

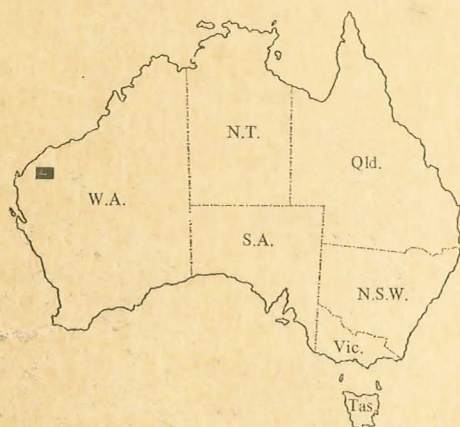
T.I.O

1 : 250,000 GEOLOGICAL SERIES—EXPLANATORY NOTES

REFERENCE ONLY

WYLOO

WESTERN AUSTRALIA



SHEET SF/50—10 INTERNATIONAL INDEX

WESTERN AUSTRALIA

INDEX TO GEOLOGICAL MAPS

1 : 250,000 OR 4 MILE SCALE

PUBLISHED



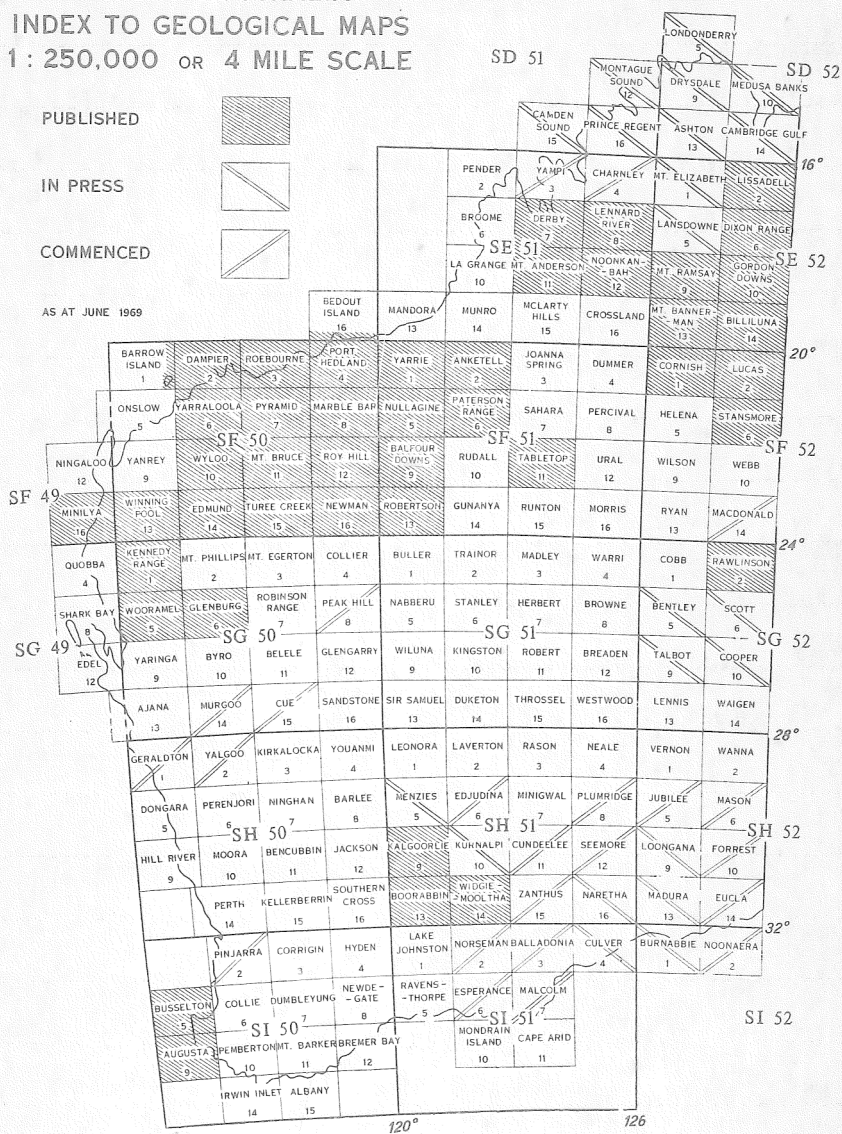
IN PRESS



COMMENCED



AS AT JUNE 1969



GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

1 : 250,000 GEOLOGICAL SERIES—EXPLANATORY NOTES

WYLOO

WESTERN AUSTRALIA

SHEET SF/50-10 INTERNATIONAL INDEX

Compiled by J. L. Daniels

*Published by the Bureau of Mineral Resources, Geology and Geophysics, and
issued under the authority of the Hon. David Fairbairn, D.F.C., M.P.,
Minister for National Development*

1970

DEPARTMENT OF MINES, WESTERN AUSTRALIA

MINISTER: THE HON. A. F. GRIFFITH, M.L.C.

