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REPORT ON PHOTO-INTERPRETATION OF THE YAMPI, CHARNLEY, PRINCE REGENT-CAMDEN SOUND, MONTAGUE SOUND, ASHTON, LONDONDERRY-DRYSDALE, AND MOUNT ELIZABETH 1:250,000 SHEET AREAS, KIMBERLEY DIVISION, WESTERN AUSTRALIA.

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CONTENTS

SUMMARY

Photo-interpretation of nine 1:250,000 Sheets in the Kimberley Division, Western Australia has been carried out with the purpose of assisting in the planning and execution of field work scheduled in the area during 1965 and 1966. The Sheets interpreted are Yampi, Charnley, Prince Regent-Camden Sound, Montague Sound, Ashton, Londonderry-Drysdale and Mt. Elizabeth.

A north-west trending belt of dominantly igneous rocks, of Proterozoic age, the Lamboo Complex, crops out on Yampi and Charnley Sheets. This is overlain unconformably by a younger Proterozoic succession of sandstone, siltstone and interbedded volcanics, the Kimberley Group, which extends at least in part on to all the Sheets studied. This succession is intruded in places by dolerite, and is overlain unconformably by the Walsh Tillite and Mt. House Beds. Devonian rocks are found on Charnley and Yampi Sheets, and Cretaceous rocks crop out in the west of Yampi Sheet.

The Kimberley Group succession is broadly folded except on Yampi Sheet, where strong folding with probable overturning and important faulting is present. Elsewhere faulting seems to be minor, but great lineaments trending north-west and north-east are impressive features.

Because the volcanics in the Kimberley Group and the intrusive dolerite have a similar photographic appearance, it is difficult, where they are adjacent, to locate the boundary between them. Other important problems requiring solution include the nature of the structure of the strongly folded area in the west of Yampi Sheet, and the elucidation of the stratigraphy of the Lamboo Complex.

INTRODUCTION

Photo-interpretation of the above sheets at 1:250,000 scale in the Kimberley Division, Western Australia has been carried out with the purpose of providing a sound basis for planning and executing the field work scheduled for 1965 and 1966. An existing geological map by J.E. Harms at 10 miles to an inch (Harms, 1959) has served as the basis for the geological interpretation.

The results are, in broad outline, the same as those of Harms; where our work differs in detail, mention is made in the body of the report.

The air photographs used were taken by the R.A.A.F. in 1949 and are of only fair quality. Planimetric compilations by the Royal Australian Survey Corp on stable material at 1:250,000 scale were available, and the centre points on these were used to locate reduced scale prints of annotated photo overlays, to make the photo-geological compilation. Serious distortions, apparently in the original slotted templet lay-down, were encountered on Prince Regent between Run 14, Photos 5195-5185, and Run 15, Photos 5120-5129, and at the junction between Yampi and Charnley on Run 15. In places, distortions of the stereoscopic model, evident particularly in the Montague Sound photos, for example Run 12, Photos 5131-2, make the estimation of direction and the amount of dip of strata subject to gross error.

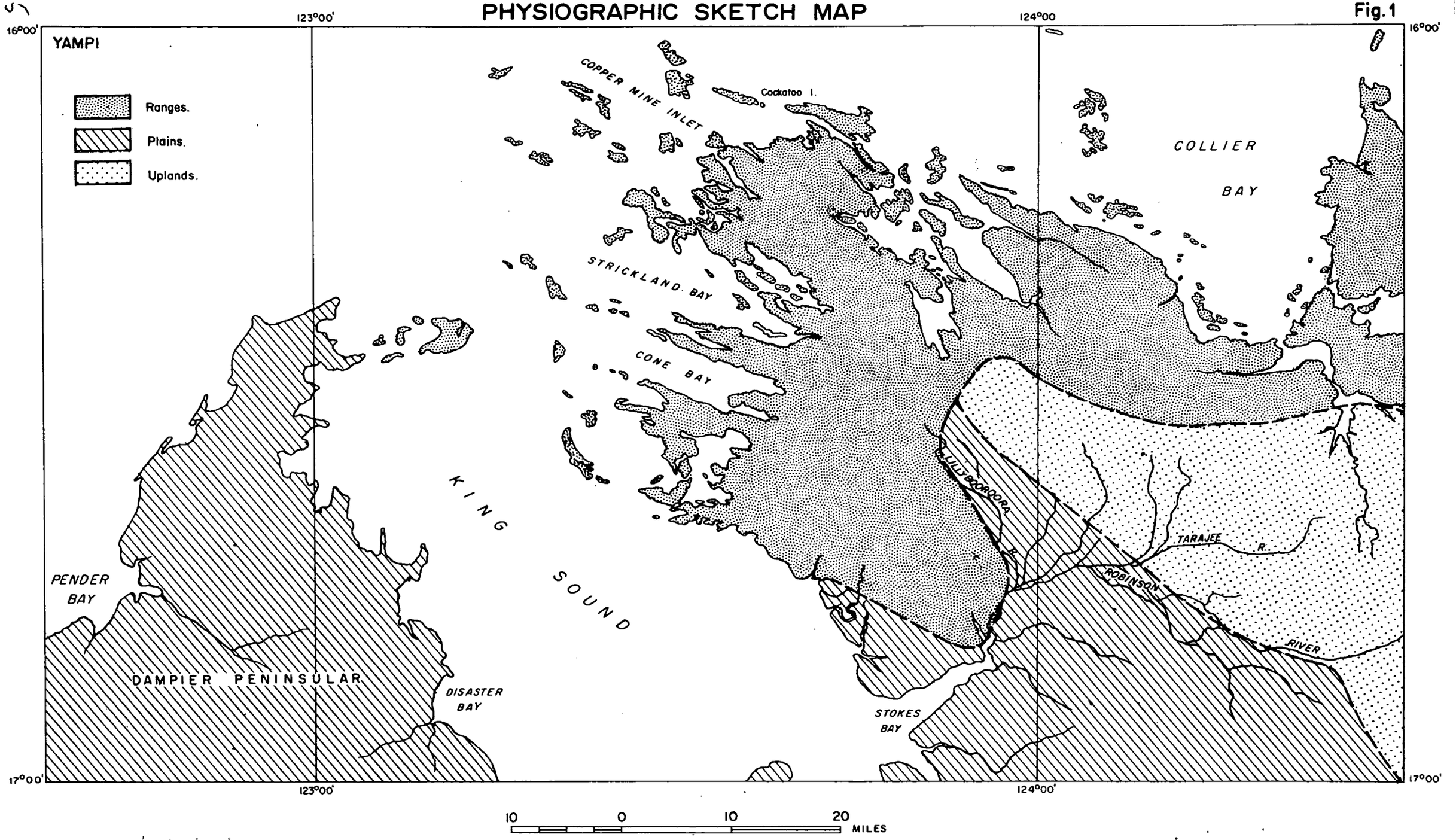
TABLE OF PHOTOGEOLOGICAL UNITS

The following table lists all the units encountered in the whole area; references on individual map Sheets include only those units found in the particular Sheet.

PHOTOGEOLOGICAL CHARACTER	SYMBOL	POSSIBLE GEOLOGICAL INTERPRETATION		
	Q	River and coastal alluvium	QUATERNARY	CAOIZNOIC
Dark toned, smooth surface, low relief	Cz	Residual soil, sand includes some laterite.	UNDIFFERENTIATED	CAOIZNOIC
Medium grey toned, low relief	K		CRETACEOUS	MZEOSIOC
Medium grey toned, rough surface, low relief, bedded	D2	Napier Formation	DEVONIAN	PAZLOAIEOC
Medium grey toned, smooth surface, soft appearance, bedding rare	D1	Patterson Conglomerate	DEVONIAN	PAZLOAIEOC
Medium grey toned, smooth surface, well bedded	Bm	Mt. House Beds		PROTEROZOIC
Dark toned, smooth surface, bedding uncommon	Bt	Walsh Tillite		PROTEROZOIC
Light to medium toned, striated pattern	Btm	Mendena Formation	BASTION GROUP	PROTEROZOIC
Dark toned, soft unit, forms depressions within sandstone	Bdh	Hart Dolerite		PROTEROZOIC
Dark toned, well bedded	Bkp	Pentecost Sandstone	KIMBERLEY GROUP	PROTEROZOIC
Medium grey toned, smooth surface, low relief	Bke	Elgee Siltstone	KIMBERLEY GROUP	PROTEROZOIC
Dark toned, low relief	Bkw_1	Volcanic rocks	KIMBERLEY GROUP	PROTEROZOIC
Light toned, scarp forming, bedded	Bkw	Warton Sandstone	KIMBERLEY GROUP	PROTEROZOIC
Grey toned, soft formation Grey toned, soft with hard intercalations, relief low to moderate	Bkc_1 Bkc	Carson Volcanics	KIMBERLEY GROUP	PROTEROZOIC
Light toned, rough surface, hard appearance, bedded, much jointed	Bkl	King Leopold Sandstone	KIMBERLEY GROUP	PROTEROZOIC
Dark toned with light toned smooth areas in places, forms rounded hills	B7			PROTEROZOIC
Dark toned, well bedded, strongly folded	B6			PROTEROZOIC
Dark toned, generally massive formation with high relief	B5			PROTEROZOIC
Dark toned, linear form	B4			PROTEROZOIC
Medium grey toned, forms rounded hills, jointed	B3			PROTEROZOIC
Dark toned, forms steep sided hills with rounded tops, jointed	B2			PROTEROZOIC
Light grey toned, low relief	B1			PROTEROZOIC
	U	Undetermined		

PHYSIOGRAPHIC SKETCH MAP

Fig.1



Previous work in the area is summarized by Harms (1959). The stratigraphic nomenclature used follows that adopted by Bureau of Mineral Resources geologists working on the Lissadell (Dunnet & Plumb, 1964) and Cambridge Gulf Sheets (see Table).

