

GEOLOGICAL REPORT ON THE FRANKFORD DISTRICT.

I. LOCATION AND ACCESS

This district is situated in the vicinity of the Frankford settlement in the northern part of Tasmania. Frankford is located 20 miles to the north west of Launceston, and 18 miles to the south east of Latrobe, and a similar distance to the south of Port Dalrymple which forms the mouth of the River Tamar.

The only means of access to the district is by one or other of the various roads. The most convenient is from Launceston via Exeter (12 miles) Frankford being a further 12 miles or a total distance of 24 miles. The same road connects Frankford with Latrobe, a distance of 20 miles to the north-west. Frankford is also connected by road with Westbury (20 miles) to the south, and with Beaconsfield via Holwell or Flowery Gully to the north.

II. PHYSIOGRAPHY

The district is generally of very high relief, the highest parts being over 1600 feet and the lowest parts about 200 feet above sea level. The central portion of the drainage systems and contains the most elevated mountains and hills. Of these the most prominent and conspicuous named features are the Little Black Sugarloaf or Flagstaff Hill (1600 feet), Kelly's Lookout (1600 feet), Mt. Careless and Bald Tier. In addition to these there are many other prominent but unnamed features rising to altitudes of 1000 to 1500 feet.

The principal drainage systems are those of the Franklin River, Supply River, Meander River, and Anderson's Creek. The Franklin River rises by means of numerous small creeks in the vicinity of Frankford and flows in a general westerly and then north-westerly direction into the estuary of Port Sorell. The Supply River rises as two main streams (the parent and the Little Supply River) in the hills to the east and north of Frankford and flows in a general north-easterly direction into the River Tamar. Two tributary streams of the Meander River viz the Black Sugarloaf Creek and Brumby's Creek rise to the south and south-east of Frankford and join the main stream 8 miles to the south. Anderson's Creek rises to the immediate north of the district in the vicinity of Holwell and flows northerly into the West Arm of the River Tamar.

III. GEOLOGY

The oldest rocks within the district are the schists assigned to Precambrian era. To the east and to a less extent to the west, Lower Palaeozoic rocks occur and are referred to the Cambro-Ordovician system. The above are overlain by the horizontal or low dipping strata of the Permo-Carboniferous system. All the above sedimentary strata are intruded by diabase of Upper Mesozoic age. Recent alluvium has been, and is now, forming along some of the streams.

A geological sketch map showing the above formations together with topographical features, contours, etc. is attached to this report.

Precambrian

Rocks assigned to this era outcrop at several localities within the district. These rocks consist chiefly of grey to almost black micaceous schists with smaller amounts of micaceous quartz schists which are often much lighter in colour. When freshly broken along foliation planes, the schists have a very silky appearance. The planes of schistosity or foliation are closely spaced and are sometimes contorted but not to any great extent.

The strike of the schists varies from 290° to 360° but the usual strike is 310° or 315° . The usual dip is to the north-east at high angles of 75° to 90° . A reversal of dip to the south-west appears to take place at some localities, but the occurrences are unsatisfactory and the evidence is not definite. Only the one set of planes - those of schistosity - are present, but whether these are coincident with the bedding planes of the unaltered sediments, or completely mask them, could not be satisfactorily determined.

The schists are exposed in three areas, all of which are parts of the same belt, but which are separated by the overlying Permo-Carboniferous rocks. One of the largest areas is that forming Kelly's Lookout and extending from Frankford on the south to the west of Holwell on the north. It is probably also continuous with that of the Asbestos Range further north. This area is half a mile wide and at least four miles long. It is bounded by Cambro-Ordovician rocks to the east and is covered by Permo-Carboniferous rocks to the south and west.

A small area of schists is exposed in the valley of the Copper Mine Creek to the west of the above underlying the Permo-Carboniferous rocks. It is this area that the Pandora Copper Mine is situated in.

Another large area, three miles long and three-quarters of a mile wide, occurs to the south of Frankford where it forms a high, unnamed ridge. This area is intruded by diabase on the south-west and overlain by Permo-Carboniferous rocks to the north-east.

The original rocks from which these schists have been formed were undoubtedly of sedimentary origin, but no fossils have been found in them. This fact, together with their structural and lithological characters, cause them to be assigned to the Precambrian era.

The relation of the schists to the Cambro-Ordovician rocks to the east is by no means clear. There is an apparent large divergence in strike, indicating an unconformity which relationship is the most probable one.

