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RECORDS.

1959/129

EXPLANATORY NOTES TO THE EINASLEIGH 4/Mile SHEET

Compiled by

D.A. White

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INTRODUCTION

The Einasleigh 4-mile Sheet covers the eastern part of the Etheridge Goldfield, the Oaks Goldfield, and the western part of the Kangaroo Hills Mineral Field in the Cairns Hinterland of North Queensland.

Many detailed investigations of the mineral fields have been published during the late 19th century and the early 20th century, whereas very few investigations have dealt with the regional geology. The first systematic mapping of the Einasleigh Sheet and the adjacent 4-mile Sheets of Georgetown, Gilberton, Clarke River and Atherton was begun in 1956 by a combined party of the Bureau of Mineral Resources and the Geological Survey of Queensland. The map which these notes accompany is based on the results of this combined survey; mapping was completed in 1958.

Maps and photographs covering the Einasleigh 4-mile Sheet are: aerial photographs, flown by the R.A.A.F. at a scale of 1:50,000; photo-mosaic map (4 miles to 1 inch) prepared by and available from the Division of National Mapping, Canberra; photo-maps at 1 mile to 1 inch; dyeline maps controlled by slotted template assembly (at air-photo scale, about 1 mile to 1¼ inch) with principal points and topography; and 4 mile to 1 inch planimetric maps prepared in 1944 and 1957 by the Department of the Army and available from the Division of National Mapping, Canberra.

The following information was taken from the Atlas of Australian Resources prepared by the Division of Regional Development, Department of National Development, Canberra. Most of the Einasleigh

Sheet is covered with tropical woodland dominated by low trees or tall shrubs of *Eucalyptus*. The seasonal growth is restricted to the hot summer; the dry season extends from April to December. Annual average rainfall ranges from 25 inches in the south-west to 30 inches in the north-east: most of the rain falls in January, when the average rainfall is 7 inches. The area experiences less than 5 days per year of frosts. Normal mean winter (June, July, August) temperature is 65°F. normal mean summer (December, January, February) temperatures are 75°F.-85°F. The normal annual range of temperatures is 50-60°F.; average number of days per year when the temperatures exceed 100°F is 10-20.

PREVIOUS INVESTIGATIONS

Previous investigation can be divided into five main periods.

(i) Reconnaissance 1870-1898. Jack (1887) made the first reconnaissance of the Einasleigh Sheet when he traversed from Lynd Station along the Copperfield River to Einasleigh, then west across the Newcastle Range to Georgetown.

Maitland (1891) was the first to describe the geology of the Upper Burdekin River in the Valley of Lagoons and Wairuna Station area. The boundary between the Precambrian and Palaeozoic successions shown by Maitland along the Burdekin River is essentially that accepted to-day. Other important reconnaissances during the late 19th century included that by Jack (1898), when he traversed the proposed railway route from Chillagoe to Einasleigh and to Georgetown.

(ii) Detailed investigations of mineral deposits 1909-1914. The discovery of gold in the early 20th century in the Etheridge and Oaks Goldfields was quickly followed by detailed mapping of the deposits by the Geological Survey of Queensland. Marks (1911) provided a detailed account of the mineralization and geology of the Oaks Goldfield and eastern portion of the Etheridge Goldfield; he was the first to recognise two ages of Cainozoic basalt extrusion.

A few years later Ball (1914, 1915) described the mineralization in the Etheridge Goldfield and Einasleigh Copper Mine.

(iii) Reconnaissance and detailed investigations 1920-1925. From 1920 to 1923 the Geological Survey of Queensland carried out regional geological mapping of the mineral fields of North Queensland, which included the Etheridge and Oaks Goldfields on the western part of the Einasleigh Sheet. Jensen (1920a, 1920b, 1923) described the regional geology of the Einasleigh area and he was the first geologist to subdivide and correlate the Precambrian metamorphics and granites of North Queensland. Jensen considered the metamorphics of the Einasleigh area to be the older of two Precambrian metamorphic units. Bryan (1925) accepted Jensen's subdivision of the Precambrian of the Einasleigh region.

(iv) Reviews of previous investigations 1925-1946. The reviews dealt with the subdivision and correlation of the Precambrian succession. Browne (1933) agreed with Jensen and Bryan that Precambrian metamorphics of two ages in the Einasleigh area; but Hills (1946) from a consideration of trend lines concluded that they are all of one age. Bryan and Jones (1946) summarized the geological history of the Einasleigh area.

(v) Detailed investigations of mineral deposits 1941-1952. These investigations were mainly concerned with the Ninety Mile (Halls Reward) Copper Mine (Morton 1941, 1943; Denmead, 1947) and the Perry Creek wolfram and scheelite diggings (Morton, 1944; Levingston, 1952).

(vi) Systematic geological and geophysical investigations 1955-1958. In 1953 and 1954 the Land Research and Regional Survey Section, Commonwealth Scientific and Industrial Research Organization, carried out a land-use survey of the Leichhardt-Gilbert area, which included the Einasleigh Sheet. Some of the geological and physiographical results of this survey are recorded by Twidale (1956a, 1956b).

In 1955 the Bureau of Mineral Resources carried out the first airborne scintillograph survey of the Einasleigh area, the adjacent Atherton, Gilberton and Clarke River Sheets. The results are recorded by Parkinson and Mulder (1956). Following this survey a combined geological party of the Bureau of Mineral Resources and the Geological Survey of Queensland in 1956 commenced systematic regional mapping of the Georgetown, Einasleigh, Gilberton, Clarke River and Atherton Sheets. The mapping of the first four sheets was continued in 1957 and was completed in 1958. The results of this geological mapping are recorded by White and Hughes (1957), White, Branch, Green (1958), Green (1958), White, Stewart et.al.(1959), White, Best et.al. (1959), Best (1959), Branch (1959), White & Crespin (1959). Dr. Dorothy Hill, University of Queensland, assisted in the regional geological mapping of the Siluro-Devonian succession on the Einasleigh Sheet and determined corals. Her preliminary determinations are recorded by White and Hughes (1957), White, Stewart, et.al. (1959), White, Best et.al. (1959). Miss Irene Crespin also assisted the mapping with determinations of Cainozoic diatoms (White and Crespin, 1959).

PHYSIOGRAPHY

The Einasleigh Sheet forms the north-eastern part of Twidale's (1956) "Einasleigh Uplands", which range in height from 1500 feet in the west to about 3,000 feet in the north-east. The Einasleigh Uplands on the Einasleigh Sheet are drained by the Einasleigh and Copperfield Rivers, which are part of the Gilbert River System flowing north-west into the Gulf of Carpentaria, and the Herbert and Burdekin Rivers, which flow east and south-east respectively into the South Pacific Ocean. Twidale (1956b) subdivided the Einasleigh Uplands into the physiographical units McBride Plateau, Newcastle Range, Einasleigh-Copperfield Plain, Burdekin Uplands and Uplands and Ranges of the Divide. These units with some modifications are shown in Figure 1: The physiographical units are also geological units.

The McBride Plateau occupies about 2,000 square miles in the central and northern parts of the Einasleigh Sheet. The plateau forms a broad arch, which attains a maximum height of about 2,000 feet