The boundary between the Carson Volcanics and the overlying Warton Sandstone is drawn at the base of the main scarp, though field inspection showed beds of sandstone probably interbedded with shale or soft volcanics for some distance below the base of the scarp. On Prince Regent and Ashton Sheets this lower boundary is also shown by a dashed line.

YAMPI
Physiography

Considered in relation to the Kimberley area as a whole, the position of the Yampi area is of particular interest. It occupies the extreme end of the western branch of the V made by the Lamboo Complex and forms a strongly indented peninsula fringed by many islands.

Three physiographic divisions are proposed: the Ranges, the Uplands and the Plains, each of which corresponds to the broad geological provinces (Fig. 1).

The Ranges occupying the northern and western areas of the peninsula, are characterized by long ranges trending north-west, separated by steep valleys or sea inlets that generally emphasise the position of soft rocks. Strongly folded rocks are found in this unit, which also includes the islands.

The Uplands occupy the triangle made in the centre of the peninsula by the Lamboo Complex.

The Plains form the southern area of the peninsula, and are also a part of the northern edge of the Fitzroy Basin. The part of the Dampier Peninsula which extends into the western part of the Yampi Sheet is included within the Plains.

Description of Photo-geological Units.

The Lamboo Complex is divided into several lithological subdivisions based on the type of erosion. As the manner of erosion, and hence the photogeological character can be influenced by the structural attitude of a formation, some of the boundaries drawn may be within a single rock unit.

E6 shows a well-bedded character and seems to circle other more granular looking formations (granite, gneiss, ...) that are probably older.

E7 is possibly granite or a similar rock, and is thought to be intrusive. During a brief field visit it was noticed that the smooth photo pattern normally associated with granite can be produced by anticlines in folded gneiss.

Three areas - Run 3, Photo 5107, Run 4, Photos 5122-24, and Run 5, Photo 5177 - have been designated as Ekcl because of their erosion pattern. The areas seem to cover rocks stratigraphically below the Warton Sandstone, and we have therefore considered them as Carson Volcanics. However, the probable presence of E7 (and several dykes) in the first of these areas may mean that Ekcl is quite different from the Carson Volcanics.

As mentioned in the Introduction, the basal limit of the Warton Sandstone has been placed at the bottom of the main scarp. During a brief field inspection on Charnley it was noticed that there are beds of sandstone with probable shale interbeds between the Carson Volcanics and the base of the main scarp. This part of the section was not observed on Yampi.

The Elgee Siltstone was also not recognised on Yampi Sheet; however, the Yampi Beds of Harms (1959) have been shown as Pentecost Sandstone, more because of its photogeological character than its stratigraphical position, and it may include Ɛke and Ɛkp.

A soft formation lying unconformably on the Proterozoic units Ɛkl-Ɛkc-Ɛkw has been mapped near the centre of the Sheet. It is assigned to Dl because of the similarity of its pattern to that of Dl on Charnley Sheet, and because its probable extension can be followed under cover from the south-east corner of the Sheet as indicated by the symbols Cz/Dl.

Two areas of outcrop in the south-east corner of the Sheet have been labelled U: the direction of trend lines within these areas is roughly north and it is possible that they belong to younger formations than D2.

In Dampier Peninsula, south of Deepwater Point (Run 11, Photo 5163 and Run 12, Photo 5149) a strongly folded formation is exposed in two places. It is considered more likely to be a Proterozoic formation than Cretaceous, as is shown on previous geological maps.

Structure

The main feature, in this area, appears to be the west-north-west trending fault system which passes close to the photo-centres 5027 Run 7 and 5177 Run 7A. It probably continues to the west, giving rise to the sudden change that affects the general direction of the outcrops, (Run 6, Photo 5198) and also to the east as suggested by trend lines showing through the cover.

North of this fault system the structures are almost regular and well outlined by the Ɛ6, Ɛkc, or Ɛkp. South of the fault system the structures are very complicated, and the main problem was to separate the King Leopold Sandstone from the Warton Sandstone. Where the Carson Volcanics could be identified this was easy, but elsewhere there are probably abnormal contacts between these two sandstones due to secondary faults or overturned structures. South of the fault system but east of the Robinson River, the rocks are mantled by Cz.

On the Dampier Peninsula the very poor quality of the photos prevents definite correlation of the folded rocks there with Proterozoic rocks of the Yampi area.

As indicated in the section on Photogeological Units, Ɛ7 is regarded as probably intrusive. Besides the main area of Lamboo Complex it has been mapped on Run 4, Photo 5121, in the Sunday Islands, and on Run 8, Photos 5071-73.

Attention is drawn to the scattered outcrops of Ɛ7 on Run 9A, Photo 5217, Run 10, Photo 5017, and Run 11, Photo 5091; these outcrops are surrounded by Ɛ6, and may belong at depth to the same mass.

Probably one of the main problems is the confirmation or otherwise of the fault system referred to above.

CHARNLEY
Physiography

In the south-west the Lamboo Complex forms a triangle of hilly terrain that joins with the "Uplands" division on Yampi. Immediately north-east of the Lamboo Complex, the King Leopold Sandstone and Hart Dolerite form a belt of ridge-and-valley topography with probably the highest relief in the area. The King Leopold Sandstone elsewhere forms an eroded rough-surfaced plateau with, here and there, irregular depressions occupied by dolerite. By comparison, the Carson Volcanics are low lying, with many cuestas, particularly near the base of the formation. The Warton Sandstone forms a generally scarp-bounded plateau standing above the level of the Carson Volcanics.

Description of Photo-geological Units

The subdivisions of the Lamboo Complex are an extension of those on Yampi Sheet, and as previously explained, are more lithological than stratigraphical. Only the E1, E2, E3, E6 and E7 divisions appear on Charnley.

The crystalline Precambrian is overlain unconformably by a thin bedded unit with medium grey tone (Ekl). This is considered to be an arenite and is probably the equivalent of one of the arenites below the base of the King Leopold Sandstone in the Lansdowne area; the lutites present in that area are not present here, being apparently obscured by an intrusion of thick and massive dolerite (Edh).

The Ekl proper usually has a grey toned rough surface with a hard appearance; it is bedded but in some places this is difficult to observe except near the contact with the overlying Carson Volcanics (Ekc) where bedding normally is visible.

The Pkc has a dull grey aspect and overlies the Ekl conformably. On Run 9, Photo 5083, isolated outcrops of sediments seem to be interbedded with the volcanics near the base of the unit. Interbedded sediments are also present on Run 14, Photo 5055, and on Run 11, Photo 5196, where they are near the top of the Ekc. In places, where the Ekc is adjacent to the Edh, the contact is difficult to define because the appearance of the two units is so similar (for example on Run 12, Photo 5160, Run 15, Photo 5036, Run 4, Photo 5112, and Run 5, Photo 5050).

In most places the sediments overlying the Carson Volcanics form a prominent scarp bordering a plateau that stands at a higher altitude than the volcanics. These sediments form a unit here designated as Warton Sandstone (Ekw) but which corresponds to Harms' Harding Sandstone. The Pkw is generally light toned and less jointed than the King Leopold Sandstone, but the difference is not distinctive, that is, they cannot be positively identified in isolated outcrop. Overlying the Ekw in two places, one in the Synnot Range, the other in the Harding Range, is a dark-toned unit of low relief labelled Pkwl; this has the appearance of volcanic rocks, and has been assigned to the "Mornington" Volcanics by Harms. However, it definitely overlies the Ekw and seems to be structurally conformable. A section through the Pkw from the Ekc to the Ekwl can be examined in the creek on the west side of Run 11, Photo 5192, and another section through the Ekw can be seen on Run 11, Photo 5194.

In the south-east of Charnley Sheet a bedded grey-toned unit with a smooth surface lies unconformably on the Ekc. This unit is regarded as belonging to the Mt. House Beds (Em).

The symbol Bdh is applied to a unit of dark tone commonly found within valleys and depressions in the Bkl, but occurring also within the Bkw. Although shown in Bdh colour, parts of these areas
are mantled by Cz and scree, and areincluded because of their morphology. In places the Bdh is continuous with dykes that intrude the Bkl, Bkc, and Bkw.

Two Devonian units D1 and D2, identified by continuity with formations on the Lennard River Sheet (Guppy and Others, 1958) pass across the south-west corner of Charnley on to Yampi Sheet. D1 (Patterson Conglomerate) has a characteristic soft appearance without bedding; D2 (Napier Formation) is bedded with a hard-looking rough surface.

Structure

The basal Bkl sediments dip moderately to steeply off the crystalline Precambrian Lamboo Complex in the south-west; and in the King Leopold and Isdell Ranges the Bkl shows folds of the order of a few miles in length trending sub-parallel to the margin of the Lamboo Complex. Elsewhere dips are low except near faults and the margins of dolerite intrusions where the rocks are folded into broad anticlines and synclines. These trend north-east in the Harding, Artesian and Synnot Ranges; north-west in the Phillips Range, and west in the Mt. Barnett area. In the south central part of the Sheet near Bamboo Creek a probable anticline in the Bkl trends north.

Two important fault zones trending east of north cross the Edkins Range; south of Run 5 the western fault zone turns and parallels the Artesian Range. These zones, which are in the north of the Sheet, are quartz-filled, but there appears to have been little displacement. Three major fractures or lineaments trend roughly north-west across the Sheet, the longest extending from the Phillips Range to Doubtful Bay and containing a basic dyke for part of its length. On Run 5, Photo 5058, a basic dyke trending north-west cuts a quartz-filled fracture trending north-east, and so is later in time. South of Doubtful Bay, normal faults trending north of east bring Warton Sandstone into contact with King Leopold Sandstone. On Run 6, Photo 5026, a basic dyke with a north-west trend cuts a probable dolerite sill.

