dipping at low angles in general easterly or westerly directions, and their structure consists of very wide and shallow anticlines and synclines. In the valleys of the Myrtle Creek and Florentine River the limestones and sandstones form a sharp synclinal fold.

(*c*) *Faulting.*—Though in general the valley of the Adam and Eve Rivers appears to represent a wide syncline, this is greatly modified by faulting. The western limb of the anticline on the Thumbs is clearly seen from the field relations to be broken by a fault, which has a general north and south trend. The serpentine dyke also obviously occupies a fault, as on its eastern side there are east-dipping conglomerates, and on the western side west-dipping and horizontal limestones and sandstones. This fault coincides with the southern extension of that on the Thumbs, so that they represent one and the same fault.

A north-west—south-east fault exists along the eastern side of the Clear Hill and Ragged Mountains. Direct evidence of it exists at the junction of the Adam and Eve Rivers, where horizontal sandstones on the east abut against steeply-dipping conglomerates and quartzites on the west.

The valley of these two rivers thus occupies a trough fault superimposed on a large syncline. A transverse fault traverses the faulted block at the southern end of the district, but cannot be accurately located. Another fault probably occurs at the southern end of the Thumbs.

(*d*) *Igneous Intrusion.*—The large serpentine dyke is the only intrusion within the district. It occurs in the form of a long dyke-like body, and as seen above is coincident with the fault on the western side of the Thumbs and the Sawback Range.

(6)—Geological History.

(*a*) *Cambro-Ordovician Sedimentation.*—The history of the district, as represented by the rocks at the surface, began with the period of Cambro-Ordovician sedimentation. During this period the muds, sands, detrital igneous material, &c., were deposited, and gave place, on consolidation, to the slates, cherts, breccias, and tuffs of the Dundas series. Volcanic activity accompanied this sedimentation, and lava flows, as well as tuffs, are present in some parts of the State.

(*b*) *Period of Diastrophism.*—At least one period of diastrophism followed the above, during which the rocks were folded and faulted.

(*c*) *Period of Denudation.*—Following the above sedimentation the district formed dry land for a period of unknown extent, during which the rocks of the Dundas series were subjected to the ordinary processes of denudation.

(*d*) *Silurian Sedimentation.*—The district again sank below the sea, and a long and probably continuous period of sedimentation occurred during the Silurian period. This began with coarse gravels and sands, under shallow conditions, followed by slightly deeper conditions and finer sands. The conditions then changed to clear water ones, during which thick beds of limestone were formed. Another alteration then occurred to more or less shallow conditions, when sands and clays were deposited. These sediments gave, on consolidation, to the following series respectively:—West Coast Range Conglomerate, Quartzite, Gordon River limestone, and Queen River slates and sandstones.

(*e*) *Period of Diastrophism.*—The Silurian sedimentation was followed by at least one period of diastrophism not long after the close thereof. These movements resulted in probably all of the folding and the greater part of the faulting to which the rocks have been subjected.

(*f*) *Devonian Igneous Intrusions.*—Accompanying the above earth-movements shortly after the close of the Silurian period, large intrusions of magma occurred throughout Tasmania. A great variety of rocks ranging from acidic to ultrabasic types were formed, with the quantity of acidic rocks greatly in excess of others. The only representative of these rocks in the Adamsfield district is the large dyke of ultrabasic rock now represented by serpentine. The serpentine is of great economic importance, as the osmiridium was introduced with it, and has been shed into the alluvial and detrital deposits from which the osmiridium is won.

(*g*) *Period of Denudation.*—The district became a land surface after the Silurian sedimentation, and underwent extensive denudation in common with the remainder of the State. This may have persisted until the Pleistocene period, or may have been interrupted by one or more of the following geological events which occurred in other parts of the State:—

(*h*) *Permo-Carboniferous Sedimentation.*

(*i*) *Triassic Sedimentation.*

(*j*) *Period of Igneous Intrusions (Doleritic).*

(*k*) *Period of Denudation.*—The above three events, if they occurred, were followed by a long period of denudation, during which a topography practically identical with the existing one was formed.

(*l*) *Pleistocene Deposition.*—During the Pleistocene epoch Tasmania was subjected to glacial conditions on the higher parts of its surface. Glacial deposits are not in evidence in the Adamsfield district, but the gravels, &c., of the Clear Hill Plains, Adams River valley, and other localities were formed under fluviatile or fluvio-glacial conditions.

(*m*) *Present Cycle of Denudation.*—Since the close of the glacial epoch the district has probably been subjected to an uninterrupted period of denudation. The streams adjusted their courses to the alterations of the surface caused by the Pleistocene deposits, and have formed the present drainage system and resulting topography. River alluvium and gravels have been formed to a limited extent along the present streams.

V.—ECONOMIC GEOLOGY.

(1)—Introduction.

The only mineral of economic importance at Adamsfield at the present time is osmiridium. Chromite accompanies the osmiridium in considerable quantities, but is too far from markets to render its exploitation possible at the present time.

Leases have been taken up for the purpose of mining for gold, but none has been proved to exist up till the present. A small quantity of gold is obtained with the osmiridium.

The osmiridium which has been mined on Adamsfield has been obtained from secondary deposits. Primary deposits of osmiridium have not yet been located, but consideration of them is involved in the question of the source of the osmiridium in the secondary deposits.

(2)—Mineralogy.

The Adamsfield district is not characterised by the presence of a large number of mineral species. The greater part of the district is occupied by sedimentary rocks, which have already been described. Only one igneous rock is known, viz., the serpentine dyke, so that rock-forming minerals are few in number. The largest association of minerals occurs in the alluvial deposits, and has been revealed by the mining of the deposits for osmiridium. The most important and interesting mineral species are:—

Chromite (Oxides of Iron and Chromium, FeO Cr_2 O_3).—Occurs abundantly in the secondary deposits with osmiridium. The average grain size ranges from 0·03 to 0·1 of an inch, but occasionally pieces as large as 1 to 3 inches are obtained. While the grains are generally water-worn and rounded, a considerable proportion show the typical octahedral crystal outlines.

Chromite is also plentiful in the serpentine and enstatite rock as octahedral crystals about 0·03-inch in size, readily visible to the naked eye. It is also present in the red talcose rock east of the serpentine in Main Creek and in occasional pieces of white quartzite found in the wash.

Corundum (Oxide of Aluminium, Al_2 O_3).—A few pieces up to 1 inch in size have been obtained from the secondary deposits. They were dark-grey to black in colour, and thus represent the variety known as "emery."

Enstatite (Silicate of Magnesium, MgO SiO_2).—Enstatite occurs as veins and small irregular bodies in the serpentine. It is a light, greyish-green colour, with a pearly to vitreous lustre. It has a hardness of 5 to 6, and while being somewhat brittle it is exceedingly tough in larger pieces. It is coarsely crystalline, and exhibits one prominent system of cleavage planes, together with a less prominent cleavage or parting in another direction.

An analysis of typical material made in the Mines Department Laboratory, Launceston, gave the following results:—

Reg. No. 890, 1927.

	Per cent.
Silica	55·36
Ferric oxide	2·82
Ferrous oxide	3·02
Alumina	5·28
Titanium dioxide	Nil
Lime	Nil
Magnesia	32·10
Ignition loss	1·30
	99·88

The analysis is a typical one for enstatite. The magnesia is largely in excess of the ferrous oxide, so that the mineral does not approach bronzite. The alumina content is fairly high, but this is a common feature of enstatite associated with the Devonian serpentines of Tasmania ([5]).

Gold (Native Gold, Au).—Occurs in association with the osmiridium and chromite in the secondary deposits. It is bright golden in colour, and apparently contains little, if any, silver. It occurs as flat grains, all of which show effects of being waterworn, while the larger pieces are completely rounded. The largest piece obtained was one of two and a half ounces. One specimen consisted of half gold and half osmiridium adhering closely together.

Ilmenite (Oxides of Iron and Titanium, FeO TiO_2).—Occurs only in the form of extremely fine grains in a fine, heavy sand accompanying the osmiridium concentrates.

Jasper (Oxide of Silicon, SiO_2).—Occurs as pieces in the secondary deposits, especially at the head of Main

([5]) Reid, A. McIntosh: Osmiridium in Tasmania, Tas. Geol. Surv. Bull. No. 32, 1920, p. 26.

Creek. It is of the typical red colour, and has the usual hardness of quartz. Also occurs in boulders in association with the conglomerates and quartzites to the east of the serpentine. At the head of Hopper Creek a large development of jasperoid rock occurs, and apparently represents altered quartzites at the contact with the serpentine.

The miners erroneously apply the term jasper to the red talcose material at the head of Main Creek.

Millerite (Sulphide of Nickel, NiS).—On W. N. Doak's claim, at the head of Main Creek, a considerable amount of secondary pyrite has been obtained, which, on assay, yielded a nickel content as shown in the following tables:—

	Reg. No. 742.	Reg. No. 1096.
Iron oxide (FeO)	—	0·75
Iron (Fe)	21·60	24·03
Sulphur (S)	42·07	38·98
Nickel (Ni)	21·80	11·8
Nickel oxide (NiO)	—	2·2
Cobalt (Co)	0·30	0·31
Sulphur trioxide (SO_3)	1·37	3·43
Arsenic (As)	Trace	Trace
Alumina (Al_2O_3)	1·1	1·00
Magnesia (MgO)	—	0·36
Moisture (H_2O)	1·10	5·00
Insolubles (including chromite)	7·80	9·8
	97·14	97·66

The material is a dark-grey massive type showing small crystals of chromite. Under the microscope it appears to consist of quartz, chromite, a bright yellow sulphide-like pyrite, and probably a grey sulphide.

There occurs associated with the above smaller pieces of a bright yellow sulphide-like pyrite, which, presumably, is the pyrite-like mineral in the above material. An analysis of this (Reg. No. 888) gave 56·0 per cent. nickel and 2·0 per cent. iron. The yellow sulphide must therefore be millerite (nickel 64·7 per cent. and sulphur 35·3 per cent.). The greyish sulphide is therefore probably secondary pyrite in a fine-grained form.

Osmiridium.—Osmiridium is a native alloy composed essentially of the metals osmium and iridium in varying proportions. The other metals of the platinum group, such as ruthenium, platinum, rhodium, and palladium, are also present in smaller amounts.

Two varieties of osmiridium have been recognised, viz., nevyanskite and siserskite, in relation to the relative proportions of osmium and iridium, nevyanskite having over 40 per cent. iridium and siserskite not over 30 per cent. iridium. The distinction is, however, more or less an arbitrary one, as the varieties are isomorphous and probably only arbitrary divisions in a more or less continuous series of alloys. Nevyanskite is tin-white in colour, while siserskite is greyish.

Osmiridium crystallises in the hexagonal (rhombohedral) system, but crystals are rare. The usual occurrence is shotty grains or flat scales, sometimes hexagonal in outline. Aggregates of the grains and scales made large pieces. It has one prominent cleavage, fracture along which probably produces the scales.

It has a hardness of 6 to 7, and is slightly malleable to nearly brittle. The specific gravity ranges from 18·8 to 21·2.

The following table gives a very important and extensive series of analyses of osmiridium from Adamsfield:—

Analyses of Osmiridium from Adamsfield.