UNDER SECRETARY: I. R. BERRY

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

DIRECTOR: J. H. LORD

Explanatory Notes on the Wyloo Geological Sheet

INTRODUCTION

The Wyloo 1:250,000 Sheet SF/50—10 is bounded by latitude 22° and 23° S and by longitude 115°30' and 117° E. It is located on the western edge of the Hamersley Iron Province in the North-West Division of Western Australia.

The pastoral stations of Cane River, Duck Creek, Glen Florrie, Red Hill, Boolaloo, Kooline, Mount Stuart, Nanutarra, The Range, Urandy Creek, and Wyloo mainly occupy the lower, less rugged, western half of the Sheet area, where generally good access is given by several earth roads and station tracks.

The main road from Carnarvon to Roebourne crosses the northwestern corner of the area and the trunk road from Onslow, on the northwest coast, to Meekatharra, crosses the area from Mount Minnie to Kooline and affords access to much of the Ashburton valley and environs. The Ashburton River itself is difficult to cross because of steep banks and long narrow, permanent pools. Annual floods usually wash away road approaches to the river, leaving crossings unserviceable for long periods.

The eastern half of the Sheet area is rugged and very poorly supplied with tracks; hence it is not easy country to traverse in detail. In the northeastern part of the Sheet area lies the western end of the Hamersley Range.

A little gold, copper, and lead mining has been undertaken, but has now ceased. Iron ore deposits of moderate size are known and should prove to be of value in the future.

PREVIOUS INVESTIGATIONS

No earlier systematic geological mapping has been undertaken in the Wyloo Sheet area.

In 1907 traverses were made by Maitland from Glen Florrie to Cane River via Mount Stuart. He investigated the general geology and studied some of the mineral occurrences (Maitland, 1909). In 1918 Talbot studied the geology in the Hardey River region and westward down the Ashburton River valley (Talbot, 1926).

Recently several mining companies have investigated the area. Some of these investigations are still proceeding.

The present regional geological survey was undertaken by R. Halligan and J. L. Daniels between 1962 and 1964.

PHYSIOGRAPHY

The high and rugged country of the Hamersley Range occupies the north-eastern part of the Sheet area and is cut by numerous narrow, steep-sided

valleys. To the southwest the country is more open and lower lying; it contains isolated hills and long, narrow ridges, typified by the Parry Range and its continuation south-southeasterly through Mount Florry.

The Ashburton River flows across the southwestern corner of the Sheet area and is fed from the north by important tributaries, including Duck Creek and the Hardey River. From the south the Ashburton River is joined, near Mount Price, by the Henry River.

STRATIGRAPHY

The Wyloo Sheet area contains representatives of the Archaean, Mount Bruce Supergroup, Mount Minnie Group, and the Bangemall Group. A stratigraphic column is given in Table 1.

ARCHAEAN

Archaean rocks crop out in the central part of the Wyloo anticline over an area of approximately 35 square miles.

The Archaean has been subdivided into two units: the Warrawoona Series and granite. The latter is intrusive into the former. The Warrawoona Series consists of basic lavas, agglomerate, thin banded iron formation bands, and dolerite sills. It is intruded by granite as large masses and thin veins. Quartz veins are not uncommon. Both the Warrawoona Series and the granite are cut by dolerite dykes of unknown age.

PROTEROZOIC

Lower Proterozoic rocks of the Mount Bruce Supergroup (Halligan and Daniels, 1964) unconformably overlie the Archaean. The supergroup includes the Fortescue Group, the Hamersley Group, and the Wyloo Group. It is overlain by the Mount Minnie Group which is probably Lower Proterozoic, and by the Middle Proterozoic Bangemall Group.

FORTESCUE GROUP

The Fortescue Group unconformably overlies the Archaean of the central part of the Wyloo anticline.

This group is a complex accumulation of basalts and pyroclastics with minor sandstone, conglomerate, banded iron formation, chert, and dolomite.

On the eastern side of the Wyloo anticline the group can be subdivided into several units mainly corresponding to the subdivisions proposed by de la Hunty (1965) for the Fortescue Group in the Mount Bruce Sheet area to the east. However, the Hardey Sandstone, the lowest formation in the group, is poorly developed and not represented on the 1 : 250,000 geological map of the Wyloo Sheet area as a separate unit. It may be represented, approximately 10 miles east of Mount de Courcey, by a thin conglomerate containing pebbles and boulders of vein quartz, quartzite, prase, and granite. The conglomerate has been sheared and consists of elongated clasts in a chlorite schist matrix.

It is not possible to trace the subdivisions of the Fortescue Group westward across the Wyloo anticline because of their loss of identity, facies changes, and shearing. In this area the Fortescue Group consists mainly of basalts, which have been sheared in many areas and now consist of chlorite schist.