Cambro-Ordovician

To the east of the belt of schists at Frankford there occurs one or more series of ancient sedimentary rocks. The total width of this zone as far as examined to the east was $2\frac{1}{2}$ miles and the width is probably greater as related rocks have been reported to occur at Glengarry further east. Lack of exposure and the limited time available did not permit of a thorough investigation of the zone of rocks. The rocks will therefore be divided into a number of arbitrary series and described under these headings.

Conglomerate Series

This series is exposed to the north of Frankford where it occurs immediately to the east of the Precambrian schists. Conglomerates outcrop boldly immediately above the school at Frankford, and quartzites occur further east on the northern side of the head of the Little Supply River. On the summit of the Little Black Sugarloaf (or Flagstaff Hill) conglomerates and quartzites outcrop prominently, and on the fall to the Supply River cliffs of these rocks are prominent. They are visible on the north banks of the Gorge through which this river runs, and form the Bald Tier ridge which courses to the north. Similar cliffs are also visible to the east where the river runs to the south east for a short distance. The total width of the outcrop of this series is one half to three quarters of a mile.

The rocks forming this series consist of conglomerates and quartzites. The conglomerates vary in grain from very fine when they approach sandstones up to coarse with pebbles 6 inches in length. The pebbles form more than half the bulk of the rock and are set in a fine sandy matrix. In the finer grained types the pebbles are all composed of white vein quartz, but in the coarser grained ones, pebbles of quartzite are abundant. An occasional pebble of quartz schist which might easily have been water-worn and rounded and are roughly bedded.

The strike of the series is not very definite owing to the massive nature of the rocks, but it appears to be between 0° and 45° . This is in agreement with the general direction of the zone of these rocks. This strike is somewhat different to that of the adjacent schists, with which the conglomerate series is probably unconformably related.

Red Hill Series

In the road cutting on the Red Hill between Frankford and Glengarry a series of slates and sandstones are exposed. The same rocks are exposed in some old mine workings on the hill to the south of the road, and also to the north along the Little Supply River.

The rocks have the appearance of being light coloured slates with mica along the planes in some cases. On closer examination, very thin bands of quartz sand are visible throughout the rock. The original sediments from which these rocks were derived probably consisted of thin alternating layers of clay and sand. To the north along the Old Mill Road, very fine grained argillaceous sandstones (slightly schistose) occur with the above. On the south bank of the Little Supply near the edge of the cultivation at Glengarry, dark ironstained quartzites are found on the dump from an old adit.

Strikes and dips are obtainable in only a few localities. In the old workings on Red Hill, the rocks have a strike of 335° and a dip of 60° to the north east. In other workings to the north of the road the strike is 345° and the dip at high angles to the north east. Other apparent strikes are different to the above, but could not be recorded with any degree of certainty. It has been reported that similar strikes (340°) and dips of 60° to the north east occur at Glengarry further to the north east.

On the west this series junctions with the conglomerate series, but the nature of the junction could not be determined. The strike of the conglomerates is 0° to 45° , while that of the Red Hill series is 340° , thus suggesting an unconformable relation.

To the south, north and east, this series extends for some distance but is finally overlain by Permo-Carboniferous rocks.

Age of the Conglomerate and Red Hill Series

The age of these series cannot be determined at the present time. No fossils have been found in them to help in this respect. They are metamorphosed to a much less extent than the Precambrian schists and are therefore of much more recent age. They are older than the Permo-Carboniferous rocks which overlie them. Should no large faults or folds occur between the Red Hill and Flowery Gully, the former series should underlie the sandstones, limestones and slates at Flowery Gully by some considerable distance. The lithological nature of the two rocks of the two areas supports this statement as the Red Hill rocks are more altered than those at Flowery Gully. The Flowery Gully rocks are referred to the Cambro-Ordovician (possibly the Ordovician) and the Red Hill series are therefore older and probably nearer to the base of this system.

With the exception of the conglomerate series, the whole of the rocks from the Precambrian schists to the uppermost beds in the Beaconsfield and Flowery Gully district have a strike of 315° to 340° and a dip to the north-east, and form apparently a conformable succession. The conglomerate series has a probable strike of 0° to 45° , and thus appears to be unconformable with the schists and the Red Hill series. It may be, however, that local earth movements have caused this diversity in the strikes. The evidence available is so small in amount that the relative age of the conglomerate and Red Hill Series cannot be determined.

