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NOTES TO ACCOMPANY THE PHOTO-INTERPRETATION OF THE COUNTRY BETWEEN THE ARTHUR AND PIEMAN RIVERS, TASMANIA.

by

S. WARREN CAREY

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GEOPEKO

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NOTES TO ACCOMPANY THE PHOTO-INTERPRETATION OF THE COUNTRY BETWEEN THE ARTHUR AND PIEMAN RIVERS, TASMANIA.

S. WARREN CAREY
HOBART
JANUARY, 1981.

Transparency of photo geology (in Vertiplan in Closed file room 120) to above restricted file Loose

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Notes to accompany the photo-interpretation of the country between the Arthur and Pieman Rivers, Tasmania.

by S. Warren Carey.

The following maps are submitted:

1:40,000:
Photogeological interpretation of the Arthur to Pieman valleys.

1:100,000:
Photogeological interpretation of the Arthur to Pieman valleys.
Magnetic anomalies.
Bouguer gravity anomalies.
Reported base-metal prospects and geochemical anomalies.

1:500,000:
Regional structure of northwest Tasmania.

Group nomenclature:

Use of field names for photo-interpretation "formations" is unwise. Hence I have used Greek letter names, Sigma, Kappa, Phi, Epsilon, Alpha, and Rho (probably in that order of increasing age) for the photogeological sedimentary groups into which I have divided the Precambrian rocks.

Phanerozoic rocks:

The maps show Tertiary basalts, Tertiary sediments (including silicified conglomerate), a Jurassic dolerite cone-sheet, Carboniferous tillite, a graben slice of strongly folded Ordovician-Silurian Junee Group, and the Devonian granites, but as I have little to add to existing information, I will not elaborate on these groups.

The youngest of the pre-Ordovician rocks are the Nu and Upsilon Groups, which occupy the trough of the Montagu synclinorium in the extreme north of the area studied. These could have been included as the highest formations of the Sigma Group. Relief is subdued, and I suspect a good deal of carbonate. They may be Cambrian, or possibly latest infra-Cambrian. This may also apply to the higher formations of the Sigma Group, but in the absence of firm evidence I have included them with the Precambrian.

Sigma Group:

The Sigma Group forms prominent well-wooded strike ridges with good continuity around the structures. Photogeologically it behaves like the Junee-Eldon Group, but is clearly much older. Folding is more characteristic than faulting. Smaller-scale folding is common near the base of the group with a pattern strongly suggestive of bottom drag due to glacier-like gravity creep (for example, the basal contact southwest of photo-centre 3-53, fourteen km north of Balfour). The fold pattern suggests some overprinting of WNW Tyennan folding by NNE Taberabberan folds. The Sigma Group appears to underlie the Upsilon Group conformably, and to overlie the Phi Group with unconformity.

Where this group runs into known field observations (Smithton in the north and Corinna to Conical Rocks in the south), it is clear that the group contains extensive dolomite, cherts (probably silicified dolomite), basalts and other volcanics, and fairly thick slates. Some sink-holes were observed, but these

are very much more frequent and conspicuous in the underlying Phi Group. This may reflect not only the thickness of dolomites but rather the continuity of permeability through them. Lake Chisholm (367500E. 54446N), south of the Arthur River, is a remarkable lake-filled pentagonal doline, more than 200m across and a hundred m deep, yet there are no other signs of karst for many kilometres.

According to the photo-geological interpretation along the Pieman River, the Savage Dolomite is followed by the Bernafai Volcanics, then the Corinna Slates in the core of a major syncline, not the core of an anticline as previously thought. The Corinna Slate might then be a correlate of the Crimson Creek Group. The Delville Cherts occur intermittently within the belt of Savage Dolomite, and I regard the cherts as silicified Savage Dolomite, and not an independent formation.

The Smithton Dolomite has been interpreted as marine because of the presence of stromatoporoids. This conclusion is false, because the spores of stromatoporoids can endure desiccation for many decades, and could have been blown several times around the world before colonizing an intra-continental waterway where the environment suited their growth.

The Sigma Group often gives strong positive total-intensity magnetic anomalies, which I believe to be caused by basaltic lavas and possibly other volcanics. These magnetic anomalies are not always present, but this may indicate non-continuity of the basalts, or perhaps deep hydration of their ferro-magnetic minerals.

If it were economically warranted, I think I could divide the Sigma Group into three formations, and trace these photogeologically through the area.

Although the Smithton basalts carry some native copper, I am not aware of any base-metal prospects associated with the Sigma Group. However, where the Sigma Group is truncated by the Devonian granite near Conical Rocks, the possible development of King Island type scarns from the carbonates warrants investigation.

Phi Group:

The Phi Group has very low relief everywhere, a general absence of outcrop traces, and scant vegetation. Sink-holes are common, and the formation contains much dolomite and little quartzite. It is not strongly magnetic. There seems to be an unconformity at the base. The Phi Group usually rests on the Epsilon Group, but also on the Alpha Group if my photogeological correlation is correct. I have no record of economic mineralization associated with this group.

Epsilon Group:

The Epsilon Group has the photogeological texture of slates or silty greywackes, finely bedded rhythmically, without much quartzite. On the peneplaned area west of the Norfolk Range the strikes of the rhythmic beds are uniform, but in the mountain country east of the Norfolk Range they are much contorted, with a characteristic photogeological texture. This group has little competence to resist stress difference.

Where the Epsilon Group runs into areas where field data are available, the group correlates with the Balfour Slates (sensu stricto) and with the Interview Group.

More of the recorded mineralized veins in the region occur in this group than in any other group, but there are many areas of the Epsilon Group which appear barren. My impression is that the primary control is a specific tectonic lineament, and that within the corridor so constrained, the Epsilon Group forms a convenient host, probably more from physical than chemical reasons.

Alpha Group:

The Alpha Group gives prominent relief with poor vegetation and harsh outcrops of quartzite. Bedding units are thicker than in the Epsilon Group. Where the photogeological Alpha Group runs into areas of recorded field observations it correlates with the Donaldson Group of quartzites, conglomerates, and interbedded slates and dolomite. Some of the conglomerates have very large boulders in a slatey matrix; these may be glacigene. No data suggest any correlation of this group with mineralization.

Rho Group:

Photogeologically the Rho Group gives strong relief with good vegetation and prominent strike ridges. The ridges express composition--e.g. quartzitic, pelitic, amphibolitic, carbonates, etc., and mainly indicate Taberabberan folding, although there is complex earlier folding on smaller scales.

The Rho Group is associated with intense positive magnetic anomalies in the total-intensity reconnaissance. Field data correlate the group with the Whyte Schists, which contain amphibolites. The magnetic signature seems to be due to the metamorphic generation of magnetite.

Kappa Group:

The Kappa Group, which forms the high core of the Norfolk Range, looks to me to be a basic igneous rock-e.g. gabbro. I was quite surprised to have to suggest such large masses of igneous rock, because the literature gives no hint of their existence. Perhaps owing to inaccessibility, no competent geologist has ever been on these outcrops.