No.	Iridium.	Osmium.	Ruthenium.	Platinum.	Rhodium.	Palladium.	Gold.	Remarks.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent	
	40·80	46·10	8·00	2·00	0·80	trace	...	From Eames and Scoles' Claim
2	39·20	50·20	6·50	2·00	1·00	trace	...	Hansen's Claim
3	38·40	47·00	9·80	1·60	1·60	trace	...	H. Tudor's Claim
4	36·30	47·25	10·60	2·20	1·60	trace	...	General sample
5	40·12	44·89	6·50	1·02	0·18	...	...	From 60 oz. parcels
6	40·48	44·14	6·54	1·00	0·20	...	...	
7	40·02	43·96	6·67	1·16	0·20	...	...	
8	44·35	45·74	6·46	—	trace	...	trace	
9	41·43	43·50	5·35	1·10	0·16	...	0·007	Samples from 50 oz. parcels
10	42·33	43·86	5·97	1·06	0·17	...	0·03	
11	42·70	46·28	5·54	1 04	0·18	...	0·003	
12	41·37	46·84	5·29	1·01	0·16	...	0·005	
13	42·80	47·10	5·52	0·48	0·14	...	0·002	
14	42·22	46·30	6·03	0·92	0·14	...	0·005	
15	43·21	45·88	5·81	1·04	0·14	...	0·003	
16	42·39	44·96	6·75	1·25	0·17	...	nil	Samples from 75 oz. parcels
17	41·[illegible]5	43·92	6·59	1·27	0·21	...	nil	
18	42·85	44·10	6·47	1·21	0·19	...	0·007	
19	42·82	44·30	6·12	1·36	0·22	...	nil	
20	43·58	44·36	5·81	0·50	0·14	...	nil	
21	42·11	45·70	6·16	0·56	0·10	...	nil	

22	42·03	45·92	5·73	0·52	0·16	...	nil	50 oz. parcel
23	42·62	43·31	6·43	1·14	0·14	...	nil	75 oz. parcel
24	41·45	46·80	6·13	1·12	0·16	...	nil	75 oz. parcel
25	42·53	44·36	6·02	1·24	0·18	...	nil	50 oz. parcel
26	41·66	43·35	6·48	1·34	0·12	...	nil	75 oz. parcel
27	42·02	46·22	5·30	1·21	0·11	...	nil	75 oz. parcel
28	41·85	46·64	5·49	0·92	0·12	...	nil	50 oz. parcel
29	41·76	45·74	6·79	1·14	0·19	...	nil	75 oz. parcel
30	42·20	45·83	6·35	1·26	0·18	..	nil	75 oz. parcel
31	42·28	46·50	6·31	1·20	0·18	...	nil	50 oz. parcel
Average	41·65	45·51	6·40	1·12	0·29	...	0·002	

Analysts:

Samples 1-4—Mines Department Laboratory, Launceston.

,, 5-7—Daniel C. Griffith and Co., London.

,, 8—Mathey's, London.

,, 9-31—Daniel C. Griffith and Co., London.

In the Adamsfield analyses the iridium and osmium are in approximately equal proportions, with the osmium always somewhat in excess, the approximate average contents being 41·65 per cent. iridium and 45·51 per cent. osmium. These figures suggest an alloy with iridium and osmium in the proportion of 1 : 1. Ruthenium is present to the amount of 6·40 per cent., while platinum and rhodium have average values of 1·12 and 0·29 per cent. respectively. The mineral is, therefore, the nevyanskite variety of osmiridium with iridium and osmium in the proportion of 1 : 1.

The analyses show the remarkable uniformity in composition of the osmiridium sampled, the constituents varying very little from sample to sample.

The following table includes most of the larger nuggets from Adamsfield:—

Discoverer.	Weight (Troy).			Locality.
	ozs.	dwts	grs.	
C. Stubbings & H. Hansen	1	11	1	Main Creek
J. Glenn	1	7	17	Lavelle Creek
— Copping	1	7	0	
E. Smith and partner	1	5	0	Main Creek
Gadsby and Tudor	1	4	12	Main Creek
W. Grove	1	4	0	Top End Reward Claim, Main Creek
— Tudor	1	0	4	Deep Creek

Platinum (Platinum, Pt).—Platinum is present in the osmiridium in small proportions. Native platinum is also an associate of osmiridium. One piece has been obtained from Adamsfield and determined to be platinum. It was dark steel-grey in colour, and had a hardness of about 4, and was identified chemically as platinum. Much of the so-called platinum from the field has been proved to be lead, probably derived from shot, bullets, &c.

Pyrite (Sulphide of Iron, FeS_2).—Pyrite occurs in several different ways on Adamsfield, but it is probably always of secondary origin. It is very common as spherical pieces up to 1-inch diameter in the clay or "pug" bottom found to the north of the township. Similar bodies are contained in the Silurian limestone. The secondary pyrite associated with millerite on Doak's claim has already been referred to above. (6)

(6) See p. 22.

Quartz (Oxide of Silicon, SiO_2).—Quartz is common on this, as on all fields, in the form of sand grains and as pebbles. These are derived from the sandstones, quartzites, and conglomerates of the district. The only occurrence of quartz, apart from that in the sedimentary rocks and alluvial deposits referred to, is the reef in the serpentine in the vicinity of Doak's and O'Reilly's claims. The quartz is the typical reef quartz, and is associated with impure siderite and oxide of iron containing a small proportion of nickel.

Serpentine (Hydrated Silicate of Magnesium, $2H_2O \cdot 3MgO \cdot 2SiO_2$).—Pieces of serpentine are common in the secondary deposits, and have been derived from the large serpentine intrusion. This intrusion has already been described ([7]) from the petrological aspect. The serpentine is always of the massive type. Its colour is generally dark-green to black, with occasionally lighter shades of blue and green. Weathered specimens are, of course, much lighter, often being dirty white and yellow. Foliated and fibrous types are so rare that they may be considered practically non-existent.

The jointing is generally rectangular, but platey jointing is also common.

Talc (Hydrated Silicate of Magnesia, $H_2O.\ 3MgO\ 4\ SiO_2$).—To the east of the serpentine belt, at the head of Main Creek, an area of red talcose material occurs. A sample (Reg. No. 1336, 1928) was analysed in the Mines Department Laboratory, Launceston, with the following results:—

	Per cent.
Silica	52·96
Ferric oxide	8·72
Ferrous oxide	1·55
Alumina	6·96
Lime	Nil
Magnesia	26·08
Ignition loss	4·40
	100·67

Although the material generally resembles serpentine and is harder than ordinary talc, the analysis proves that it is talc. The material has generally a slaty cleavage or jointing, and contains numerous small crystals of chromite.

([7]) See p. 14.

Topaz (Fluo-silicate of Aluminium, $(Al(OF_2))AlSiO_4$).—Topaz occurs only in the form of extremely fine grains in the concentrates of fine brownish sand obtained with the osmiridium.

Zircon (Silicate of Zirconium, ZrO_2 SiO_2).—Zircon occurs similarly to the topaz, &c., in the form of extremely fine grains in the concentrates of fine sand accompanying the osmiridium.

(3)—Mineral Associations.

The minerals described above have, as would be expected, several different sources or origins, and naturally form themselves into a number of different associations. These associations and classes will be discussed below under their respective headings.

Rock-forming Minerals.—Of the above minerals only a few can be classified as being rock-forming minerals on Adamsfield. These are serpentine, enstatite, chromite, and quartz. The serpentine forms the rock of the same name which occurs as a large dyke. The enstatite occurs as veins and apparently small irregular bodies in the serpentine. Chromite is present as small crystals in both the serpentine and the enstatite rock.

The quartz enters largely into the composition of the sedimentary rocks, such as the conglomerates, quartzites, and sandstones.

Osmiridium and Its Associates.—The minerals which are constantly associated with the osmiridium are chromite and gold. Of these, the chromite is, of course, the most plentiful, while the osmiridium is more abundant than the gold. The relative proportions of the latter vary from place to place, *e.g.*, gold is said to occur in greater relative proportions on the western than the eastern part of the field.

Besides this close association in the secondary deposits, further evidence proves their intimate association in the primary deposits from which they were shed. One specimen in the possession of the writer consists of both gold and osmiridium firmly joined together. Another piece was brought to the writer's notice which consisted of chromite and osmiridium joined similarly. It is evident, therefore, the osmiridium, gold, and chromite have a common source.

Topaz, Zircon, and Ilmenite.—These three minerals, together with quartz and chromite, form the fine brownish sand which is obtained as a concentrate along with the osmiridium. They occur only in this fine form, and no evidence of coarser pieces has yet been obtained. The ilmenite might possibly be derived from the serpentine, but it is unlikely that the topaz and zircon would come from such a source. The latter minerals are generally associated with any gravels, &c., formed under conditions suitable for the concentration of heavy minerals. The conglomerates on the Sawback Range and Ragged Mountains represent consolidated gravels of this type, and it is from these rocks that the topaz, zircon, and ilmenite (partly, if not wholly) have been derived.

Secondary Minerals.—As already described, the pyrite in the limestone, pug, and in the gravels is regarded as being of secondary origin. The millerite associated with pyrite on Doak's claim is also regarded as being of secondary origin.

(4)—Source of the Osmiridium.

(*a*) *General.*—The question of the origin or source of the osmiridium in the north-western fields has already been discussed in previous bulletins.

In 1914 Twelvetrees ([8]) found that "the matrix rock of the osmiridium was apparently a peridotite," and that "the serpentine rock associated with these occurrences is in a more or less altered and softened condition, and shows here and there decayed whitish flakes of bronzite, having a mica-like appearance to the naked eye.

In 1921 A McIntosh Reid ([9]) states that: "It has been definitely established as the direct result of the recent investigations of the Tasmanian fields that the occurrence of osmiridium is intimately related to the chemical and physical characters of serpentine rocks derived largely from bronzite rich in alumina, consequently the distribution of this mineral is determined by that of a particular variety of serpentine. For instance, in all the fields the osmiridium invariably accompanies serpentised peridotite (olivine and bronzite), while the serpentines derived from pyroxenites and gabbros are barren . . It has been determined also that the deposits of osmiridium in the peridotite serpentine are almost exclusively confined to pockety accumulations distributed irregularly along structural planes in the rock."

([8]) Twelvetrees, W. H.: The Bald Hill Osmiridium Field, Tas. Geol. Surv. Bull. No. 17, 1914, p. 16.

([9]) Reid, A. McIntosh: Osmiridium in Tasmania, Tas. Geol Surv. Bull No. 32, 1921, p. 1.

Adamsfield possesses the same general features which appear to be the essential factors in the occurrence of osmiridium on the north-western fields, viz., a large intrusion of serpentine containing veins and irregular bodies of enstatite. There is thus every reason to expect that the osmiridium has been shed from the serpentine on Adamsfield as on all other Tasmanian fields. As already stated, [10] it is impossible to determine the nature of the original rock from which the serpentine was derived, so that the derivation of the osmiridium from a serpentinised peridotite as on other fields cannot be discussed in the present state of our knowledge.

In addition to the above general reasoning there are, of course, other evidences which prove that the osmiridium on Adamsfield has been derived from the serpentine. The mineral associations furnish strong evidence. As already described, [11] the osmiridium is always associated with chromite and gold, while some specimens show osmiridium and gold and others show chromite and osmiridium in intimate association. As chromite can be seen in almost every specimen of serpentine and enstatite, it is evident that the osmiridium and gold must have occurred in the serpentine also.

It is somewhat remarkable that more definite evidence of the presence of the osmiridium in the serpentine has not been obtained. One specimen was, however, given to the writer by Mr. W. C. Burrows, which shows beyond doubt that the osmiridium occurs in the serpentine. The specimen was a small piece ($\frac{1}{2}$-inch x $\frac{1}{4}$-inch x $\frac{1}{8}$-inch) obtained from the serpentine on the claim in Main Creek, first owned by T. Stacey. It consists chiefly of the dark-green or black variety of serpentine with a light yellowish-brown variety also present on one side. At least 6 grains of osmiridium and numerous small octahedral crystals of chromite are visible in the serpentine, being more or less restricted to the light-coloured variety on one side of the specimen.

(*b*) *Local Features.*—The distribution of the osmiridium deposits along Main Creek proves that the osmiridium in these deposits must have been derived from some source in the basin-shaped depression near the head of Main Creek. This depression consists mainly of serpentine with quartzites to the east. A few chains east of the serpentine boundary the quartzites form the watershed between Main Creek and the Florentine Valley. The osmiridium-bear-

([10]) See p. 15. ([11]) See p. 28.

ing ground is restricted to the serpentine, and this, coupled with the fact that only traces of osmiridium occur on the fall to the Florentine River, furnishes further proof that the osmiridium was shed from the serpentine.

Several interesting features occur on the group of miner's right claims adjacent to the eastern boundary of the serpentine in the above locality. This group of claims includes those held formerly by W. N. Doak (M.R. 43), N. H. Doak (M.R. 44), J. E. Doak (M.R. 45), M. O'Reilly, Fullerton (M.R. 48), Noyes, &c. As serpentine occurs on these claims which are close to the eastern boundary thereof, and osmiridium is obtained from them, it is obvious that some, at least of the osmiridium must have been shed from the serpentine on or near them.

One of the interesting features has been already referred to, viz., the occurrence of millerite and pyrite, probably of secondary origin. As both nickel minerals and osmiridium are usually associated with ultrabasic rocks, it is possible that it will be found that there is some connection between the source of the osmiridium and the millerite.