Where Bkc and dolerite come together, the uncertainty of locating the boundary precisely makes for uncertainty in the structural interpretation. For example, on Run 7, Photo 5172, the map shows dolerite apparently terminating on the east side of a fault and Bkc on the west. This situation is interpreted to mean that the fault is post Bkc but pre-dolerite; however, if dolerite is found on the west side of the fault one could conclude that the faulting is post-dolerite. On Run 6, Photo 5011, a fault trending north-north-east appears to be later than the dolerite.

The Bkl is much jointed or fractured and it is difficult to tell from the air photos in most places whether movement has occurred along these lineaments. The Bkw is also jointed but less so than the Bkl.

PRINCE REGENT & CAMDEN SOUND

Physiography

The western part of this area is characterised by a succession of cuestas. These are steep within the sandstone but low within the volcanics except where the latter are interstratified with hard sedimentary rocks. Cuestas are also present in the north-eastern area but only within the volcanic rocks.

The central area covered by the King Leopold Sandstone may be considered as a plateau with rounded hills in places and crossed by very steep canyons, mainly in the vicinity of the Prince Regent River.

The broken nature of the coastline and the many offshore islands suggest that the last significant earth movement was one of submergence.

Description of Photo-geological Units

The units on these Sheets have all been previously described but certain problems should be mentioned.

In the extreme western area where Pentecost Sandstone is shown on the map, a soft formation previously shown as dolerite, has been included in the Bkp; in part it may be the Bke.

Difficulty has been experienced in locating the limit between Carson Volcanics and Hart Dolerite wherever the postulated dolerite is extensive, and particularly in the south-east corner (Run 13, Photo 5056-62).

On Run 15, Photo 5114, the peninsula was mapped by Harms (1959) as Harding Sandstone, but because of the structure it is considered as King Leopold Sandstone. The abnormal contact between the two sandstones Bkl and Bkw is regarded as being due to faulting.

Structure

This area was very strongly affected by intrusive dolerite, in the form of dykes and sills. The dykes occur along parts of the fracture in which the Prince Regent River runs, and intersecting this are two long dykes trending north-north-east; shorter dykes are found elsewhere, particularly within the western outcrop of Carson Volcanics.

Certain of the broad outcrops of dolerite have the structure of sills, for example, on Run 14, Photo 5193.

In some places the dolerite may be laccolithic because it appears to have domed up the sediments it intrudes, for example, Run 1A, Photo 5205, Run 11, Photo 5162.

North of George Water a broad anticline is marked by the appearance of Bkl within the Bkc. North of this the Bkw is folded into a broad syncline and to the west another syncline occurs in the Bkw and Bkp.

East of the long fracture system trending more or less north, there are many small anticlines, possibly because of the intrusive activity of dolerite. The synclines are marked by the presence of Bkc.

The main fracture directions are north-west, north-east and north, the most important being the one in which the Prince Regent River runs. Many of the small fractures seem to be due to the dolerite activity. To the west of George Water is the important fault system that brings the Bkl and Bkw into abnormal contact.

MONTAGUE SOUND
Physiography

In the west the King Leopold Sandstone (Bkl) forms a rough surfaced plateau with irregularly distributed small valleys floored with Bdh or Cz, while in the south-east the cuesta topography of the Carson Volcanics continues from Prince Regent Sheet. The Bkc is partly covered by mesas of laterite. Much of the drainage system within the Bkl is joint-controlled. The many islands and deep indentations are characteristic of a drowned coastline.

Description of Photo-geological Units.

The King Leopold Sandstone (Bkl); the Carson Volcanics (Bkc); possibly the Warton Sandstone (Bkw); and the Hart Dolerite (Bdh), are found on Montague Sound Sheet, and their nature has already been described in connection with Charnley Sheet. Bkw has been applied to isolated (?)sandstones overlying the Bkc in the Osborne Islands, but these could be the equivalents of sediments interbedded in the volcanics as on Charnley.

Structure

The Bkl forms a more or less sub-horizontal plateau that is warped in the east into a north-trending syncline some 16 miles wide. The syncline is occupied by Bkc, which has an estimated thickness of 900 feet. The master joints or lineaments in the Bkl trend north-north-east and west-north-west.

ASHTON
Physiography

The Pentecost Sandstone which covers about half the Sheet is characterised by a succession of benches or low scarps, and in the north-east corner forms a plateau. The Carson Volcanics and the Elgee Siltstone form relatively low topography; mesas are well developed where laterite covers the Carson Volcanics.

The main river draining the area is the Drysdale, which heads in the south-west and flows generally north-north-east.

Description of Photo-geological Units

The complete succession from the King Leopold Sandstone to the Pentecost Sandstone is present on this Sheet, and all units except the latter have been described previously.

The Pentecost Sandstone (Bkp) is a dark toned well-bedded unit.

There is the usual difficulty of locating the limit between the Carson Volcanics (Bkc) and the Hart Dolerite (Bdh).

In the northern part of the Sheet the boundary between the Bkl and Bkc, in places masked by laterite, is easy to follow, but to the south the limit is confused, and it seems that the Bkc is thinner.

The boundary between the Bkc and Bkw is drawn at the base of the main sandstone scarp, but where the softer beds below the scarp and above the Bkc are visible, a probable lithological boundary is included also.

Away from the base of the Pentecost scarp the Elgee Siltstone does not crop out well, and where the cover is thought to be lying directly on Bke the symbol Cz/sh is used.

The plateau in the north-east of the Sheet was regarded as probable Mt. House Beds by Harms (1959), but we have preferred to leave it in the Bkp, though it has been outlined by a "probable" lithological boundary.

Structure

In the west where the Sheet adjoins Prince Regent, the Bkl is intruded by dolerite; some anticlines in the area are probably due to concealed dolerite, (Run 11, north of Photo centres 5183-84; Run 12, south of Photo centres 5165-66; Run 14, Photos 5086-87).

Within the Carson Volcanics the anticlinal structures are well marked by the King Leopold Sandstone along their axes, and by the indentations in the boundary of the Warton Sandstone.

In the north the Pentecost Sandstone is subhorizontal, but south of the centre of the Sheet large indentations in the base of the formation outline anticlinal structures, the most important of which may be the one whose axis trends north. This direction is unusual because the general direction of the axes is roughly east.

The main fractures trend north-east and north-west. Small anticlines are associated with the latter direction in several places.

On Run 3, Photo 5139, King Leopold Sandstone is present as an inlier within the Carson Volcanics, because of a north-trending fault.

LONDONDERRY AND DRYSDALE
Physiography

The coast can be classified as of the drowned type; in the north-west the Carson Volcanics (Bkc) form a deeply indented peninsula capped with thick mesaform laterite deposits. The streams entering Vansittart and Napier Broome Bay probably originally formed two river systems but are now betrunked.

In the south-east the Pentecost Sandstone (Bkp) forms a plateau characterised by numerous benches and low scarps due probably to the interbedding of relatively soft finer grained sediments with the sandstone. The junction between the Pentecost Sandstone and the underlying Elgee Siltstone (Bke) is marked in most places by a prominent scarp, but in the north of the outcrop area, e.g. Run 5, Photo 5141, only a low scarp is present, and the Elgee Siltstone is covered by scree.

A zone of Cz cover generally obscures the contact between the Elgee Siltstone and the Warton Sandstone (Bkw) in the relatively low lying area below the Pentecost scarp.

The Warton Sandstone forms another prominent scarp at its contact with the Carson Volcanics; the latter unit gives rise to hilly topography, generally at a lower altitude than the Warton Sandstone. The mesas of laterite on the volcanics form high isolated hills, e.g. Oombrai Hill, Putairta Hill.

In the west and north the King Leopold Sandstone (Bkl) forms a rough-surfaced plateau with, in places, irregularly shaped depressions occupied by Hart Dolerite (Bdh).

Description of Photo-geological Units

All units on Londonderry-Drysdale have been mentioned in connection with the Ashton Sheet and only particular problems will be referred to here.

Near the base of the Carson Volcanics, sediments (probably sandstone) are interbedded with the volcanic rocks (Run 1, Photo 5161; Run 14, Photo 5074; Run 15, Photo 5026); possible sediments also occur on Run 6, Photo 5128; and Run 7, Photo 5169 within the Carson Volcanics. At the top of this formation on Run 11, Photo 5060, extra sedimentary beds may be present at the junction of the Carson Volcanics and the Warton Sandstone. On Run 1, Photo 5157, and on Run 2, Photo 5004, laterite is developed apparently on thin volcanics overlying the Warton Sandstone.

Good exposures of Elgee Siltstone have been observed on Run 13, Photo 5024, and a suitable place to measure a section through the Unit should be found on Run 9, Photo 5141. Bedding trends in the Siltstone are distinct on Run 7, Photo 5159; and this may indicate the presence of dolomite which has been observed in this stratigraphic position on Lissadell and Lansdowne Sheets (K. Plumb, pers. comm.).

The lithology of the rocks shown as Hart Dolerite should be checked in the field as Harms (1959) has mapped them as "Mornington" Volcanics.

Structure

Broad gentle warping is typical of the area, the largest fold being the syncline in the Pentecost Sandstone, Elgee Shale and Warton Sandstone. Most fold axes trend north or east of north, but a few cross-folds trend west or north-west.

The major lineaments form a conjugate set trending about 330 and 055 degees respectively. The numerous joints also show these directions, and there is a third important set of joints well developed in the Pentecost and Warton Sandstone whose direction, approximately 280 degrees, almost bisects the angle made by the conjugate set. The straight trace of most joints indicates that they dip steeply. Movement along the lineaments has been minor.

Basic dykes have been mapped within the King Leopold Sandstone, particularly along lineaments in the 055 direction.