My reasons for this conclusion are:
(1) The photographic tone and texture do not look like those of a sediment, or foliated metamorphic rock. Whatever the Kappa Group rocks are, they are massive and physically resistent.
(2) The relations to the Alpha and Epsilon Groups suggest transgressive contacts in several places.
(3) The Kappa Group in the areas about Mt. Hadmar, Mt. Judith, and Mt. Sunday seems to be the source of several dykes reported by Ward to be amphibolitized gabbro.
(4) The Kappa Group yields more fertile soil which supports thicker vegetation than the Alpha, Epsilon, and Phi Groups.

I have tentatively included the crown of Mt Balfour in this group, although not confidently.

Assuming that my photointerpretation is correct, the Kappa Group consists of plutons along the Norfolk Range and Mt. Hadmar, and satellitic sills sheets and dykes over an extensive area. The Group most intruded is Epsilon, and also Alpha, and less frequently Phi, and rarely Sigma. Perhaps the rare occurrences in Sigma should be checked. The Kappa igneous activity probably occurred in the Sigma time interval, perhaps co-eval with the Smithton Basalts, and the Bernafai Tuffs and Volcanics.

Nowhere is the Kappa Group associated with high magnetic anomalies, which is surprising if it is really basic igneous rock.

Quite a number of mineralized veins (particularly copper) are in or near Kappa rocks, but this may be coincidental because these veins have other stronger correlations. However an alert should be kept for signs of nickel mineralization, possibly with copper. The copper-nickel body northeast of Zeehan may well belong to this Kappa Group. Watch should be kept for nickelliferous pyrrhotite,

pentlandite or millerite mistaken for pyrite, and zaratite or morenosite mistaken for chlorite. Any geochemical samples on hand should be checked for nickel, if not already done.

Magnetic Anomalies:

The regional magnetic data are old and contain instrumental compilation artefacts, which yield spurious east-west pseudo-anomalies parallel to the flight lines. Nevertheless the magnetic compilation on the same scale as the photogeology, mineralization, and gravity is useful.

The very strong anomaly belt which extends NNE from the coast between Granville Harbour and Ahrberg Bay to Savage River expresses the Rho Group (Whyte Schists), which have high magnetite content. The intensity of this magnetic relief is so great that even the Jurassic dolerite and Tertiary basalt which would normally form prominent anomalies, are eclipsed to second order or even to relative negative areas. These anomalies are of no further interest except in the context of possible extensions of iron ore. The graben of Junee Group trending a little north of east along Duck Creek four km north of Granville Harbour, interrupts the Rho Group pattern. South of the graben strong anomalies reappear, which I interpret as Rho Group, but the pattern is greatly complicated by large patches of Tertiary basalt, a large dolerite cone-sheet, and the Heemskirk granite. The trend of these anomalies is NW, and the strikes recorded in the field agree that these trends (at right angles to the main Rho trend) are real, and are not caused by the overlying basalt. In view of this, and some uncertainty of the photogeological correlation with the Rho Group, and the immediate proximity of the granite, some field follow-up here is warranted for the chance of mineralized scarns. The very intense anomaly one km north of Granville Harbour might be checked, although of all the anomalies here, this one seems most likely to be a direct extension of the Rho Group magnetite. The significant anomalies at 341000E.537000N and 346000E.5369000N, both in the granite aureole, warrant checking before elimination.

The strong positive anomaly along the Bernafai Ridge and Ahrberg Hill, forming the NW divide of Newdegate and Corinna Creeks and the SE divide of the lower six km of Savage River, is along the Bernafai Volcanics of the Sigma Group, and does not warrant further investigation. Three moderate positive anomalies, the largest one south of the Pieman River at 535000E.539000N, and the other two north of the Pieman and west of Mt. Donaldson, are within the Sigma Group, and could be caused by volcanics, and hence rank low for further investigation. This also applies to the Leigh anomaly, trending ESE for six km along the Leigh River from 331000E.5429000N, and the wide belt of positive anomalies which runs NW from the junction of the Frankland, Lindsay, and Horton Rivers towards Smithton, and the anomaly straddling the Frankland River referred to as the Clump anomaly, although it is five km N of the Clump.

A prominent anomaly, which I have called the Interview anomaly, occurs in the Interview valley some two km SW of Interview Pinnacle. It could perhaps be caused by a Sigma Group intrusion or by a Tertiary basalt plug. However it occurs in an area of structural complexity where the Lagoon River fault system (which is a significant mineralization locus) terminates against the NE trends of the Arthur lineament. A lot of quartz-veining and dyking and cross-faulting occurs in this area. Therefore I consider that this anomaly warrants further investigation.

A small but strong positive anomaly is shown on a tributary of the Lagoon River near 326000E.5406000N. This anomaly is only one km in diameter, and could be interpreted as a basalt plug, but there is no sign of any such on the aerial photographs. If this anomaly is not spurious, I can offer no explanation. There is certainly nothing on the photographs to suggest mineralization, and I recommend that no further investigation is warranted. The same applies to

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a very similar circular anomaly SW of the Frankland River at 313000E.5446000N, but note that this one is negative.

The so-called Nelson Bay anomaly trending east-west along 5449000N from the coast seems to be an artefact, and of no further consequence.

The Temma group of anomalies could be of interest, but the air photography gives very little information about them, owing to deep weathering and thin superficial covering on the peneplane surface.

The most significant group of anomalies lie along the Balfour lineament, and include the Nelson River, Frankland, Balfour, Hazelton, Norfolk, and Lagoon anomalies. As will be discussed later, the Balfour lineament is the locus of strong tectonism and mineralization. Each of these anomalies warrants full investigation.

Two parallel lines of moderate positive anomalies six km apart run northwest from Balfour along the lines indicated later as "deep faults". The southwestern line runs along the Frankland River from 320000E.5438000N to Green Point west of Marrawah. The second runs from the junction of the Arthur River with Hawkes Creek and Blackwater Rivulet (322000E.5438000N) to a few miles east of Marawah. These anomalies could be due to basic lavas in the Sigma Group, but both lines warrant some further investigation because they follow the potentially mineralized corridor.

The Nelson Bay anomaly is of particular interest, because it lies on a major fault of the Lagoon River-Balfour set, and Ward, who inspected it in 1910 after "some superficial prospecting on it" described the outcropping lode as "the most massive one seen by the writer in the whole field" from the Arthur to the Pieman Rivers. The central part of the lode contains so much magnetite that Ward seriously contemplated it as a potential iron mine. This accounts for the strong magnetic anomaly. Further along strike the lode outcrop is a silicious gossan with much haematite, with pyrite chlorite and limonite. Although it is not clear why there should be so much magnetite, and although this body may turn out to be largely pyrite or pyrhottite with little base metal, this question certainly warrants a definite answer. As mentioned earlier, the "chlorite" should be checked for nickel.