Another feature is a formation traversing the serpentine on Doak's (M.R. 44) and O'Reilly's claims. This formation is 2 to 4 feet wide, with a strike of 330°. The formation contains a vein of ordinary white reef quartz some 1 or 2 feet wide. The formation also contains irregular bodies of a soft white material, which hardens to a dirty white cellular material resembling an impure carbonate. A sample of this hardened material was analysed (Reg. No. 225, 1927) in the Mines Department Laboratory, Launceston, with the following results:—

	Per cent.
Silica	1·16
Ferrous oxide	22·05
Ferric oxide	42·47
Alumina	1·54
Titanium dioxide	Trace
Lime	Nil
Magnesia	Trace
Nickel oxide	0·18
Carbon dioxide and ignition loss	31·60
	99·00

The material is apparently a mixture of ferrous carbonate (siderite) and hydrated ferric oxide (limonite). The small content of nickel is interesting, and serves to connect the occurrence with the secondary millerite in the "wash." Some of the millerite is, however, obtained above (uphill) from the formation, and so there must be another source for some, at least, of the millerite. Further, this formation does not appear to be connected with the source of the osmiridium, because tests of material from it did not prove the presence of osmiridium in it, and, further, osmiridium is present in the deposits situated uphill from this formation.

To the west of the dark-green serpentine there is a narrow belt of red talcose material. There are very few natural exposures of this material, and what few there are show that it has a considerable range in character. Some of the material has a system of joints resembling the cleavage of slates, and is a red rock, uniform in appearance, and containing small crystals of chromite. Another variety resembles a breccia, consisting of angular pieces (up to 1 inch in size) of the reddish talcose material in a fine matrix. Calcite occurs as narrow veins through the material, and in some cases it forms a thin layer round the included fragments, and in others it appears to have replaced some of the fragments. Chromite is also present. Once more the tests have failed to prove the presence of osmiridium in the rock.

The above descriptions show that there are some unusual occurrences near the eastern boundary of the serpentine in the immediate vicinity of the area from which part of the osmiridium shed into Main Creek must have been derived. Although none of them can be proved to be definitely associated with the source of some of the osmiridium, their presence is somewhat significant, and during the further progress of mining in that locality there may yet be revealed some occurrence which forms the source of this osmiridium.

(5)—Types of Deposits.

(*a*) *Primary Deposits.*—As proved above, the osmiridum in the secondary deposits has been derived from some source in the serpentine rock, so that primary deposits of some type must exist. These deposits will, no matter what form they take, be in the nature of magmatic deposits, *i.e.*, formed from the magma which, on crystallising, yielded the igneous rocks in which they now occur.

The osmiridium deposits would appear to occur in either or both of the following ways:—

(i) As disseminations throughout the serpentine. While it is probable that some of the osmiridium occurs in this way, its distribution is too irregular to be accounted for by a general and uniform distribution throughout the serpentine. Even in those parts of the serpentine where the osmiridium is more concentrated than in others it may occur as disseminations.

(ii) In the north-western fields it has been determined that the osmiridium occurs in the serpentine in the form of irregular accumulations arranged along important structural planes. Similar accumulations may exist on Adamsfield, especially at the head of Main Creek, but they have not yet been exposed or otherwise proved to exist.

These magmatic deposits are related to the similar ones, such as those of magnetite, chromite, ilmenite, diamond, platinum, and gold, which occur in genetic association with ultrabasic igneous rocks. The chief difference lies in the extremely small amounts of osmiridium in the deposits of this mineral compared with those of the majority of the other minerals in their own particular deposits.

It is to be noted that the minerals occurring in such deposits are native metals and oxides, while certain sulphide deposits also are genetically related to ultrabasic and basic rocks.

(*b*) *Secondary Deposits.*—The osmiridium-bearing deposits of Adamsfield which have been exploited up till the present time consist wholly of ores of secondary origin. These secondary deposits are not uniform from place to place, but present a diversity of types. Each type will be discussed separately below.

(i) Surface Soil.—It was sometimes claimed that osmiridium was obtained from the " grass roots " or the peaty soil. While this was possible, it is probable that the osmiridium-bearing material was not the actual soil, but the upper part of the detrital or alluvial material which occurs immediately below the soil.

(ii) Detrital and Residual Deposits.—These deposits are formed by the weathering and disintegration of the underlying rocks and the accumulation of a small thickness of detritus, weathered material, &c. Such deposits can, of course, only be osmiridium-bearing if the underlying rocks or formations are osmiridium-bearing. This type is therefore more or less restricted to areas over which serpentine outcrops. Claims were worked on this type of deposit in the eastern part of the original reward lease (9457-M).

Another possible occurrence is where former alluvial and other deposits, not necessarily on a serpentine bottom, have been destroyed by erosion and formed more or less detrital deposits. Such types have been formed on Football Hill, and will be described below.

(iii) Alluvial Deposits.—Alluvial deposits are those formed along streams. In small streams, or at the heads of larger ones, the volume of water is small, and the pebbles, &c., are not subjected to much abrasion, and so are more or less angular. The deposits in such localities form a connecting link with the detrital deposits.

In larger streams the pebbles become water-worn and rounded, and the deposits then become gravels. Gravels are the most usual deposits in which secondary deposits of stable minerals, such as gold, osmiridium, cassiterite, &c., occur. On Adamsfield, however, osmiridium-bearing gravels are not plentiful. Small areas occur in Main Creek, at two localities, viz.: Upstream from lease 9457-M and also between Harper's and Heazlewood's claims. A small isolated occurrence is that on Mainwaring and Tribolet in the valley of Lavelle Creek.

Heavy gravels are more plentiful in Adam River and Sawback Creek, as, for example, on lease 9468/M and Stacey and Wright's claims. Similar gravels apear on the eastern fall of Ragged Mountains, as, for example, in Scanlon Creek, but these assume their characters mainly on account of the included water-worn pebbles derived from the West Coast range conglomerates.

(iv) Redistributed Deposits.—The majority of the claims contain a type of deposit to which it is difficult to give a name. The deposit may consist of sand, clay, or sandy clay, with a relatively small number of pebbles, which are largely angular but may contain a few rounded ones. The rounded pebbles are accidental, in that they probably have been derived from older gravels. The angular pebbles suggest detrital deposits, but some of the deposits occur in valleys of small streams, and so are partly alluvial. It is to be noted that in many cases these deposits rest upon a false bottom of clay.

These deposits occur in the valleys of Lavelle Creek, Moore Creek, Smith Creek, and other localities on the eastern and northern slopes of Football Hill. The osmiridium in them, while being distributed by the present streams and topography, was derived from older secondary deposits.

(5)—Distribution of the Deposits.

The chief areas in which payable osmiridium deposits occur are;—

(a) Along the Main Creek from its source to below its junction with Smith Creek.

(b) On the eastern, northern, and western slopes of Football Hill.

Less important areas are:—

(c) At numerous isolated places along the eastern side of the Adam River valley, such as near head of Lavelle Creek, Miller Creek, Williams Creek, and the Sawback Creek, near lease No. 9468.

(d) Along the western side of the valley of Adam River, at isolated localities such as Worsley Creek, Lumsden Creek, Scanlon Creek, Marriott Hill, and the Adam River, immediately above and below the falls.

The distribution of these areas is difficult to explain when the *present* drainage is considered, and it is assumed that all the osmiridium has been derived from the serpentine. The osmiridium, while being derived mainly from the head of Main Creek, has also been derived from a few less important localities to the south along the serpentine dyke. The present drainage from these localities readily explains the presence of osmiridium in Main Creek, Lavelle Creek, Miller Creek, Williams Creek, and Sawback Creek. It will not, however, explain the occurrence of osmiridium on Football Hill or along the western side of the Adam River valley. The reason for this is that the present drainage system does not necessarily have to explain the whole of the distribution, because drainage systems change during geological time, and part of the present distribution may have been brought about by a drainage system older than the present one. The older system would have existed when the surface of the land in the

Adamsfield district was higher than it is at present, that is to say erosion had not proceeded as far as at the present time. An ancestor of the Main Creek probably flowed over the site of the present Township Hill and Football Hill. The osmiridium deposited by this stream on these hills has since been redistributed by the present streams, and thus accounts for the osmiridium found on all sides of Football Hill and in the valleys of Lavelle Creek and Moore Creek, between Football Hill and the Township Hill. Confirmatory evidence of the existence and course of this stream is afforded by the fact that the coarsest nuggets of osmiridium, and also gold, are found in two localities, viz., at the head of Main Creek and in the valley of Lavelle Creek, to the south of the township. The obvious inference is that the coarse osmiridium at the latter locality was derived from the same source as the other, viz., Main Creek, and was brought to its present position by the ancestor of the Main Creek, referred to above.

The osmiridium on the western side of the Adam River valley was also brought there by a former drainage system. The courses of the streams have been eroded away, and so definite details of the system are lacking. One feature of the then valley must have been that the lowest parts of the valley were along the western side, so that the osmiridium could be transported to it from the eastern side.

Several factors arise out of a general consideration of the distribution of the osmiridium deposits—

(*a*) The country north of Main Creek and Hopper Creek, *i.e.*, north of the northernmost point of the serpentine, is apparently barren, the drainage being almost due west.

(*b*) The country east of the Thumbs-Sawback Range is practically, if not entirely, barren. This is because the serpentine occurs only on the western slope of the Sawback Range, and so it is impossible for osmiridium to be shed to the east.

(*c*) Although osmiridium has been shed from several places along the serpentine, by far the greatest quantity has been shed from the northern end of it where, incidently, the dyke is widest.

VI.—THE MINING PROPERTIES.

(1)—Introduction.

The only mining properties in the Adamsfield district of any importance at present are those upon which mining for osmiridium is conducted. Except for the two reward leases, the mining tenements consist of miner's right claims only. Of these claims a comparatively small number are registered, which can only be done after they have been surveyed, while the greater number are unsurveyd and unregistered. The claims are often abandoned and then repegged again, often in a different shape and area by different people. For these reasons they are continuously being changed, and so the descriptions given below will be brief.

The descriptions of the claims will generally refer to them in the early days of the fields, but it must be understood that there have probably been many changes since then.

For convenience the district will be divided into a number of arbitrary areas, and the claims in each area described under their respective headings.

(2)—Terms Employed by the Miners.

The miners employ a number of terms in connection with the deposits and their mining which unconsciously become embodied in reports, so that definitions of some are advisable:—

Bottom.—This refers to the bedrock, whether serpentine, sandstone, clay, &c., upon which the osmiridium-bearing material rests. It is applied equally to the false bottoms of clay as well as to the bedrock of serpentine, sandstone, &c.

Metal.—This term is almost universally used when referring to the osmiridium.

Pug.—Pug is the general term applied to the clay which occurs on many parts of the field.

Stripping.—This term refers to the material which contains little or no osmiridium and which is removed or stripped off so that the osmiridium-bearing material can be mined and treated.

Wash.—Wash apparently is a shortened form of wash-dirt, as it is applied to the osmiridium-bearing material, whether gravels, clay, detritus, &c.

(3)—Main Creek Area.

Doak's Claims.—At the head of a small branch of Main Creek, a group of three registered miner's right claims are held, as follow:—W. N. Doak, No. 43; N. H. Doak, No. 44; and J. E. Doak, N. 45—all of half an acre. These are arranged in a general direction from south-west to north-east along the small creek or gully already referred to. At the time of the writer's first visit these claims were just being opened up. At a later visit work had progressed further, and, at the present time, the working face is on the central claim (No. 44). The lode formation [12] in the serpentine crosses this claim a short distance south-west of the present face. It is from these claims also that the secondary pyrite and millerite have been obtained.

A more or less well-defined gutter is being followed through these claims. The depth of "wash" ranges up to four or five feet, being deepest in the actual gutter. The osmiridium is present in grains averaging about one-sixteenth of an inch, but good, clean nuggets, up to nearly 10 dwts. in weight. The bedrock is the normal dark greenish serpentine.

M. O'Reilly.—This claim is situated to the south-east of Doak's claim. The ground consists of detrital material, some three three to four feet in depth. The bedrock is the dark greenish serpentine. The lode formation [13] with quartz veins traverses this claim.

D. J. Fullerton.—Fullerton holds a registered miner's right claim (No. 48), of half an acre, to the south-east of O'Reilly's claim. The ground is some four to five feet deep, and consists of of alluvial and detrital material, near the head of Main Creek. The bedrock on the western part is the dark green serpentine, but to the east the reddish serpentine material appears.

Noye.—The miner's right claim of Noye is situated at the head of Main Creek, adjacent to the serpentine boundary. At the western end the ground consisted of 18 inches of stripping (peaty soil, &c.) and 12 inches of wash, on a soft green serpentine bottom. Near the eastern part of the claim 4 inches of wash and 4 inches of serpentine were being treated. The workings consisted of a narrow strip along the course of Main Creek. The wash

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([12]) See p. 31. ([13]) See p. 31.

consisted chiefly of quartz and quartzite pebbles, but pieces of the red serpentine material were also present.

