

REPORT ON GEOLOGICAL RECONNAISSANCE OF SURVEYOR
AND DECEPTION RANGES DISTRICT

INTRODUCTION:

From 10th February to 15th March this year a geological reconnaissance was undertaken of an area comprising some 60 square miles of country west and adjoining the district between Jane River and Prince of Wales Range, the survey of which was completed in 1936.

The present examination is complimentary to the latter and was made with the object of ascertaining (a) if similar alluvial gold deposits to those of Jane River Goldfield, or any other mineral deposits, existed to the west, and (b) whether geological conditions were in any way different from that of adjoining areas.

Mr. T.D. Hughes rendered valuable work in his capacity of geological assistant, in mapping portion of the geological and topographical features.

Alluvial prospecting, in conjunction with the geological survey, was ably carried out by field assistants M. Fletcher and C. Abel.

LOCATION AND ACCESS:

The area is situated to the south and south-east of Frenchman Cap. It adjoins Jane River Goldfield area along the eastern boundary, is bounded on the west by Franklin River and extends slightly south of the lower portion of Jane River in the south.

Access is gained by way of Jane Goldfield foot-track as far as the eastern edge of the area. This is a well graded track commencing at a point West Coast road, half a mile east of Stonehaven Creek, 123 miles from Hobart, and proceeding in a general southerly direction as far as Calder Pass (11 miles). From there it turns easterly and south-easterly down Thirkell Creek, crosses Erebus Rivulet, and after sideling up the north-east side of Warne Lookout, finishes at the goldfield. At Riley's Hut (10½ miles from road) a subsidiary foot track deviates to Piner's Hut on the right bank of Jane River, 4 miles to the south-south-east. From this hut a minor track again connects with the main goldfield route, this time in vicinity of Thirkell Creek, at about 5 miles from the goldfield.

The first route through the district was probably that taken by Sir John Franklin in 1842, on his way from Hobart to Macquarie Harbour, when he proceeded by way of Calder Pass westerly to Lightning Plain, thence along eastern fall of Deception Range to White Hill Plain, then south-westerly to cross Franklin River above its confluence with Jane River.

In 1900 a track cut by J.L. Moore passed through the area westerly and southerly from Calder Pass to cross the upper reaches of Jane River and mount Surveyor Range, to west of Mt. Elliott. The south-easterly course then adopted crossed the lower portion of the same river by way of eastern

fall of Surveyor Range and followed the stream down on left bank. Throughout the area this track is now almost impossible to trace and cannot be used for access.

TOPOGRAPHY: The topography of the area varies within short distances from high rugged mountain ranges to low-lying plains about the beds of the major streams at the base of the high country.

The chief physiographical units are represented by Deception Range, Surveyor Range and Norway Range.

- (1) Deception Range, the largest mountain mass, dominates the western part of the terrain. It has a general trend, over a distance of 8 miles, in a meridional direction to the south of Frenchman Cap, from which eminence it originates in the form of a high spur. Towards the south the range turns south-westerly for several miles before terminating about the junction of Franklin and Jane Rivers. It is bounded on the west by Franklin River and on the east by head waters of Jane River and Acheron Rivulet, between which it rises into several rugged peaks, reaching towards the north a maximum height of 3161 feet approximately above sea level.
- (2) Surveyor Range, which occurs about the middle of the district, is an outstanding mountain range roughly parallel to, and east of, Deception Range. It rises to a general height of about 2500 feet and is distinguished in the north east by the isolated though prominent, peak of Mt. Elliott, having an estimated height of 2910 feet. From Mt. Elliott north-easterly and easterly, a high level plateau extends for 3 miles before the continuity is broken by Jane River valley.
- (3) Norway Range extends in a south-south-westerly direction along a large part of eastern boundary of the area. It is much lower and less prominent than the mountains already described, and is dissected into two parts by a steep gorge of Jane River valley, where the latter cuts through the range from east to west. A ridge extending westerly from northern end of this range culminates in an outstanding peak, 2026 feet in height, known locally as Spion Kop.

With the exception of the western fall of Deception Range, the drainage of the district is effected by the complicated system of streams embraced by Jane River and its numerous tributaries. The river rises at a low saddle between Deception Range and Surveyor Range towards the northern end. It flows northerly for 3 miles but there turns and runs in a general easterly direction as far as Thirkell Creek. It then flows southerly to Algonkian Rivulet and, after turning sharply to the west, continues to its junction with Franklin River in a general west-south-westerly direction. Along its course Jane River passes alternately through a series of open plains and steep gorges, each feature being controlled by the rock type encountered by the stream. In its passage over the plains the river has assumed an extremely sinuous course, but with a few exceptions, it has carved a more even route through the ravines.