Distribution of Mineralization:

No base-metal mineralization has been recorded ENE of the Redpa "deep fault" (see following section). Excluding the tin veins which are closely associated with the Devonian granite, the recorded prospects are dominantly copper, and are closely associated with the Balfour "deep fault". The "deep fault" does not outcrop as such, but numerous surface faults extend along it, commonly en echelon and trending fifteen degrees or so more westerly. The mineralized veins behave similarly. Much shorter transverse veins trending northeasterly often accompany the northwesterly veins. This pattern is consistent with the Balfour "deep fault" being the direction of dextral shear *stress*, the direction of the surface faults and veins being the direction of dextral shear *failure*, and the short north-easterly veins the direction of tensional failure. When these outcrops are being examined in the field geologists should be vigilant for differences between NE and NW veins

Some copper veins along the upper Lindsay River (330000E5420000N) trend SE towards some more veins on the Toner River (337000E.5410000N), all of them further than usual from the Balfour "deep fault". This may indicate a deep shear between the two deep faults.

Although no mineralization is known NE of the Redpa lineament, scattered prospects are known between the Balfour lineament and the granites further SW.

Several occur inland from the coast between Gannet Harbour and Rebecca Point, all trending NW. A cluster occurs on the Interview River about 330000E5398000N. This area is interesting because the trend of the veins is nearly east-west, with some NE and some NW, and the photo-interpretation shows this area to be strongly disturbed, with many faults dykes and quartz veins, extending eastwards as far as 336000E.5398000N. However the most interesting prospect in this region is the Nelson River prospect described above because of its magnetic anomaly.

When the area under authority to prospect needs to be reduced, I suggest that the area NNE of the Redpa lineament could be safely surrendered at this stage, unless there is other favourable evidence not known to me.

Structure and tectonics:

The most conspicuous feature of the region is the conflict of trends, NNE in the ESE part and NNW in the WSW part. These provinces are quite fundamental, and are separated by "deep faults" shown by yellow dots on the 1:100,000 photogeological compilation, which I have named the Balfour and Redpa "deep faults", forming a corridor six to ten km wide. Along these "deep faults" the superficial folds often swing sharply in trend, indicating dextral drag. I have marked with smaller dots another parallel lineament a few km further to the NE along which the bending of fold traces is conspicuous.

There are strong through-going surface faults, the most conspicuous being the Lagoon River Fault, but this is one of a family en echelon. The "deep faults" are followed by positive magnetic anomalies. The corridor delineated by them contains nearly all the mineralization prospects in the region, except the tin mineralization directly associated with the granites. If the Kappa Group be confirmed to be mafic plutonic rocks, then these rise from the "deep faults" corridor.

The "deep faults" separated the sedimentation and folding associated with the Tyennan craton from that associated with the Victorialand craton before the departure of Antarctica during the Palaeocene, a slice of the Victorialand craton being left behind in Tasmania.. The lineament has the broad character of WSW block NNW and up (dextral).

Significantly younger rocks occur on the NE side of the lineament. In the Montagu valley the floor must be very deep indeed. This might be expected to show up in the regional gravity survey, even at the wide spacing currently available. But dolomite and basic lavas are both much denser than normal sediments, and if these make up a significant part of the sequence, which seems likely, the deep floor could be wholly masked.

Regionally, this lineament continues towards King Island, which falls on its SW side, thus correlating the Grassy granite with the coastal granite between Sandy Cape and Pieman Heads. The lineament is parallel to the coast, and to later fractures separating Tasmania and Antarctica. Here again there appears to be a dextral echelon pattern, with the coastal fault off the Arthur-Pieman coast forming a long sigma curve along the NE of Macquarie Harbour, and the Cape Sorell to Elliot Bay block rising to its southwest.

The "deep faults" impinge directly against the grain of the faults and folds and dykes, which trend NNE from the mouth of the Pieman River, and at first sight they terminate there, and this might be the case. However there are some signs that the lineament might continue further southeast. The major syncline through Corinna and several smaller associated folds have strongly sigmoid shape as though dragged dextrally along the Balfour lineament, and further extension of the trend follows along the west limb of the Zeehan Syncline where the stratigraphy is drastically fore-shortened by strike faulting, with the SW side up.

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Notwithstanding these coincidences, I doubt the validity of the direct continuation of the deep faults of the Balfour lineament across the unbroken NE trends (which have been referred to in the past as the Arthur lineament). The Arthur lineament consists of through-going faults, the northwesternmost of which is the Pieman fault, which runs from the Pieman Heads NNE until it leaves my study area at the head of the Horton River (345500E.542000N), trending towards the north coast at about Rocky Cape. Parallel to the Pieman fault are the Donaldson and Whyte faults, and a number of otherfaults and anastomoses.

This family of faults seems to be transcurrent, with sinistral offset, as indicated by the impingement of folds. Note particularly the pronounced sinistral sigmoidal inflection of the Corinna syncline, and the sense of impingement of many of the other folds and faults.

This Arthur lineament must be of Taberabberan (Mid-Devonian) age, because the Junee Group is involved. However this raises the anomaly that Sigma Group basic dykes or sills (pre-Taberabberan) are clearly dominated by this trend, and are particularly numerous and persistent in the slice between the Pieman and Donaldson faults. It is also true that Taberabberan folds were inflected along the Balfour lineament. These facts imply that both the dextral Balfour lineament and the sinistral Arthur lineament were fully developed in the Proterozoic, and both were strongly reactivated during the Taberabberan. This would be to be expected if these were deep faults delineating cratonic blocks.

If we go along this Arthur lineament sinistrally looking for a continuation of the Balfour lineament with the criteria specific to the Balfour-Redpa lineaments (namely change from NNW trends to NNE trends, and regionally SW block up), we have to go NE to the head of the Donaldson River (355000E.5425000N), whence the first criterion (locus of NNW to NNE trends) leads us SE parallel to the Balfour lineament to Rosebery, where it converges on the Henty Fault, which runs up the Henty and Mackintosh valleys parallel to the Arthur lineament, and may like the latter offset the Balfour Redpa corridor sinistrally to Tullah, whence the "deep fault" would trend down the west face of the West Coast Range from Mt Murchison to Mt Darwin, once again with dextral offset west side up. The corridor would then include the Tullah, Rosebery, Mt. Read, Red Hills, Comstock, Mt. Lyell, Mt. Jukes, and Mt. Darwin mines and prospects.

If these correlations are correct, the Balfour-Redpa mineralized corridor (dextral) is offset some ten km sinistrally along the Arthur lineament, then a further ten km or so sinistrally along the Henty fault.

The Balfour-Redpa corridor contains the bulk of the Sigma Group gabbros(?), and between the Arthur lineament and Henty fault the corridor contains the bulk ot the serpentinites of that segment. Note that the Heazlewood, Luina, and Magnet mafic bodies could be a single dyke, dextrally offset along faults of the Balfour family.

Taberabberan folding dominates the structure of northwest Tasmania. Even the Whyte Schists (Rho Group) show coherent strikes and folds on the aerial photographs. By contrast, the field outcrops are reported to show close isoclinal folding on scales from hand specimen to tens or even hundreds of metres. I interpret this as implying that the Precambrian rocks were deposited in intra-continental basins. The folding in them was syntaphral gravity folding due to glacier-like flow towards the trough. Some of this was concentrated near the base of major units (like the folds at the base of the Sigma Group), but much of it was penetrative on various scales through the sedimentary pile. In principle, this folding resembled the Naukluft folds and thrusts described in 1959 by Korn and Martin (*Bull. Geol. Soc. Am.*, 70:1047-1078) and reproduced by Holmes in his text-book on Physical Geology, but did not reach this intensity. Following these folding episodes the prevailing dips were flat, but with frequent sharp apices. As this tight folding in the Proterozoic strata precedes the Taberabberan folding, these small-scale folds cannot be used to determine facing

with respect to the dominant Taberabberan folds. In fact the facing of the small-scale Proterozoic folds should be recorded, then unfolded with respect to the major folds to determine the direction of Proterozoic gravity creep.