The osmiridium obtained was good, clean metal, with nuggets up to 12 dwts. 16 grs. present.

Quarrel.—Quarrel's claim was situated between the western end of Noye's and Doak's claims. Underlying the soil there was 1 foot of wash and then a greenish "pug," lying on a bedrock of soft bluish-green serpentine. The osmiridium was more or less confined to the lower part of the wash and the pug. The finer osmiridium was clean, while the coarser metal was somewhat stained.

Gadsby and Tudor.—Gadsby and Tudor held a registered (No. 39) and consolidated claim, of 1 acre, to the south of W. N. Doak's claim (No. 43). This claim was not held at the time of the writer's visit.

Thompson.—Thompson's claim was situated over 100 feet to the west of Quarrel's claim. The ground worked was on the northern side of the Main Creek valley. One foot of peaty soil was stripped off and the underlying 18 inches of clay and reddish wash treated. The bottom was the normal green serpentine. The osmiridium obtained was of medium-grain size.

A. Dean.—The miner's right claim of A. Dean embraced half an acre of the tea-tree covered flat of the Main Creek. Beneath the peaty soil there was 1 foot of subsoil and wash, resting on a bedrock of weathered green serpentine. The osmiridium was chiefly contained in the pug at the bottom of the wash. The metal was generally clean, and comprised both fine and coarse grains. The largest nugget obtained was 12 dwts. 9 grs.

Greatbatch.—The miner's right claim of Greatbatch was situated downstream from that of A. Dean, in the valley of Main Creek. The valley of the creek is wide at this point and the wash shallow. The wash consisted largely of pebbles of red talcose material, serpentine, &c. The bottom part of the wash was cemented somewhat and rested on a serpentine bottom. In all respects this claim was very similar to that of T. Stacey, and, like the latter, was one of the most valuable ones on the field.

T. Stacey.—This claim occupied a flat portion of Main Creek, similar to that of Greatbatch. The workings were shallow and over a width of 40 feet. Below the soil there was a few feet of clay, wash, and cement, the latter resting on a greenish serpentine bottom. The wash contained pieces of sandstone, serpentine, red serpentine, and enstatite The latter was derived from the irregular veins occurring in the serpentine on the claim. T. Stacey worked the wash but did not treat much of the cement. It was stated that osmiridium occurred in the soil, clay, wash, and cement. This claim was one of the best on the field, as much as $8\frac{1}{2}$ oz. being obtained from the sluice-box in one day.

The claim passed to various other owners after T. Stacey disposed of it. The later owners devoted their attention to the cement. This was picked up and allowed to weather, for the purpose of breaking it up. Later a small crushing plant was installed to break up the cement prior to treating it by concentration.

Cornelius and Tudor.—Downstream from T. Stacey, Cornelius and Tudor each held a miner's right claim, and worked in conjunction. Later H. Hansen took over the claim of Cornelius, and held it as registered claim No. 27.

These claims were situated at the western end of the flat in which the other claims, described immediately above, were situated. The workings were 4 to 5 feet deep and 20 to 30 feet wide. A small thickness of wash occurred at the bottom of the face, and the osmiridium was most plentiful right on the bedrock of serpentine.

Webb, Richards, and Kelly.—This claim was situated some 11 chains to the north-west of those of Tudor and Cornelius. The valley of Main Creek is narrow and rocky at this locality. The workings were 30 feet wide and extended along the course of the creek. The depth of the workings were about 3 feet. The osmiridium included both fine and coarse grains, and was obtained chiefly from the bottom of the wash and on the green serpentine bottom.

Stocks and Hall.—This claim adjoins the former one and is generally similar to it. The workings are 30 to 40 feet wide and extend along the Main Creek. The faces exposed 3 feet of soil and wash, on a serpentine bottom. It was stated that the osmiridium was obtainable from the joint planes in the serpentine bedrock. This osmiridium was not *in situ*, but retained there when washed down the creek bed.

F. Robinson.—This claim was situated in the flat of the Main Creek, which here has a westerly course to the west of Stock's and Hall's. The flat was about 50 feet wide, but the wash was shallow, being only about 1 foot in depth. The osmiridium was obtained in the bottom of the wash on the serpentine bedrock and in the upper part of the joint planes in the latter.

Batchelor.—Batchelor's claim was situated some 25 chains lower down Main Creek and a short distance east of the eastern boundary of the 40-acre lease (9457/M) originally surveyed for a reward claim. There is a small flat along the creek at this locality, with a small waterfall at the upstream end of it. The faces showed 5 feet of wash, some of which was cemented with oxides of iron. The pebbles in the wash included quartz, serpentine (red and green), and jasper. The osmiridium was, for the most part, of coarse-grain size.

W. S. and N. Thompson.—This claim is situated several chains downstream from the eastern boundary of 9457/M, 40 acres, and to the south of Main Creek. There was no wash on this claim, but a few inches of the surface detrital material from the serpentine was treated. The bottom was a soft yellowish decomposed serpentine. The osmiridium was obtained from the surface material, and was of extremely fine-grain size with an occasional larger speck.

Glock.—Glock's claim is north and adjoining that of Thompson's. The working faces showed 6 inches of soil, &c., which was stripped, and 1 to 2 feet of wash on a bluish-green serpentine bottom. The workings were carried down into the serpentine in order to include some of the joint planes in which osmiridium had been collected. The osmiridium was clean, coarse, and shotty.

Paul.—Paul's claim adjoined Glock's, on the western side, and the conditions are generally similar on both claims. On Paul's claim the wash is only 9 inches in thickness, however, and the serpentine bottom was not taken up to the same extent.

Miller, Upcher, Griffin, and Hodgkinson.—This claim is situated to the south-west of Thompson's claim and south of Main Creek. The ground treated consisted of 9 inches of the superficial detrital material. This rested on a soft weathered serpentine bottom. Osmiridium was obtained from the detritus and, to a less extent, from the joints of the serpentine. It was clean shotty metal.

Price.—Price's claim was situated to the west of that of Miller and others, and was generally similar as regards conditions. A few inches of the subsoil and surface detritus was treated by puddling and sluicing. The bottom was the typical soft weathered serpentine of the vicinity.

Grey and Lavelle.—This claim was situated to the west of the above and about 200 feet south of Main Creek. The ground treated consisted of 6 to 12 inches of superficial detritus, resting on a bedrock of soft weathered serpentine. The osmiridium was a coarse shotty type, with small nuggets up to 3 dwt. in weight.

Lease 9457/M, 10 *Acres.*—This lease was originally granted to A. J. Stacey, C. B. Stacey, and R. S. Kingston as a reward claim for the discovery of osmiridium in what is now the Adamsfield district. A 40-acre lease was applied for and surveyed, but this was later reduced to 10 acres.

The lease has been transferred in turn to F. T. Turvey and D. F. Robinson, F. T. Turvey, and E. Bond, who is the present lessee.

It occupies part of the valley of Main Creek, to the north-east of the township.

Workings occur at numerous places on the lease. Towards the east they have been opened up on shallow detrital material, on the soft serpentine bottom as described in the claims above. To the western part of the lease they are situated along Main Creek and a tributary of the latter entering it from the south. In the latter creek the workings are narrow and about 3 to 4 feet deep, 2 feet of the weathered serpentine bottom being taken up.

The workings near the western boundary expose 1 to 2 feet of soil, overlying 3 to 6 inches of wash, on a hard green serpentine bottom. The osmiridium was clean and shotty, the largest piece being one half to one dwt.

Challenger.—This claim was situated in the bed of Main Creek, near the western boundary of lease 9457/M. The uppermost two feet of soil, &c., was stripped off, and three inches of wash, lying on a hard serpentine bottom, treated. The osmiridium was clean and shotty, and present in pieces up to half a pennyweight in weight.

S. Reeve and V. Royce.—Reeve and Royce held a registered miner' right claim (No. 29), of half an acre, on the south side of Main Creek and north of the township of Adamsfield. When first opened up, the ground on this claim consisted of hill detritus, but as work progressed it revealed an old terrace deposit of Main Creek. This terrace consisted largely of heavy wash with boulders of conglomerate, quartzite, &c. Overlying this was a bed of sandy clay which was succeeded by the peaty soil. The bedrock was a soft light-coloured slate. The osmiridium was clean and shotty, but not very coarse, the largest piece being 6 grains.

Hamlin.—This claim was situated to the north of that of Reeve's and Royce's and on the same slope of the hill from the township. The working faces showed up to 5 feet of sandy clay, overlying 3 inches of "wash," containing quartz grit. The bottom consisted of clay which probably represents the weathered surface of slates which occur on other parts of the claim. The osmiridium was clean and fine in grain size.

T. Harper.—Harper's claim was situated in the bed of Main Creek, to the north of that of Hamlin. The workings were 5 feet 6 inches deep, and the faces showed 3 feet of sandy clay, which was stripped off, and 2 feet 6 inches of heavy gravels, containing boulders. The bottom consisted of grey slates, with a strike of 345°-355°, and a vertical dip. The osmiridium was obtained mainly from the lower one foot of wash. The osmiridium was generally clean and shotty, with pieces ranging up to 15 grains in weight.

Flegg.—This claim is situated in the flat along Main Creek, about 800 feet north-west of Harper's claim. The working faces revealed 6 inches of soil 18 inches of clay, and 3 feet of gravels on a pug bottom. The gravels contained pebbles and small boulders of quartzite, jasper, serpentine, and green silurian sandstones. The osmiridium was confined to the bottom three inches of the gravels which, together with two inches of pug, were sluiced for their osmiridium content. The osmiridium was clean metal, of medium grain-size, with pieces up to 12 grains in weight.

Fife.—This claim was situated about 200 feet north-west of Flegg's claim. The deposits were generally similar as regards the depth and nature of wash, &c. The lowest 3 inches of wash and upper 1 inch of the pug bottom were treated. The osmiridium was also similar in character, but pieces up to 1 dwt. were obtained.

Sales, White, Acre, and White—The claim of this party was situated in Main Creek, about 450 feet west of the junction of Moore Creek. The ground ranged up to 9 feet in depth. The upper part consisted of peaty soil and sandy clay, and the lower of heavy river gravels. The bedrock consisted of grey silurian limestone, containing small amounts of pyrite. The gravels contained pebbles of decomposed serpentine.

Bantick.—This claim adjoined the above one on its western side. The general character of the wash was the same as on Sales' and party, and there was again a limestone bottom.

W. Heazlewood, H. Brazendale, and J. Ackroyd.—This party held a registered miner's right claim (No. 42), of 1½ acres. The Main Creek on this claim is confined between low sandstone hills, and has only a narrow flat along it. The ground is 3 to 6 feet deep and consists chiefly of gravels. The bedrock is the typical green and brown friable silurian sandstones. The osmiridium won was clean, and both fine and coarse grains were obtained.

Caldwell's and Alexander's Claims.—These were situated downstream from that of Hazelwood and party. They were generally similar in characters, but osmiridium did not appear to be so abundant.

(4)—Moore Creek Area.

Grenda.—Grenda's claim was situated at the head of Moore Creek to the south-west of the township. The workings consisted of a narrow strip about 10 feet wide along the course of the creek. The material treated consisted of sand and grit, the bedrock being the typical Silurian sandstones.

G. Moore (M.R. No. 16) *and A. E. Moore (M.R. No.* 7).—These claims were situated to the east of Grenda's claim. The materials were generally similar to those on Grenda's, but the workings were wider. The upper four feet of soil, sand, &c., were stripped off, and 12 inches of a black sandy clay with angular pebbles were treated. The bottom was the white to green Silurian sandstones.

N. Tatnell.—This claim (No. 25) is south-east of and adjoining that of A. E. Moore. The ground mined consisted of 6 inches of soil, 18 inches of sand and clay, and 10 inches of soft green sandstones, with a bottom of hard sandstone. Most of the osmiridium was obtained above the black clay. The metal was generally fine in grain size with pieces up to 29 grs.

Stubbins and Party.—This claim was situated to the east of that of Tatnell. The ground it occupies forms a saddle between the heads of tributaries of Moore Creek and Lavelle Creek. There was no gravel or wash on this claim, but the material treated consisted of 10 to 12 inches of clay beneath 9 inches of soil. The bottom was a sandy material which in some cases probably represented weathered sandstones, and in others may have been a detrital deposit overlying the sandstones. At first it was the clay that was treated, but later it was found that the sand in some localities was a false bottom and that osmiridium-bearing ground occurred beneath it. The osmiridium was bright and shotty with a few small, clean nuggets.