Acheron Rivulet, comprising the largest tributary of Jane River, wholly located in the mapped area, commences on southern side of the same saddle and, within a few chains from the head of the parent stream. After running southerly for nearly 5 miles it unites with the river on west side of

the southern extremity of Surveyor Range. In the north-east of the district Thirkell Creek takes its rise at Calder Pass and flows easterly and southern before combining with the river waters. Numerous other smaller streams reticulate in all directions to eventually coalesce with Jane River and assist with the drainage.

Along the western border of the area Franklin River, the largest stream of the district, flows south along the western foot of Deception Range, and, after gathering the Jane River waters, passes on to its confluence with Gordon River. Several low-lying button grass plains occur at different points, about river level, in Jane River valley. Among these are Lightning Plains to the east of Deception Range and south of Frenchman Cap range; Thirkell Creek plain, together with its southerly continuation along Jane River to the north-east of Spion Kop; and several other minor occurrences. White Hills Plain is situated at a much higher elevation than these, between Acheron River and south-east of Deception Range, and occurs about the upper reaches of a small tributary of Jane River.

GEOLOGICAL MAP:

A map illustrating the geological and topographical features of the area examined has been compiled to supplement this report.

The positions of major topographical units, including 4 peaks on Deception Range, 3 peaks including Mt. Elliott on Surveyor Range, and 3 peaks including Spion Kop on Norway Range were fixed by resection and intersection with the aid of magnetic compass. A number of less important points, among which were Abel Peak, Punt Hill, Goodwin Peak, 4 peaks of Craycroft Range, Elliott Range, Mt. Emma etc. were also fixed. All of these were primarily controlled by the trigonometrical stations of Frenchman Cap, Wyld Craig and King William 1st. Numerous subsidiary points fixed in 1936 on the adjoining Jane River - Prince of Wales area were used as a minor control.

GEOLOGY:

The geology of this area differs in no marked degree from that of the area to the east. The consolidated sedimentary rocks are all referred to as the Pre-Cambrian era, and no igneous rocks are present.

(1) Pre-Cambrian:

These rocks consist of quartzites, quartz schists, quartz sericite schists, argillaceous schists, phyllites, dolomites and magnesium limestones.

As a rule the quartzites consists of extremely fine grained, white coloured types showing little schistosity, and occurring as thick, massive beds at heights of 1800 feet, and over, on the principle mountain tops, viz., Deception Range and Surveyor Range. Small thicknesses of quartz sericite and argillaceous schists are in some localities interbedded with white quartzites. Underlying and conformable with the quartzites is a thick series of beds alternating between quartz schists, quartz-sericite schists, argillaceous schists, and dark grey phyllites.

These are exposed along the mountain and steep hill sides down to river level, where the valley is narrow. Below these rocks again, at all points on the wide valley floors, and where plains occur, dolomites or magnesium limestones are almost invariably present. The dolomites are generally fine grained, massive, light grey types of considerable thickness, but seldom showing distinct bedding planes. Generally the dolomites appear to be the lowest beds of the Pre-Cambrian rocks in this district, but thin beds do occur at slightly higher horizons, especially in association with phyllites.

Along the banks of Jane River at the south-eastern base of Surveyor Range, and again below the mouth of Acheron Rivulet, variations of the normal types occur. These consist of fine grained, dark blue-grey dolomites similar in hand specimens to limestones. At the former place they appear to underlie normal light grey dolomites, but below Acheron Rivulet the sequence is reversed. The blue-grey dolomites vary from thick massive beds containing reticulating calcite veins to thinly bedded, semi-schistose varieties, with interbedded phyllites, which, in places, are underlain by quartz sericite schists. In this region, also, small areas of siliceous magnesium limestones are associated with the dolomites. On Lightning Plains, dark, blue-grey and creamy coloured crystalline dolomites are interbedded with the normal dolomites.

The following table of analyses illustrates the composition of the several types of dolomite and magnesium limestones:-

Constituents	1	2	3	4	5	6
	Reg.No. 416	Reg.No. 417	Reg. No. 418	Reg. No. 419	Reg. No. 420	Reg. No. 421
T						
Moisture at 105°C	0.08	0.08	0.03	0.14	0.44	0.12
Acid Insoluble	--	1.16	0.36	--	2.60	0.60
SiO ₂	18.00	--	--	17.00	--	--
Al ₂ O ₃	0.96	Trace	Trace	2.27	Trace	Trace
Fe ₂ O ₃	1.35	0.86	0.40	1.14	1.14	0.78
MnO	0.02	0.03	Trace	0.03	0.02	0.02
TiO ₂	Nil	Nil	Nil	Trace	Nil	Nil
P ₂ O ₅	0.03	0.01	Trace	0.04	0.06	0.06
CaO	25.26	30.26	31.56	24.34	29.90	31.22
MgO	17.22	21.48	21.58	17.40	20.74	21.68
S	0.01	Trace	Trace	Trace	0.01	0.01
Loss on Ignition	37.68	46.96	47.05	38.00	45.74	46.34

- (1) Siliceous Magnesium Limestone; Jane River at south-eastern base of Surveyor Range.
- (2) Creamy coloured, crystalline dolomite; Lightning Plains
- (3) Dolomite of dark, blue-grey colour (crystalline); Lightning Plains.