Coastal Peneplane:

My early impression was that the Norfolk Range might be separated from the coastal peneplane by Tertiary faulting, especially as the peneplane itself is broken by some small faults with this trend.

However this impression is not correct. I found no structural discontinuity along the Norfolk Range front. Morover, the peneplane surface penetrates far inland along the Lagoon River valley, and residuals of the peneplane surface occur around Balfour, and further inland well behind the mountain front.

I conclude that this coastal peneplane is a wave-cut Cretaceous-to-Palaeogene surface when the seashore intermittently reached the mountain front, and that tectonic rise of more than a hundred metres has occurred since the Miocene along the west coast from the Arthur River to Macquarie Harbour. Extensive Tertiary lacustrine sediments occur in Macquarie Harbour to elevations above 100m with no seaward barrier to maintain them.

The overall model I have of the region is that Antarctica lay south of Australia and west of Tasmania until the Triassic. During the Jurassic, rifting occurred without great displacement, resulting in a rift valley between Australia and Antarctica which forked near the Victoria-South Australia border, to yield a rift valley between Tasmania and Victoria, and the other fork branch between Tasmania and Antarctica. Tasmania lay in the fork rather like the Sinai block (which resembles Tasmania in size and shape) between the Suez and Aqaba-Dead Sea rifts. Again like the Dead Sea system, the rifts about Tasmania during the Cretaceous to Palaeogene were sometimes flooded by the sea, but more commonly lacustrine.

During the photo-geological study I have looked for Antarctica-derived alluvials in western Tasmania, but found none. I don't think any such crossed the intervening rift valley, as indeed should be expected. During the study I have also considered the possibility of heavy-mineral residual alluvials. Residuals of Tertiary basalts and Tertiary gravels sometimes silicified to form small mesas and flat-irons, occur far inland (for example in the Lagoon River valley and about the Dempster plains (341000E.5436000N). Some of these could be of interest, and if required, a reconstruction of the early Tertiary topography could be made.

Hobart,
January, 1981.



PHOTOGEOLOGICAL INTERPRETATION of the ARTHUR AND PIEMAN VALLEYS TASMANIA 1980

SCALE 1:40 000

0 5 km

SEDIMENTS

	Boundary Symbols	Colour
Quaternary		
Active dunes	Qa	Qa
Stabilized dunes	Qs	Qs
Tertiary		
Conglomerates, sands	T	T₁ T₂
Permian ?		
Zeehan Tillite	P	Pz
Ordovician–Silurian		
Junee Group	O	Oj
Cambrian ?		
Nu Group	V	Cv
Upsilon Group	U	Cu
Precambrian		
Sigma Group	S	Ps
Phi Group	F	Pr
Epsilon Group	E	Px
Alpha Group	A	Pa
Rho Group	R	Pa

IGNEOUS ROCKS

Tertiary		
Basalt	B	Tx
Jurassic		
Dolerite	J	Jr
Devonian		
Granite	G	Dx
Eocambrian ?		
Kappa Group	K	Ek

SYMBOLS

Anticlines	Photo: run, centre, number
Synclines	Outcrop traces
Faults	Prospect veins
Kappa dykes	Quartz veins