At the western extremity of the district there occurs another area of Lower Palaeozoic rocks. These outcrop to the north and south of the Franklin River and are bounded on the east by intrusive diabase.

On the western bank of the river where it flows due north for some distance, these rocks consist of dark coloured quartzitic rocks. An adit exposes a good section of these rocks which have a strike of 350° and a dip of 45° to the north-east. To the south of the river and east of Flag Creek, slates, sandstones, quartzites and conglomerates occur, of which the sandstones and conglomerates are the most numerous. The conglomerates are fine grained, the included pebbles consist chiefly of white vein quartz with a smaller amount of slates.

The relative age of these rocks with those around Frankford is indeterminate, and they are provisionally assigned to the Cambro-Ordovician.

Permo-Carboniferous

Permo Carboniferous rocks occupy a considerable portion of the surface of the district, chiefly in the vicinity of Frankford and South Frankford. They rest on an uneven floor of the Precambrian schists and to a less extent of the Cambro-Ordovician rocks.

The rock types present are conglomerates, sandstones, mudstones, and argillaceous sandstones.

The conglomerates occur at the base of the series resting on the underlying schists, etc. They are not so extensively developed as in other districts, and show no sign of glacial origin. The pebbles consist of schists, quartz and quartzites all of which could be derived locally from the underlying formations.

The succeeding beds are different in different localities. Along the Franklin River to the south of the township reserve, sandstones (slightly fossiliferous) succeed the conglomerates. A similar succession is visible on the road to the Pandora copper mine. At other localities pebbly and fossiliferous mudstones, probably representing the Lower Marine series, succeed the basal members.

Sandstones overlie these mudstones along the Frankford-Beaconsfield road and apparently represent the Greta or Lower Coal Measure series.

The uppermost members consist of thinly-bedded mudstones and white argillaceous sandstones.

The total thickness of strata at present exposed is 300 to 400 feet, but it is probably much greater as considerable thicknesses must have been removed by denudation.

Fossils are not so numerous as in other districts, but typical Permo-Carboniferous ones such as fenestells, protoretepora, and spirifera were obtained at a few localities.

Recent to Tertiary Alluvium

Along the course of the Franklin River and Saxon Creek in the extreme western part of the district, a large area of river alluvium occurs. This is the only locality where alluvium has been formed, as in other parts the streams are in too youthful a state of development to permit of its formation. The formation of the above area has been caused by the fact that the hard diabase, quartzites, etc. downstream have greatly retarded the development of the river, and in thus damming back the waters has caused flooding and deposition of the alluvial material.

The alluvium is not all of quite the same age, that along the streams being the most recent and that on the flat plains above river level being older. The latter certainly extends back in age as far as the Pleistocene and possibly further into the Upper Tertiary.

Upper Mesozoic Diabase

The only igneous rock occurring in the district is the diabase (locally known as basalt and blue metal) which is found so plentifully throughout Tasmania.

The various areas over which this rock outcrops are shown on the map accompanying this report. They occur chiefly to the south and east of Frankford. An inspection of the map shows that practically all these areas are connected with one another and form part of one large body of diabase with a general trend from south-east to north-west. For the most part, the diabase is in contact with the Permo-Carboniferous rocks but it also comes into direct contact with the Precambrian schists and the Cambro-Ordovician rocks. The contacts are always transgressive with respect

to the Permo-Carboniferous, and to all appearances, to the older rocks as well.

The rock is the medium-grained type, composed essentially of plagioclase feldspar and augite, so commonly found in Tasmania and need not be described further.

IV. ECONOMIC GEOLOGY

The occurrence of metallic and non-metallic mineral substances in rocks depends to a large extent upon the nature and age of the rocks. The possibility of the occurrence of such deposits in the Frankford district will be discussed from this view-point.

Diabase

No mineral deposits are found associated with this rock in Tasmania. Its sole use and one for which it is particularly suitable, is for road construction purposes.

Permo-Carboniferous

Mineral deposits of commercial value which occur in the rocks of this system in Tasmania are limestone, coal and oilshale.

Limestone beds are interbedded with the shales and mudstones of Lower Marine series of this System. This series is represented in the Frankford district but is not so prominent as in the Beaconsfield district to the north. Thin beds of limestone are found in the latter locality but are of no commercial importance. No trace of limestone was found in the Frankford district, but should such beds be present it is not anticipated that they would be of any greater importance than those at Beaconsfield.