Mount Jope Volcanics

A thick series of volcanic rocks consisting of basalts, pillow lavas, and pyro-

clastic deposits is exposed on the eastern side of the Wyloo anticline and also over a large area southwest of Mount Farquhar. These volcanic rocks have been tentatively subdivided (mainly by photo-interpretation) into, in ascending order, the Boongal Pillow Lava Member, the Pyradie Pyroclastic Member, and the Bunjinah Pillow Lava Member. These divisions are those proposed for the Mount Jope Volcanics of the Mount Bruce Sheet area by de la Hunty (1965).

Jeerinah Formation

The Jeerinah Formation overlies the Mount Jope Volcanics in the eastern part of the Wyloo anticline and also in the area south of Mount Farquhar. It consists of shale, thin cherts, banded iron formation, and sandstone with dolerite sills. The formation thins westward and is absent over much of the Wyloo anticline. Near Mount de Courcey the upper part of the Fortescue Group consists of shale and greywacke, possibly equivalent to the Jeerinah Formation.

HAMERSLEY GROUP

Marra Mamba Iron Formation

The Marra Mamba Iron Formation generally forms long, narrow, rounded ridges. It consists of broadly banded chert and banded iron formation with coarse 'pinch and swell' structure and minor shale. Generally, it is about 600 feet thick, but in the Duck Creek area a thickness of 750 feet was measured by J. Blockley. The thickness is approximately 600 feet 24 miles east of Wyloo homestead, but the formation thins to the east of this area and is probably absent over most of the western half of the Wyloo anticline. It may be represented by conglomerate at Mount Edith.

Wittenoom Dolomite

The Wittenoom Dolomite conformably overlies the Marra Mamba Iron Formation. Typically it is very poorly exposed and generally forms low ground between ridges and masses of Marra Mamba Iron Formation and Brockman Iron Formation. The Wittenoom Dolomite consists of grey-weathering dolomite with some chert and dolomitic shale. It is some 500 feet thick in the eastern part of the Sheet area. In Duck Creek the upper part of the formation is dominantly chert. West of the eastern nose of the Wyloo anticline, the formation thins rapidly and it is absent over much of the western part of the Wyloo anticline.

Mount Sylvia Formation

Conformably overlying the Wittenoom Dolomite is the Mount Sylvia Formation consisting of three prominent thin bands of iron formation interbedded with dolomitic shale. The top of the formation is marked by the top of the uppermost banded iron formation. The formation, of total thickness approximately 100 feet, is an excellent marker horizon. It is missing from much of the western part of the Wyloo anticline.

Mount McRae Shale

The Mount McRae Shale, approximately 300 feet thick, conformably overlies the Mount Sylvia Formation. It consists of light-weathering shale, dolomitic shale and siltstone, with some thin bands of chert. The formation is easily eroded and forms concave slopes below cliffs of the overlying, resistant Brockman Iron Formation.

Brockman Iron Formation

The Brockman Iron Formation conformably overlies the Mount McRae Shale. It is approximately 2,200 feet thick and is the thickest formation in the Hamersley Group. It occupies a large part of the northeastern section of the

Sheet area and gives rise to high rounded hills frequently fringed by cliffs immediately above the Mount McRae Shale.

The formation is composed of interbanded iron formation, chert, and shale with minor amounts of riebeckite.

Detailed descriptions of this formation are given by MacLeod (1966) and Trendall and Blockley (in prep.).

The Brockman Iron Formation was originally defined by MacLeod and others (1963) while subsequent work by Ryan and Blockley (1965) subdivided the formation into five members. More recent work by Trendall and Blockley (in prep.) has redefined the Brockman Iron Formation to include only the four lowest members. The uppermost member is now included in the overlying Weeli Wolli Formation.

On the accompanying geological map the upper boundary of the Brockman Iron Formation is the same as that mapped in other parts of the Hamersley Iron Province and includes all five members. The discrepancy between the Brockman Iron Formation as originally defined and the Brockman Iron Formation consisting of four members is approximately 60 feet and negligible on the 1 : 250,000 geological sheet.

The Brockman Iron Formation is the host for the majority of the hematite bodies developed in the Hamersley Iron Province.

The Brockman Iron Formation thins rapidly over the western part of the Wyloo anticline, becomes difficult to recognise, and eventually disappears. At Mount Edith the formation is thin and consists of chert between two conglomerate horizons. It is not known whether these conglomerate horizons are lateral facies equivalents of the Brockman Iron Formation, adjacent formations, or isolated lenses.

Weeli Wolli Formation

Conformably overlying the Brockman Iron Formation is the Weeli Wolli Formation. It consists of a sequence of interbedded thin banded iron formation and shale intruded by abundant dolerite sills. The total thickness of sediment and dolerite is approximately 1,600 feet. Several of the iron formation bands are bright red.

The formation gives rise to low ground with many low, parallel ridges.

The contact with the underlying Brockman Iron Formation is poorly exposed and not well defined.

Woongarra Volcanics

The Woongarra Volcanics are rocks of rhyolitic and dacitic composition that conformably overlie the Weeli Wolli Formation. They are approximately 1,800 feet thick in the eastern part of the Sheet area but thin to the west; they are absent over the western part of the Wyloo anticline.