G. Hansen (M.R No. 2), V. Kingston (M.R. No. 1), and G. E. Hansen (M.R. No. 8).—These three claims adjoined one another along Moore Creek, and were worked in conjunction by the owners. The workings consisted of a strip of ground extending along the creek bed and 10 to 20 feet in width. The ground was shallow and consisted of 1 foot of soil, &c., which was stripped, and 3 to 12 inches of sandy clay with quartz grit. The bottom was the normal white sandstone. The osmiridium was clean and shotty with small nuggets up to 2 dwt. in weight.

A. Clark.—Clark's claim was situated to the west of those of Hansen and party and on the terrace above the bed of Moore Creek. The ground consisted of peaty soil, sand, &c., with a bottom of white sandstones. The lowest three inches of sand was barrowed to Moore Creek and sluiced. The osmiridium was clean metal of both fine and coarse grain size.

G. J. Eames (M.R. No. 36) and R. Scoles (M.R. 37).—These two registered claims are east of and adjoining that of G. Hansen (No. 2). The ground was unoccupied for a long time as it was not considered to contain osmiridium. The prospecting of Eames and Scoles, however, was more successful, and they pegged the claims and obtained a considerable amount of osmiridium from them. They were not opened up at the time of the writer's visit.

Camm.—Camm held a registered claim (No. 38) north of G. E. Hansen. The general conditions are similar to those on Jones' claim, which will be described below.

C. Jones.—Jones held a registered claim (No. 15) north-east and adjoining that of Camm. The claim is situated along the bed of Moore Creek. The faces showed 2 to 4 feet of stripping, consisting of soil, sandy clay, and clay. The osmiridium-bearing material was 4 to 9 inches of sandy clay with angular pieces of quartz, &c. The bot tom was green sandstones dipping at 15° to the north. The osmiridium was clean and shotty, with small nuggets up to 1 dwt.

J. L. Lewis.—Lewis held a registered claim south of and adjoining those of Camm and Jones. The ground was mostly on the terrace above Moore Creek, but the eastern end extended to near the creek. The ground was 3 feet deep, and had a bottom of green sandstones weathered to different degrees in different places. It consisted of soil, clay, and sandy clay, 18 inches of which was stripped and the remainder treated. The osmiridium was clean and shotty.

Doyle.—Doyle held a registered claim (No. 10), west of and adjoining that of Jones. It included a small gully entering the valley of Moore Creek from the west. The ground was shallow, and consisted of peaty soil with several inches of sandy clay on a bottom of broken sandstones.

The claim was later transferred to R. A. Fenton.

W. Holloway.—Holloway held a registered claim (No. 9) north of and adjoining that of Doyle. It occupied part of the bed of Moore Creek. The ground was 2 to 4 feet deep, and included 1 to 2 feet of wash from the creek containing quartz grit. The bottom consisted of soft pug and sandstones. Away from the creek the ground was shallower and comprised a few inches of sandy material on a bottom of broken sandstones.

The osmiridium was clean and shotty, with pieces up to 1 dwt.

E. Masters.—Master's registered (No. 35) claim is west and adjoining that of Doyle. The claim is situated on the bank between Moore and Baptist Creeks. The ground is shallow with a total depth of 1 to 2 feet. The soil, &c., is stripped off and the underlying material, which is detrital sands and clays with a few angular pebbles, treated. The bed-rock is normal Silurian sandstones.

F. M. Smith.—Smith's claim (No. 40) was not being worked to any extent at the time of the writer's visit.

E. Papworth (No. 4) and G. Gibbon's (No. 5).—These two registered claims were worked in conjunction. They occupy the flat of Baptist Creek at its junction with Moore Creek. At one part of the claims the ground was 2 to 3 feet deep consisting of soil and sandy clay. Two to 3 inches of wash, containing angular pebbles on a clay bottom, were treated. At another locality 12 inches of soil was stripped off and 9 inches of sandy soil treated. The osmiridium was clean and of medium grain size, with pieces up to $1\frac{1}{2}$ dwts.

W. Powell (No. 23) and W. T. Hansen (No. 24).—These two claims occupy a part of Moore Creek and adjoin those of Smith and Papworth. The ground was deep, a maximum of 7 feet being mined. The stripping ranged from 2 to 6 feet, and consisted of soil and stained sandy clay. The material treated was 9 inches of wash, with pebbles of quartz, sandstones, &c. The bottom was clay, 1 inch of which was treated with the wash. The osmiridium was clean and of medium grain size, with pieces up to 2 dwts.

H. A. Brown, D. Warburton, and J. Brown, Jr.—This party held a registered claim (No. 41) to the east of that of Powell. It occupies the western slope of Township Hill to Moore Creek. The ground was 4 to 6 feet deep, and consisted of clay and detrital material on a bedrock of shales and sandstones. The claim was not taken up by the above party until after the writer's visit.

Allan.—Allan's claim was situated to the north of Hanson's claim. The stripping consisted of 2 to 3 feet of soil and clay. The material treated was 2 to 3 inches of clayey material with angular pebbles of quartz, jasper, and green sandstones. The bottom was clay, the real bottom of sandstones being at greater depths. The osmiridium was clean and of fine point metal size with pieces up to 2 dwts.

Jan.—Jan's claim adjoined that of Allan, and was generally similar in nature but had deeper pot-holes with "wash" in them.

Antenen and Donough.—The claim of this party was situated to the north of that of Jan. The upper 3 feet of soil and clay were stripped off and 3 inches of wash treated. The wash contained pebbles of quartz, quartzite, and jasper. The bottom was clay.

Hall and Hilton.—This claim was north of the preceding one. Two to 3 feet of soil and clay were stripped and 6 inches of wash treated. The wash contained waterworn pebbles of quartz, quartzite, and jasper. There was a clay bottom which had been penetrated to a depth of 2 feet at least. The osmiridium was clean coarse metal, with pieces up to 3 grains in weight.

Hayes, Ripper, and Lea.—The conditions on this claim were similar to those on the preceding one. Six inches of the wash and 3 inches of the clay bottom were treated and yielded clean coarse and shotty metal.

(5)—Baptist Creek Area.

Prowse and Major.—This claim is situated to the east of the head of Baptist Creek. The ground is shallow, and includes 12 inches of soil, which is stripped, and 6 to 9 inches of gritty wash which is treated. The wash contains worn pebbles of quartz, jasper, sandstone, and quartzite, and rests upon a sandstone bedrock. The osmiridium was clean and of medium grain size with pieces up to 18 grs.

Salter.—This claim was located in a small gully entering Baptist Creek. The workings were 5 feet wide, and the ground generally similar to the above.

Undy.—Undy's claim embraces part of Baptist Creek, and the workings are confined to the bed thereof. The ground is not deep and includes 2 to 3 feet of stripping (soil, sand, &c.) and 6 to 9 inches of gritty wash. The bottom is a soft greenish one, probably representing weathered shales and sandstones. The osmiridium was clean and of medium-grained size.

Webb, Porter, Shield, and Button.—The claim of this party adjoins that of Undy and occupies part of Baptist Creek. It probably included part or the whole of the registered claim (No. 5) first held by P. Marsh. The registered claim (No. 6) first held by J. Baptista and later by Webb was probably included in that of the above party. The workings were confined to the bed of the creek, and were only 5 to 10 feet wide. The ground consisted of 18 to 24 inches of soil, sand, &c., which was stripped, and 6 to 9 inches of gritty wash which was treated. The wash contained pebbles of white quartzite, jaspers, and water-worn quartz, and rested upon a bedrock of green and brown sandstones. The osmiridium was present in the joints of the sandstone to a slight extent. It was clean and of fine to medium grain size, with pieces up to 2 grs.

D. J. Fullerton.—Fullerton held a registered miner's right claim (No. 22) west and adjoining that of Baptista, but transferred it later to W. H. Doherty. The claim was located on the western bank of Baptist Creek. The ground was 2 to 4 feet deep, and consisted chiefly of sand overlying several inches of angular wash or detritus on a sandstone bottom. An obsidian button was found in the wash on this claim.

Doherty and Chenery.—This claim was also situated on the western bank, and was north of and adjoining that of Fullerton. The ground consisted of soil and sand overlying 9 inches of sand and iron-stained gritty wash on a soft sandstone bottom. The osmiridium was fine and clean and in pieces up to 6 grs. in weight.

Bateman.—Bateman's claim is situated on the north side of Papworth's claim and on the northern side of Baptist Creek. It includes shallow ground worked to a depth of 15 inches. The material treated consisted of gritty wash with angular pebbles on a clay bottom. The osmiridium was clean and of medium to coarse grain size.

(6)—Smith Creek Area.

Thorne.—Thorne's claim was situated on the summit of Football Hill between the heads of Moore and Smith Creeks. The ground was shallow, the surface soil being stripped, and the underlying 6 to 8 inches of sandy material being treated. This material contained black carbonaceous material and pieces of white quartzite, and rested upon a bottom composed of weathered sandstones.

W. H. Smith.—Smith's claim occupied part of the bed of Smith Creek. The workings on this claim (and also up and down stream from it) were narrow, and occupied 10 to 15 feet of the bed of the creek. The workings were 3 to 5 feet deep, the upper 2 to 4 feet of sand, &c., being stripped off and the 1 foot of dark gritty material at the bottom being treated. The bedrock was horizontal fossiliferous Silurian sandstones. The osmiridium was clean and shotty and of fine grain size, with pieces up to 12 grs.

Woods and Party.—The claim of this party was situated some 400 feet down the creek from that of Smith. The Valley of the creek was wider at this point and the workings were also wider and shallower. The stripping consisted of soil and sand, while the material treated was a coarse grit with pieces of white quartzite. The bottom was a soft weathered sandstone.

Townsend.—This claim was located in a small tributary gully on the eastern side of Smith Creek. The workings were 5 to 10 feet wide and shallow. The ground consisted of sand and grit with angular pieces of sandstone and quartz. The bottom was sandstones, and the joints near the surface contained small amounts of osmiridium and chromite.

T. Dickenson.—In this locality the course of Smith Creek is occupied by a tea tree swamp. The conditions on this claim are similar to those on that of Marriott and Splann, about to be described.

Marriott and Splann.—On this claim 2 to 3 feet of soil and sandy clay are stripped off and 3 to 4 inches of wash treated. The wash rests upon a bottom of clay. The osmiridium was clean and of coarse grain size with no nuggets.

Watson, Dobson, and Roggerri.—This claim is situated to the north-west of the above. About 2 feet of soil and sandy clay are stripped and a few inches of wash and pug from the clay bottom are treated. The wash contains pebbles of quartz, jasper, &c. The osmiridium was clean and of fine grain size.

Castle and Duncan.—This claim was north and adjoining the one described previously. The ground was shallow, 18 to 24 inches of soil and sandy clay being stripped and 3 inches of wash treated. The wash contained pebbles of quartz, jasper, and sandstones, and rested upon a clay bottom. The osmiridium was clean and of fine to medium grain size with pieces up to 1 dwt.

T. Dunn and Salter.—This claim was north of the above, and was the most northern one in Smith Creek. The stripping included 3 feet of soil, sand, and sandy clay. About 6 inches of wash, containing pebbles of quartz, jasper, and quartzite were treated. The bottom was the usual clay one of this locality. The osmiridium was clean and of medium grain size with pieces up to 1 dwt.

(7)—Batchelor Creek Area.

Mullen and Illslow (No. 12).—These two claims were situated in a small flat at the head of Batchelor Creek, and were only being opened up at the time of the writer's visit.

J. Donnelly -This registered claim (No. 11) was north and adjoining that of Illslow, and occupied part of Batchelor Creek. The stripping was 4 to 5 feet deep, and included soil, sand, and sandy clay. One foot of sand and gritty wash were treated, the bedrock being Silurian sandstones. The osmiridium was clean and of coarse grain size.

P. Hartnett.—Hartnett's claim was west and adjoining that of J. Donnelly. The stripping was 4 feet deep, and comprised soil, sand, and gravels. The lowest 4 inches of wash resting on the sandstone bottom was treated. The osmiridium was clean and shotty and of fine grain size.

Griffiths and Donahoo.—This claim was north-east and adjoining that of J. Donnelly. The ground worked was not so deep, the stripping being 2 feet of soil, &c. Three inches of wash on a sandstone bottom was treated.

H. Donahoo and W. J. Batchelor.—This party held a registered claim (No. 28) in part of Batchelor Creek. The stripping of soil, sand, &c., was 30 inches deep, and 15 inches of sand with angular pebbles was treated. The bedrock was Silurian sandstone. The osmiridium was clean and coarse with pieces up to 2 dwts.