Oil shale and coal seams occur in the Greta or Lower Coal Measure series of the Permo-Carboniferous system. This series is probably represented within the district by the sandstones in the Beaconsfield and the Lilydale districts. In the latter district they are undoubtedly of fresh-water origin and represent the Greta series. Assuming the sandstones to be of fresh-water origin, only coal seams and not Tasmanite shale can be expected to occur. No coal has so far been found and it seems certain that in this, as well as the districts to the north and east, that coal seams were not formed.

As Tasmanite shale was formed only when marine instead of fresh-water conditions prevailed during the deposition of the Greta series, it cannot be anticipated to occur within the district.

Coal seams were also formed during the deposition of the Tomage or the Newcastle series in some parts of Tasmania. These series do not occur in the Frankford district and it is probable that marine conditions prevailed from the Upper Marine to the end of the Permo-Carboniferous sedimentation.

Cambro-Ordovician and Precambrian

With the exception of limestone, the deposits likely to occur in these rocks are restricted to those of the metallic minerals.

Limestone could be expected only in the Cambro-Ordovician beds which are the equivalent of the Flowery Gully beds to the north-east. Any extension of these beds from Flowery Gully would pass through Winkleigh and near Glengarry which are situated to the north-east.

Metallic minerals such as those of gold, silver, tin, copper, zinc, lead, etc. would occur in the Cambro-Ordovician rocks by virtue of their intrusion by igneous rocks of Devonian or earlier age. Such association of the ore deposits with intrusive igneous rocks is exemplified in every mining field in Tasmania.

The only igneous rock outcropping in the Frankford district is the diabase of Upper Mesozoic age, but no deposits have yet been found to have been formed in association with this rock.

Devonian igneous rocks do not outcrop within the district or its immediate vicinity. The nearest outcrops of such rocks are at Beaconsfield and Anderson's Creek where basic rocks (now largely converted into serpentine) and to a less extent acid, granitic rocks, occur. The auriferous quartz lodes at Beaconsfield were derived from the underlying granite in that vicinity.

While igneous rocks do not outcrop at the surface, there is some evidence that suggest their presence beneath. This evidence consists of the occurrences of quartz veins (occasionally with an appreciable content of chalcopyrite) and barite veins. Whether these are associated with Devonian igneous intrusions or older ones cannot be definitely stated, although it is probable that they are associated with the older intrusions.

The veins of quartz containing chalcopyrite are restricted to the Precambrian schists in the present district and also that of the Asbestos Range to the north-west. The barite deposits in Tasmania are generally associated with the Porphyroid series and may be genetically related to the Porphyroid period of igneous activity. The quartz veins in both the Precambrian and Cambro-Ordovician might be related to either these older intrusions or to the Devonian Period.

Thus there is some slight evidence of mineralisation within the district, but it is not possible to definitely assign it to any particular period.

A description of the few ore deposits that have been located and opened up by underground workings will now be given.

The Barite Deposit

This deposit occurs on Lease 7286-M of 80 acres granted as a reward claim to B. Sykes and J.A. Crisp. The lease is situated on the western side of Flag Creek, in the western part of the district. It was granted in 1916, so that the discovery of the barite is comparatively recent.

The country in the vicinity is occupied by sandstones, quartzites, conglomerates and slates of Cambro-Ordovician age.

The only workings that the writer was shown consisted of a short trench and a fallen-in adit. The surface at the trench was occupied by soft sandstones, and numerous pieces of barite were lying alongside it, as though they had been taken from the trench. From an inspection of the specimens, it would appear that the barite occurred in a vein or veins at least 5 inches wide in the soft sandstones. No veins

could be located in the trench, although it is possible that might have occurred in one small part and been missed owing to their narrowness.

About two chains to the north-east an adit was driven in a general westerly direction probably to cut the deposit along its line of strike. Unfortunately the adit was fallen-in near its entrance and an inspection could not be made. Clay representing decomposed slates occurs in the approach and the entrance. Quartzites and conglomerates form the material on the dump, but no barite could be found. It would appear, therefore, that the barite was not intersected in the adit, although this could not be verified by an inspection. It was no possible to ascertain whether the strike of the deposit was such that it would be intersected by the adit, but if this is the case it would appear that the deposit has no northerly extension.