MT. ELIZABETH
Physiography

The area is drained by three important rivers; the Durack and Chapman rise in the south-east and south-central part respectively, flow north-east and join near the northern boundary of the Sheet; they flow over the gently warped surface of the Pentecost Sandstone (Bkp). The Hann River rises in the north-west and follows an arcuate course generally south; it crosses the fold structures of the Barnett Range, and further south, the Phillips Range, and because of this discordance with structure it is regarded as a superimposed stream. Possibly the Durack and Chapman Rivers are also superimposed, though the evidence is not compelling, and their northerly path could have been produced by slight regional tilt.

The eastern half of the Sheet and part of the west is occupied by the Pentecost Sandstone, which forms an undulating plateau with numerous benches and low scarps. A prominent scarp marks the contact with the Elgee Siltstone (Bke), which formation, away from the foot of the scarp, is concealed in most places by Cz; this also masks the contact between the Elgee Siltstone and Warton Sandstone (Bkw). The Warton Sandstone makes a scarp at its junction with the Carson Volcanics (Bkc); The Volcanics are low-lying relative to the Sandstone, and they are commonly drained by strike streams such as Harris Creek and North Creek.

In the north-west the rough surfaced plateau of the King Leopold Sandstone (Bkl) continues from Charnley Sheet; in the south-west the Phillips Range is formed by a fold in the King Leopold Sandstone.

Description of Photo-geological Units

All units of the Kimberley Group are present on the Mt. Elizabeth Sheet, and the Hart Dolerite, the Mendena Formation of the Bastion Group, the Walsh Tillite and Mt. House Beds are found also.

The Mendena Formation overlies the Pentecost Sandstone conformably. In the east the unit has been extended to Mt. Elizabeth Sheet from the previously mapped Lissadell Sheet (Dunnet & Plumb, 1964), and it probably occurs in the south-east also. The Mendena Formation is lighter in tone than the Pentecost Sandstone, and has a striated pattern due to the alternation of hard and soft beds.

The Walsh Tillite (Bt) occupies an area drained by the headwaters of the Traine River, the Chapman River and the creek that flows through Police Valley. It is a dark-toned soft unit with a smooth surface; bedding is observed in only a few places near the base, which rests unconformably on the Pentecost Sandstone and older formations of the Kimberley Group, with the exception of the King Leopold Sandstone. Harms (1959, Part II, p.41) reports an area of some acres of glaciated bedrock of the Pentecost Sandstone in the vicinity of Lat. 16°52'E, Long.126°25'S. In places the boundary of the Tillite with the Pentecost Sandstone is difficult to distinguish, particularly east of the Harris Range.

All other units have been referred to previously, and only particular points will be mentioned.

The Mt. House Beds (Bm) conformably overlie the Walsh Tillite; in the air photos they appear as a bedded grey-toned smooth surfaced unit whose main area of distribution is east and north-east of the Phillips Range.

An area on Run 5, Photo 5164, south of Karunjie, is assigned to the Hart Dolerite (Bdh) because of its photo character, though it is probably mainly soil covered. On Harms' map it is shown as "Mornington" Volcanics, and he refers to it as "doleritic rock interbedded with or intruding the Pentecost Sandstone" (Harms, 1959, Part III, p.33). He also reports dolerite in an area west of the Salmond River, Run 8, Photo 5013, but this is shown as Cz on our map.

Structure

Broad gentle folding is typical of the whole area, and particularly of the Pentecost Sandstone, which occupies somewhat more than the eastern half of the Sheet. Steeper dips are found in the Phillips Range, where the King Leopold Sandstone forms the core of a well defined east-plunging anticline. Intrusive dolerite in the vicinity of the crest has apparently pushed up the sediments, and is responsible for the varying trend of the axis. North of this anticline is a complementary syncline with a core of Pentecost Sandstone. Near the western end of the syncline, within the Pentecost Sandstone is a complex structure whose nature is not understood; several steeply dipping probable sandstone beds are disposed in a roughly radial fashion round a central low hill, the photo character of which appears the same as that of the adjacent sandstone beds. The structure is tentatively regarded as an intrusive centre.

Just south of this structure the Pentecost Sandstone and subjacent Elgee Siltstone are folded into a small anticline, but the south limb of the complementary syncline is considered to be faulted out. A normal fault, with north-east block down is postulated, followed by erosion of Elgee Shale and Pentecost Sandstone from the south-west block, then reverse movement along the same fault line, producing the present attitudes of the units.

Small folds in the King Leopold Sandstone and the Carson Volcanics are present north of Barnett River Gorge.

Faulting is widespread, but it seems of minor importance in that no large relative movements are involved. On Run 10, Photo 5123, and Run 12, Photo 5170, the Walsh Tillite appears to be faulted down into the Warton Sandstone and Pentecost Sandstone respectively, or the tillite was deposited against existing fault scarps in these formations.

Important trend directions of lineaments and joints are approximately 050 and 325 degrees, and a third direction of 275 degrees, which almost bisects the angle between the other two. Of interests in the Pentecost Sandstone in the south-east part of the Sheet are the curved lineaments which apparently dip at shallow angles relative to those with straight traces.

REFERENCES

DUNNET, D., & PLUMB, K.A., 1964 - Explanatory Notes on the Lissadell 1:250,000 Geological Sheet SE52-2, Bur.Min.Resour.Aust.Rec. 1964/70 (unpubl.)

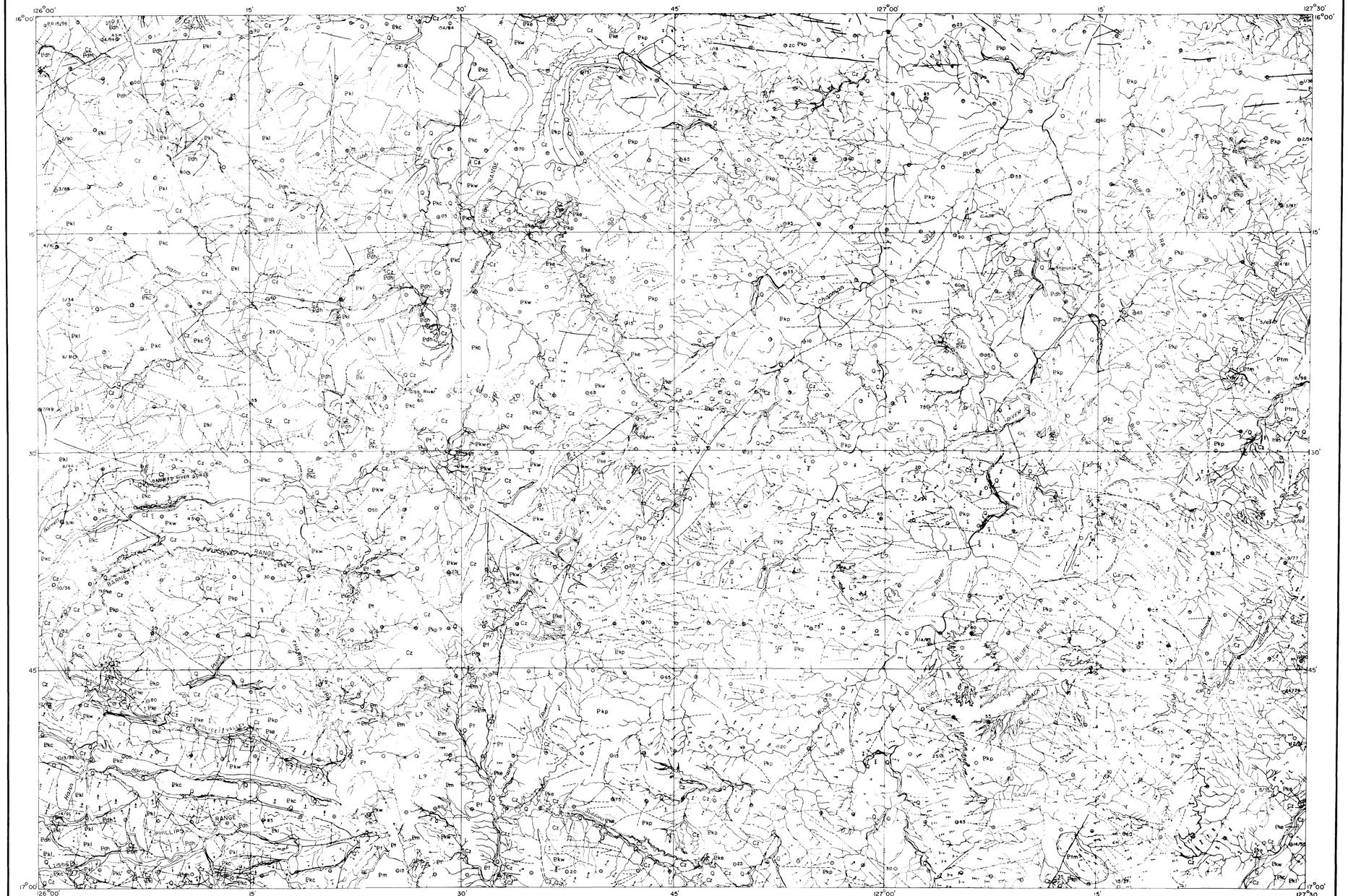
GUPPY, D.J., LINDNER, A.W., RATTIGAN, J.H., & CASEY, J.N., 1958 - The Geology of the Fitzroy Basin, Western Australia, Bur.Min.Resour.Aust. Bull. 36.

HARMS, J.E., 1959 - The Geology of the Kimberley Division, Western Australia, and of an adjacent area of the Northern Territory, M.Sc. thesis, Univ. of Adelaide, (unpubl.).

BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

MOUNT ELIZABETH
WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SE52-1



REFERENCE

Photogeological Character		Possible Geological Interpretation		
	Q	Alluvium	QUATERNARY	CAINOZOIC
Dark tone, smooth surface, low relief	Cz	Residual soil, sand, includes some laterite.	UNDIFFERENTIATED	
Medium grey toned, smooth surface, well bedded	Em	Mt House Beds		PRECAMBRIAN
Dark toned, smooth surface, bedding uncommon	Et	Walsh Tillite		
Light to medium toned, striated pattern	Etm	Mendena Formation		
Dark toned, soft unit, forms depressions within sandstone	Bdh	Hart Dolerite		
Dark toned, well bedded	Pkp	Pentecost Sandstone	PROTEROZOIC	
Medium grey toned, smooth surface, low relief	Eke	Elgee Siltstone		
Dark toned, scarp forming, bedded	Ekw	Warton Sandstone		
Grey toned, soft with hard intercalations, relief low to moderate	Ekc	Carson Volcanics		
Light toned, rough surface, hard appearance, bedded, much jointed	Ekl	King Leopold Sandstone		

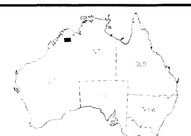
- Lithological boundary
- Probable lithological boundary
- Anticlinal axis
- Synclinal axis
- Fault
- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

Estimated dips
- Horizontal
- Very low
- Low
- Medium
- Steep
- Vertical

- Trend line
- Joint pattern
- Topographic scarp
- Laterite (L), Terrace (T), Scree (S)
- Dyke

- Principal road
- Minor roads and tracks
- Railway line
- Telephone line
- Fence
- State boundary
- Mine
- Homestead
- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points-adjoining sheet

Compiled by the Bureau of Mineral Resources, Geology and Geophysics.
Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force, complete vertical coverage at 1:48,000 scale
Transverse Mercator Projection



SCALE 1:250,000

5 0 5 10 15 MILES

5 0 5 10 15 20 KILOMETRES

INDEX TO ADJOINING SHEETS

PRINCE REGENT	ASHTON	MEDUSA BANKS
CHARNLEY	MOUNT ELIZABETH	LISSADELL
LENNARD RIVER	LANSDOWNE	DIXON RANGE

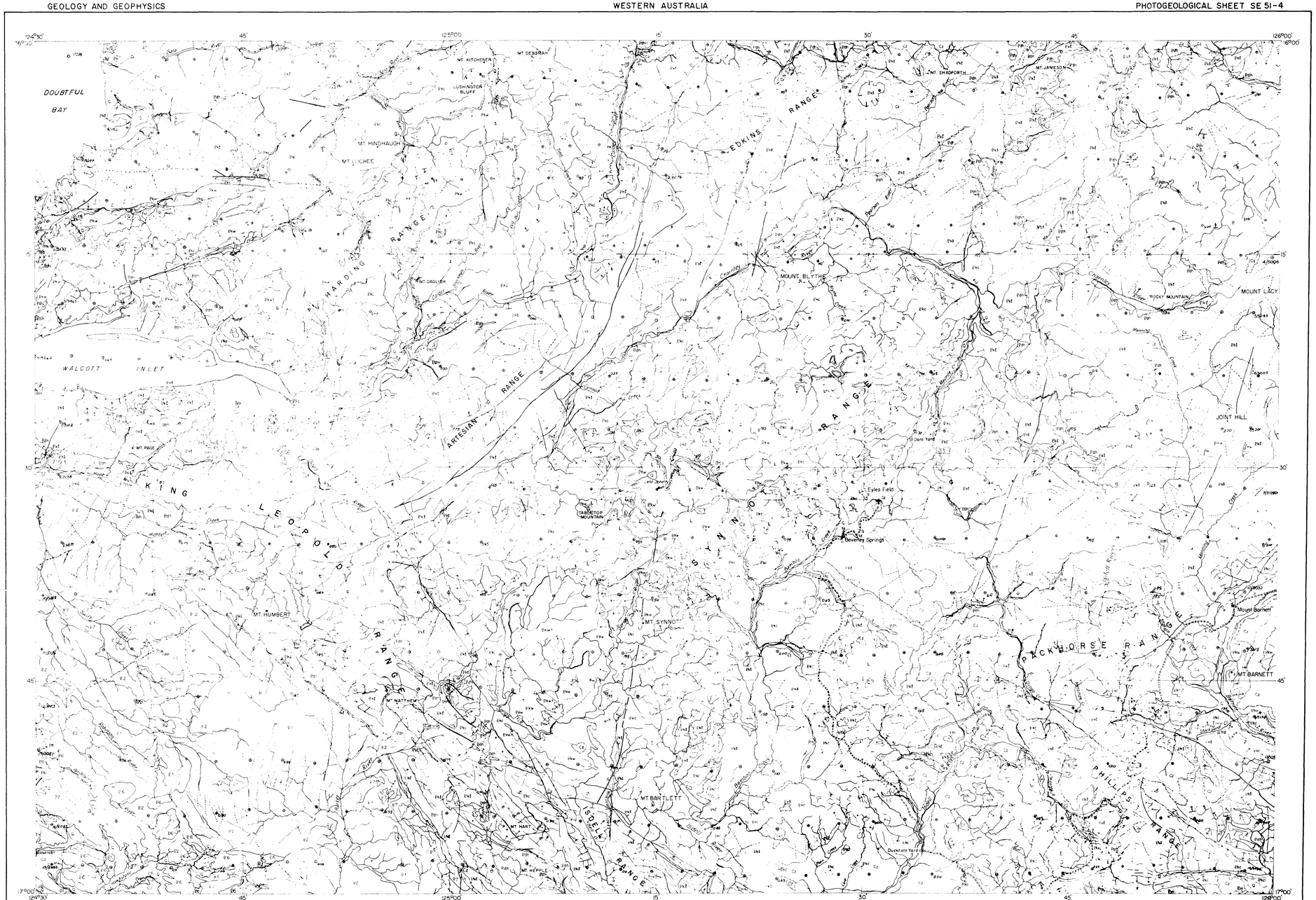
Photo-interpretation by the Photogeological Group
Bureau of Mineral Resources, Geology and Geophysics 1965
Interpreted by W.J.Perry

E52/A1/2

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

CHARNLEY
WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SE 51-4



REFERENCE

Photogeological Character		Possible Geological Interpretation		
	Q	River and Coastal alluvium	QUATERNARY	CAINOZOIC
Dark toned, smooth surface, low relief	Cz	Residual soil, sand includes some laterite	UNDIFFERENTIATED	CAINOZOIC
Medium grey toned, rough surface, low relief, bedded	D2	Napier Formation	DEVONIAN	PALAEOZOIC
Medium grey toned, smooth surface, soft appearance, bedding absent	D1	**Patterson** Conglomerate	DEVONIAN	PALAEOZOIC
Medium grey toned, smooth surface, well bedded	Pm	Mt House Beds	PROTEROZOIC	PRECAMBRIAN
Dark toned, soft unit, forms depressions within sandstone	Pdh	Hart Dolerite	PROTEROZOIC	PRECAMBRIAN
Dark toned, low relief	Pkw1	Volcanic rocks	PROTEROZOIC	PRECAMBRIAN
Light toned, scarp forming, bedded	Pkw	Warton Sandstone	PROTEROZOIC	PRECAMBRIAN
Grey toned, soft with hard intercalations, relief low to moderate	Pkc	Carson Volcanics	PROTEROZOIC	PRECAMBRIAN
Grey toned, rough surface, hard appearance, bedded, much jointed	Pkl	King Leopold Sandstone	PROTEROZOIC	PRECAMBRIAN
Dark toned with light toned smooth areas in places, forms rounded hills	P7	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, well bedded, strongly folded	P6	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Medium grey toned, forms rounded hills, jointed	P3	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, forms steep sided hills with rounded tops, jointed	P2	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Light grey toned, low relief	P1	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
	U	Undetermined		

- Lithological boundary
- Probable lithological boundary
- Anticlinal axis
- Synclinal axis
- Fault
- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

Estimated dips
- Horizontal
- Very low
- Low
- Medium
- Steep
- Vertical

- Trend line
- Joint pattern
- Topographic scarp
- Laterite (L), Terrace (T), Scree (S)
- Dyke

- Principal road
- Minor roads and tracks
- Railway line
- Telephone line
- Fence
- State boundary
- Mine
- Homestead
- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points-adjoining sheet

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Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force, complete vertical coverage at 1:48,000 scale.
Transverse Mercator Projection.

SCALE 1:250,000

5 0 5 10 15 MILES
5 0 5 10 15 20 KILOMETRES

INDEX TO ADJOINING SHEETS

CAMDEN SOUND	PRINCE REGENT	ASHTON
YAMPI	CHARNLEY	MT ELIZABETH
DERBY	LENNARD RIVER	LANSDOWNE

Photo-interpretation by the Photogeological Group,
Bureau of Mineral Resources, Geology and Geophysics, 1964.
Interpreted by W.J. Perry