- (4) Siliceous magnesium limestone (schistose); Jane River, at south-eastern base of Surveyor Range.
- (5) Dark, blue-grey dolomite; Jane River, below mouth of Acheron Rivulet.
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The strike and dip of the Pre-Cambrian rocks in this area, where observed, have been delineated on the geological map. Although the strike varies widely from place to place, and indicates faulting and contortion of the beds, the general trend appears to be between 66° west of north and 67° east of north. The rocks extending over the area have a general tendency to dip to the east and to the west, from an arbitrary north-west south-east trending line, situated slightly to the west of Mt. Elliott. They dip at comparatively low angles chiefly ranging between 15° and 45° , but dips as low as 5° and as great as 55° have been recorded. This data suggests that a wide, open limbed, anticlinal fold has been developed with its axis about the indicated line, and that modifications occur in the form of faulting and minor folding along the limbs.

(2) Pleistocene to Recent:

Gravels, clays and sands have been deposited along the flood plains of Jane River and the lower parts of its larger tributaries where the valleys are wide and flat floored; as at Lightning Plains, Thirkell Creek and Piner's Hut Plains, between Norway Range and Surveyor Range, and in vicinity of mouth of Acheron Rivulet. River cuttings in several places expose the gravels etc., showing a thickness of 10 feet and upwards. Gravels also cover the greater part of White Hills Plains which is situated at a higher level and over a mile distant from Jane River. Shallow recent gravels and alluvium are forming along the courses of many of the smaller streams.

ECONOMIC GEOLOGY:

(1) Quartz Veins:

Small irregular veins and bunches of quartz traversing quartz sericite schists, argillaceous schists and phyllites are prevalent, but metallic minerals do not appear to be associated with the quartz in this area.

(2) Iron Deposits:

Large deposits of limonite, with traces of manganese oxides, occur about the banks of Jane River in the vicinity of Moore's old track, between Piner's Hut and Lightning Plains. They are visible on either side of the valley in the form of crags and low cliffs where the limonite has apparently partly replaced quartzite and quartz breccia rocks.

The limonite is represented by concretionary and honeycombed masses intermixed with chalcedony. The origin of the deposit is doubtful, but a secondary replacement of iron from pyrite is suggested since cubical cavities, probably resulting from removal of pyrite, appear in the surrounding rocks. A sample of limonite taken at random from the locality, and assayed by the Government Chemist and Assayer, showed traces of gold and silver.

Numerous samples of detrital iron taken from below the outcrops and washed in prospecting pans, produced no gold or other minerals of value. On prospecting shallow alluvial gravels in the river, at a point where limonite beds crossed the stream, a few/specks of gold to the dish of wash were obtained. fine

(3) Alluvial:

In conjunction with the geological examination of the district, prospecting of creek and river alluvials was undertaken by two members of the party. With few exceptions the streams shown on the accompanying plan were tested, but circumstances did not permit the prospecting of Franklin River watershed.

The only mineral of economic importance observed in the area was gold, and this in extremely minute quantities. In no instance was the metal found in any-thing like payable amounts. A few fine colours of gold were washed in the following localities on the map:

- (a) Small creek entering Jane River from the south, near eastern edge of Lightning Plains.
- (b) Upper part of Jane River, near crossing of Moore's old track.
- (c) Several small creeks on south side of Jane River, below the above crossing.
- (d) An upper branch of small stream junctioning with Jane River on plains, north of Spion Kop.
- (e) Small creeks on north side of Jane River, and along the river banks to west of Norway Range.
- (f) Streams joining Jane River on south-east side of Surveyor Range.
- (g) Head waters of creek on west side of White Hills Plain.

The origin of the gold is doubtful as, with the possible exception of the limonite deposits already referred to, no authentic primary deposits have been proved to exist.

CONCLUSIONS:

The examination of Surveyor and Deception Ranges district has shown that the consolidated rocks consist of Pre-Cambrian sedimentary types in which little or no mineralisation occurs.

In the absence of intrusions of Devonian igneous rocks in this area, there is little likelihood of the discovery of mineral deposits of economic value. Alluvial gold is present but rare, and only occurs as small quantities in a fine state of division.

Large areas of dolomites outcrop at various places within the district but, owing to lack of transport facilities, these cannot be considered from a commercial view point at the present time.