The lack of facilities for inspection prevents an expression of opinion as to the value of the deposit, but should the barite in the trench be all that has been located, it will of course be of no economic importance.

Mahony's Reef

The occurrence known by this name is situated to the south of the South Frankford district in the south-eastern part of the district.

The country in the vicinity is occupied by Precambrian schists, but diabase occurs a few chains to the south-east. The schists have a strike of 290° - 310° but the dip is indefinite.

The outcrop consists of whitewquartz with darker patches. A shaft was sunk on this outcrop between the two small head-water streams of the Black Sugarloaf Creek. It was filled with water to within two feet of the surface at the time of inspection and only this upper portion could be examined. The quartz appeared to form a vein about two feet in width which had a strike in accordance with that of the enclosing schists and was dipping vertically. Another shaft was sunk to the north west, but a short distance to the south-west of the line quartz. Crosscutting would have been necessary from this shaft to cut the lode.

The lode appeared to extend a short distance to the north-west, but no workings were visible.

The quartz was of a compact white nature with dark patches in it. A small proportion of chalcopyrite and to a less extent, arsenopyrite occurs in the quartz. A

A grab sample from the quartz lying near the shaft and containing an appreciable content of chalcopyrite was assayed in the Mines Department Laboratory, Launceston with the following results:-

Gold	Nil
Silver	Nil

The quartz would only be of economic importance for its gold silver content and as the above assay shows these are not present. Whether these would be present in quantity at other parts of the lode cannot be stated, although it is not anticipated that they would be. The lode therefore appears to be of no economic importance.

The deserted mine of this name is situated on Copper Mine Creek in the northern portion of the district to the north-west of Frankford. The land in which the deposit occurs was held under mineral lease until recent years but is not held at the present time.

Precambrian schists outcrop in the valley of the Copper Mine Creek and it is in these rocks that the lode occurs. At higher altitudes in the valley the schists are overlain by Permo-Carboniferous strata.

1893 — The Pandora lode was probably discovered in the eighties. The mine was visited and reported on by Mr. A. Montgomery in 1893, when a large extent of workings had been carried and a few parcels of ore sent away. Operations ceased some time after Mr. Montgomery's visit and the mine was idle until 1897. In this year, the Saxon Creek Copper Mining Co. N.L. was formed to work the mine. Operations were carried out for a short period but were again abandoned. In 1913, attention was again given to the mine and it was worked by the May Queen Copper and Gold Mining Co. N.L. for a short period. Since then the mine has been idle.

The workings cannot be entered now, and an inspection of the mine was impossible. The shafts, winzes, etc. are filled with water and what was apparently an adit cannot be entered for similar reasons. The following descriptions are therefore taken from the older reports. Mr. Montgomery (1893) states "A drive has been made to the N.E. a distance of about 104 feet, with several branches. At the mouth a flat vein of ferruginous vuggy quartz is seen, but is very irregular, having apparently no defined course or underlay. All along the tunnel and its branches we find similar irregular flat veins, sometimes up to 4 feet in thickness, but generally smaller; they consist of quartz full of cavities filled with oxide of iron and also containing copper pyrites. The cavities are evidently spaces from which copper pyrites have been dissolved out. About 30 feet from the entrance to the tunnel a strong-looking vein of quartz crosses the drive running to the N.N.E. but when this is followed some 13 feet it is found to have become small and flat. At 82 feet in, two drives go off from the adit, one running about S.E. and the other a little south of east; the former is along the best defined vein of ore seen in the mine, which it follows for about 40 feet, when it again becomes small and flat, and dips underfoot. Near the end of this drive a winze has been sunk on the vein, and some good ore is said to have been extracted. The underlay is very flat and to the south-west; it is said that some driving was done from the bottom of this winze towards the south-east but as it was full of water I could not see this. Opposite the winze a drive runs about 18 feet to the N.E. and meets the other branch drive from the main adit, which is then continued eastward some 30 or 40 feet but this part was inaccessible at the time of my visit. Another winze was sunk close to the end of the connecting drive and some good ore was extracted, but the very irregular character of the veins is evident when I say that though the two winzes mentioned are only some 16 feet apart, the long axis of the second one is almost at right angles to that of the first, and the underlay of the vein is to the north-west. It is quite impossible to say really what is the course of the vein or the direction of its underlay, though the latter appears to be on the whole rather westward than eastward. The country rock throughout the drives appears to be much broken and often contains quartz veins, and we cannot yet decide whether there is only one main flat-lying vein with numerous feeders and droppers and itself much contorted, or