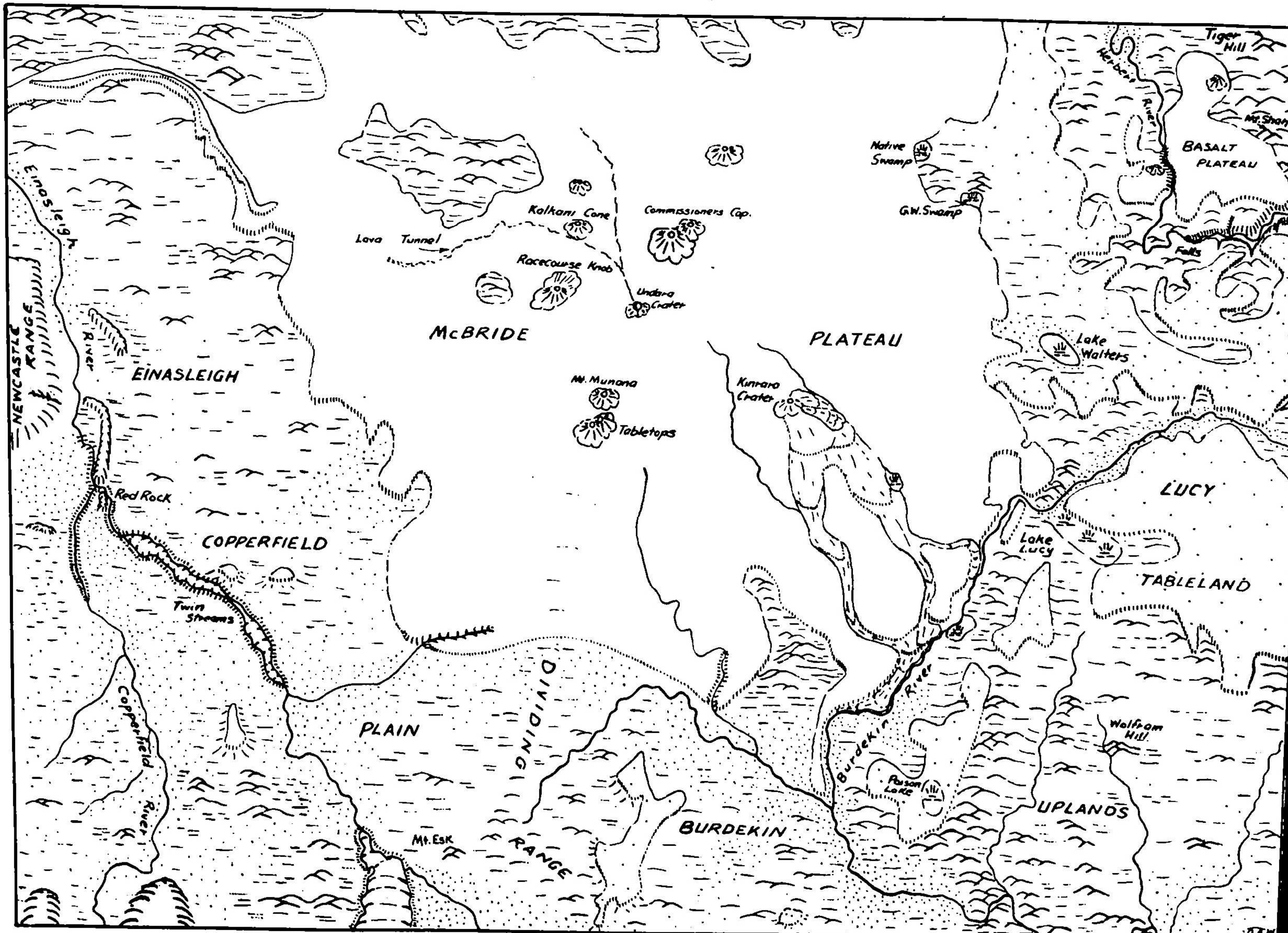


FIGURE 1 : PHYSIOGRAPHICAL UNITS EINASLEIGH 4-MILE SHEET

SCALE 12 MILES TO 1 INCH

above sea level in its central region, and it merges to the south with the north-trending Great Dividing Range. The McBride Plateau consists of Cainozoic basalt which was extruded from about 110 craters, of which the majority are grouped in the centre of the plateau. Recent, probably within the last 1,000 years, flows extruded from Kinrara Crater in the central eastern part of the plateau form low rugged terrain with little or no soil or vegetation cover. Lakes (e.g. Native Wells Swamp, G.W. Swamp and Lake Walters) have been formed along the eastern margin of the McBride Plateau by the damming of river systems by Cainozoic flows.

The eastern part of the Newcastle Range occupies the central western margin of the Einasleigh Sheet. The range consists of resistant Upper Palaeozoic acid volcanics; in places it is about 2,300 feet above sea level and rises about 750 feet above the Einasleigh-Copperfield Plain.

The Einasleigh-Copperfield Plain consists of Precambrian granites and metamorphics, with isolated hills of more resistant metamorphics and basalt-capped mesas.

The Burdekin Uplands, which form the undulating country east of the Dividing Range, merge with the western slopes of the Coastal Range, which are exposed farther to the east. The Uplands range in height from 1400 feet to about 2,800 feet. The highest peaks are Tiger Hill (2,834 feet) and Mt. Sharples (2,650 feet), in the north-east. A feature of the Burdekin Uplands is the Herbert River Gorge in the north. The gorge, cut in granitic rocks, begins about six miles south-west of Gleneagle Homestead at the Herbert River Falls, which are about 350 feet high, and extends from the falls for some 35 miles east-south-east to the vicinity of Sugar Loaf Hill, where, according to the Ingham 4-mile military map, it is 2,000 feet deep. Twidale (1956b) has recognised lateritized surfaces, valley-side facets and knick points, representing three cycles of erosion. The Burdekin Uplands contain small isolated tablelands, of which the Lucy Tableland of about 200 square miles is the most extensive.

The Einasleigh-Copperfield Plain and the McBride Plateau merge into the Uplands of the Divide. Mt. Esk, 3 miles north-east of Lynd Homestead, is the most conspicuous peak of the Divide; it consists of Precambrian granite and metamorphics.

STRATIGRAPHY and PALAEONTOLOGY

Table I summarizes the stratigraphy and palaeontology. Rock units have been named according to the Australian Code of Stratigraphical Nomenclature. All type localities for the rock units, which range in age from Archaean to Recent, lie within the Einasleigh Sheet.

The ages of the granites are not precisely known: until age determinations by radioactive measurements are obtained, they are tentatively regarded to be Upper Palaeozoic and late Precambrian.

The division of the Precambrian sequence into two units is based on strongly contrasting grades of metamorphism. The younger unit, consisting of contact metamorphics, is tentatively placed in the Proterozoic; the older unit, which has been subject to high-grade regional metamorphism, is tentatively placed in the Archaean.

STRUCTURE

Folding

Precambrian. The fold axes have an arcuate trend from east in the Einasleigh area to north-east in the Burdekin River area. Little is known of the folding, except that it is tight and probably isoclinal. The foliation dips from 70^{o} to vertical.

Palaeozoic. The Palaeozoic sediments are tightly folded. The trends of the fold axes generally conform to the north-east trend of the Precambrian margin along the Burdekin River. An exception is the east and east-north-east trends of the Upper Silurian/Lower Devonian sediments in the Camel Creek region.

Faulting

A major fault zone trending north-east along the valley of the Burdekin River separates the Precambrian metamorphics in the west from the Palaeozoic sediments in the east. The movement in the fault zone was mainly vertical with little or no horizontal

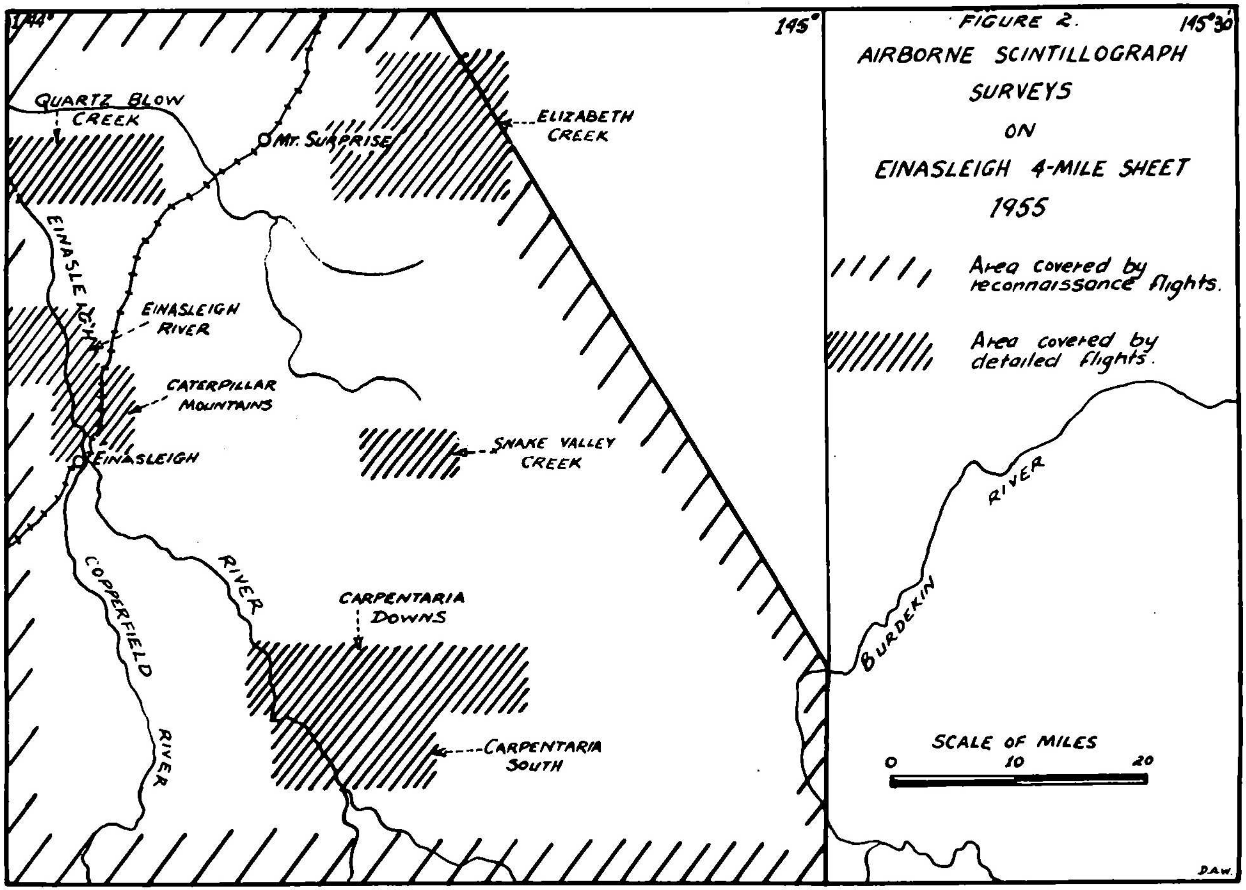
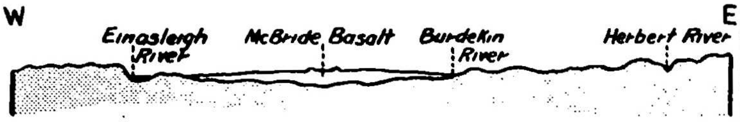


FIGURE 2.
AIRBORNE SCINTILLOGRAPH SURVEYS ON EINASLEIGH 4-MILE SHEET 1955

FIGURE 3   TECTONIC HISTORY EINASLEIGH 4-MILE SHEET

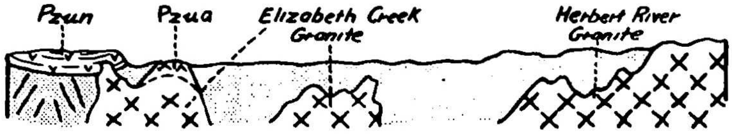
8 CAINOZOIC

Extrusion of basalt from ?Pliocene to Recent over Precambrian shield and part of Palaeozoic with modifications to Einasleigh and Burdekin River Systems.