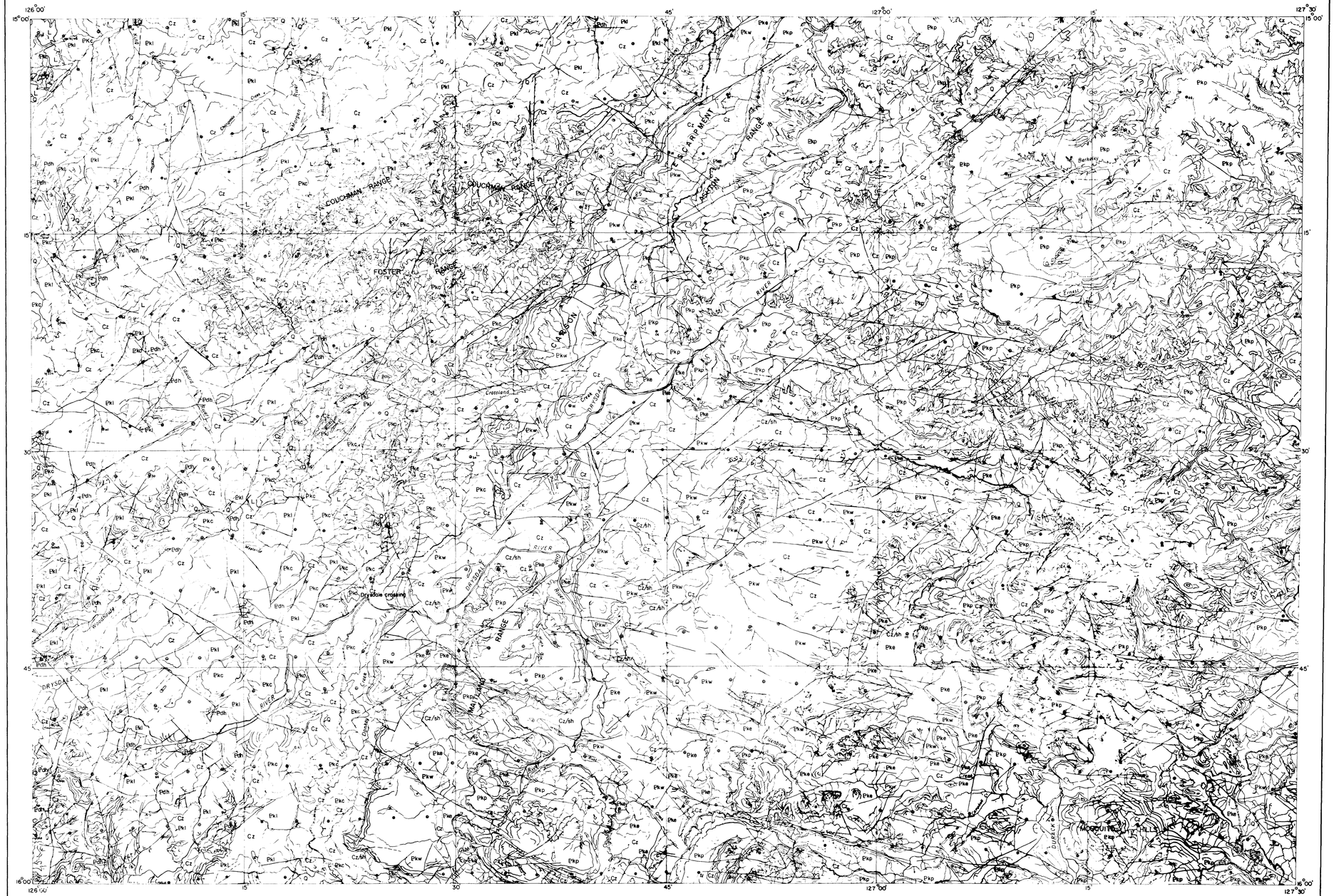
E51/A4/1

BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

ASHTON

WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SD 52-13



REFERENCE

Photogeological Character		Possible Geological Interpretation	
	Q	River and coastal alluvium	QUATERNARY
Dark toned, smooth surface, low relief	Cz	Residual soil, sand including laterite	UNDIFFERENTIATED (CAINOZOIC)
Dark toned, soft unit, forms depressions within sandstone	Pdh	Hart Dolerite	PROTEROZOIC (PRECAMBRIAN)
Dark toned, well bedded	Pkp	Pentecost Sandstone	
Medium grey toned, smooth surface, low relief	Pke	Elgee Sandstone	
Light toned, scarp forming, bedded	Pkw	Warton Sandstone	
Grey toned, soft with hard intercalations, relief low to moderate	Pkc	Carson Volcanics	
Light toned, rough surface, hard appearance, bedded, much jointed	Pkl	King Leopold Sandstone	

- Lithological boundary
- Probable lithological boundary
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- Synclinal axis
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- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

Estimated dips

- Horizontal
- Very low
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- State boundary
- Mine
- Homestead
- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points - adjoining sheet

Compiled by the Bureau of Mineral Resources, Geology and Geophysics.
Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force; complete vertical coverage at 1:48,000 scale.
Transverse Mercator Projection.

SCALE 1:250,000

5 0 5 10 15 MILES

5 0 5 10 15 20 KILOMETRES.

INDEX TO ADJOINING SHEETS

MONTAGUE SOUND	DRYSDALE	MEDUSA BANKS
PRINCE REGENT	ASHTON	CAMBRIDGE GULF
CHARNLEY	MT ELIZABETH	LISSADELL

Photo-interpretation by the Photogeological Group,
Bureau of Mineral Resources, Geology and Geophysics, 1964
Interpreted by: R. Richard, Institut Français du Pétrole.

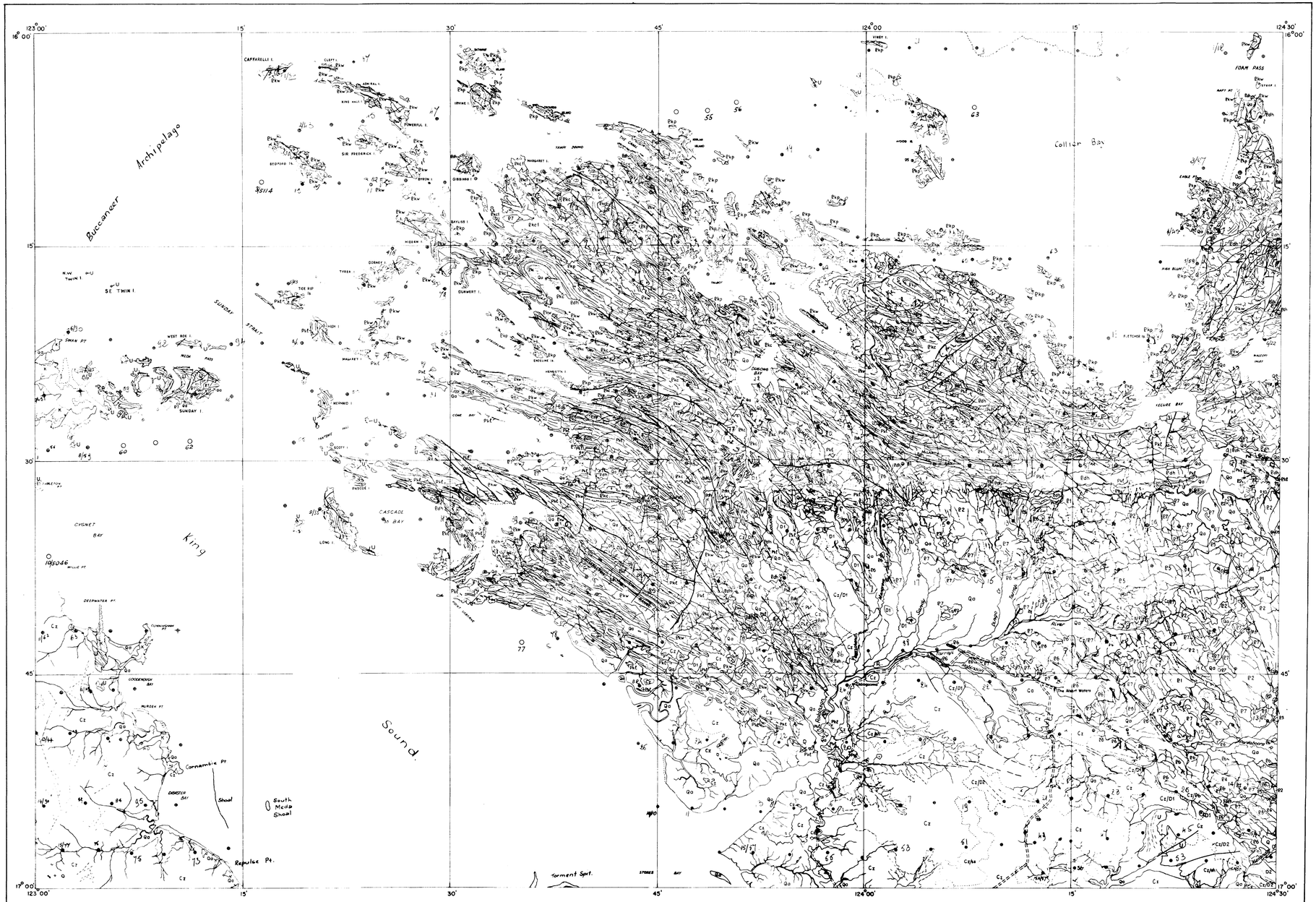
D52/A13/2

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

YAMPI

WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SE51-3



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Detail adjusted to compilation prepared by the Royal Australian Survey Corps
Aerial photography by Royal Australian Air Force, complete vertical coverage at 1:48,000 scale
Transverse Mercator Projection

SCALE 1:250,000

5 0 5 10 15 MILES
5 0 5 10 15 20 KILOMETRES

INDEX TO ADJOINING SHEETS

	CAMDEN SOUND	PRINCE REGENT
PENDER	YAMPI	CHARNLEY
BROOME	DERBY	LENNARD RIVER

Photo-interpretation by the Photogeological Group,
Bureau of Mineral Resources, Geology and Geophysics 1964,
interpreted by: R Richard, Institut Français du Pétrole.