TION
YS
Colour
Qa
Qs
Tc Ts
Pz
Oj
Cv
Cu
Pb
Pr
Pz
Pk
Pe
Te
Jr
Dw
Ex
5450000 mN
5440000 mN
5430000 mN
5420000 mN
5410000 mN
5400000 mN
5390000 mN
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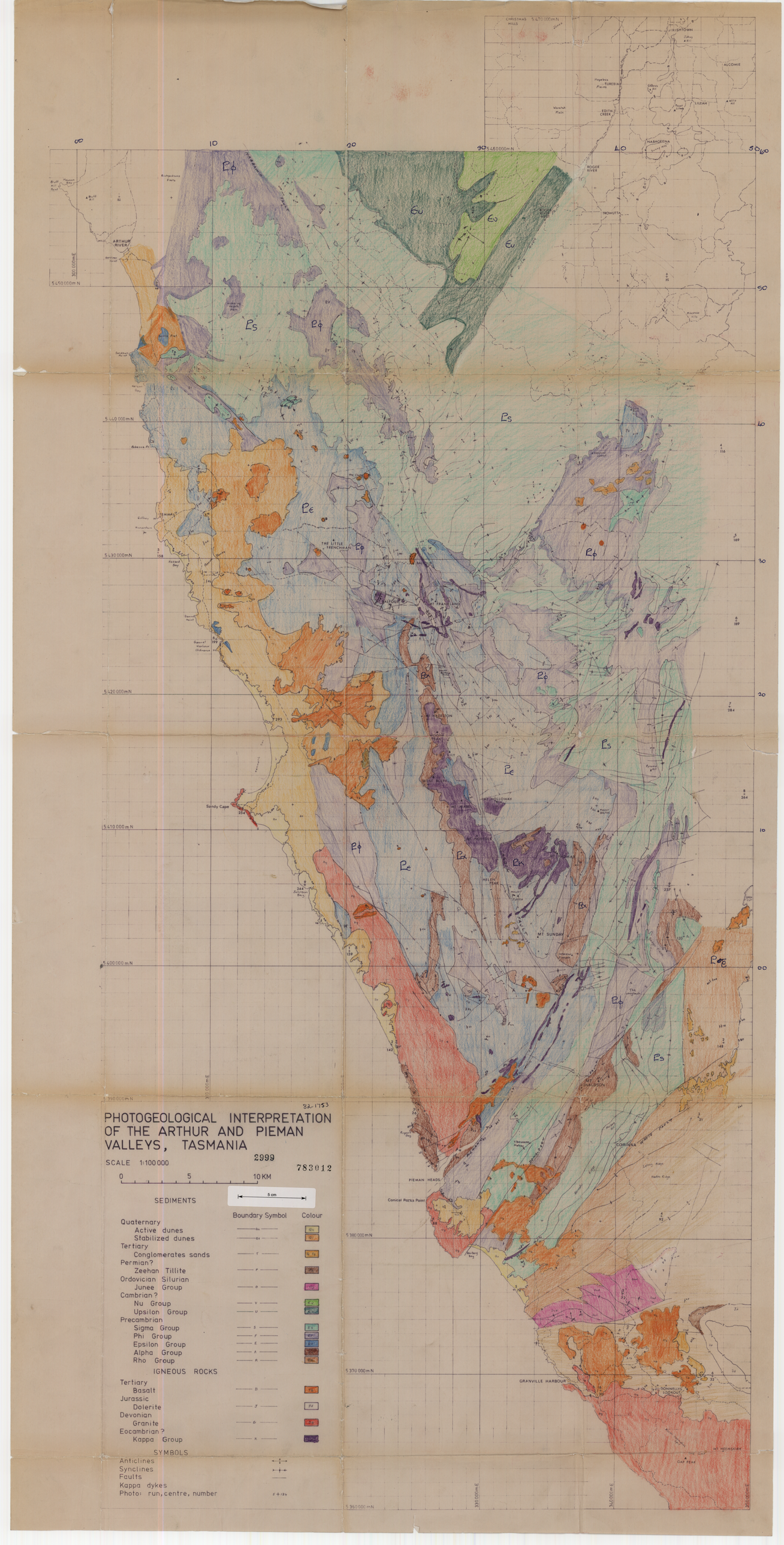
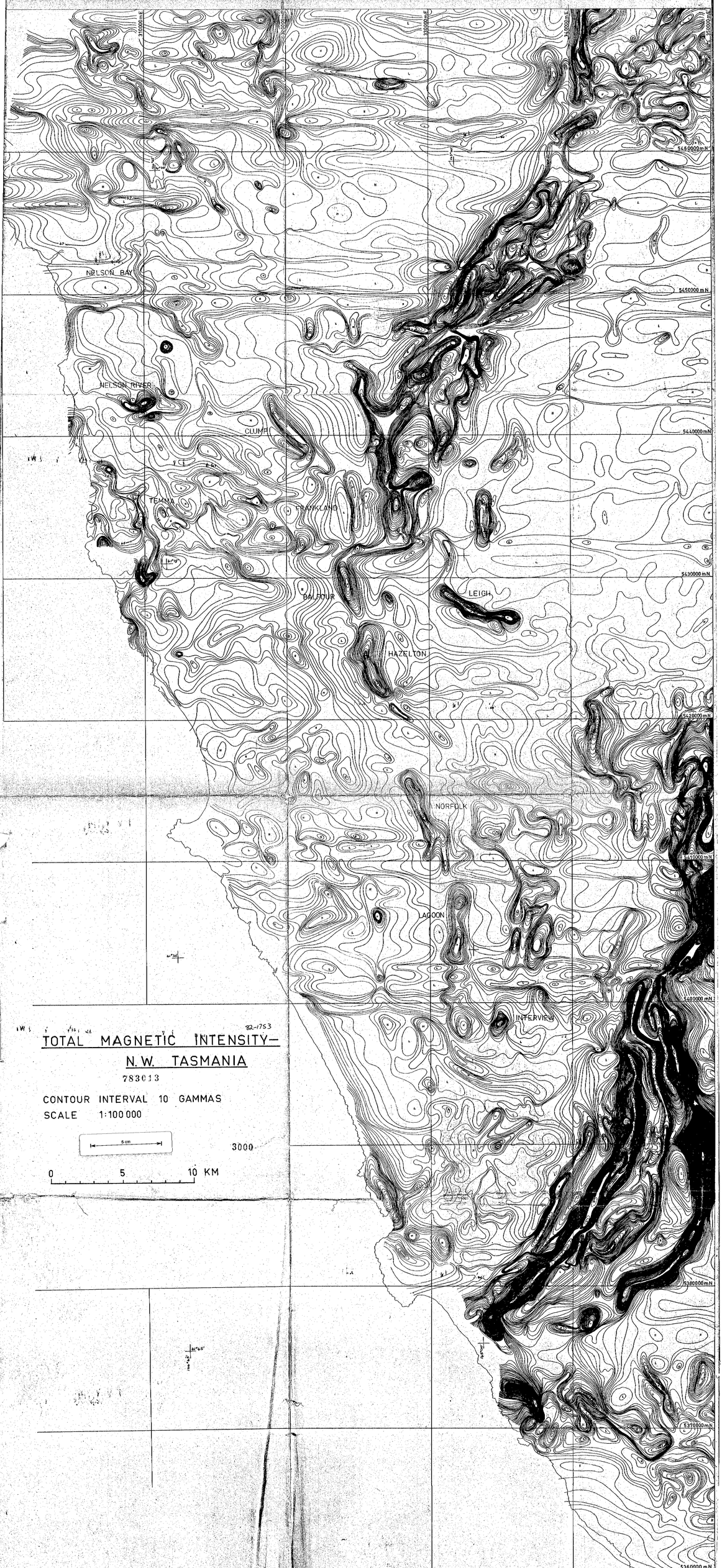
320000 mE
330000 mE
340000 mE


PHOTOGEOLOGICAL INTERPRETATION OF THE ARTHUR AND PIEMAN VALLEYS, TASMANIA
82-1753
2999
783012
SCALE 1:100 000
0 5 10 KM
5 cm
SEDIMENTS
Boundary Symbol
Colour
Quaternary
Active dunes
Stabilized dunes
Tertiary
Conglomerates sands
Permian?
Zeehan Tillite
Ordovician Silurian
Junee Group
Cambrian?
Nu Group
Upsilon Group
Precambrian
Sigma Group
Phi Group
Epsilon Group
Alpha Group
Rho Group
IGNEOUS ROCKS
Tertiary
Basalt
Jurassic
Dolerite
Devonian
Granite
Eocambrian?
Kappa Group
SYMBOLS
Anticlines
Synclines
Faults
Kappa dykes
Photo: run, centre, number
ARTHUR RIVER
TEMMA
THE LITTLE FRENCHMAN
MT HAZELTON
MT HOLLOWAY
Sandy Cape
HELEN PEAK
MT SUNDAY
MT DONALDSON
CORINNA
PIEMAN HEADS
Conical Rocks Point
GRANVILLE HARBOUR
DONNELLYS LOOKOUT
MT HEEMSKIRK
THE GAP
GAP PEAK
IRISHTOWN
ALCOMIE
LILEAH
NABAGENA
ROGER RIVER
TROWUTTA
CHRISTMAS HILLS
EDITH CREEK
EUREKA
Hayshaw Plains
Wanstead Plain
Gillies Lake
Pine Lake
Rhuhadunes Plains
Bluff Hill Point
Sandfly Point
Arthur River
Temma Inlet
Rocky Point
Rocky Inlet
Rocky Creek
Arthur Plains
Sandfly Creek
Hibbs Bay
Rebecca Pt
Rebecca Creek
Rebecca Bay
Temma
Edgcumbe Bay
Round Hill
Round Hill Pt
Round Hill Creek
Round Hill Bay
Sandfly Point
Sandfly Creek
Sandfly Bay
Sandfly Hill
Sandfly Plain
Sandfly Lake



82-1753

TOTAL MAGNETIC INTENSITY— N.W. TASMANIA

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CONTOUR INTERVAL 10 GAMMAS

SCALE 1:100 000

5 cm

3000

0 5 10 KM

3001

82-1753

BOUGUER ANOMALIES— N. W. TASMANIA

783014

CONTOUR INTERVAL 2·5 MILLIGALS

SCALE 1:100 000

5 cm

0 5 10 KM

300000 mE
310000 mE
320000 mE
330000 mE
340000 mE
350000 mE

5460000 mN
5450000 mN
5440000 mN
5430000 mN
5420000 mN
5410000 mN
5400000 mN
5390000 mN
5380000 mN
5370000 mN
5360000 mN