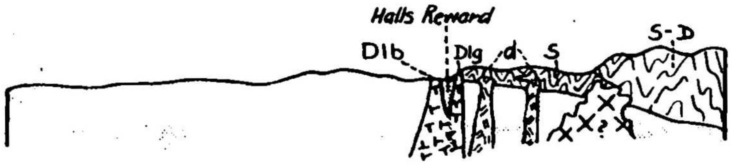
7 UPPER PALAEOZOIC

Extensive igneous activity. Intrusion of subsequent granite with formation of porphyry hoods, ring dyke complexes. Acid vulcanism (Newcastle Range Volcanics - Pzun).



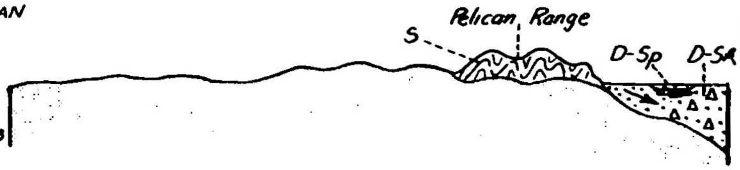
6 LATE LOWER DEVONIAN

Major orogeny. Uplift and folding of Siluro-Devonian sediments. Intrusion of serpentinites and basics of Gray Creek (Dlg) and Boiler Gully (Dlb) Complexes along old Precambrian Palaeozoic fracture boundary. ? Granite intrusion.



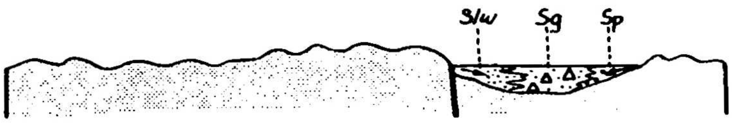
5 UPPER SILURIAN-LOWER DEVONIAN

Major orogeny. Uplift and folding of Silurian sediments. Formation of trough along their eastern margin. Rapid deposition of thick flysch facies of Kangaroo Hills (S-Dk) and Perry Creek Formations (S-Dp) into trough.



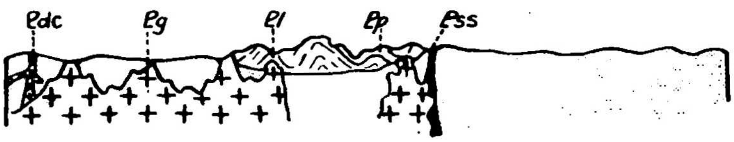
4 SILURIAN

Formation of depression (probably by faulting) in Greenvale area. Deposition of clayey quartz sands (Sp) and silts (Slw) with thick quartz greywacke and greywacke (Greenvale Formation - Sg) in unstable shelf environment.



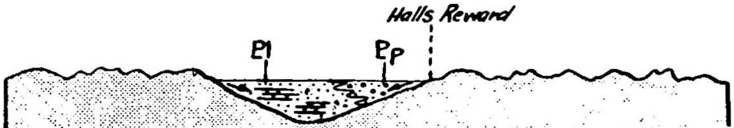
3 LATE PRECAMBRIAN

Major orogeny. Uplift and folding of Proterozoic sediments. Intrusion of Cobbold Dolerite (Pdc) and Sandalwood Serpentinite (Pss). Intrusion of granite (Pg) with extensive contact metamorphism.



2 PROTEROZOIC

Uplift of Archaean basement. Formation of depression on Archaean land mass in Halls Reward Mine area. Deposition of impure calcareous sediments (Lucky Creek Formation - Pl) and quartz sands and silts (Paddys Creek Formation - Pp).



1 ARCHAEAN

Formation of basement (A). Migmatization and other regional metamorphism.

movement. Other faults such as those separating the Pelican Range and Greenvale Formations are generally parallel to the Burdekin River fault zone.

Joints

A system of north, north-east and north-west joints is well exposed in the Upper Palaeozoic igneous rocks.

GEOPHYSICAL SURVEYS

Airborne scintillograph surveys of the western part of the Einasleigh Sheet were carried out in 1955 by the Bureau of Mineral Resources. The area covered is shown in Figure 2. The results of the survey are reported by Parkinson and Mulder (1956). The anomalies were examined on the ground and reported by Taylor (1956) and White and Hughes (1957).

TECTONIC HISTORY

Figure 3 summarizes the tectonic history of the Einasleigh Sheet.

ECONOMIC GEOLOGY

Gold

About 75,000 oz of gold have been won from the Oaks Goldfield, one mile west of Kidston. Gold was discovered here in 1907 and mined till 1942. The most comprehensive description of the Oakes Goldfield is that by Marks (1911). The gold is found in quartz veins and altered and crushed zones of the Forsayth Granite.

Less important occurrences of gold are in Balcooma Creek apparently associated with quartz porphyry.

Copper

The Einasleigh Copper Mine was worked between 1898 and 1924 for a total production of 134,257 tons of ore averaging 6 per cent copper, 8 grains of gold and 1 oz of silver per ton. The mine is situated in Archaean Einasleigh Metamorphics at the junction of the Copperfield and Einasleigh Rivers, near Einasleigh. Geology of the mine was first described by Ball (1914) and more recently by the

Geological Survey of Queensland (1953).

The Hall's Reward (Ninety Mile) Copper Mine, situated near Sandalwood Homestead on the Burdekin River, yielded 2,200 tons of copper between 1933 and 1957. Geology of the mine was first described by Morton (1941, 1953) and later by Denmead (1947). Recently a detailed description of the mine was given by White et al. (1958).

Small copper deposits are exposed in Precambrian metamorphics 4 miles south of Reedy Brook Homestead and in the Herbert River Granite, 6 miles north of Princess Hills Homestead (Cameron, 1914).

Tungsten and Tin

Minor amounts of wolfram and scheelite are exposed in quartz lodes in an inlier of the Herbert River Granite at Perry Creek, about 12 miles north-west of Camel Creek Homestead. This occurrence and another 6 miles farther south at Wolfram Hill have been described by Morton (1944) and Levingston (1952). Alluvial tin is mined nearby in Perry Creek. Denmead (1947) described tin in horizontal sediments partly capped with billy, in an old stream valley 5 miles west of Camel Creek Homstead.

Wolfram and tin deposits are exposed in the Elizabeth Creek Granite at Elizabeth Creek 13 to 20 miles east of Mt. Surprise (Morton, 1944). Alluvial tin has been won from Elizabeth Creek in the Angor Field, 22 miles north-west of Mt. Surprise.

Diatomite

In 1958 the combined Bureau of Mineral Resources and Geological Survey of Queensland party discovered diatomite overlain by Cainozoic basalt in Wyandotte Creek, near Conjuboy; near Cashmere; near Gleneagle; and near the north-western margin of Lake Walters in the Herbert River area. The Conjuboy diatomite is the largest deposit containing at least 1,000,000 tons of diatomite. The diatomite deposits have been described by White & Crespin (1959) and Best (1959).