The lavas are characteristically dark green and fine-grained. The majority contain small phenocrysts of quartz and feldspar. Spherulitic texture is rare. In the Duck Creek area, agglomerate and tuff are noted.

Boolgeeda Iron Formation

Conformably overlying the Woongarra Volcanics is the Boolgeeda Iron Formation. It is approximately 700 feet thick and consists of purplish flaggy siltstone, ferruginous shale, and banded iron formation. It is probably absent near Wyloo homestead but could be represented by conglomerate in the Mount Edith area.

WYLOO GROUP

Turee Creek Formation

The Turee Creek Formation occurs at the base of the Wyloo Group and lies with possible disconformity over the Boolgeeda Iron Formation. It forms the base of a thick sequence composed largely of clastic deposits.

Typically the Turee Creek Formation consists of greywacke, conglomerate, shale, quartzite, and dolomite but is very variable. Rapid thickening and thinning of the members occurs and individual units are difficult to trace laterally.

In the southeast corner of the Wyloo Sheet area the formation is approximately 1,000 feet thick. It thins rapidly west of Mount de Courcey and is probably absent over the western half of the Wyloo anticline. Approximately 11 miles north-northeast of Mount de Courcey the formation is probably represented by a thin hematized conglomerate.

Beasley River Quartzite

Conformably overlying the Turee Creek Formation is the Beasley River Quartzite. Lithologically the quartzite is a cream or white-weathering, coarse-grained quartz sandstone which is often silicified and glassy. It is frequently banded, and current-bedding and ripple marks have been seen. Thin conglomerate bands, pebble beds, grits, and shale bands are observed occasionally.

Near the eastern nose of the Wyloo anticline some of the quartzites are dark green and interbedded with thin, micaceous, silty shales. There is also a thin sedimentary breccia composed of small (1 inch to 2 inch) angular pieces of quartz and banded iron formation set in a very coarse quartz sandstone matrix. The lowermost quartzite is maroon and brecciated due to movement during folding.

The formation thins rapidly westward and is absent over much of the western part of the Wyloo anticline. In the Urandy Creek area the quartzite is strongly developed and some repetition by strike faulting is apparent.

Mount McGrath Formation

Overlying the Beasley River Quartzite is the Mount McGrath Formation. It comprises a thick sequence of shale, sandstone, greywacke, conglomerate, dolomite, quartzite, and basalt. Rapid lensing of the beds makes for difficult lateral correlation.

In the Mount Bruce Sheet area to the east, de la Hunty (1965) subdivided the formation into four members. Of these the Cheela Springs Basalt Member is delineated in the Wyloo Sheet area and the remainder are grouped together as the Mount McGrath Formation.

The Cheela Springs Basalt Member occurs in two main outcrop areas on the north and south limbs of the Wyloo anticline. Approximately 6 miles north of Cheela Springs, it is at least 5,000 feet thick but it thins and eventually disappears to the west. In its northern outcrop, the Cheela Springs Basalt Member immediately overlies the Beasley River Quartzite in some localities. However, north of Cheela Springs the Cheela Springs Basalt Member overlies a 120-foot thick series of shale, quartzite, micaceous siltstone, and amygdaloidal basalt correlated with the Nummana Member of the Mount McGrath Formation (see de la Hunty, 1965).

Duck Creek Dolomite

The Duck Creek Dolomite, which conformably overlies the Mount McGrath

Formation is the most persistent unit of the Wyloo Group, though in the extreme western end of the Wyloo anticline, 5 miles northwest of Mount Edith, it is absent.

The formation consists of several lithological types, but the general impression in the field is of a thick-bedded, yellow or orange-weathering dolomite with some chert bands. It frequently contains abundant stromatoliths.

The following section was measured in a gorge in Duck Creek approximately 18 miles east of Mount Stuart homestead.

	<i>Thickness (feet)</i>
<i>Top (Uppermost contact unexposed)</i>	
Mauve-weathered, grey, thin-bedded dolomite with mesh type silicification and stylolites	145
Fault and 15 feet of steep-dipping, brown weathered, greyish dolomite together with a thin intrusion of basalt and agglomerate with pyrite	15
Well-bedded dolomite becoming more thin-bedded upward. Colour fawn to yellow-grey without obvious algae	1,070
Thick-bedded to massive, dark orange-weathered, siliceous dolomite with large-diameter, columnar <i>Collenia</i>	670
Thick-bedded, orange-weathered dolomite with interbedded <i>C. undosa</i> and small, columnar <i>Collenia</i>	700
Massive, orange-weathered dolomite with abundant <i>C. undosa</i>	7160
Dark, silicified dolomite with abundant wavy, siliceous laminae	550
Minimum thickness	3,300

Approximately one mile east of Coorara the upper part of the Duck Creek Dolomite carries a large number of chert bands.