E 51/A3/1

REFERENCE

Photogeological Character		Possible Geological Interpretation		
	Qa	River and coastal alluvium	QUATERNARY	CAINOZOIC
Dark toned, smooth surface, low relief.	Cz	Residual soil, sand, includes some laterite	UNDIFFERENTIATED	CAINOZOIC
Medium grey toned, low relief.	K		CRETACEOUS	MESOZOIC
Medium grey toned, rough surface, low relief, bedded.	D2	Napier Formation	DEVONIAN	PALAEOZOIC
Medium grey toned, smooth surface, soft appearance, bedding rare.	D1	Patterson Conglomerate	DEVONIAN	PALAEOZOIC
Dark toned, soft unit, forms depressions within sandstone.	Pdh	Hart Dolerite	PROTEROZOIC	PRECAMBRIAN
Dark toned, well bedded.	Pkp	Pentecost Sandstone	PROTEROZOIC	PRECAMBRIAN
Light toned, scarp forming, bedded.	Pkw	Warton Sandstone	PROTEROZOIC	PRECAMBRIAN
Grey toned, soft formation. / *Grey toned, soft with hard intercalations, relief low to moderate.*	Pkct / Pkc	Carson Volcanics	PROTEROZOIC	PRECAMBRIAN
Light toned, rough surface, hard appearance, bedded, much jointed.	Pkl	King Leopold Sandstone	PROTEROZOIC	PRECAMBRIAN
Dark toned with light toned smooth areas in places, forms rounded hills.	P7	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, well bedded, strongly folded.	P6	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, generally massive formation with high relief	P5	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, linear form.	P4	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Medium grey toned, forms rounded hills, jointed.	P3	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Dark toned, forms steep sided hills with rounded tops, jointed.	P2	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
Light grey toned, low relief.	P1	Lamboo Complex	PROTEROZOIC	PRECAMBRIAN
	U	Undetermined		

- Lithological boundary
- Probable lithological boundary
- Anticlinal axis
- Synclinal axis
- Fault
- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

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- Horizontal
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- Low
- Medium
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- Trend line
- Joint pattern
- Topographic scarp
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- Dyke

- Principal road
- Minor roads and tracks
- Railway line
- Telephone line
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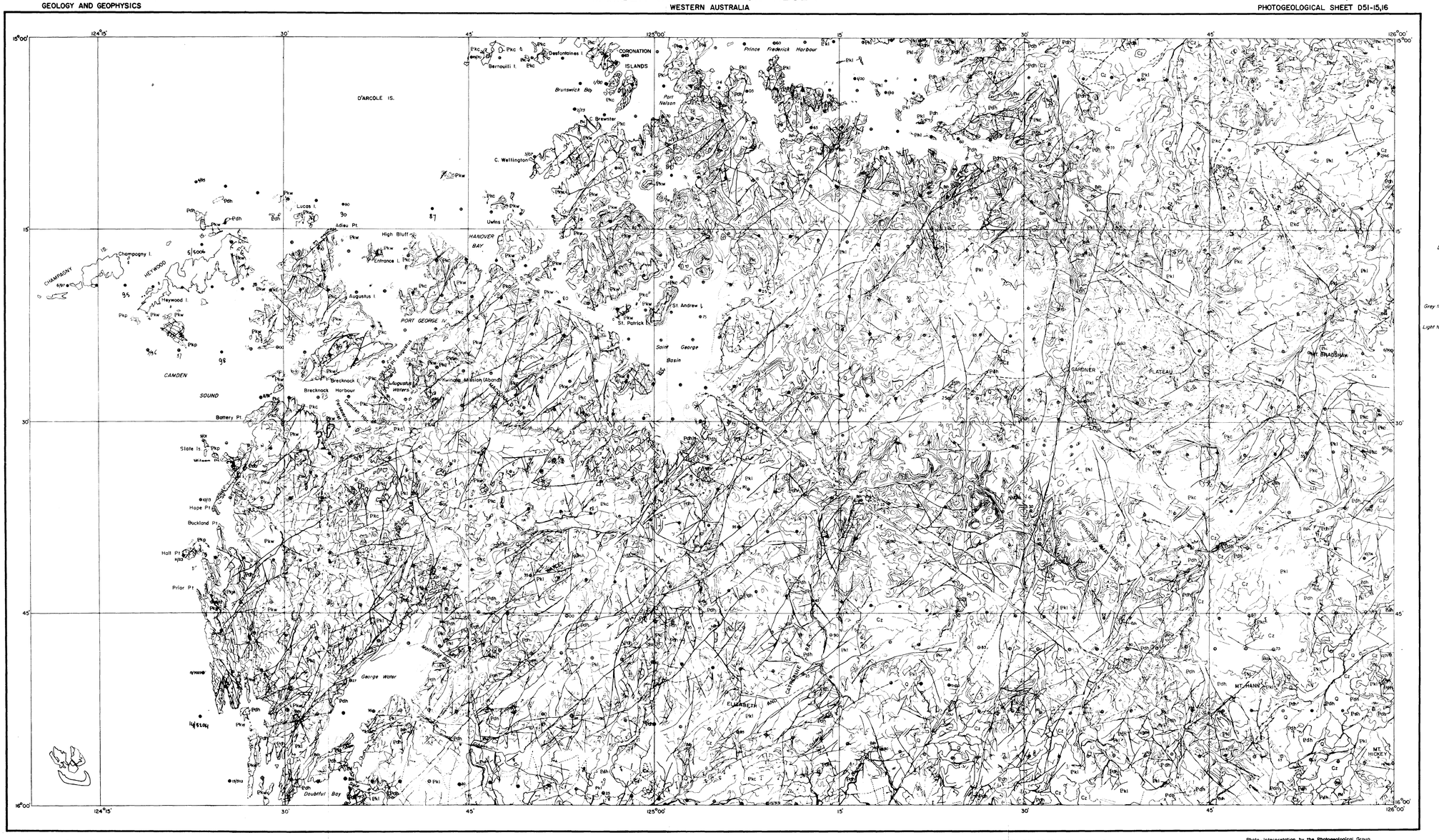
- Homestead
- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points - adjoining sheet

BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

CAMDEN SOUND-PRINCE REGENT

WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET D51-15,16



REFERENCE

Photogeological Interpretation		Possible Geological Interpretation	
	Q	River and coastal alluvium	QUATERNARY
Dark toned, smooth surface, low relief	Cz	Residual soil, sand, includes some laterite	UNDIFFERENTIATED (CAINOZOIC)
Dark toned, soft unit, forms depressions within sandstone	Pdh	Hart Dolerite	PROTEROZOIC (PRECAMBRIAN)
Dark toned, well bedded	Pkp	Pentecost Sandstone	
Dark toned, scarp forming, bedded	Pkw	Warton Sandstone	
Grey toned, soft with hard intercalations, relief low to moderate	Pkc	Carson Volcanics	
Light toned, rough surface, hard appearance, bedded, much jointed	Pkl	King Leopold Sandstone	

- Lithological boundary
- Probable lithological boundary
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- Synclinal axis
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- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points-adjoining sheet

Compiled by the Bureau of Mineral Resources, Geology and Geophysics.
Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force; complete vertical coverage at 1:48,000 scale.
Transverse Mercator Projection.

SCALE 1:250,000

5 0 5 10 15 MILES

5 0 5 10 15 20 25 KILOMETRES

INDEX TO ADJOINING SHEETS

	MONTAGUE SOUND	DRYSDALE
CAMDEN SOUND	PRINCE REGENT	ASHTON
YAMPI	CHARNLEY	MT. ELIZABETH

Photo-interpretation by the Photogeological Group,
Bureau of Mineral Resources, Geology and Geophysics 1964.
Interpreted by: R. Richard, Institut Français du Pétrole.