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TABLE 1. - STRATIGRAPHY OF EINASLEIGH 4-MILE SHEET

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
QUATERNARY		Residual soils (Qs)	Superficial	Variable sandy soil	Well developed over Precambrian granites particularly between Einasleigh and the Hann Highway	Slightly undulating				Good water at shallow depths, particularly granitic soils	White & Hughes (1957)
		Alluvium (Qa)	0-75+ feet	Variable. Light-textured high sand content in granitic terrains; dark high clay content in basaltic areas	Along the major rivers particularly Burdekin River System along the Dry River to Greenvale Homestead	Steep river banks and flat flood plains				Good water at shallow depths	White & Hughes (1957) White et al. (1959)
	RECENT	Kinrara Basalt (Qrk)	Unknown probably does not exceed 50 feet	Fine grained, generally vesicular, olivine basalt	Covers an area of about 70 square miles on portions of Kinrara, Valley of Lagoons and Reedy Brook Stations. The southern portion of the flow is confined to the valley of the Burdekin River and its tributaries, Glenlofty Creek and Expedition Creek	Extremely rough plain, consisting of jagged blocks of basalt with little to no soil	Sink holes, lava tunnels, pahoehoe and blocky surfaces. Flows are 40 miles long and have dammed Burdekin River and tributaries to form lakes e.g. Pelican Lakes near Valley of Lagoons Homestead. Flows originated from Kinrara Crater.	Sturgeon and Nulla Basalts on the Hughenden 4-mile sheet. Recent, probably historical.	Unconformably overlies the McBride Basalt and Archaean Metamorphics	Excellent supply of water. Supplies most of the water to the Upper Burdekin River System.	Twidale (1956a). Best (1959). White, Best et al. (1959)
-?-?-? CAINOZOIC		McBride Basalt (Czm)	Unknown. Probably does not exceed 1,000 feet and averages 450 feet	Grey fine-grained olivine basalt, commonly vesicular and/or amygdaloidal. Iddingsite pseudomorphs after olivine phenocrysts are common	About 2,000 square miles roughly bounded by Conjuboy Homestead in the south, St. Ronans Homestead in the north, Mt. Surprise in the west and Lake Walters in the east	Plateau. Numerous basalt rises separated by valleys and plains of soil covered basalt boulders.	Dome. Contains about 110 volcanic craters, most of which are concentrated in the central part. Lava tunnels e.g. Undara tunnel extends over 25 miles	Chudleigh Basalt and Nulla Basalt on Clarke River 4-mile Sheet. ?Pliocene to ?Pleistocene.	Unconformably overlain by Kinrara Basalt. Unconformably overlies diatomite deposits near Conjuboy and Lake Walters	Good supply of water. Supplies most of water to Elizabeth Creek and Junction Creek. Diatomite in Wyandotte Creek, near Conjuboy and at Lake Walters	Twidale (1956a). White & Hughes (1957). Best (1959). White & Crespin (1959).
		Chudleigh Basalt (Czc)	Unknown. Probably does not exceed 500 feet.	Olivine basalt.	Covers about 500 square miles. Flows extend from Chudleigh Park, on the Clarke River 4-mile Sheet, north along the valleys of the Copperfield and Einasleigh Rivers	Small plains consisting of rough basalt boulders and thick black and grey basaltic soil	Valley-fill. Craters not exposed on Einasleigh Sheet.	?Pliocene to? Pleistocene	Unconformably overlies Precambrian granites and metamorphics	Good supply of water	Twidale (1956a). White & Hughes (1957)
		Undifferentiated (Cz)	200 feet max.	Unlithified sandstone, shale conglomerate	About 2 square miles near junction of Glendhu Creek and Burdekin River		Ancestral river-or lake-fill	Miner's Lake sediments on Clarke River 4-mile sheet	Unconformably overlies Precambrian and Silurian successions	Good supply of water	

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Paleontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
CAINOZOIC		Basalt(Czb)	Unknown. Probably does not exceed 300 feet	Olivine basalt	Isolated areas (max. 25 square miles) in the Herbert River and Camel Creek areas	Plains, plateaus and mesas.	Valley-fill. Craters not exposed (except for Walleroo Hill) on Einasleigh Sheet	Flows between Cameron Creek and Herbert River may be part of the flows originating from Atherton Tablelands farther north ?Pliocene to ?Pleistocene.	Overlies "billy" deposits and unconformably overlies Precambrian and Palaeozoic successions.	Good supply of water. Diatomite near Cashmere, Gleneagle and Princess Hills Homesteads	Twidale (1956a). White & Crespin (1959). Best (1959).
		Billy(Czy)	Unknown, probably does not exceed 15 feet	Quartzite (silicified quartz sands)	Isolated areas in the Camel Creek region	Low rises	Valley-fill	Tertiary to ?Recent	Unconformably overlain by Cainozoic basalts	Good water at shallow depths	Denmead (1947). White & Best et al. (1959).
		Laterite and lateritic soils (Czl)	Probably does not exceed 15 feet	Mottled and pallid zones, with thin ferriginous zone	Lucy Tableland and divide between Herbert River and Burdekin River	Mesas and plateaus	Flat lying	No fossils. Probably Late Tertiary.	Developed on Palaeozoic sediments and in places over Tertiary basalt. Mainly overlain by Tertiary basalt.	Some fresh water springs near Wairuna Station	White & Hughes (1957). White, Stewart et al. (1959). White, Best et al. (1959).
CRETACEOUS		Undifferentiated (K)	50 feet to 75 feet	Sandstone, conglomerate and shale	Isolated areas on Newcastle Range and Butlers Igneous Complex	Mesas	Flat lying	No fossils. Blythesdale Sandstone	Unconformably overlies the Newcastle Range Volcanics and Butlers Igneous Complex		
UPPER PALAEOZOIC	? PERMIAN	Butlers Igneous Complex (Pb)	— —	Medium grained pink granite, rhyolite porphyry and trachyte	Covers 14 square miles about 10 miles south-west of Kidston	Rough hills about 700 feet above the surrounding country	Oval-shaped mass. Essentially an inclined granite sheet intruded into its rhyolite porphyry hood. Centre of mass intruded by a trachyte plug. Ring dykes.	Granite similar to the Lochaber Granite. Genetically related to Bagstowe Ring Dyke Complex on Clarke River 4-mile Sheet	Intrudes the Dumbano and Forsayth Granites	Local water supply in joints and faults	Branch (1959).
		Lochaber Granite (Pgl)		Grey-pink, porphyritic (in feldspar) massive granite with minor amounts of mafic minerals. Rhyolite	Crops out over 300 square miles, central 12 miles south of Kidston	Rough hills about 500 feet above surrounding country	Oval-shaped mass. Granite grades marginwards to a flow banded rhyolite hood. Excellent tors. Well jointed	Granite probably same age as Elizabeth Creek Granite. Genetically related to Bagstowe Ring Dyke Complex on Clarke River 4-mile Sheet. Upper Palaeozoic	Intrudes the Precambrian Forsayth and Dumbano Granites	Local water supply in joints and faults. Wolfram in its extension into the Clarke River 4-mile Sheet	Branch (1959)
		Undifferentiated (Pzu)		Rhyolite porphyry, quartz porphyry and agglomerate	Over 60 square miles in the Balcooma Creek area. Isolated dykes around the Newcastle Range Volcanics and in the Herbert River area	High resistant ridges	Steep to vertical dip. Well jointed.	Newcastle Range Volcanics. Upper Palaeozoic	Intrudes Proterozoic granites and Herbert River Granite	Local water supply in joints	White, Stewart et al. (1959). Branch (1959).

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
PALAEOZOIC	? PERMIAN	Elizabeth Creek Granite (Pgz)		Massive, medium to fine-grained, slightly porphyritic pink to red granite with little mafic mineral	Covers 240 square miles on the northern edge of Einasleigh Sheet. Probably occupies a greater area on Atherton Sheet	Rough hills	Linear belt. Excellent tors. Well jointed	Grades upwards into the Cumbana Rhyolite Porphyry. Tiger Hill Microgranite. Upper Palaeozoic	Probably intrudes the Precambrian granites. Unconformably overlain by the McBride Basalt. Intrudes the Newcastle Range Volcanics in adjacent Georgetown 4-mile sheet. Upper Palaeozoic	Local water supply in joints and folds. Wolfram and tin	White, Best et al. (1959).
		Tiger Hill Microgranite (Pgt)		Massive, pink, even medium-grained granite with some biotite. Some microgranite and rhyolite porphyry	Covers 80 square miles in the Tiger Hill/Mt. Sharples area. Probably covers the coastal ranges on the Atherton, Cairns and Innisfail 4-mile sheets	Rough hills and ranges. Attains a height of about 2,800 feet above sea level at Tiger Hill	Linear belt. Well jointed	Cumbana Rhyolite Porphyry and Elizabeth Creek Granite. Upper Palaeozoic	Intrudes the Herbert River Granite	Local water supply in joints and faults	White, Best et al. (1959).
		Newcastle Range Volcanics (Pn)	2,500 to 3,000 feet	Rhyolite, some tuff and breccia, with basal lenses of arkosic conglomerate, arkose, shale and algal limestone	Crops out over 1000 square miles in the Newcastle Range (50 square miles on the Einasleigh 4-mile Sheet).	Rough range	Basin; dips 40°. Well jointed	Cumberland Range Volcanics and Agate Creek Volcanics (Georgetown Sheet). Upper Palaeozoic	Unconformably overlies Precambrian Forsayth Granite and Einasleigh Metamorphics. Intruded by Elizabeth Creek Granite and other granites (Georgetown 4-mile Sheet)	Local water supply in joints and faults	White & Hughes (1957). White, Stewart et al. (1959). Branch (1959).
UPPER	? CARBONIFEROUS	Herbert River Granite (Cgh)		Massive, medium grained, grey biotite granite. In places feldspar is pink and prophyritic. Contains some syenite	Crops out over 180 square miles in the Herbert River area. Small inliers farther south at Perry Creek, Rocky Dam and Frasers Creek	Large weathered tors in Upper parts of Herbert River area. Jointed pavements in Herbert River Gorge	Well jointed	Upper Palaeozoic	Intruded by the Tiger Hill Microgranite and related porphyry dykes. Intrudes the Silurian Wairuna, Greenvale and Pelican Range Formations. Unconformably overlain by Cainozoic basalts	Good water in weathered and jointed sections. Copper and lead in Herbert River Gorge near Princess Hills Homestead	White, Best et al. (1959).
		Sunday Creek Rhyolite (Cs)	400 feet	Altered rhyolite, some andesite	4 square miles near Tiger Hill	High resistant ridges	Tilted (45°) fault blocks	Rhyolite at Mt. Redcap (Atherton Sheet)	Intruded by Herbert River Granite		
DEVONIAN	?Lower Devonian	Boiler Gully Complex (Dlb)		Serpentinized peridotite consisting of bastite and mesh-texture serpentine pseudomorphs after orthopyroxene and olivine respectively. Gabbro, microdiorite and diallagite	A triangular-shaped mass $2\frac{1}{2}$ miles by $1\frac{1}{2}$ miles, south-west of Halls Reward Copper Mine	Rough low rises and hills. Central area contains thick lateritic soil cover	Probably domal	Gray Creek Complex. Devonian, probably Lower Devonian	Intrudes Proterozoic Paddy's Creek Formation	Nickel, chromium and copper	Green (1958). White et al. (1958)