Ashburton Formation

Overlying the Duck Creek Dolomite is the Ashburton Formation. It is exposed over a large part of the western half of the Sheet area. Characteristically it is strongly cleaved. It is regionally metamorphosed in the western half of its outcrop, with the grade increasing westward. The contact between the two formations is not well exposed, but has been studied in a number of places.

Four miles east-northeast of Hardey Junction the contact is represented by a 10-foot thick transition zone consisting of interbanded dolomite and maroon and brown-weathering shale and thin greywacke bands.

Three miles northeast of Red Hill the contact is again exposed. Above the Duck Creek Dolomite is a 300-foot thick band of agglomerate, basic amygdaloidal lava, and thin tuff bands interbanded with dolomite. Blocks of dolomite occur in the upper part of the agglomerate. Above the agglomerate the sequence passes up into dark maroon to black-banded mudstone and greywacke.

In the June Hill area the Duck Creek Dolomite is overlain by acid volcanic rocks, volcanic agglomerates, tuffs, and some banded iron formation extending over a strike length of 8 miles and a width of up to three quarters of a mile. This accumulation is in turn overlain with local unconformity by a thin discontinuous conglomerate, shale, and greywacke.

Overlying these transition zones is the Ashburton Formation proper which comprises a great thickness of shale, sandstone, conglomerate, and greywacke with minor amounts of banded iron formation, dolomite, calcareous shale, quartzite, and basalt. The formation is very thick, but due to changing lithology along strike and complicated folding, no accurate estimate of the thickness can be made.

Iron formation bands approximately 50 feet thick occur in the lower part of the sequence at Mount Stuart and near Red Hill. They also occur in the upper part of the sequence (as developed in the Wyloo Sheet area) near Mount Alexander. In strong contrast to the iron formations of the Hamersley Group, those in the Ashburton Formation do not persist for more than about 10 to 15 miles along strike.

The upper part of the formation near Mount Alexander and immediately north of Mount Murray carries a well-developed sequence consisting mainly of quartzite with minor marble and magnetite quartzite. This unit has been named the Mudong Member of the Ashburton Formation and is overlain to the west by more metamorphosed shales and greywackes of typical Ashburton Formation lithology.

The top of the Ashburton Formation is not known in the Wyloo Sheet area.

It overlain unconformably by the Mount Minnie Group in the northwest and by the Bangemall Group in the west and southwest.

MOUNT MINNIE GROUP

Unconformably overlying the Ashburton Formation is the Mount Minnie Group, which in the Mount Minnie region is subdivided into three formations. The group is restricted to the northwestern corner of the Sheet area and forms a series of isolated outliers occupying a total area of approximately 100 square miles.

On the western side of the Parry Range the group is intruded by thin quartz-muscovite veins and probably also by granite.

Brodagee Sandstone

The lowest formation of the Mount Minnie Group is the Brodagee Sandstone consisting of massive quartzite and sandstone with an impersistent basal conglomerate. Bedding is very poorly developed, but some current-bedding has been noted. It is approximately 2,500 feet thick in the Parry Range, but may thicken in the Mount Minnie area.

Wabco Shale

Conformably overlying the Brodagee Sandstone in the Mount Minnie region is the Wabco Shale. This formation consists of brown-weathering shale with varying amounts of thin quartzites. In the Mount Minnie area the formation is approximately 1,700 feet thick and appears to thicken to the north. It is absent in the Parry Range.

Warrambo Sandstone

The Warrambo Sandstone conformably overlies the Wabco Shale in the Mount Minnie region, but directly overlies the Brodagee Sandstone in the Parry Range.

The formation consists of well-bedded, thin-bedded sandstone with minor shale. The sandstone is commonly current-bedded and occasionally carries ripple marks and slump structures. The highest part of the formation exposed is a brown, somewhat porous sandstone interbedded with some white shale.

Outliers of sandstone and minor conglomerate, tentatively correlated with the Mount Minnie Group, occur approximately 6 miles northeast of Cane River homestead, at Mount Amy and immediately west of Red Hill.

On the line of the southeasterly extension of the first locality and one mile east of Brodagee Well a small synclinal outlier of grey to white, current-bedded sandstone overlies strongly cleaved Ashburton Formation. At the contact is a thin variegated jasper band and some chert breccia.

At the base of the sandstone outlier immediately west of Red Hill is a conglomerate approximately 2,000 feet thick in its northern outcrop. This grades up into poorly bedded sandstone with thin conglomerate and pebble beds. The total thickness is unknown. The outlier is synclinal with a northeasterly trending axis. It could be an excellent reservoir for underground water.

BANGEMALL GROUP

The youngest of the Proterozoic sedimentary rocks in the Wyloo Sheet area form the Bangemall Group. The group is confined to an elongated arcuate area of approximately 400 square miles in the west and southwest parts of the Sheet area.

A preliminary subdivision of the Bangemall Group was made by Halligan and Daniels (1964) who proposed the following three-fold subdivision:

- Top 3. Kurabuka Formation
- 2. Fords Creek Shale
- 1. Top Camp Dolomite.