Fraser and Saville.—The claim of this party occurs along a small tributary gully which joins Batchelor Creek to the east of Butcher and Donahoo's claim. The ground was shallow, 1 foot of soil being stripped off and 1 foot of sand and wash treated. The bedrock was white sandstones. The osmiridium was clean and shotty and of medium grain size.

Burnley.—Burnley's claim was located along Batchelor Creek. The course of the creek was occupied by a deep tail-race at this locality. The workings were 5 to 6 feet deep, the stripping consisting of soil and sandy material, while several inches of wash, containing pebbles of quartz, quartzite, &c., was treated.

Allan.—This claim and several others were located between Batchelor and Smith Creeks. They were frequently taken up and abandoned and so worked at infrequent intervals only. The ground ranged in depth from 2 to 7 feet, the stripping of soil and sandy clay being from 2 to 6 feet deep, while 2 to 12 inches of wash were treated. The bottom was sandstone in some cases and clay in others. The osmiridium was clean and fine in grain with pieces up to $1\frac{1}{2}$ dwts.

Major.—Major's claim was situated in the flat of Batchelor Creek north of Burnley's claim. The stripping amounted to 4 to 6 feet of soil and sand. The material treated consisted of 6 to 9 inches of sand with grit and angular pebbles on a clay bottom. The osmiridium was clean and of fine to medium grain size.

H. S. Lonergan (*No.* 14) *and R. Hanson* (*No.* 23).—These two registered claims are situated on the western side of Batchelor Creek and adjacent to the bottom of a low sandstone hill. The ground ranged in depth up to 4 feet, and osmiridium-bearing wash occurred at two depths. In the shallow ground 3 inches of wash at a depth of 1 foot was treated. In the deeper ground the whole of the material from a 4-foot face was treated. It was coloured greenish and had a bottom of green sandstones. The wash contained angular pebbles of quartz, jasper, quartzite, &c. A strip of deep ground 10 feet wide occurred against the foot of the hill. The osmiridium was of medium grain size with pieces up to 3 grs.

C. A. Clark.—Clark's claim was situated on the side of the hill and to the west of those of Lonergan and Hanson. The ground was shallow, the surface soil being stripped and several inches of wash treated. The wash contained angular pebbles of quartz, jasper, &c. It appeared to occur at two levels, representing possibly terraces of an old stream. The osmiridium was clean and shotty.

Kingsley and Williamson.—The claim of this party was situated near the summit of the hill to the west of Batchelor Creek. About 18 inches of soil and sand were stripped off and several inches of brown cemented wash treated. The bedrock was sandstone. The osmiridium was clean and fine and associated with a considerable amount of the brownish powder composed of very small gains of chromite, quartz, ilmenite, topaz, and zircon.

(8)—Card Creek Area.

Card and Booth.—This claim is situated at the head of Card Creek. At the eastern end of the claim the ground was shallow, 12 inches of soil being stripped and 3 inches of gritty wash treated. At the western end the ground was deeper, several feet being stripped and 2 inches of wash treated. The wash contained pebbles of quartz and felspar and had a bottom of clay.

John and Richards.—This claim is west and adjoining the above one. The ground consisted of 18 inches of soil and sandy clay, which was stripped off, and 6 inches of gritty wash, which was treated. The bottom was a similar material, but was not osmiridium-bearing. The osmiridium was clean and of medium grain size.

A. Thomas.—Thomas' claim was west and adjoining that of John. Nine inches of soil was stripped off and 12 inches of sand and gritty wash treated. The bottom of the wash was a false bottom of dark-coloured sand, 6 inches above the bedrocks of sandstones. The osmiridium was clear and of medium grain size

Blegg and Johnson.—The claim of this party was south-west of the above. Soil and sub-soil to a depth of 2 feet were stripped off and 6 inches of gritty wash treated. The bottom was a yellow sandy clay. Nearby there were deeper workings with 4 feet of stripping (3 feet of soil and dark sandy clay and 1 foot of sand and grit), below which 4 inches of wash was treated. The bottom at this place was Silurian shale. The osmiridium was clean and of medium grain size, with pieces up to 3 grains.

Thompson.—This claim was south-west of the above and on the edge of the swamp into which Card Creek flows. It was being prospected at the time of the writer's visit. The prospect holes revealed soil and sandy clay to a depth of 5 feet and then coarse angular wash on a clay bottom, the clay being at least 4 feet deep. Pebbles of quartz, jasper, and white sandstone occurred in the wash.

(9)—Western Fall of Football Hill.

Etchell, Cobbing, and Keygan.—The claim of this party was situated at the north-western part of Football Hill and south of Thompson's claim. The stripping consisted of 5 feet of soil and variously coloured clays. Two inches of gritty wash and 1 inch of the clay bottom were treated. Shallower ground with a shale bottom occurred to the east. The osmiridium was clean and of medium grain size, with pieces up to 1 dwt. 4 grs.

J. Campbell.—This claim was situated several hundred feet to the south of the above. The ground consisted of 5 feet of stripping, including soil, sandy clay, and gritty wash. Two inches of the wash on a clay bottom were treated. The osmiridium was coarse in grain and in pieces up to 2 dwts.

Ticknell and Tomlin.—This claim was 200 feet south of the above. Nine inches of soil was stripped and 6 inches of gritty wash on a pug bottom treated, and yielded osmiridium of fine grain size.

Gaster Gully.—This gully is situated 10 chains south of the above claim. The deposits in the gully were worked out prior to the writer's visit. The workings were 6 feet wide and carried down to the sandstone bottom. At the place where the creek enters the marsh the ground is much deeper. Ten feet of soil, sand, and gritty wash were exposed in workings without bottom being reached.

Ockenden, Fletcher, and Lynch.—The claim of this party was situated near the mouth of Manning Gully. The stripping was 4 to 5 feet deep and composed of soil and sand. The material treated was 2 feet of wash and broken sandstones The wash contained water-worn pebbles of quartz, and the osmiridium was clean, coarse metal.

L. G. Reid.—This claim was situated upstream from the previous one, and the workings were narrow ones along the gully. Two feet of soil, &c., were stripped and 1 foot of wash on a shale bottom treated.

Manning Bros.—This claim was situated near the head of the gully bearing the same name. The workings were in the bed of the gully and 8 to 10 feet wide. Six inches of gritty wash on a green sandstone bottom was treated. The osmiridium was clean and of medium grain size.

L. Fisher.—This claim was situated near the mouth of Livingstone Gully. The workings were narrow and shallow. The material treated was the wash on a sandstone bottom and some of the softer and shaley layers in the well-jointed sandstones. The osmiridium in the latter found its way there through the joints in the sandstones.

J. Hayes and F. Chatwin.—The claim of this party was in Livingstone Gully, upstream from the above. The ground and workings were similar to those in Fisher's claim.

MacCallum.—This claim was situated in a very small gully south of Livingstone Gully. The workings were shallow and 6 inches of wash on a sandstone bottom were treated. The osmiridium was of fine grain size.

Sweeney and Donnicker.—The claim of this party was situated in Hayes Gully. The stripping of soil and sand was 1 to 3 feet deep. Several inches of wash and the upper part of the sandstone bottom was treated. The osmiridium was clean and coarse, with pieces up to 2 grs.

Hull and Party.—This claim was situated at the south-western end of Football Hill. The workings were shallow, the surface soil being stripped and 6 to 9 inches of broken sandstone from the bottom treated. Close to these there were other workings 5 feet wide and 4 feet deep with a sandstone bottom.

McKendrick.—McKendrick's claim was situated to the north-east of the above one. Three feet of soil, &c., were stripped off and 6 inches of wash and broken sandstone from the sandstone bottom treated. The osmiridium was clean and of coarse grain size.

Trowbridge.—This claim was situated to the west of the two preceding ones. Six inches of angular wash on a sandstone bottom were treated. The wash contained pebbles of rounded quartz, conglomerates, and quartzites. The osmiridium was clean and of medium grain size.

(10)—Area on East Side of Football Hill.

McLennan.—This claim was situated at the head of one of the tributaries of Lavelle Creek and about 4 chains south of the registered claim No. 25 in the name of E. Tatnell. The soil was stripped off and 6 to 18 inches of clay with a little sand and angular pebbles treated. The bottom was of hard clay.

J. P. Mann.—Mann's claim was situated to the east of McLennan's. The soil was stripped and 2 inches of clay treated. The bottom was clay and the osmiridium fine in grain.

C. Walker.—This claim was south of that of McLennan and in a flat between two small creeks. The soil was stripped off and 6 inches of wash and pug treated. The bottom was clay, which extended to depths of 14 to 15 feet. The osmiridium was fine.

Hudson.—This claim was east and adjoining that of Walker, and was similar in every respect.

Brown and Betts.—The claim of this party was located to the south-east of that of Walker. The soil was stripped and 6 inches of clay wash treated. The bottom was generally sandstone, but in some places 2 feet occurred between the bottom of the wash and the sandstone bedrock. The osmiridium was of medium grain size.

Redpath.—This claim was located to the south-east of the above. Three to 4 feet of soil and sandy clay were stripped off and 1 foot of wash treated. The bottom was hard sandstones and the metal was shotty.

Smith, Kingston, Harris, and Gayton.—The claim of this party was situated about 6 chains south-east of Redpath's claim. The ground consisted of soil, sand, broken sandstones, and wash on a sandstone bottom. The stripping was 6 to 18 inches deep. The osmiridium was coarse, small nuggets several dwts. in weight being obtained.

Smith and Higginson.—This claim was located to the south of the above and in the bed of one of the main parts of Lavelle Creek. The soil was stripped off and 2 to 3 inches of wash treated. The bottom was sandstone, which was folded into an anticline on this claim. Where the beds were dipping easterly the wash was poor, but where dipping westerly the wash was rich in osmiridium. This was due to the upturned edges of the westerly-dipping strata acting as natural riffles. The osmiridium was coarse, with small nuggets up to 3½ dwts. Some of them were stained by oxides of iron, &c., and one large piece of gold was obtained.

Gresson and Beavis.—The claim of this party was situated south of that of Smith. The stripping consisted of 3 feet of soil, sandy clay, &c. Six inches of gritty wash with pieces of broken sandstone on a clay bottom was treated. The osmiridium was coarse, pieces up to 2 dwts. 13 grs. being obtained.

Street, Fleming, and Party.—This claim was situated on the main branch of Lavelle Creek from the Sawback Range at its junction with the branch heading towards the township. The wash consisted of pieces of broken sandstone and rested upon a bedrock of sandstone. The osmiridium was of coarse grain size.

Clarke.—This claim was situated to the south-west of that of Redpath. The ground was deep, and consisted of 11 feet of soil, clay, and angular grits on a bottom of white sandstone

Ruthven.—Ruthven's claim was situated some four chains to the south of Clarke's. The ground consisted of 9 inches of soil, which was stripped off, and 3 inches of angular pebbles in clay upon a hard clay bottom.

J. Ramsay.—Ramsay was probably working on the registered claim (No. 34) in the name of J. Ramsay and J. Ramsay. The soil was stripped off and 7 to 8 inches of angular wash (with pebbles of quartz and jasper) treated. A layer of dark sand separated the wash from the bottom of white sandstones.

J. Ramsay and Kelly.—This party were probably working on the registered claim of W. E. Kelly (No. 31). The soil was stripped and 1 foot of sand and gritty wash on a bottom of green sandstone treated. The osmiridium was fine with pieces up to 1 dwt.

R. Mainwaring, A. Russell, and A. Wakefield.—This party held a registered claim (No. 32) of 1½ acres, which was situated on a gully entering Lavelle Creek from the west. The ground was fairly deep, 6 feet of stripping (soil, sandy clay, &c.) being removed, and 6 to 12 inches of wash treated. There were apparently two leads joining on this claim which corresponded to the small creeks on the surface. In the northern one the wash consisted of coarse gravel with rounded quartz pebbles on a sandstone bottom. In the southern one the wash contained pieces of broken sandstone. The rounded wash did not extend on to Ramsay's claim to the west. The osmiridium was coarse, with small nuggets up to 8½ dwts.

Tribolet Bros.—This claim adjoined that of Mainwaring and party on the east. Five feet of soil and sandy clay were stripped and 6 inches of wash on a green sandstone bottom treated. The wash was a continuation of the lead on Mainwaring's claim. The osmiridium was clean and coarse, with nuggets up to 8 dwts.