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
DEVONIAN	?Lower Devonian	Gray Creek Complex (Dlg)		Serpentinite, pyroxenite, gabbro, amphibolite, granodiorite, and diorite	An elongate body 15 miles long and 3 miles wide exposed in valley of Gray Creek. Northern extremity only exposed on Einasleigh Sheet. Outcrop exaggerated on Einasleigh Sheet.	Rough strike ridges	Linear	Boiler Gully Complex. Lower Devonian	Intrudes Silurian and Upper Silurian - Lower Devonian sediments. Unconformably overlain by Lower to Middle Devonian sediments on Clarke River Sheet. Faulted against Carboniferous sediments	Nickel, chromium, copper and gold	Green (1958). White, Stewart et al. (1959).
		Undifferentiated basics (Dld)		Dolerite and basalt with some gabbro and diorite	Isolated elongate masses exposed between Valley of Lagoons and Camel Creek Homesteads	Weathered and decomposed pebbles. Usually accompanied by resistant jasper and chert ridges	Linear. Well jointed	Basics of Boiler Gully and Gray Creek Complexes. ? Lower Devonian	Intrudes Silurian and Lower Devonian successions		White, Best et al. (1959).
	Lower Devonian to Upper Silurian	Perry Creek Formation (S-Dp)	3,500 feet	Well bedded quartz sandstone and quartz siltstone, with lenses of limestone and limestone conglomerate. Sandstone generally cross-bedded	Exposed over 10 square miles near Perry Creek and over 200 square miles in the Christmas Creek area (Clarke River Sheet), of which northern extremity exposed on Einasleigh Sheet	Low strike ridges. Best exposed in creek sections.	Probably complicated basin: Steep to vertical dips. Faulted	?Chillagoe Formation(Atherton Sheet). Jack Limestone(Clarke River Sheet). Corals *Favosites*, *Alveolites*, *Halysites*, *Tryplasma*, *Cystiphyllum*, *Plasmopora*, *Heliolites*, *Cladopora*, *?Propora*, *Striatopora*. Upper Silurian to Lower Devonian	Conformably overlies the Kangaroo Hills Formation with ?some gradation. Some limestone reefs contain basalt flows	Good water from limestone members	White, Stewart et al. (1959). White, Best et al. (1959).
?-?-? SILURIAN	Lower Devonian to Upper Silurian	Kangaroo Hills Formation (S-Dk)	35,000 to 40,000 feet	Thinly bedded rhythmically alternating fine-grained impure quartz sandstone, siltstone, shale with thicker beds of graded-bedded coarse-grained greywacke and lenses of pebble greywacke conglomerate. Sandstone generally cross-bedded with some slumps	Covers an area of 1,000 square miles western part only exposed in the south-eastern corner of the Einasleigh Sheet. Extends east into Ingham Sheet	Strike ridges and low rises. Best exposed in creek sections	Tightly folded and cross-folded. Steep dips. Probably a synclinorium. Faulted. Well jointed	Graveyard Creek Formation(Clarke River Sheet). Fossil fragments in greywacke conglomerate include corals, brachiopods, crinoid stem joints.	Unconformably overlies the Greenvale Formation. Conformably underlies the Perry Creek Formation. Intruded by basics. Intruded by granite farther east near Kangaroo Hills and Ewan (Ingham Sheet).	Poor aquifer. Wolfram, tin, lead, iron and copper at Ewan (Ingham Sheet)	White, Best et al. (1959).
	Lower Devonian to Upper Silurian	Mt.Garnet Formation (S-Dg)	?15,000 feet	Thin bedded radiolarian jaspers, quartz greywacke, greywacke, siltstone. Lenses of limestone, limestone conglomerate, greywacke conglomerate	Isolated outcrops in north-eastern corner of Einasleigh Sheet.	Strike ridges and low rises	Trend 020°. 50° dips	?Chillagoe Formation (Atherton Sheet) corals	Intruded by Herbert River Granite and faulted against Precambrian	Copper at Mt.Garnet (Atherton Sheet)	

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
SILURIAN		Pelican Range Formation (Sp)	Unknown. Probably does not exceed 5,000 feet	Brown massive or thinly bedded, coarse to medium-grained, impure quartz sandstone, with some inter-bedded quartz siltstone and shale. In places sandstone contains load and flow casts.	Wedged-shaped area of about 30 square miles. Forms resistant Pelican Lake Range. Extends south into Clarke River Sheet	Strike ridges. Strongly lateritized in Pelican Lake Range	Tightly folded. Many strike faults. Steep dips.	No fossils. Probably Silurian	Down-faulted into the Greenvale Formation	Local water supply in joints and faults	White, Stewart et al. (1959). White, Best et al. (1959).
		Greenvale Formation (Sg)	?30,000 feet	Buff quartz siltstone, shale, with lenses of quartz greywacke, greywacke, and pebble greywacke conglomerate. Irregularly bedded	Exposed in an area of 650 square miles including its southerly extension into Clarke River Sheet	Strike ridges and rises	Tightly folded and sheared. Steep dips	Indeterminate fossils. Probably Silurian	Unconformably overlain by the Kangaroo Hills Formation. Faulted against the Pelican Range and Wairuna Formations. Intruded by basics and Herbert River Granite.	Poor aquifer. Wolfram, copper.	White, Best et al. (1959).
	Late Lower Silurian (Wenlock to Upper Llandovery)	Wairuna Formation (Slw)	? 5,000 feet	Thinly bedded quartz siltstone, impure quartz sandstone and shale. In places sandstone is cross-bedded	Linear belt, 4 miles wide extending from Wairuna Homestead south-south-east along the Burdekin River valley for about 80 miles to the Broken River (Clarke River Sheet)	Strike ridges and valleys	Tightly folded and sheared. Strike faulted. Steep to vertical dips	Graptolites (Monograptus); Trilobites (Encrinurus, Scutellidae (2 species), Proetus?, Sphaerexochus? or Onycopyge?); Brachiopods (Brachyprion); Pelecypods; Corals; Bryozoa. Late Lower Silurian.	Unconformably overlain by Graveyard Creek Formation (Clarke River Sheet). Faulted against Precambrian metamorphics and Silurian Greenvale Formation. Intruded by Herbert River Granite, basics and serpentinite of Boiler Gully Complex	Poor aquifer.	White, Best et al. (1959). White and Stewart (1959).
PROTEROZOIC		Dido Granodiorite (Bgd)		Grey, well foliated, medium-grained hornblende-biotite granodiorite	Irregularly exposed through a thick soil cover in a linear belt 6 miles wide and 40 miles long. Northern extremity exposed on Einasleigh sheet.	Low tors scattered through a thick soil cover		Forsayth, Dumbano and McKinnons Creek Granites. Late Precambrian	Intrudes Lucky Creek Formation to form a wide aureole of contact metamorphics. Intruded by porphyry.	Local water supply in deeply weathered and jointed sections. Gold	White, Best et al. (1959).
		McKinnons Creek Granite (Bgm)		Coarse, even-grained, cream-pink muscovite granite. In places finer grained parts show foliation.	Crops out over 120 square miles in Lynd Homestead area. Extends south into Clarke River 4-mile Sheet	Weathered scattered tors separated by thick sandy soil		Forsayth, Dumbano and Dido Granites. Late Precambrian	Intrudes Lucky Creek Formation, Archaean metamorphics and Sandalwood Serpentinite	Good water supply in weathered sections. Gold and copper	White, Best et al. (1959).
		Forsayth Granite (Bgf)		Grey, coarse-grained massive to porphyritic biotite granite. Platy flow structure on margins.	Crops out over 2,000 square miles, half of which is exposed on the Einasleigh Sheet	Deeply weathered. Scattered tors and pavements separated by a thick sandy soil		McKinnons Creek, Dido and Dumbano Granites. Late Precambrian	Intrudes the Einasleigh Metamorphics and Cobbold Dolerite. Unconformably overlain by the Newcastle Range Volcanics. Intruded by dolerite & porphyry dykes	Local water in deeply weathered sections at shallow depths. Copper, gold and lead	White & Hughes (1957). White, Best et al. (1959).