This was followed by more detailed mapping of the group in the Edmund Sheet area and the Top Camp Dolomite was replaced by several formations and members (Daniels, 1966). The lowest formation, the Irregully Formation, is the most important in the Wyloo Sheet area, where it is subdivided into nine members.

Yilgatherra Member

The lowest member of the Irregully Formation is the Yilgatherra Member. It consists of sandstone, quartzite, and quartz-pebble conglomerate. Cementation by iron oxides is frequently encountered in the conglomerate.

Approximately one mile east of Bedan well, the member is approximately 1,000 feet thick. It thins gradually to the north and south, but thins abruptly to the east. Near Warrada Creek well, approximately 5 miles northeast of its maximum development, the member is represented by a one-foot thick grit band.

Wongida Dolomite Member

Conformably overlying the Yilgatherra Member is the Wongida Dolomite Member. It has a total thickness of approximately 2,100 feet. The basal 500 feet is a massive white-weathering dolomite. This underlies well-bedded, white, cream, mauve and grey dolomite with some sandy dolomite, dolomitic sandstone, and chert. It contains abundant stromatololiths frequently in well defined horizons. Partial or complete silicification of the algal structures is common. Edgewise conglomerate has been noted frequently.

Gooragoora Sandstone Member

Overlying the Wongida Dolomite Member is the Gooragoora Sandstone Member. In the Mount Florry region it consists of thin-bedded, cross-bedded sandstone, which frequently carries small iron oxide pseudomorphs after pyrite. A small amount of shale is locally present. In the southern part of the Parry Range this horizon is 1,100 feet thick and is dominantly composed of mudstone and shale with thin sandstone bands and rare thin dolomite bands. Further north, approximately 4 miles east of Range bore the member is again more arenaceous and consists of quartzite, sandstone, and silty sandstone interbedded with shale and variegated shaley sandstone.

Wannery Member, Chubilyer Member, Weewoddie Dolomite Member, and Yeelingee Member

Immediately north of Gooragoora Pool on the Wannery Creek the Gooragoora

Sandstone Member is conformably overlain by the Wannery Member. In this locality the latter consists of shale.

Southeast of Gooragoora Pool, near Mount Florry, the member thickens considerably and can be subdivided into three units. These are, from the base upward, the Chubilyer Member, the Weewoddie Dolomite Member, and the Yeelingee Member. The Chubilyer Member consists of approximately 600 feet of shale and mudstone with thin sandstone bands.

The Weewoddie Dolomite Member, approximately 500 feet thick, consists dominantly of black-weathering, dark blue-grey dolomite and rare thin sandstone bands. The dolomite is lens-shaped and of no large lateral extent.

The Yeelingee Member is about 700 feet thick and consists of finely-banded mudstone, sandstone, and thin dolomite bands. It overlies the Weewoddie Dolomite Member near Mount Florry, but overlies the Chubilyer Member near Weewoddie. The Wannery Member and its lateral equivalents appear to be missing from the section developed in the southern part of the Parry Range.

Warrada Dolomite Member

Overlying the Gooragoora Sandstone Member in the southern part of the Parry Range is the Warrada Dolomite Member. It is approximately 2,100 feet thick. Its lower half is a massive cream-weathering, light-grey dolomite carrying sand grains and bands of calcarenite. The upper portion is a well-bedded dolomite with bands of edgewise conglomerate. Thin silicified bands are present and become more common up the sequence.

The member has not been identified south of the Ashburton River.

Revels Corner Sandstone Member

This member overlies the Warrada Dolomite Member in the southern part of the Parry Range and is the youngest unit of the Bangemall Group exposed in that region. It has not been identified south of the Ashburton River.

The member is at least 1,100 feet thick and consists of brown-weathering, thin-bedded sandstone and quartzite, some of which carries clay pellets. On weathering the sandstone becomes porous.

Kiangi Creek Formation

South of the Ashburton River the Wannery Member and its lateral equivalents are overlain, apparently conformably, by the lowest part of the Kiangi Creek Formation. The latter consists of grey, glassy, poorly-bedded orthoquartzite. It forms the capping to the prominent Mount Florry. It is the youngest formation of the Bangemall Group exposed on the Wyloo Sheet area.

Breccias

Throughout much of the Bangemall Group sequence in the Wyloo Sheet area, breccias of various types occur. They have been divided into three types according to their origin (sedimentary, tectonic, and diapiric) and described in detail (Daniels, 1965).

The sedimentary breccias are common near Mount Price and west of the Henry River. They consist almost entirely of angular fragments of current-bedded sandstone and silicified algal dolomite derived from the Bangemall Group.

Near Mount Price the breccias are interbedded with dolomite and sandstone, but the basal contact is transgressive, implying contemporaneous erosion. Approximately 5 miles north of Mount Price the breccias bury an older well-developed, rounded topography developed on dolomite. The old surface is smooth and contains rare, small pot-holes partly filled with small rounded banded iron formation pebbles.