145°45'
41°00'
145°00'
41°15'
145°45'
41°30'
145°00'
41°45'

783015

82-1753

MINERALIZATION DATA — N.W. TASMANIA

5 cm

SCALE 1:100000

3002

0 5 10 KM

Old mines and reported prospects

Lodes reported by Ward (1911)

Geochemical sampling (CRA Tc 75)

$\frac{Sn}{W}$ $\frac{Sn-80\#}{W-80\#}$ ppm $\frac{150}{(10)}$ $\frac{80}{(25)}$

Pieman and Lagoon River Faults

"Deep faults"

300 000 mE
310 000 mE
320 000 mE
330 000 mE
340 000 mE
350 000 mE
5 460 000 mN
5 450 000 mN
5 440 000 mN
5 420 000 mN
5 410 000 mN
5 400 000 mN
5 390 000 mN
5 380 000 mN
5 370 000 mN
5 360 000 mN
144°45'
145°00'
41°00'
41°15'
41°30'
41°45'
REDPA
"DEEP FAULT"
BALFOUR
"DEEP FAULT"
LAGOON RIVER FAULT
PIEMAN FAULT
Nelson R
Corinna
Strickland

82-1753

STRUCTURAL INTERPRETATION OF NORTHWEST TASMANIA

S. WARREN CAREY

5 cm

3003

January 1981

1 : 500 000

0 50 km

783016

145°E

5500000mN

40°S

5500000mN

41°S

5400000mN

42°S

300000mE

400000mE

Currie

Elephant River

Smithton

Marrawah

Arthur River

Duck River

Black River

Wynyard

Flowerdale R.

Inglis R.

Rapid River

Lineament

Arthur River

Donaldson River

Savage River

Luina

Waratah

Savage River

Pieman River

Renison Bell

Tullah

Murchison R.

Zeehan

Eldon R.

Queenstown

Strahan

LEGEND

Ordovician-Silurian: Junee Group	O
Eocambrian-Cambrian undifferentiated	P-€
Sigma Group	S
Proterozoic undifferentiated	P
Phi Group	F
Epsilon Group	E
Alpha Group	A
Rho Group	R
Intrusive Rocks	
Jurassic dolerite cone sheet	Jd
Devonian granite	Dg
Eocambrian to Cambrian	
Acid to intermediate volcanics	€v
Mafic intrusives	€m
Serpentinites	€s
Proterozoic granite	Pg

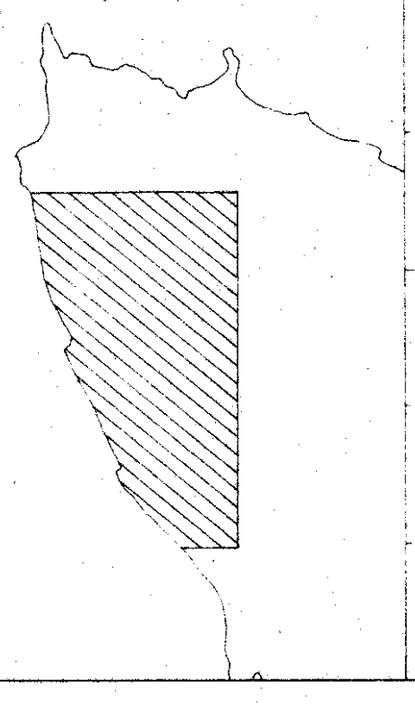
Structures

- Anticlines
- Synclines
- Faults
- Faults projected
- "Deep faults"
- "Deep faults"— projected

SOURCE DIAGRAM

Photo interpretation by S. Warren Carey

Tasmanian Geological Survey maps



82_1753

Notes to Accompany the Photo-Interpretation of the Country betwe
CRA Exploration Pty Ltd"; Geopeko Ltd
Carey, S.W. EL1/1977

Central West Tasmania
Geological Interpretation
+ mag. anomalies
1:100,000

SK 55-3, 5

GE 0104

CENTRAL WESTERN TASMANIA GEOLOGICAL INTERPRETATION

320 000mE 330 000mE 340 000mE 350 000mE 360 000mE 370 000mE 380 000mE 390 000mE

5 420 000mN 5 410 000mN 5 400 000mN 5 390 000mN 5 380 000mN 5 370 000mN 5 360 000mN 5 350 000mN 5 340 000mN

CLEVELAND MT BISCHOFF QUE RIVER ROSEBERY RENISON HERCULES MT LYELL Mt Lindsay St Dizier Severn

INTERVIEW GRANITE MEREDITH GRANITE HEEMSKIRK GRANITE GRANITE TOR

REMA DEER FAULT LAGOON FAULT PIEMAN FAULT SAVAGE FAULT RENISON ANTICLINORIUM HEEMSKIRK SYNCLINORIUM HUSKISSON SYNCLINE FEDERAL FAULT DISCONTINUITY

Kilometres

SCALE 1:100000

QUATERNARY — Q — glacial derived deposits, alluvium, river gravels, beach sands

TERTIARY — Tb basalt; Ts sediments

JURASSIC — Jd dolerite

PERMIAN — Ps sediments

DEVONIAN — Ds sandstone, siltstone, mudstone; Dg granite (ilmenite series)

SILURIAN — Ss siltstone, sandstone, limestone

ORDOVICIAN — Oo Gordon limestone; Om Moina sandstone & Owen conglomerate

OSD

CAMBRIAN — Cd Dundas Group - fossiliferous sediments, dominantly greywacke-shale turbidites; Cc Crimson Ck. Formation - unfossiliferous argillaceous sediments & basic tuffaceous greywackes. Minor tholeiitic basalts; Cub Complex of ultrabasics & basic volcanics; Cu ultramafics - massive serpentine, serpentinised peridotite, serpentinised dunite & related rocks. Coarse gabbroic types (Cug); Crv MT READ VOLCANICS - acid to intermediate lavas & pyroclastics minor sedimentary lenses (Cvs) Stitch Range Sediments; Rosebery hanging wall tuffs; Tyndal Group; Cg granite (ilmenite series)

EO CAMBRIAN — Ce Success Ck. Group - siliceous sandstone, siltstone minor chert, conglomerate & dolomite

PRECAMBRIAN

UNMETAMORPHOSED

a) Oonah Formation

Puo Upper Oonah - black shale, siltstone, dolomite minor tuff

Pus Lower Oonah - quartzite & phyllite

Pu Oonah - undifferentiated

UNMETAMORPHOSED

b) Rocky Cape Nucleus

PS Sigma - slates, basic lavas & massive dolomite (may correlate with Crimson Ck. Formation)

PΦ Phi Group - dolomite, quartzite, shale

PE Epsilon Group - shale, greywacke, quartzite

PA Alpha Group - thick bedded quartzite

PKA

K Kappa Group - basic to intermediate dykes (Cooee Dolerites)

METAMORPHOSED

PA Arthur lineament - dominantly schist & phyllite, with amphibolite

Pt Tyennan Nucleus - quartzite, schist & phyllite

geological boundary

fault

King Island Flinders Island BASS STRAIT Launceston TASMANIA Hobart TASMAN SEA

MAGNETIC ANOMALIES

High Priority

Medium Priority

Known Deposits

Note: This map is a geological summary, most pre-Devonian cover is not shown.