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
PROTEROZOIC		Dumbano Granite (Bgu)		Grey medium-grained biotite granite with pink porphyritic feldspar. Generally foliated	Crops out over one square mile in south-western corner of Einasleigh Sheet. Extends into Clarke River and Gilberton 4-mile Sheets. Total area is 1700 square miles	Deeply weathered. Scattered tors separated by thick sandy soil		Forsayth, Dido and McKinnon's Creek Granites. Late Precambrian	Intrudes the Bernecker Creek Formation (Gilberton Sheet) and Einasleigh Metamorphics. Intruded by the Butlers Knob Igneous Complex.	Good water in weathered sections	White, Best et al.(1959).
		Cobbold Dolerite (Bdc)		Dolerite, possibly containing olivine. Locally metamorphosed to amphibolite or gabbro	Isolated linear belts in the Einasleigh area	Strike ridges, hills and low rises	Steeply dipping dykes and sills	Precambrian	Intruded by Forsayth Granite. Intrudes the Proterozoic sediments.	Poor aquifer. Copper.	White, Best et al. (1959).
		Sandalwood Serpentinite (Bss)		Serpentinite, generally metamorphosed to antigorite serpentinite, with chlorite, talc and tremolite. Gabbro.	Discontinuous linear belt trending north-north-east from Halls Reward Mine along Burdekin River valley. Isolated serpentinite lenses farther north near Valley of Lagoons and Minnamoolka probably represent outliers of Sandalwood Serpentinite.	Low rough silicified mounds and strike ridges	Steeply dipping lenticular sill-like bodies.	Precambrian	Intruded by McKinnon's Creek Granite in Halls Reward Mine region	Poor aquifer. Copper, nickel, chromium and manganese	Green (1958). White et al. (1958).
		Paddys Creek Formation (Bp)	1,000 feet to 3,000 feet	Well bedded quartzite and quartz phyllite	Exposed over 50 square miles in southern part of Einasleigh Sheet	Strike ridges and valleys	Steeply to moderate dips. Moderately folded	Robertson River Metamorphics (Georgetown Sheet) ?Proterozoic	Conformably overlies Lucky Creek Formation with some interfingering. Intruded by Boiler Gully Complex. Faulted against and unconformably overlies the Halls Reward Metamorphics	Poor aquifer. Copper	White & Hughes (1957). White et al. (1958).
		Lucky Creek Formation (Bl)	10,000 feet to 15,000 feet	Actinolite schist, quartz-chlorite-epidote schist, quartz-albite-hornblende schist, with thinly bedded marble and calc-silicate hornfels. Some calcareous greywacke.	Exposed over 150 square miles in southern part of Einasleigh Sheet.	Valleys and plains well exposed in creek sections, otherwise covered with thick red-brown soil	Tightly folded with many drag-folds. Steep dips.	No fossils. Bernecker Creek Formation (Gilberton Sheet) ? Proterozoic	Conformably underlies Paddys Creek Formation with some interfingering. Metamorphic unconformity against Einasleigh Metamorphics. Contact metamorphosed by Dido and McKinnons Creek Granites	Good water supply, particularly from calcareous members. Gold and Copper.	White & Hughes (1957). White et al. (1958).

Period	Age	Rock Unit	Thickness	Lithology	Distribution	Topography	Structure	Correlation Palaeontology and Age	Stratigraphic Relationship	Economic Geology	Principal References
? ARCHAEAN		Einasleigh Metamorphics (Ae)	Unknown	Gneiss (in places ptygmatic), migmatite, garnet-mica-sillimanite (?) schist and garnetiferous quartzite	In isolated areas between Junction Creek (north) and Lynd (south) of about 500 square miles	Plains, ridges and rough hills	Strongly foliated	Halls Reward Metamorphics ?Archaean	Metamorphic unconformity against the Lucky Creek Formation, Bernecker Creek Formation (Gilberton Sheet) and Etheridge Formation (Georgetown Sheet). Intruded by Precambrian granites with some retrograde metamorphism. Intruded by Cobbold Dolerite.	Poor water supply. Copper, gold, lead and silver.	White & Hughes (1957). White, Best et al. (1959). White & Wyatt (1959, in press).
		Halls Reward Metamorphics (Ah)	Unknown	Mica schist, quartz-mica schist, garnet-mica schist; quartzite and migmatite	Crops out over 25 square miles in the Halls Reward Mine area	Low quartz covered rises. Well exposed in creek sections	Strongly sheared and foliated (vertical)	Einasleigh Metamorphics ?Archaean	Unconformably overlain by the Paddys Creek Formation	Poor water supply. Copper	White et al. (1958). Green (1958).
		Stenhouse Creek Amphibolite (As)	Unknown (?3,000 feet)	Banded amphibolite with some marble lenses.	Covers 5 square miles in the Halls Reward Mine area	Outcrops restricted to creek sections. Other places heavy red-brown soil cover	Tightly folded. Well jointed. Foliated	?Archaean	Conformably underlies Halls Reward Metamorphics with some interfingering. Regionally metamorphosed to amphibolite facies	Poor water supply. Copper	White et al. (1958). Green (1958).

AUSTRALIA 1:250,000

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PRELIMINARY EDITION

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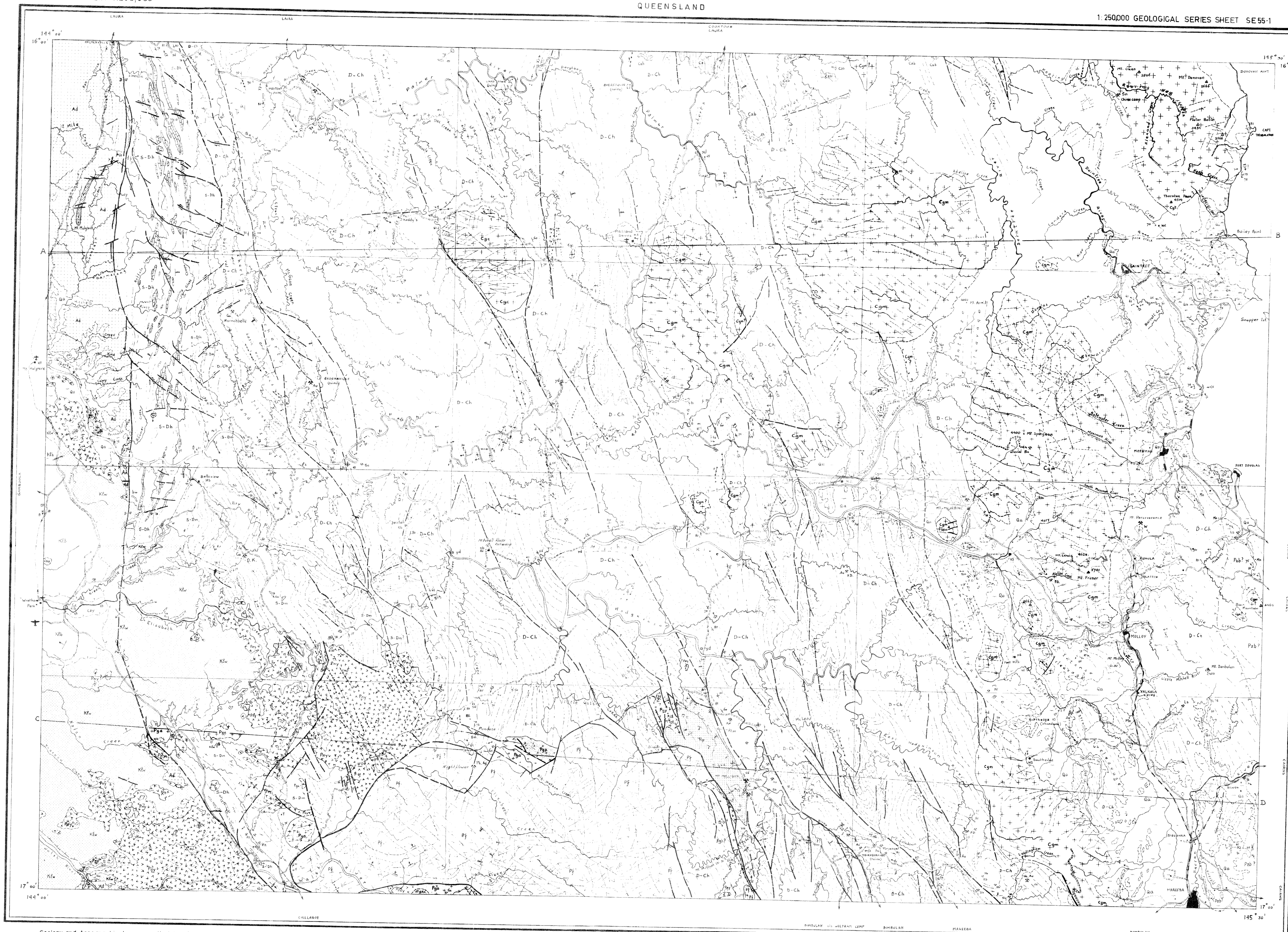