whether there is a large broken lode-mass consisting of disturbed country rocks, in the crevices of which irregular strings and veins of quartz and ore have been deposited. A small shaft which was sunk less than a chain to the south east of the tunnel mouth passed through barren rock for some 26 feet before coming on quartz and ore at about the same level as where they are got in the tunnel, which would favour the idea that there is a flat lode, but, on the other hand, the country schist on the west side of the creek seems very solid and undisturbed. If any more work is done on this mine the shaft should be sunk deeper, and cross-cuts driven from it to prove the nature of the lode; if it is a flat vein the shaft will soon pass through it into little disturbed country rock, but if the ore is in strings through a large broken lode-mass the shaft and crosscuts will soon reveal the fact, and give a chance of estimating whether ore is present in payable quantities. If the vein is flat and irregular in its underlay, as in the present workings I do not think there is any chance of the mine being worked profitably, as the mining costs would necessarily be very heavy, and very much better ore than any yet seen in it would be required to cover them; but, in the other case, it might prove that the quartz veins would form into a more solid lode body, and that mining might be a commercial success."

Loftus Hills visited and reported on the mine 1913 and with regard to the workings states "It appears that the first work done by the Saxone Creek Co. was the unwatering of the small shaft mentioned in Mr. Montgomery's report. A drive was put in in a southerly direction from the bottom of this shaft for a distance of 40 feet. At the southern extremity of this drive a winze was sunk to a depth of 11 feet At a point about a chain east of the No. 1 shaft and about 60 feet above it, a main 8 feet x 4 feet was sunk for a total depth No ore was disclosed in this shaft The present work has merely consisted in unwatering the main adit which Mr. Montgomery stated was 104 feet in length. This disclosed the fact that the roof of the adit has fallen in at a point 45 feet from the entrance."

As far as the present inspection went, it was apparent that, judging by the dump, no ore was obtained from the main shaft. In the entrance of the adit the flat vein of quartz reported by Montgomery was visible. A dump of ore from a small shaft and possibly also from the adit has been formed on the surface and is still available for inspection.

The ore consists of white quartz with numerous vughs and cavities. The quartz contains chalcopyrite (copper pyrite) and to a less extent pyrite (iron pyrite). These minerals, particularly the chalcopyrite constitute the economic minerals of the lode. These will be of importance for their copper, or gold and silver contents or both. A grab sample was assayed for gold and silver in the Mines Department Laboratory, Launceston with the following results.

Gold	Nil
Silver	Trace

Thus as far as exposed, the ore has no value for its gold and silver contents. Any value the ore has will therefore depend upon its copper content. The ore on the dump is slightly below the average grade, as the best ore from that extracted was picked and sold. A parcel of five tons of picked ore is reported by Montgomery to have assayed 7.5% copper. In view of this it is improbable that the whole of the ore would bulk 5%. To produce a marketable product the ore would have to be concentrated, and ore of

such a low grade would not pay the expenses of mining, concentrating and transport to a smelting plant. Neither would it pay to mine and market the richer portions only as the deposit so far opened up is small and erratic and the cost of locating and mining such portions would be greater than their value.

With regard to any possibilities of higher values there is no reason to expect such to occur. As so far exposed, the deposit appears to consist of a general flat vein or veins with a number of small more or less vertical ones connected with it and running in all directions. The latter have yielded the best ore, but have no great length and all change into flat dipping irregular veins, striking and dipping in different directions. There does not appear to be any well-defined deposit but just a number of veins traversing the schists and generally becoming fairly flat. There is no reason to expect any of them to give place to more important bodies.

Considering, therefore, the nature of the deposit and the unsuccessful attempts to work the mine, further expenditure in connection with it does not seem justified.

Red Hill Area

A number of old mine workings occur in this hill, many of them having been performed over 30 years ago in the search for gold. None of the shafts can be entered, but the adits are in good order and were examined by the writer. All these workings were carried out in country consisting of the Red Hill slates and sandstones.

At the south-eastern extremity of the hill two adits were driven apparently on the same vein. The upper of these is only 15 feet in length. It was driven in a north-westerly direction with the country which here has a strike of 335° and a dip to the north-east of 60° . The adit follows a narrow vein of quartz up to 4 inches wide which has the same strike as the country and sometimes dips with it and sometimes across it. The quartz is white and contains numerous vughs, and has no visible mineral content.