A. J. Dickenson.—This claim was situated about 4 chains south of that of Mainwaring's. The stripping was 5 feet deep and 6 to 9 inches of wash with worn pebbles treated. The workings were on the edge of a sandstone bank sloping to the east, where clay overlaid the sandstones and formed the bottom of the wash.

Farquhar, Grenda, and Newitt.—The claim of this party was a few chains south of the above one. The stripping consisted of 2 feet of soil and sandy clay. The wash contained pebbles of broken sandstones and water-worn quartz on a bottom of sandstone.

Mapley.—This claim was to the south of that of Farquhar and party. Two feet of brown soil was stripped off and 6 inches of wash treated. The wash contained pebbles of broken sandstone and quartz, and had a bottom of sandstone.

Scott and Party.—The claim of this party was about 8 chains south of the above claim. The stripping consisted of 6 feet of soil, sand, &c. Six to 12 inches of a gritty wash on a green sandstone bottom was treated.

W. Hall.—Hall's claim was a few chains south of that of Scott. Eighteen inches of soil, &c., were stripped, and 3 inches of sand and gritty wash on a bottom of weathered sandstone treated. The osmiridium was of medium grain size.

J. Stacey.—This claim was situated at the lower end of Stacey Gully near its junction with Lavelle Creek. The stripping was 2 feet deep, and consisted of soil and a few inches of gravels. Six inches of gravels with large pebbles of quartzite, &c., were treated. The bottom was Silurian sandstones, dipping north-easterly at 15°.

Wright.—Wright's claim adjoined that of Stacey, and was generally similar. The wash, with large rounded pebbles, did not continue uphill, but osmiridium was present for some distance. The osmiridium was clean and of coarse grain size, with pieces up to 22 grains.

Looby.—This claim was situated at the head of Stacey Gully. The soil was stripped off and 9 inches of sand and gritty wash treated. The bottom was brown-stained sandstones.

Lavelle.—This claim was situated on Lavelle Creek, near the locality where it was crossed by the foot-track from the South Gordon track to the 10-acre reward claim. The soil was stripped and the material between a layer of pieces of broken quartzite and the serpentine bottom treated. The osmiridium was fine, and pieces up to 3 grs. obtained. It was stated that the osmiridium was only present where the white quartzite was.

(11)—Area West of Adam River.

Barrett Creek.—Several claims had been held in this creek, but were practically worked out at the time of the writer's visit. In the lower part of the creek the workings were 5 feet wide and 1 to 2 feet deep. Towards the head of the creek the workings were 9 feet wide and 5 feet deep. The stripping comprised 4 feet of soil and sandy clay. One foot of sand and iron-stained clay, with a few pebbles of quartz, sandstone, and jasper, was treated. The bedrock was sandstone and shales of Silurian age. It was stated that a larger proportion of gold was associated with the osmiridium than on the eastern part of the field. The gold was water-worn and up to 1-16-inch in size. Coarse pieces of chromite, and a few grains doubtfully determined as cassiterite, were also obtained.

Barrett.—This claim was situated in the above creek. Six inches of soil were stripped, and 12 to 18 inches of gritty wash on a sandstone bottom treated.

O'Connell and Welsh.—This claim was situated near the head of Welsh Gully at the southern end of Marriott Hill. Four feet of soil and sandy clay were stripped and 3 to 4 inches of wash treated. This wash rested on a false bottom of clay, 18 inches in thickness, beneath which there was 1 inch of wash on another false bottom of clay. The wash contained pieces of quartzites and green sandstones. The osmiridium was clean, with small nuggets up to 8 grs., one of which was discoloured.

Curtain Bros.—The claim of this party was situated on Curtain Gully, a few chains north of Welsh Gully. Two or 3 feet of soil and sandy clay were stripped off and 3 inches of wash, with a few pebbles in it, treated. The bottom was Silurian shales dipping to the south-east.

Scanlon and Morgan.—This claim was situated on Scanlon Creek. The ground was 2 to 4 feet deep, the lower part consisting of heavy gravels on a green sandstone bottom. The large water-worn pebbles in the wash were derived from the conglomerates on the Ragged Mountains. A fair proportion of gold accompanied the osmiridium.

T. Williams and J. T. Bowes.—This claim was situated on Lumsden Creek. The ground treated consisted of 2 to 3 feet of heavy gravels composed largely of pebbles released from the West Coast Range conglomerates on Ragged Mountains. These gravels carry osmiridium throughout and rest on a clay bottom. The osmiridium was clean and of medium grain size, with pieces up to 17 grs.

Stewart.—This claim was situated in the fringe of a timbered hill on the west side of the Adam River, about 45 chains north-west of the 5-acre reward claim. Three to 4 feet of soil, sand, &c., were stripped, and 4 to 6 inches of wash on a hard sandstone bottom treated. The osmiridium was flakey and was mixed with an appreciable amount of gold.

(12)—Millen Creek Area.

Cunningham and Millen.—This party held a claim on the above creek, about 35 chains east of Adam River. Two to 3 feet of soil and clay were stripped and 1 to 2 feet of gravels treated. The gravels contained pebbles of quartz, quartzite, and serpentine, and rested upon a bottom of clay. The osmiridium was of medium grain size with pieces up to 6 grs.

(13)—Williams Creek Area.

Williams.—This claim is situated on Williams Creek at the crossing of the foot-track to the South Gordon track. The ground consists of soil and gravels to a depth of 1 foot, with 4 inches of clay separating the gravels from the serpentine bottom. The osmiridium occurred in the gravels and upper 1-inch layer of the clay. It was clean coarse metal in pieces up to 1 dwt.

(14)—Sawback Creek Area.

R. J. Stacey.—A 5-acre reward claim (No. 9468) was granted to R. J. Stacey on Sawback Creek—the eastern branch of Adam River. It was not being worked at the time of the writer's visit, and the workings were more or less filled with water. As far as could be seen the ground consisted of 6 to 12 inches of peaty soil, overlying 1 foot of clay or sand and fine gravels, which passed down into coarse gravels with boulders of quartzite and jasper.

Stacey Bros.—Stacey Bros. were working the two registered claims in the names of A. Wright (No. 21) and T. Stacey (No. 20), situated on a small creek entering Sawback Creek, about 20 chains south of lease 9468M. The peaty soil was stripped off and 2 to 3 feet of heavy gravels treated. The bottom was clay, and the osmiridium obtained was fine, clean metal in pieces up to 2 grains.

The claims were later amalgamated and transferred to Stacey, Wright, and Bowden.

Harrison and Brandstater.—This claim was situated on the east bank of the Sawback Creek, about 30 chains southeast of lease No. 9468. The peaty soil was stripped off and 12 to 18 inches of wash on a serpentine bottom treated. The osmiridium was slightly stained and in pieces up to 7 grs.

(15)—Area Below Adam River Falls.

Donahoo.—This claim was situated in the bed of Adam River, about 20 chains below the falls. The ground worked consisted of a small flat between the present and an older course of the stream. The material consisted of heavy gravels with boulders of quartzite and jasper, the lower 18 inches of which were treated. The bottom consisted of purple slates of the Dundas series with an easterly dip. The osmiridium was clean and of coarse grain size.

J. Webster and L. Bernard.—This party held two claims downstream from that of Donahoo. The ground worked consisted of the heavy gravels on the banks of the river. The lower 6 inches of gravels and several inches of the purple slates forming the bedrock were treated. The osmiridium was clean and of coarse grain size, with gold to the extent of 3 grs. of gold per ounce of osmiridium.

(16)—Hopper Creek Area.

Flight and Ellens.—The claim of this party was situated on one of the heads of Hopper Creek north-east of lease 9457-M. The ground and workings were shallow, about 6 inches of soil and detritus from the serpentine being treated. In some places the osmiridium was concentrated on the serpentine bottom and in others between the soil and the detritus from the serpentine. The osmiridium was iron-stained and of fine grain, with pieces up to 8 grs.

Daniels.—This claim adjoined the above one. The ground consisted of 6 inches of soil and 6 to 12 inches of wash. The wash contained pebbles of quartz, quartzite, and jasper, and rested on a bottom of brown clay representing weathered serpentine. The osmiridium was clean and of medium grain size.

J. Brennan and G. Dunn.—The ground on this party's claim consisted of a few inches of soil overlying quartz gravel, which rested on brown clay (decomposed serpentine). The osmiridium was concentrated in the bottom of the wash and the top of the clay. It was generally clean, but sometimes stained, and was of medium grain size with pieces up to 6 grs.

Littlechild.—This claim is south-east of the above. The ground consists of 1 foot of dark soil and sub-soil, 12 to 18 inches of sandy material with pebbles of iron-stained sandstones, quartz, and jasper, and 12 to 18 inches of brown clay (decomposed serpentine) resting on serpentine. The osmiridium was stained and of medium to oarse grain size, with pieces up to 1 dwt.

Paton.—This claim was east of that of Littlechild. Two inches of the material on top of the brown clay was treated. The osmiridium was iron-stained and shotty and of medium grain size, with pieces up to 1 gr.

(17)—Gold Prospect at Adam River Falls.

Location.

The above prospect is situated at the top of the Adam River Falls, about $2\frac{1}{2}$ miles to the west of the township of Adamsfield.

Leases.

The prospect is embraced in a gold lease (1721/G) of 40 acres, granted as a reward claim to A. E. and B. C. G. Rayner, S. Matthews, and F. J. Reading.

Geology.

The valley of the Adam River, to the east of the falls, is occupied almost entirely by strata of probably Silurian age. These are generally either horizontal or dipping at low angles. The strata consists of friable sandstones, limestones, and shales. They extend westward along the Adams River, as far as the junction with the Eve River, immediately to the east of the falls. The sandstones near the falls, as exposed in the bed of the Adam River, appear to have been slightly altered, and are of the nature dark-grey, almost quartzitic types. Similar altered sandstones and one patch of limestone occur in the north-west angle between the Adam and Eve Rivers.

The top of the falls and the cliffs and ridges to the north and south thereof are occupied by hard white quartzites and siliceous conglomerates. The strikes and dips are extremely variable in the immediate vicinity of the falls, and those obtainable suggest an intensely folded and probably faulted area. A few fossils are visible in the quartzites, and enable the correlation with similar quartzites on Clear Hill, Thumbs, and Sawback Range, which appear to underlie the Silurian sandstones and limestones.

On the eastern slopes of Clear Hill and Ragged Mountains, to the north and south respectively of the falls, the conglomerate, and probably the overlying white quartzites, have a uniform dip to the east of 45°.

To the west of the falls, purple slates and various coloured cherts of the Dundas series of the Cambro-Ordovician system occur.

The relation between the horizontal strata east of the falls and the quartzites and conglomerates at the top of the falls is probably a faulted one The junction of these rocks has a general trend from north-west to south-east, and this appears to be the direction of the fault. The downthrow is to the east.

Economic Geology.

The top of the falls, between the main fall and the junction of the Eve and Adam Rivers, has a width of from 80 to 100 feet. This width is occupied by conglomerates and quartzites. Numerous potholes occur in these slates, and range up to 30 feet in depth. During the past 14 months Messrs. Rayner and party have been engaged in draining these potholes, with the object of winning any osmiridium contained in them. In order to control the water a channel has been cut through the western side of the falls, exposing the rocks to depths ranging up to 6 or 7 feet.

The whole of the rocks along this channel have been found to be impregnated with iron pyrite (sulphide of iron). Some indication of this was obtainable before the rocks were broken, in the iron staining of some of the quartzites and the presence of some iron pryite in them.

At the top of the main falls there is a band of 30 feet of fine and medium conglomerate. This is succeeded to the north or north-east by 40 to 60 feet of quartzites, with a narrow band of friable sandstone or quartzite in it.

Numerous samples have been assayed for various parts of these rocks, and it is stated that they gave results ranging up to over an ounce, the best assay being from a loose block in one of the potholes.

The pyrite and gold conent of the rocks are strongly suggestive of the work of mineralising agencies. This would appear to be related to the fault occurring immediately to the north-east of the impregnated rocks, and it is presumed that the mineralising solutions ascended along the fault plane and vicinity.

The general geological conditions at the top of the falls would therefore appear to be favourable for the presence of ore-bodies.

The quartzites to the north and south of the falls do not appear to be impregnated with pyrite. This may be because they were not impregnated, or else all the pyrite has been leached out without leaving any trace.

The association of the pyrite with the top of the falls might possibly be considered as pointing to a secondary origin for the pyrite.

Development.

The only work performed on the deposit is the channel referred to above, and which was cut merely to help the draining of the potholes.

In addition, several trenches have been cut to the north-west of the junction of the Adam and Eve Rivers to expose as close as possible the line of the contact (fault plane) described above.