REFERENCE

CAINOZOIC	QUATERNARY		Qa	Alluvium, soil
			Qa	Coastal marsh.
			Qr	Old beach sand
		Unconformity		
			Czb	Olivine basalt.
			Czy	Billy breccia, gravel.
		Unconformity		
MESOZOIC	LOWER CRETACEOUS	Blackdown Formation	Klb	Grey shale, siltstone, sandy shale; some lenticular sandstone. Calcareous concretions in places. Fossiliferous.
		Wrotham Park Sandstone	Klw	Pebble conglomerate, feldspathic sandstone, pebbly sandstone. Glauconitic horizon on top.
	JURASSIC (?)	Laura Sandstone	Jl	Conglomerate, sandstone.
	TRIASSIC (?)	"Pepperpot Sandstone" *	Rp	Red, white pebble conglomerate and massive pebbly sandstone at the base. Floggy argillaceous and silty sandstone towards the top. Cross-bedding common.
		Unconformity		
PALAEOZOIC	PERMIAN to TRIASSIC	Elizabeth Creek Granite	Pgz	Pink biotite granite, leucocratic.
		Featherbed Volcanics	Pf	Acid lavas and pyroclasts, generally massive.
		Unconformity		
		Almaden Granodiorite	Pga	Grey hornblende-biotite granodiorite
		Herbert River Granite	Pgh	Grey hornblende-biotite granite.
		"Mt. Mulligan Coal Measures" *	Ptm	Massive pebble conglomerate, sandy shale, shale, sandstone, arkose, mudstone, coal bands.
		Nychum Volcanics	Pny	Mainly acid lavas and pyroclasts; some intermediate and basic lavas, amygdaloidal lavas – Tuffaceous sediment, arkose, siltstone, impure coal
		Unconformity		
	CARBONIFEROUS	Montalbion Sandstone	Cm	Quartzose sandstone
		Unconformity		
		Cannibal Creek Granite	Cgc	Cream biotite-microcline granite ± muscovite
		Mareeba Granite	Cgm	Grey biotite-microcline granite ± muscovite Commonly strongly porphyritic.
		"Thornton Granite" *	Cgt	Cream leucocratic granophyric granite.
	M. DEVONIAN to L. CARBONIFEROUS	Hodgkinson Formation	D-Ch	Well-bedded micaceous (quartz) greywacke, siltstone, slate; intercalations of basic volcanics, chert, sedimentary breccia, conglomerate. – Main conglomerate horizon.
		Unconformity ?		
	U. SILURIAN to L. DEVONIAN	Mt. Garnet Formation	S-Dm	Quartz 'greywacke', arkose, feldspathic sandstone, siltstone, breccia, conglomerate lenses; intercalations of basic volcanics and chert. Small limestone lenses.
		Chillagoe Formation	S-Dh	Fossiliferous limestone, bedded chert, quartz 'greywacke', siltstone, breccia, conglomerate lenses, intercalations of basic volcanics. At the base: quartz sandstone and quartz siltstone – Main outcrop of limestone.
	Undifferentiated	Barron River Metamorphics	Pzb	Low-grade metamorphic phyllite, schist, quartz 'greywacke', and siltstone
		Unconformity		
PRE-CAMBRIAN	ARCHAEAN (?)	Dargalong Metamorphics	Ad	Quartz-mica schist, augen gneiss, granulite, quartzite, amphibolite.

* Note: Formation name not yet approved by Queensland Stratigraphic Nomenclature Committee.

- Trend of bedding
- Geological boundary
- Fault
- Relative horizontal movement
- Relative vertical movement: U = up, D = down
- Anticline, showing plunge
- Syncline, showing plunge
- Where location of boundaries, folds, and faults is approximate, line is broken; where inferred, queried; where concealed, boundaries and folds are dotted, faults are shown by short dashes
- Strike and dip of strata
- Overturned strata
- Vertical strata
- Horizontal strata
- Generalized strike and dip of folded strata
- Top of strata
- Direction of sediment transport
- Dip < 15°; Dip 15°–45°; Dip > 45°; Joint pattern and possible faults — from air-photo interpretation
- Strike and dip of foliation (metamorphic rocks) and flow layering (igneous rocks)
- Vertical foliation
- Strike and dip of cleavage
- Vertical cleavage
- Plunge of lineation
- Horizontal lineation
- Dyke or vein — q = quartz; d = dolerite, or other basic or intermediate dyke rock; r = rhyolite, or other acid dyke rock; gr = granite, or related rock
- Volcanic vent, extinct
- Macro fossil locality
- Micro fossil locality
- Plantfossil locality
- Minor mineral occurrence, of mineralogical interest only
- Prospect; little or no production
- Mine, quarry, large open cut, or group of mines and prospects
- Prospect, position doubtful or approximate (P.D.)
- Old battery, smelter, or treatment plant

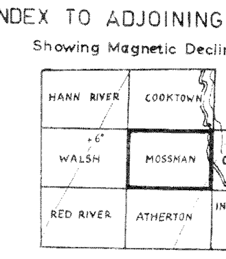
Ag = Silver, Au = Gold, Bi = Bismuth, C = Coal, Cu = Copper, Ls = Limestone, Mn = Manganese, Pb = Lead, Sb = Antimony, Sn = Tin, W = Tungsten

- Trigonometric station, height in feet above sealevel
- Spotheight, taken from Queensland 4-Mile Series maps
- Highway or main connecting road
- Secondary road, in general use and usually in fair condition
- Vehicle track no longer in use, in very poor condition, suitable for 4-wheel drive vehicles only
- Water hole (W.H.)
- Waterbore with windpump
- Water tank
- Dwelling
- Homestead (Brooklyn)
- Larger town (MOSSMAN)
- Site of former village, now abandoned or in ruins
- Yard
- Fence
- Telephone or telegraph line
- Railway line
- Landing strip
- Dam

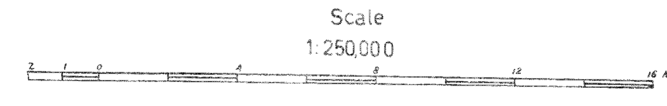
Geology and topographic base compiled by the Bureau of Mineral Resources, Geology and Geophysics, using slotted template assemblies prepared by the Army Survey Corps. Aerial photography by Adastra, scale 1:80,000, vertical coverage complete except for north-east corner.

INDEX TO ADJOINING SHEETS

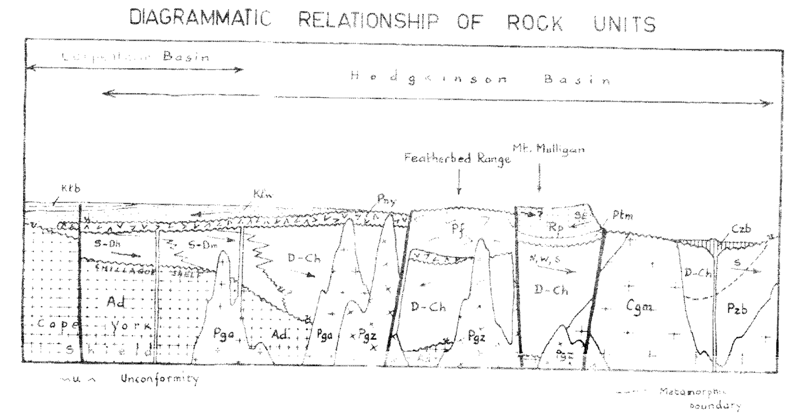
Showing Magnetic Declination



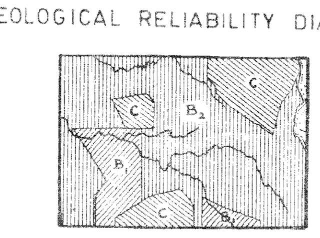
Scale 1:250,000



DIAGRAMMATIC RELATIONSHIP OF ROCK UNITS



GEOLOGICAL RELIABILITY DIAGRAM



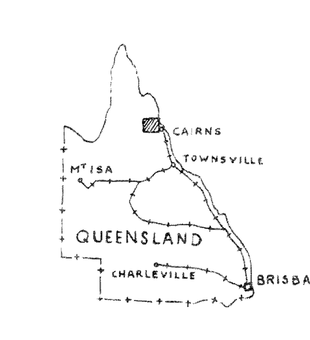
B1 Detailed reconnaissance: numerous traverses and photo-interpretation

B2 Reconnaissance: traverses and photo-interpretation

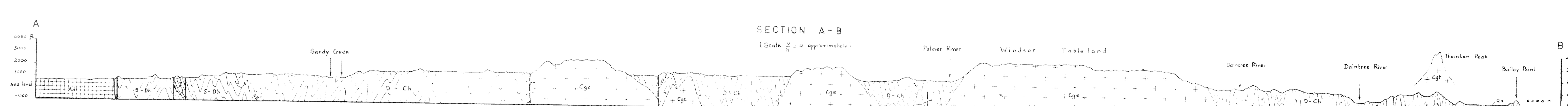
C Air-photo interpretation only

Geology by: F. de Keyser, K.G. Lucas, W.R. Morgan, B.J. Amos, R.M. Tucker.

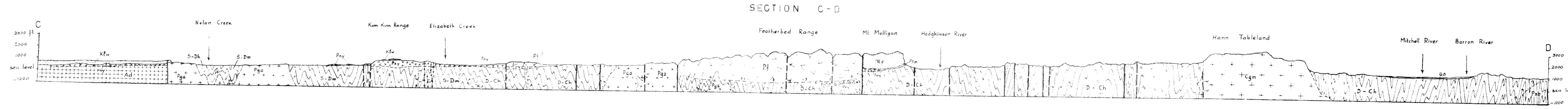
Compiled and drawn by: F. de Keyser, May 1961.