To the south-east along the same line of strike another adit was driven from the northern bank of Beasley Creek. At the start this adit was driven with the country to the north-west, but was gradually turned and at the face was bearing to the south-west. In the first portion several narrow veins of quartz striking and dipping with the country were exposed. At 90 feet a winze was sunk and there appeared to be some other workings east of the winze. At 145 feet a short drive was put in to the north-west on a narrow vein of quartz striking and dipping with the country. A similar parallel vein, up to 4 inches wide, of white vughy quartz, was cut at the face, 165 feet from the entrance. Which if any, of these veins represent that cut in the upper adit cannot be stated. The veins are so narrow that they probably have no great length or depth and it is possible that none of them represent the one cut above. They are of no economic importance.

About 8 chains up Beasley Creek from the last mentioned adit, another has been driven into the north bank. The adit was commenced at a bearing of 15° , but gradually altered in direction until at the face it was driven across the country. At 15 feet from the surface, a vein of quartz running parallel with the strata was intersected. A bunch in this vein was 10 inches wide. At 30 feet, another bunch was visible in the bottom of the adit

and a winze had been sunk on it. Similar veins and bunches were met with along the greater part of the length of the adit. At 150 feet, another winze was sunk but on what formation could not be observed. At 165 feet a 6 inch vein running parallel with the strata was out, and the adit continued past it to 180 feet. All the veins and bunches were composed of the white quartz with vughs and had no apparent mineral content.

On the summit of Red Hill, several shallow shafts and trenches occur, but cannot be inspected owing to the state of disrepair into which they have fallen. No quartz was visible on the dumps of those visited. While sunk for prospecting purposes for gold-quartz reefs, the immediate objective of these shafts is not clear.

Little Supply River Area

At a point about three-quarters of a mile north of Red Hill, a small amount of mining operations has been carried out. The country rocks are similar to those at Red Hill. The strike ranges from 345° to 360° and the dip is to the east. Several trenches have exposed a number of veins of quartz on the western bank of a small tributary of the Little Supply River. An adit has also been driven from a lower level apparently to cut some of these veins, but was not continued for a sufficient distance to achieve this purpose. The adit was commenced in a westerly direction but was turned to the south-west. At 50 feet, a number of veins of quartz were exposed over a width of 18 inches, but did not persist in the back.

To the north-east and near the edge of the cultivation around Glengarry, another adit was driven into the hills on the southern bank of the Little Supply River. It has fallen in at the entrance and could not be examined. Soft altered slates and hard brown quartzites form the dump, but no quartz was visible.

V. CONCLUSIONS

In the above report the possibilities of the occurrence of various minerals has been discussed and the known occurrences described.

Although in the Permo-Carboniferous strata in other parts of Tasmania, beds of limestone, coal or oil-shale may be found, it is considered that in the Frankford district that they were not formed and therefore do not occur.

In the Cambro-Ordovician strata, deposits of metallic minerals could be expected to occur provided that evidence of igneous intrusions of Devonian age or older or the mineralisation resulting therefrom occurs. No surface evidence of Devonian intrusions nearer than Anderson's Creek are known, while nothing at all can be said as to older intrusions. However, the presence of veins of barite and of quartz (with or without chalcopyrite) indicates the presence of mineralisation to a slight extent at least. The period to which this mineralisation should be assigned cannot be definitely stated, although it is possible that one or more periods may be represented. The quartz-chalcopyrite veins appear to be restricted to the Precambrian schists and further prospecting would probably only result in the discovery of such veins. The most important of these so far found is that at the Pandora Copper Mine, which however is not of economic importance as it cannot be successfully exploited.

Barren quartz veins occur in both the Precambrian schists and the Cambro-Ordovician rocks. These have been prospected at numerous places but without any success, and they appear to be devoid of gold. The general absence of alluvial gold in appreciable quantities in the streams indicates the barrenness of outcropping quartz veins.

Barite occurs at only one locality in the western part of the district, but as far as could be ascertained it appeared to have no economic importance.

Thus up till the present time, no deposits of economic importance have been discovered. Whether ones of greater importance will be located is a question that can only be settled as a result of future prospecting, but as far as the evidence goes, the chances are not very favourable.

Yours faithfully,

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HOBART,
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