The tectonic and diapiric breccias were produced during the Edmundian Fold Period (Halligan and Daniels, 1964).

MESOZOIC

A few small, isolated mesas and buttes of Mesozoic rocks occur in the northwest of the Sheet area. They consist of ferruginous sandstone and conglomerate and are part of both the Nanutarra Formation and the Yarraloola Conglomerate (McWhae and others, 1958; Williams, 1966).

CAINOZOIC

The Cainozoic rocks of the Wyloo Sheet area are subdivided into two main units. The older unit consists of pisolitic limonite, calcrete, and partly consolidated colluvium. The younger group includes unconsolidated colluvium, wind-blown sand, and river sand and gravel.

The pisolitic limonite was deposited in old, incised streams. Subsequent erosion removed the surrounding rocks and left the resistant limonite as long narrow mesas with an overall meandering outcrop preserving the course of the original stream, which frequently differs considerably from the present day drainage. The maximum thickness of limonite developed is approximately 90 feet. In Boolgeeda Creek the base of one of the limonite bodies consists of leached sandy beds representing the old stream bed.

The Cainozoic deposits are good aquifers and supply most of the shallow water in the region.

INTRUSIVE ROCKS

BASIC INTRUSIVES

Several dolerite sills are present in the Weeli Wolli Formation as represented in the Sheet area.

Dolerite dykes varying in thickness from a few feet to approximately 400 feet occur throughout much of the Sheet area. They are common in the southwest part cutting Bangemall Group rocks.

In the northeast part the Brockman Iron Formation is cut by abundant joints and faults along which erosion has proceeded at a greater rate than in the surrounding rocks. Exposures in the resultant narrow troughs are very scarce. Dolerite floaters have been found in a few of these troughs and it is thought possible that many may be occupied by dolerite.

GRANITIC ROCKS

Granite rocks of Lower Proterozoic age are confined to the western third of the Sheet area. They intrude metamorphosed Wyloo Group and probably also Mount Minnie Group in the Parry Range.

The granitic rocks generally give rise either to low sandy plains with isolated monadnocks or to slightly rounded, undulating ground, strewn with granitic boulders. Fresh surfaces are white or light-grey, but weather to pale yellow brown.

The rocks are granodioritic and granitic in composition and occasionally porphyritic. Mafic minerals include biotite and muscovite. Minor amounts of tourmaline, apatite, zircon, epidote, and calcite are noted.

The granitic bodies occur as discrete intrusions or as thin bands migmatizing the country rocks in the region of Mount Alexander.

Contact metamorphism and metasomatism on the eastern side of the largest of the intrusions, the Boolaloo Granodiorite, has altered Wyloo Group sediments to cordierite- and andalusite-rich rocks.

All the granitic rocks were probably intruded during the waning phases of the Ophthalmian Fold Period.

METAMORPHIC ROCKS

Shales and greywackes of the eastern part of the Ashburton Formation possess a strong axial plane cleavage, which has been imparted to the rocks by the Ophthalmian folding. Further west the Ashburton Formation is regionally metamorphosed with the grade of metamorphism increasing progressively in that direction. Rock types include muscovite schist, quartz-biotite schist, talc schist, chloritoid schist, quartz-magnetite-grunerite schist, plagioclase amphibolite, tremolite schist, tremolite marbles, and cordierite schist. The control for the regional metamorphism is not known; it is not directly related to the Ophthalmian folding. In a very general sense the granitic rocks and the regionally metamorphosed rocks occur in the same broad area.

STRUCTURE

The Wyloo Sheet area lies in the southwest Pilbara and is structurally part of that unit.

FOLDING

The area has been subjected to two main fold periods; the Ophthalmian and the Edmundian (Halligan and Daniels, 1964). The older of these, the Ophthalmian, took place at the close of the Lower Proterozoic and produced the main structural details of the area. Folding took place along west-northeast to northwest axes producing low to moderate dips in the northeast, becoming moderate to steep south-westward. In the extreme west the fold axes have a northerly trend. The folding is accompanied by faulting and minor thrusting.

In the west and southwest of the Sheet area the Ophthalmian folding is accompanied by regional metamorphism and emplacement of granitic bodies.

The Wyloo anticline is structurally complex and is not fully understood. It is a dominant feature on the tectonic sketch map of the area (Figure 1). The area appears to have been responsible for locally controlling sedimentation in the Mount Bruce Supergroup. Isopachs for the Dales Gorge Member of the Brockman Iron Formation (Trendall and Blockley, in prep.) suggest that the basin edge may have been located in the general position of the Wyloo anticline. The anticline appears to be the result of interference of Ophthalmian folds with Rocklean folds (Halligan and Daniels, 1964; Daniels, 1967). Hence it is not known if the complexity of the Lower Proterozoic stratigraphy, as seen in the Wyloo anticline region, represents a small part of a more continuous, but unexpected shoreline, or an isolated small land mass which constantly rose during Lower Proterozoic sedimentation.