SECTION A-B



SECTION C-D



MOSSMAN

SHEET SE 55-1

(PRELIMINARY EDITION)

PLATE I

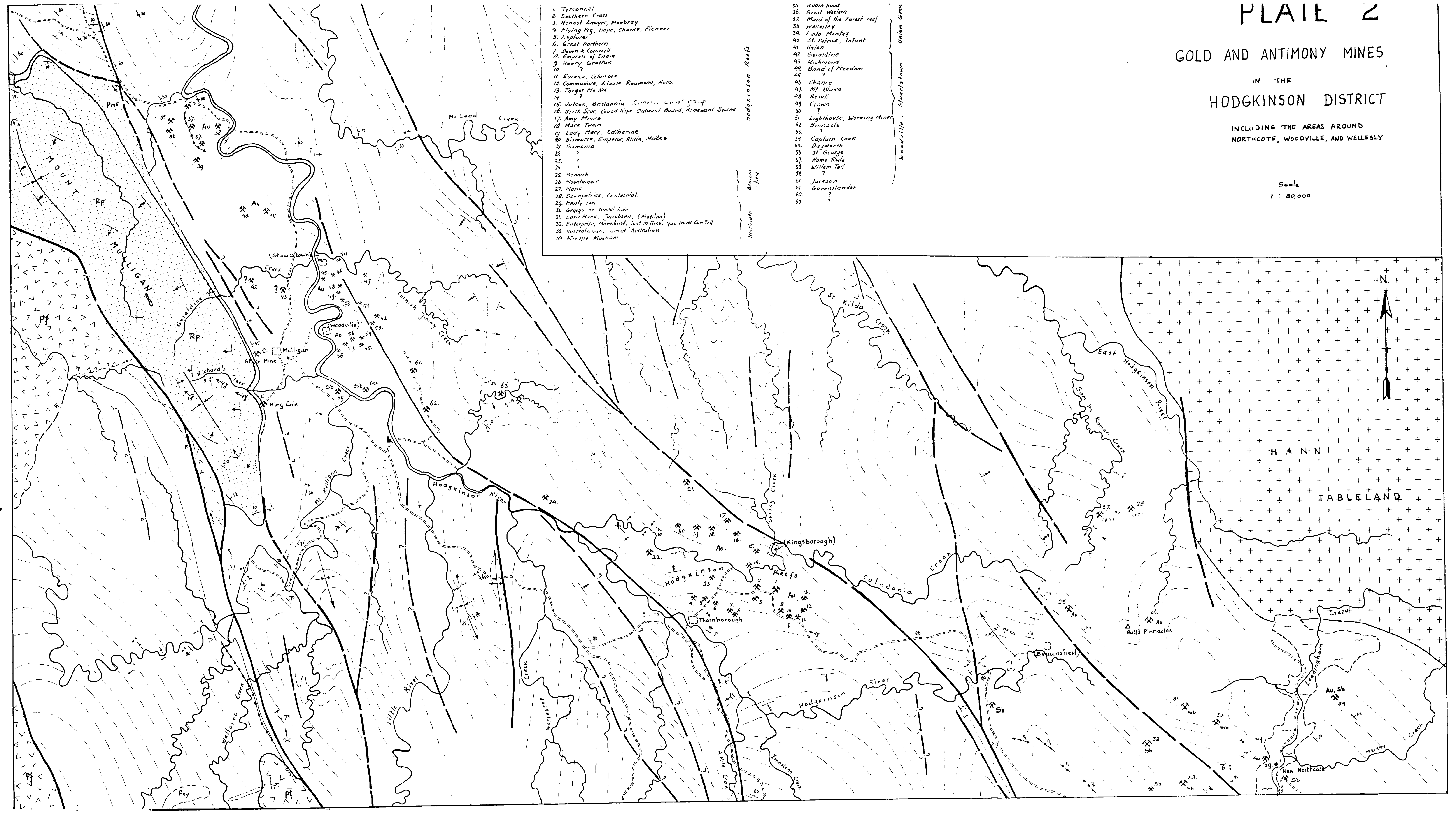
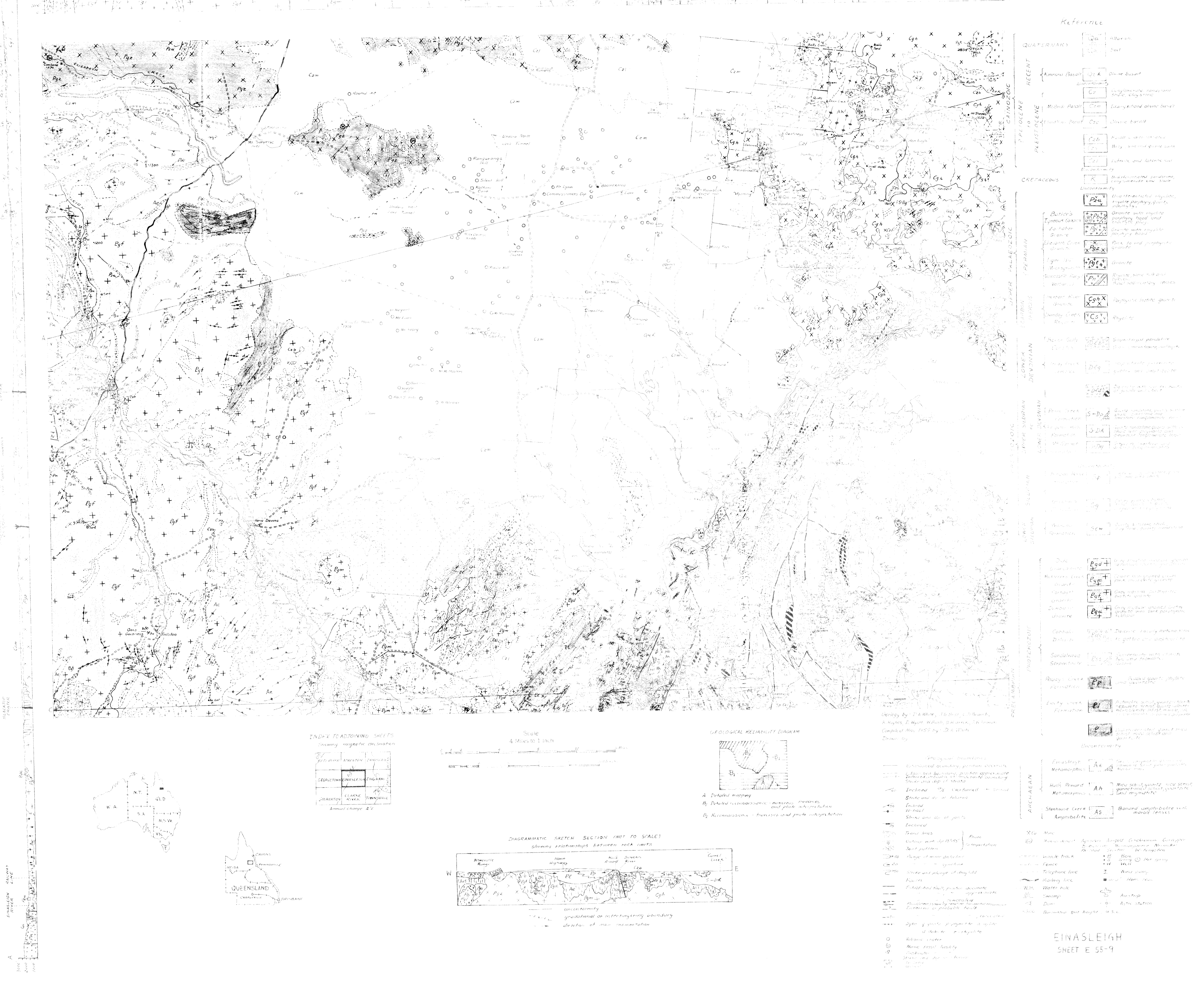


PLATE 2

GOLD AND ANTIMONY MINES IN THE HODGKINSON DISTRICT

INCLUDING THE AREAS AROUND NORTHCOTE, WOODVILLE, AND WELLESLY.



Reference
QUATERNARY
Alluvium
Soil
RECENT
Kinrara Basalt
Olivine basalt
Unconformity
Conglomerate, sandstone, shale, claystone
McBride Basalt
Olivine basalt
Laterite and laterite soil
PLIOCENE to PLEISTOCENE
CAINOZOIC
Unconformity
CRETACEOUS
Conglomerate and shale
Unconformity
Granite with rhyolite porphyry hood
Granite
PERMIAN
UPPER PALAEOZOIC
Porphyritic biotite granite
Sunday Creek
Rhyolite
LOWER DEVONIAN
Paddys Creek Formation
Banded quartz phyllite and quartzite
Lucky Creek Formation
Unconformity
Einasleigh Metamorphics
Halls Reward Metamorphics
Mica schist, quartz mica schist, garnet-mica schist, quartzite and migmatite
Stenhouse Creek Amphibolite
Banded amphibolite with marble lenses
ARCHAEAN
PRECAMBRIAN
Geology by: D.A. White, J.G. Best, C.D. Branch,
K. Hughes, D. Wyatt, W. Bush, D. Haeren, J.G. Inman
Compiled May 1959 by: D.A. White
Drawn by
Geological boundaries
Established boundary, position accurate
Established boundary, position approximate
Inferred, probable or indefinite boundary
Strike and dip of strata
Inclined
Overturned
Vertical
Strike and dip of foliation
Inclined
Vertical
Strike and dip of joints
Inclined
Trend lines
Outcrop with dip 15°-45°
Joint pattern
Photo interpretation
Plunge of minor anticline
syncline
Strike and plunge of dragfold
Faults
Established fault, position accurate
approximate
concealed
Inferred or probable fault
concealed
Volcanic crater
Marine fossil locality
Mine
Vehicle track
Fence
Telephone line
Railway line
Water hole
Swamp
Dam
Barometric spot height
Bore
Spring
Hot spring
Well
Wind pump
Airstrip
Astro station
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Gradational or interfingering boundary
Direction of main movement
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QUEENSLAND
CAIRNS
BRISBANE
W.A.
N.T.
QLD
S.A.
N.S.W.
VIC.
T.
EINASLEIGH RIVER
RAILWAY LINE
ELIZABETH CREEK