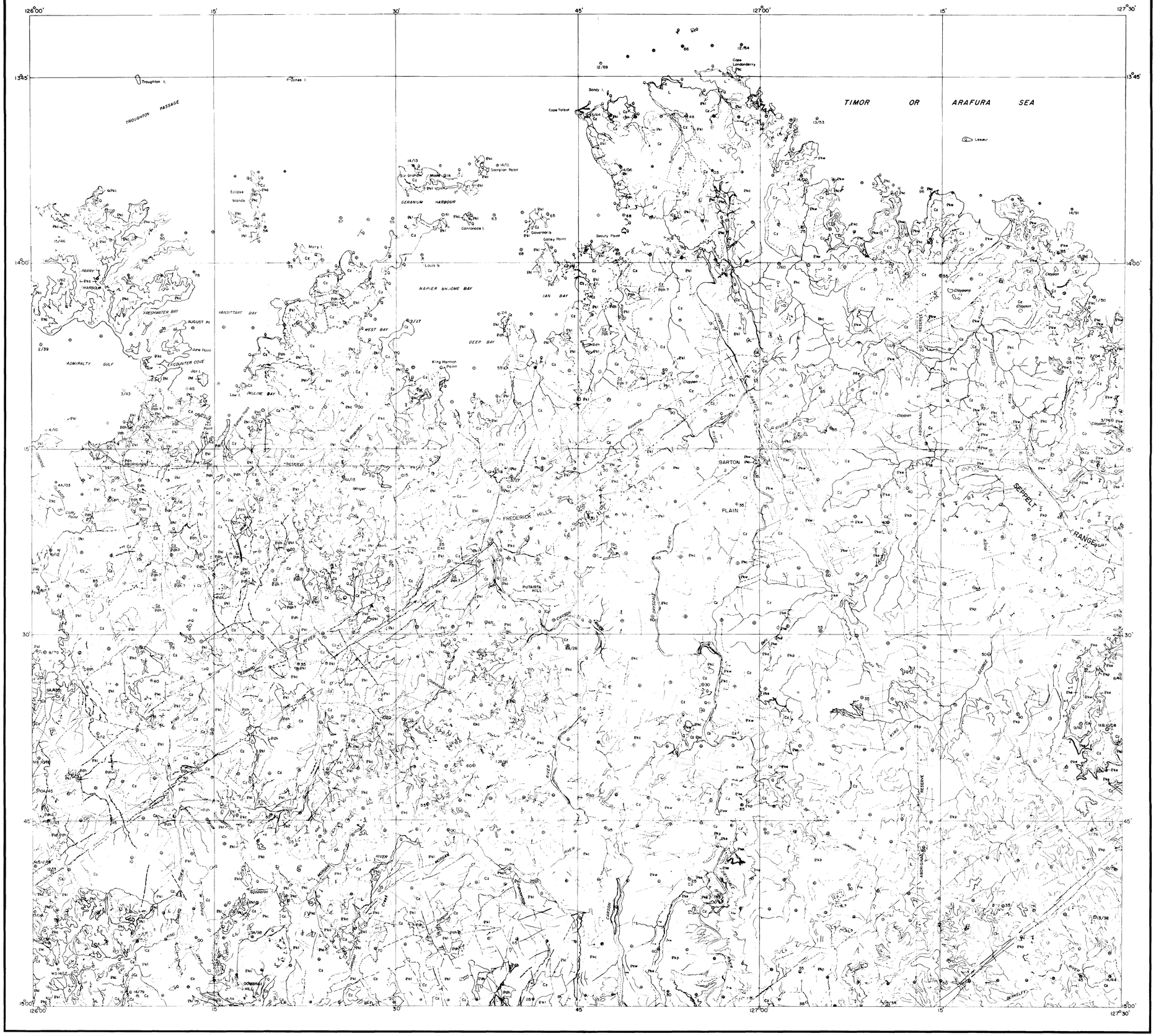
D51-A16-1

BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

LONDONDERRY AND DRYSDALE

WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SD 52-5-9



REFERENCE

Photogeological Character		Possible Geological Interpretation		
	Q	River and coastal alluvium	QUATERNARY	CAINOZOIC
Dark toned, smooth surface, low relief	Cz	Residual soil, sand including laterite	UNDIFFERENTIATED	
Dark toned, soft unit, forms depressions within sandstone	Pdh	Hart Dolerite		PROTEROZOIC / PRECAMBRIAN
Dark toned, well bedded	Pkp	Pentecost Sandstone		
Medium grey toned, smooth surface, low relief	Pke	Elgee Sandstone		
Light toned, scarp forming, bedded	Pkw	Warton Sandstone		
Grey toned, soft with hard intercalations, relief low to moderate	Pkc	Carson Volcanics		
Light toned, rough surface, hard appearance, bedded, much jointed	Pkl	King Leopold Sandstone		

- Lithological boundary
- Probable lithological boundary
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- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

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- Steep
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- Topographic scarp
- Laterite (L), Terrace (T), Scree (S)
- Dyke

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- Minor roads and tracks
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- Fence
- State boundary
- Mine
- Homestead
- Yard
- Windpump
- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points-adjoining sheet

Compiled by the Bureau of Mineral Resources, Geology and Geophysics.
Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force; complete vertical coverage at 1:48,000 scale.
Transverse Mercator Projection.

Scale 1 : 250,000

5 0 5 10 15 MILES
5 0 5 10 15 20 25 KILOMETRES

INDEX TO ADJOINING SHEETS

	LONDONDERRY	
MONTAGUE SOUND	DRYSDALE	MEDUSA BANKS
PRINCE REGENT	ASHTON	CAMBRIDGE GULF

Photo-interpretation by the Photogeological Group
Bureau of Mineral Resources, Geology and Geophysics 1964
Interpreted by: W.J.Parry

D52/A9/1

STRUCTURAL SKETCH MAP

TO ACCOMPANY

REPORT ON PHOTO – INTERPRETATION OF AN AREA IN THE KIMBERLEY DIVISION, WESTERN AUSTRALIA

SCALE

10 0 10 20 30 MILES

REFERENCE

Cz			CAINOZOIC
K		CRETACEOUS	MESOZOIC
D		DEVONIAN	PALAEOZOIC
Pm	Mt House Beds	PROTEROZOIC	PRECAMBRIAN
Pt	Walsh Tillite		
Ptm	Mendena Formation		
Pdh	Hart Dolerite		
Pkp	Pentecost Sandstone		
Pke	Elgee Siltstone		
Pkw$_1$			
Pkw	Warton Sandstone		
Pkc	Carson Volcanics		
Pkl	King Leopold Sandstone		
Pl	Lamboo Complex		
U	Undetermined		

Lithological boundary

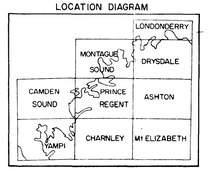
Anticline

Syncline

Fault or lineament

Planimetric detail from Geological Map of the Kimberleys & Western Northern Territory by J.E. Harms. The B.H.P. Co. Pty. Ltd.

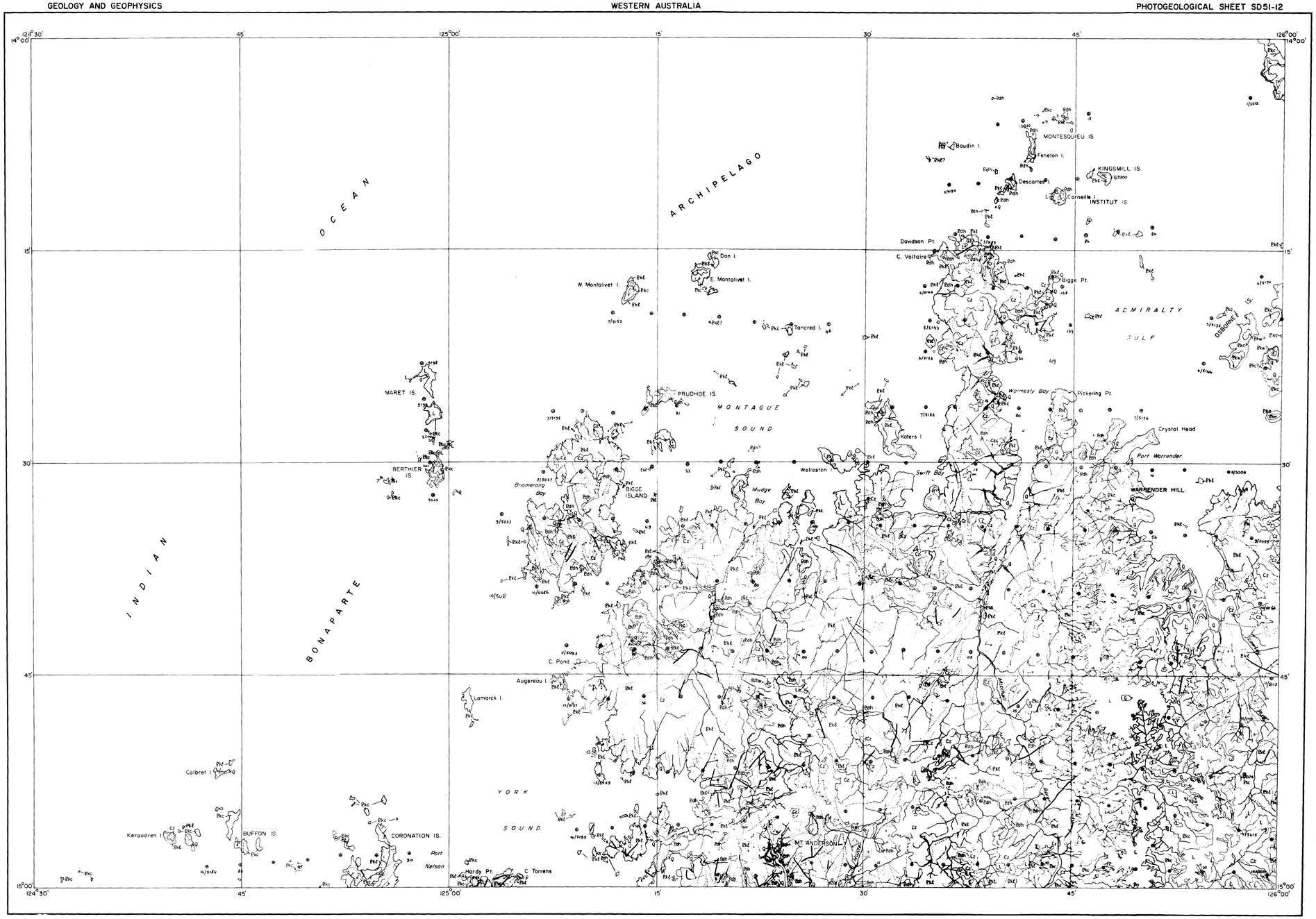
LOCATION DIAGRAM



BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

MONTAGUE SOUND
WESTERN AUSTRALIA

AUSTRALIA 1:250,000
PHOTOGEOLOGICAL SHEET SD51-12



REFERENCE

Photogeological Character		Possible Geological Interpretation		
	Q	River and coastal alluvium	QUATERNARY	CAINOZOIC
Dark toned, smooth surface, low relief	Cz	Residual soil, sand, includes some laterite	UNDIFFERENTIATED	
Dark toned, soft unit, forms depressions within sandstone	Pdh	Hart Dolerite	PROTEROZOIC	PRECAMBRIAN
Light toned, scarp forming, bedded	Pkw	Warton Sandstone		
Grey toned, soft with hard intercalations, relief low to moderate	Pkc	Carson Volcanics		
Light toned, rough surface, hard appearance, bedded, much jointed	Pkl	King Leopold Sandstone		

- Lithological boundary
- Probable lithological boundary
- Anticlinal axis
- Synclinal axis
- Fault
- Probable fault
- Edge of bed
- Probable edge of bed
- Edge of bed expressed as scarp

Estimated dips
- Horizontal
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- Medium
- Steep
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- Joint pattern
- Topographic scarp
- Laterite (L), Terrace (T), Scree (S)
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- Minor roads and tracks
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- Telephone line
- Fence
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- Mine
- Homestead
- Yard
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- Airport or Airfield, Landing ground
- Bore
- Tank
- Well
- Spring
- Waterhole
- Dam
- Photo-centre points
- Photo-centre points-adjoining sheet

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Detail adjusted to compilation prepared by the Royal Australian Survey Corps.
Aerial photography by Royal Australian Air Force; complete vertical coverage at 1:46,000 scale.
Transverse Mercator Projection.

SCALE 1:250,000

5 0 5 0 15 MILES
5 0 5 10 15 20 KILOMETRES

INDEX TO ADJOINING SHEETS

		LONDONDERRY
	MONTAGUE SOUND	DRYSDALE
CAMDEN SOUND	PRINCE REGENT	ASHTON

Photo-interpretation by the Photogeological Group
Bureau of Mineral Resources, Geology and Geophysics 1964
Interpreted by: W.J. Perry

DS/A12/1