5 cm

GN TN MN

GRID CONVERGENCE 1·5°

GN / MN ANGLE 10·7°

NOTE: Magnetic North is correct for 1982 and moves easterly by 0·1° in approx. 3 years.

GEOPEKO

A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. — DEVONPORT.

CENTRAL WESTERN TASMANIA
GEOLOGICAL INTERPRETATION
SHOWING PRIORITY MAGNETIC ANOMALIES

DATE: Feb 1983 | GEOL: R.R.Large | DRAWN: R.Tognoni | CHKD: | PLAN No: 4.

82_1753
Notes to Accompany the Photo-Interpretation of the Country betwe
CRA Exploration Pty Ltd", Geopeko Ltd
Carey, S.W. EL1/1977

CENTRAL WESTERN TASMANIA
TENURE
1:100,000

SK 55-3,5
TE 0107

320 000mE 330 000mE 340 000mE 350 000mE 360 000mE 370 000mE 380 000mE 390 000mE

5 420 000mN 5 410 000mN 5 400 000mN 5 390 000mN 5 380 000mN 5 370 000mN 5 360 000mN 5 350 000mN 5 340 000mN

E.L.12/80 E.L.18/80 E.L.1/79 E.L.1/77 E.L.23/79 E.L.1/76 E.L. 17/68 E.L.4/77
E.L.1/77 E.L.1/68 E.L.5/63
E.L.56/80
O.G. E.L.4/61
E.L.36/80
E.L.13/79 E.L.36/79
E.L.6/83
E.L.34/82 O.G. E.L.33/79
E.L.37/82 O.G.
E.L.16/78 E.L.15/73
E.L.13/81 E.L.5/63 E.L.12/72 E.L.2/70
E.L.47/82 E.L.17/77 E.L.5/63
E.L.1/77
E.L.32/79 E.L.22/74
E.L.53/70 E.L.31/82 E.L.2/63 E.L.5/63
E.L.5/63 E.L.2/78
E.L.1/62
O.G.
E.L.30/79 E.L.5/63
E.L.42/71 E.L.4/73
E.L.47/71
E.L.11/76 E.L.9/66
E.L.15/76
S.P.L. 129
MT. LYELL MG. & RLY. CO. LTD.
E.L.9/80
E.L.3/83 E.L.4/78
O.G.
E.L.51/80
S.P.L. 806
TRIKON P/L
O.G.

TENURE

E.L. 4/61	INDUSTRIAL MG. & INVEST'S P/L.
E.L. 1/62	E.Z. CO. OF AUST/ASIA.
E.L. 2/63	ABERFOYLE EXPL. P/L.
E.L. 5/63	COMSTAFF P/L.
E.L. 9/66	MT. LYELL MG. & RLY. CO. LTD.
E.L. 1/68	COMSTAFF P/L.
E.L. 2/70	CLEVELAND TIN.
E.L.53/70	C.S.R. LTD.
E.L. 42/71	RENISON LTD.
E.L.47/71	GIPPSLAND MINERALS N.L.
E.L. 12/72	E.Z. CO. OF AUST/ASIA.
E.L. 4/73	ABERFOYLE EXPL. P/L.
E.L. 15/73	ABERFOYLE EXPL. P/L.
E.L.22/74	ABERFOYLE EXPL. P/L.
E.L. 1/76	COMM. ALUM. CORP. LTD.
E.L. 11/76	RENISON LTD.
E.L. 15/76	C.S.R. LTD.
E.L. 1/77	C.R.A. EXPL. P/L.
E.L. 4/77	COMM. ALUM. CORP. LTD.
E.L. 17/77	RENISON LTD.
E.L. 2/78	ALCOA OF AUST. LTD.
E.L. 4/78	AMOCO MINERALS AUST. CO.
E.L. 16/78	ABERFOYLE EXPL. P/L.
E.L. 1/79	C.R.A. EXPL. P/L.
E.L.13/79	METALS EXPL. LTD.
E.L.23/79	B.H.P. CO. LTD.
E.L.30/79	C.R.A. EXPL. P/L.
E.L.32/79	B.H.P. CO. LTD.
E.L.33/79	B.H.P. CO. LTD.
E.L.36/79	SHELL CO. OF AUST. LTD.
E.L. 9/80	AMOCO MINERALS AUST. CO.
E.L.12/80	C.R.A. EXPL. P/L.
E.L.18/80	B.H.P. CO. LTD.
E.L.36/80	C.R.A. EXPL. P/L.
E.L.51/80	E.Z. CO. OF AUST/ASIA.
E.L. 56/80	E.Z. CO. OF AUST/ASIA.
E.L.13/81	G. ABIGNANO CONSTS. P/L.
E.L.31/82	C.S.R. LTD. (P)
E.L.34/82	CLEVELAND TIN LTD.
E.L.37/82	R.T. TORENIUS. (P)
E.L.47/82	J.P. STEPHENS. (P)
E.L. 3/83	RENISON LTD. (P)
E.L. 6/83	PEKO-WALLSEND OPER. LTD.

LEGEND

O.G. Open Ground
S.P.L. Special Prospectors License
(P) Pending

NOTE - E.L. Boundarys approximate only.

1·5 | 0·5 0 2 4 6 8 10
Kilometres
SCALE 1:100000

5 cm

GRID CONVERGENCE 1·5°
GN / MN ANGLE 10·7°
NOTE: Magnetic North is correct for 1982 and moves easterly by 0·1° in approx 3 years

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. — DEVONPORT

CENTRAL WESTERN TASMANIA
TENURE

DATE	GEOL	DRAWN	CHKD	PLAN No
Feb 1983	N.H. Large	R Tognoni		5.

82_1753

Notes to Accompany the Photo-Interpretation of the Country betwe
CRA Exploration Pty Ltd*; Geopeko Ltd
Carey, S.W. EL1/1977

CENTRAL WESTERN TASMANIA
GEOLOGY + AEROMAG.
1:100,000

SK 55-5, 3
GP 2109

CENTRAL WESTERN TASMANIA REGIONAL GEOLOGY & AEROMAGNETICS

Granville Harbour

1·5 1 0·5 0 2 4 6 8 10
Kilometres

SCALE 1:100000

QUATERNARY
- Q — glacial derived deposits, alluvium, river gravels, beach sands

TERTIARY
- Tb — basalt
- Ts — sediments

JURASSIC
- Jd — dolerite

PERMIAN
- Ps — sediments

DEVONIAN
- Ds — sandstone, siltstone, mudstone
- Dg — granite (ilmenite series)