Future Development.

The deposit could be easily exploited from the bottom of the falls. It is probable that an adit or adits could be started at depths of 130 or 140 feet below the top of the falls, and that the deposit could be intersected in distances ranging from 50 to 100 feet.

Values.

Samples submitted by the owners for assay in the past have generally yielded gold, the samples ranging in value up to several pennyweights per ton.

The writer took several samples of representative material from the full width of the formation. These were assayed in the Mines Department Laboratory, Launceston, and gave "nil" returns for both gold and silver.

The material, as determined by these samples, is therefore valueless.

Conclusions.

The prospect described above appears to occur, under favourable geological conditions, near a large fault plane. Samples taken by the owners, and assayed in the Mines Department Laboratory, Launceston, gave returns of gold and silver. Seven samples taken by the writer gave "nil" returns for both gold and silver.

In spite of the favourable geological conditions, there is a possibility that the pyrite might be secondary, in which case the deposit would probably be valueless. The presence of gold in previous samples seemed to indicate the primary origin of the pyrite, but the absence in the present ones seems to indicate a possible secondary origin.

If the deposit is actually gold-bearing, definite evidence cannot be obtained as to the possible location of shoots of payable ore. This could only be determined by actual mining developmental work attendant with the usual prospecting and mining risks. Such work could be readily carried out from the bottom of the falls.

VII.—METHODS OF WORKING.

The method of working is regulated by the position of the claim with regard to water supplies, &c., and the actual water-supply available.

Dishing or Panning.—When the ground is sufficiently rich and water supplies are small and not readily available, the material is treated by concentration in a prospecting dish. A small water-supply is made available by the construction of a small reservoir in a part of the old workings. The quantity of ground which can be treated is very limited, and the osmiridium content must be considerable for profitable working.

Cradling.—When the circumstances permit, the material is treated in a wooden cradle, as used on goldfields. This enables a larger quantity of material to be treated, and so poorer ground can be treated than with a dish. The cradle is also used under conditions of small water supply.

Sluicing.—When a sufficient supply of water can be brought on to the claim by gravitation, some form of sluicing is always adopted. The most primitive form is that of ground sluicing, when a channel is cut in the bed-rock and the material is treated in it, the running water removing the sand, &c., and concentrating the osmiridium, gold, and chromite.

The sluice-box was, however, almost universally used. The box was generally 8 to 10 feet long, with two or three cross-riffles. Sometimes the bottom of the box was covered with a fine blanket, with wire gauze on the top of it. The boxes were always fitted with hopper-plates at the head onto which the material was shovelled, and from which the coarse oversize was removed.

In a few cases a line of sluice-boxes were employed.

Puddling.—In many claims the washdirt was somewhat clayey, and in a few claims it was almost wholly clay. This needed special treatment in the way of puddling. The usual and most primitive method was to remove the overburden and then break and puddle the wash-dirt in place by treading on it for some time.

Another method used was to construct a puddling trough out of a tree-trunk, and to shovel the clay, &c., into it when it was treaded well as above.

The best and quickest method was that employed by Hanson Bros., who employed a horse to tread and puddle the material in place.

VIII.—USES, MARKETING, PRODUCTION, &c.

(1)—Uses.

The uses of Tasmanian osmiridium can be grouped into two divisions:—

(*a*) The most important is that in which it is used in the native state and it is for this purpose that it should command its highest price. In this state it is used extensively for forming the tips of gold fountain-pen nibs. For this purpose grains of the right size, shape, and physical characteristics are selected and used. All pieces larger than the required size can be broken and the largest proportion of "pen-point" metal obtained. The fines and residues are probably sold for the uses described below.

It is for the production of "pen-point" metal that Tasmania is noted. The Russian osmiridium is marketed in the form of its component metals (osmium and iridium sponge). The South African osmiridium is too fine to be used for pen-points. Tasmania, therefore, is the most important producer of "pen-point" metal.

(*b*) Apart from the above, all osmiridium is used for the production of its component metals. The most important of these is iridium, which is used for producing platinum-iridium alloys for industrial purposes. Practically all the platinum used in commerce is alloyed with amounts of iridium, ranging up to 20 per cent., the object of the iridium being to harden the platinum and enable it to resist wear and abrasion.

The trades in which iridium is used in alloy with platinum are, in order of importance: Jewellery, electrical, chemical, and dental, as well as other miscellaneous ones.

(2)—Marketing.

The Adamsfield osmiridium, as well as that from other parts of the State, is sold in its native state. The concentrates contain small quantities of gold, chromite, quartz, ilmenite, zircon, topaz, &c. These are removed as far as possible, first, by washing in a dish, and later, when dried, by blowing out the lighter minerals. Magnetic minerals and pieces of tools can be removed by a magnet. The proportion of gold is usually small and is picked out by hand, amalgamation by mercury being very seldom attempted.

Osmiridium, from near its source in the serpentine, is sometimes stained brown by oxides of iron, serpentinous material, &c. The stain can be removed by chemical treatment with acids, but this is seldom attempted.

The osmiridium is sold to buyers holding licences from the Tasmanian Mines Department. These buyers are usually acting as agents of firms in London and New York, to which places the osmiridium is shipped direct.

It must be stressed that as Tasmania holds a unique position as regards the production of "pen-point" metal, the metal should be sold as far as posible for this purpose, for which it should have its greatest value.

(3)—Production.

The following table gives the quantity and value of osmiridium produced at Adamsfield, in accordance with the sales and transfers reported to the Mines Department. The table does not show the total production, as there may be a quantity of osmiridium held by the miners; nor does the table necessarily show the actual production during the periods in the table, but only the sales during those periods. If the price is low, large quantities of the metal may be held pending an increase in price, and thus they may be sold at any period, even up to two years after they were obtained.

It may be noted that the total production of osmiridium in Tasmania, until the end of August, 1928, has been 21,436 oz., with a value of £500,665.

Quantity and Value of Osmiridium Obtained at Adamsfield since its Discovery.

Period.	Quantity.	Value.
Quarter ended—	oz. dwt. gr.	£ s. d.
June, 1925	9 1 12	281 8 11
September, 1925	625 19 9	20,144 10 11
December, 1925	2,258 5 9	68,757 1 4
March, 1926	992 13 7	23,339 0 1
June, 1926	633 12 20	12,202 18 4
September, 1926	856 9 2	Value not known
December, 1926	555 6 6	as sold under
March, 1927	203 9 11	conditions of
June, 1927	142 3 9	a 60 per cent. advance.
September, 1927	93 16 6	Estmtd. value.
December, 1927	113 10 18	20,000 0 0
March, 1928	516 12 23	12,792 2 1
June, 1928	261 19 7	6,529 9 11
July, 1928	235 4 10	6,521 4 10
August, 1928	168 4 2	4,724 12 2
	7,666 8 7	£175,292 8 7

(4)—PRICE.

The range in the average local price of osmiridium since 1910 is shown in the following table. The years 1926 and 1927 are omitted because the sales were made on an advance of 60 per cent. of the market price, and the final adjustments are not available.

It will be noted that the price rose from £4·42 in 1910 to £38·33 in 1920, the highest average price since being £30·77 in 1925. The average price for 1928, to date, is £26·6 per ounce.

The highest price for sales was £42 10s., which was reached in March, 1920. The highest price since the discovery of Adamsfield was £32 15s. per oz. in 1925.

During 1928 the price reached £30 per oz. for a very short time, but the present price is from £26 to £28 per ounce.

Year.	Average Price Per Ounce. (Local).	Year.	Average Price Per Ounce. (Local).
	£		£
1910	4·42	1918	27·90
1911	4·37	1919	23·73
1912	7·37	1920	38·33
1913	9·52	1921	24·52
1914	9·89	1922	30·25
1915	6·40	1923	29·16
1916	8·55	1924	26·36
1917	14·75	1925	30·77
		1928 (To date)	26·6

IX.—CONCLUSIONS.

The Adamsfield osmiridium field was, in its early days, a typical " new chums " field, that is to say the osmiridium-bearing deposits were rich, easily located, and generally easy to work. The deposits were easily located because there was no apparent regularity in the occurrence of the osmiridium, which was found to occur on hillsides as well as in alluvial deposits along streams. Once, therefore, the early discoverers proved the existence of the osmiridium over certain areas every place and type of material had to be tested and, in these processes of more or less " blind " testing, the inexperienced men were just as likely to be successful as the experienced ones.

The deposits were easily worked because of their shallow depths, absence of water troubles (as regards drainage), &c., while the rich nature enabled the inexperienced to work them profitably, even though they may have been working them inefficiently.

The result of these factors was that during the latter half of 1925 and the early months of 1926, the field was rushed by 800 to 1000 men, and the greater portion of the osmiridium deposits were located and worked out. During 1926 the marketing of the osmiridium was difficult (until the Producers' Association was formed) and the price low. At the same time the greater part of the rich and easily work deposits had been worked out, so that the number of miners engaged on the field fell to between 100 and 200. The same number also occupied the field during 1927, but, with the rise in the price of osmiridium during 1928 the number has risen considerably.

During these periods the ground being worked was partly that on claims not previously exhausted and partly ground that was being worked over again. A small proportion of new ground was also discovered.

The future of the field depends chiefly on the price of the osmiridium. The reason is obvious, as the greater the price the greater the value of the metallic contents of the ground, and so the better the prospects the miner has to treat the ground profitably. The profitable treatment of the ground is, of course, the basis on which the miner works, and the lower limit of profitable ground is considered to be reached when the earnings do not amount to ordinary rates of wages.

Other factors governing the future of the field are:—

(*a*) The extent of ground which can be worked by present methods. This is dependent on the reworking of old ground, the working-out of present claims, and the discovery of virgin ground. It is probable that under these conditions the field will support a diminishing population over a number of years.

(*b*) The extent of ground which can be worked by other than the present methods. These other methods will be in the nature of operations on a larger scale, and, to enable them to be carried out, larger supplies of water will be necessary. These larger water supplies will enable larger quantities of ground to be treated even under the present methods of working, or better still if hydraulic sluicing could be carried out. With such methods large areas of ground, which is at present considered unpayable, could be profitably treated. Areas of such ground occur on and around Football Hill.

(*c*) The prospecting of the deep ground of Adam River, between the southern end of Football Hill and Adam River Fall.

All streams entering the flats along Adam River have contained osmiridium, so that it is possible the gravels, which may occur at the bottom of the deep ground, may be osmiridium-bearing. The western slopes of Football Hill dip abruptly below the deep ground of the flats, so that workings have not progressed far into the flats. The depth of the ground and the difficulty of pumping, or otherwise disposing of the water, have prevented shaft-sinking for the purposes of testing the ground.

(*d*) The testing of all ground below the false bottoms on other parts of the field.

P. B. NYE, M.Sc., B.M.E.,
Government Geologist.

Hobart, October, 1928.

GEOLOGICAL SKETCH MAP
OF
ADAMSFIELD DISTRICT
SCALE
20 10 0 20 40 60 80 CHAINS
1 MILE
Q.J.H.
North
Magnetic
GORDON RIVER
THE THUMBS
CLEAR HILL
PLAINS
MYRTLE CREEK
TIGER CREEK
TIGER RANGE
ABEL CREEK
EVE RIVER
CAIN CREEK
MAIN CREEK
ADAMSFIELD
ADAM RIVER
ADAM RIVER PLAINS
RAGGED MTS.
SAW BACK RANGE
STACEY LOOK-OUT
FLORENTINE
TO FITZGERALD 32 MILES
GORDON TRACK
A
B
C
D
E
F
LEGEND
SEDIMENTARY.
RECENT — Alluvium
PLEISTOCENE — Gravels
SILURIAN — Sandstones and Shales
Limestones
Quartzites
Conglomerates
CAMBRO-ORDOVICIAN — Slates, cherts, &c.
IGNEOUS
DEVONIAN — Serpentine
CHARACTERISTICS
Geological Boundaries
Contours
Miner's Right Claims & Leases
Strike & Dip of Strata — Horizontal
Inclined
Vertical
Faults
Faults (Concealed)
Tracks
Bridges
GEOLOGICAL SKETCH SECTIONS
VERTICAL AND HORIZONTAL SCALES AS FOR PLAN
DATUM 1000 FEET Above Sea Level
THE THUMBS
Eve River
Abel Creek
Tiger Creek
Myrtle Creek
DATUM
Adam River
Adam River
Main Creek
Hopper Creek
Myrtle Creek
Florentine River
DATUM
RAGGED MTS
SAW BACK RANGE
Adam River
DATUM
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13/9/28.