SILURIAN
- Ss — siltstone, sandstone, limestone

ORDOVICIAN
- Ol — Gordon limestone
- Os — Moina sandstone & Owen conglomerate

CAMBRIAN
- Ed — Dundas Group - fossiliferous sediments, dominantly greywacke-shale turbidites
- Ec — Crimson Ck. Formation - unfossiliferous argillaceous sediments & basic tuffaceous greywackes. Minor tholeiitic basalts
- Eb — basic lavas & tuffs (usually part of Crimson Ck. Formation)
- Eu — ultramafics - massive serpentine, serpentinised peridotite, serpentinised dunite & related rocks. Coarse gabbroic types (Eug)
- EAV — MT. READ VOLCANICS - acid to intermediate lavas & pyroclastics; minor sedimentary lenses (Evs) Stitch Range Sediments; Rosebery hanging wall tuffs; Tyndal Group
- Eg — granite (ilmenite series)

EO CAMBRIAN
- Es — Success Ck. Group - siliceous sandstone, siltstone minor chert, conglomerate & dolomite

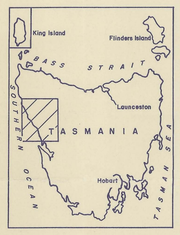
PRECAMBRIAN

UNMETAMORPHOSED
a) Oonah Formation
- POu — Upper Oonah - black shale, siltstone, dolomite minor tuff
- POl — Lower Oonah - quartzite & phyllite
- PO — Oonah - undifferentiated

UNMETAMORPHOSED
b) Rocky Cape Nucleus
- Pσ — Sigma - slates, basic lavas & massive dolomite (may correlate with Crimson Ck. Formation)
- Pφ — Phi Group - dolomite, quartzite, shale
- Pε — Epsilon Group - shale, greywacke, quartzite
- Pα — Alpha Group - thick bedded quartzite
- Pκ — Kappa Group - basic to intermediate dykes (Cooee Dolerites)

METAMORPHOSED
- PPα — Arthur lineament - dominantly schist & phyllite, with amphibolite
- PPε — Tyennan Nucleus - quartzite, schist & phyllite

——— geological boundary
——— fault



GEOLOGY compiled from Department of Mines sheets: SK 55-3, SK 55-5, SK 55-7
UPDATED with data from: Corey (1981), Brown (1982) & Large (1983)
AEROMAGNETICS from Geoex Survey for Department of Mines in 1982

5 cm

GRID CONVERGENCE 1·5°
GN / MN ANGLE 10·7°
NOTE: Magnetic North is correct for 1982 and moves easterly by 0·1° in approx. 3 years.

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. — DEVONPORT.

CENTRAL WESTERN TASMANIA
GEOLOGY & AEROMAGNETICS

DATE: Jan 1983	GEOL: R.R.Large	DRAWN: R.Tognoni	CHKD:	PLAN No: 3.

82_1753

Notes to Accompany the Photo-Interpretation of the Country betwe
CRA Exploration Pty Ltd"; Geopeko Ltd
Carey, S.W. EL1/1977

CENTRAL WESTERN TASMANIA
REGIONAL GEOLOGY
1:100,000
SK55-5, SK55-3
GE 0102

CENTRAL WESTERN TASMANIA REGIONAL GEOLOGY

SCALE 1:100000

Kilometres

QUATERNARY
- Q — glacial derived deposits, alluvium, river gravels, beach sands

TERTIARY
- Tb — basalt
- Ts — sediments

JURASSIC
- Jd — dolerite

PERMIAN
- Ps — sediments

DEVONIAN
- Ds — sandstone, siltstone, mudstone
- Dg — granite (ilmenite series)

SILURIAN
- Ss — siltstone, sandstone, limestone

ORDOVICIAN
- Ol — Gordon limestone
- Om — Moina sandstone & Owen conglomerate

CAMBRIAN
- Ed — Dundas Group - fossiliferous sediments, dominantly greywacke-shale turbidites
- Ec — Crimson Ck. Formation - unfossiliferous argillaceous sediments & basic tuffaceous greywackes. Minor tholeiitic basalts
- Eb — basic lavas & tuffs (usually part of Crimson Ck. Formation)
- Eu — ultramafics - massive serpentine, serpentinised peridotite, serpentinised dunite & related rocks. Coarse gabbroic types (€ug)
- Ev — MT. READ VOLCANICS - acid to intermediate lavas & pyroclastics
- Es — minor sedimentary lenses (€vs) Stitch Range Sediments; Rosebery hanging wall tuffs; Tyndal Group
- Eg — granite (ilmenite series)

EO CAMBRIAN
- Ex — Success Ck. Group - siliceous sandstone, siltstone minor chert, conglomerate & dolomite

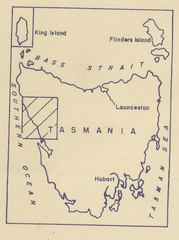
PRECAMBRIAN

UNMETAMORPHOSED
a) Oonah Formation
- Pou — Upper Oonah - black shale, siltstone, dolomite minor tuff
- Pol — Lower Oonah - quartzite & phyllite
- Po — Oonah - undifferentiated

UNMETAMORPHOSED
b) Rocky Cape Nucleus
- Pt — Sigma - slates, basic lavas & massive dolomite (may correlate with Crimson Ck. Formation)
- Pp — Phi Group - dolomite, quartzite, shale
- Pe — Epsilon Group - shale, greywacke, quartzite
- Pa — Alpha Group - thick bedded quartzite
- Pk — Kappa Group - basic to intermediate dykes (Cooee Dolerites)

METAMORPHOSED
- Pra — Arthur lineament - dominantly schist & phyllite, with amphibolite
- Prc — Tyennan Nucleus - quartzite, schist & phyllite

geological boundary
fault



GEOLOGY compiled from Department of Mines sheets: SK55-3, SK55-5, SK55-7
UPDATED with data from: Carey (1981), Brown (1982) & Large (1983)

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. — DEVONPORT.

CENTRAL WESTERN TASMANIA
REGIONAL GEOLOGY

GRID CONVERGENCE 1.5°
GN / MN ANGLE 10.7°
NOTE: Magnetic North is correct for 1982 and moves easterly by 0.1° in approx. 5 years.

DATE: Jan 1983 | GEOL: R.R.Large | DRAWN: R. Tognoni | CHKD: RRL | PLAN No: 1

82_1753

Notes to Accompany tw Photo-Interpretation of the Country betwe
CRA Exploration Pty Ltd"; Geopeko Ltd
Carey, S.W. EL1/1977

CENTRAL WESTERN
TASMANIA
AEROMAGNETICS
1:100,000

SK 55-5, 3

GP 2104

320 000mE 330 000mE 340 000mE 350 000mE 360 000mE 370 000mE 380 000mE 390 000mE

5 420 000mN
5 410 000mN
5 400 000mN
5 390 000mN
5 380 000mN
5 370 000mN
5 360 000mN
5 350 000mN
5 340 000mN

5 cm

GRID CONVERGENCE 1·5°

GN
TN
MN

GN / MN ANGLE 10·7°

NOTE: Magnetic North is correct for 1982 and moves easterly by 0·1° in approx. 3 years.

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. — DEVONPORT

CENTRAL WESTERN TASMANIA

AEROMAGNETICS

DATE: Feb 1983	GEOL: W.R.Large	DRAWN: R. Tognoni	CHKD:	PLAN No: 2.