Another structural anomaly exists about 10 miles northwest of Duck Creek homestead. There, Fortescue Group basalts are directly overlain by Brockman

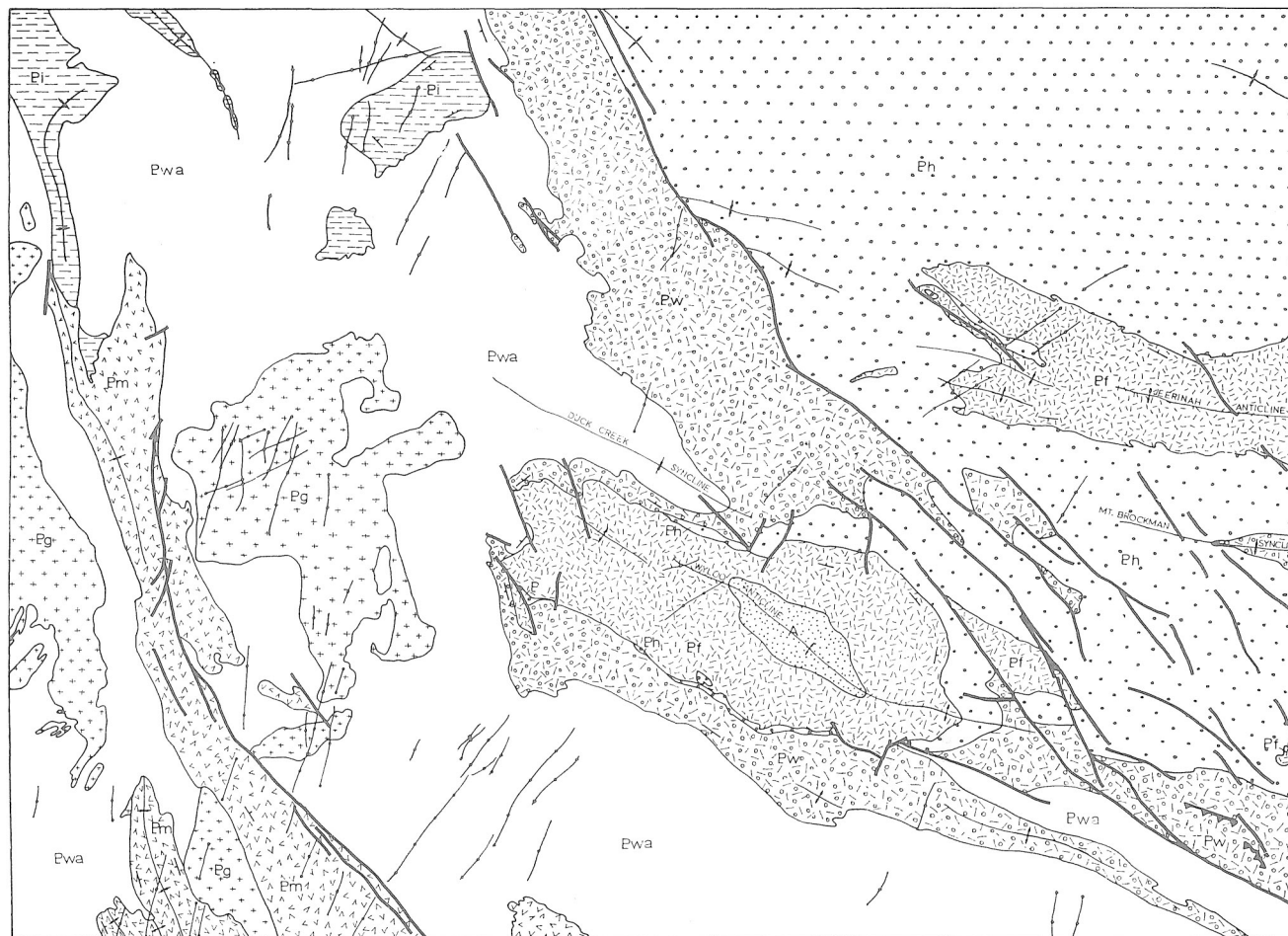
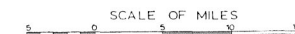


FIGURE 1

STRUCTURAL SKETCH MAP

WYLOO SHEET SF 50-10

SCALE OF MILES



REFERENCE

- PROTEROZOIC**
- Pm Bangemall Group
 - Pi Mt. Minnie Group
 - Pwa Ashburton Fm
 - Pwa Lower fms
 - Ph Hamersley Group
 - Pi Fortescue Group
 - Pg Granite
 - Archaean Archaean
- Geological boundary**
- Fault**
- Thrust**
- Anticline**
- Syncline**
- Regional dip**
- Dyke**

Iron Formation. One mile to the east, the complete sequence is present. Presumably this small area was a 'high' during much of the Lower Proterozoic.

These two features, together with several faults and dykes, fall along a northeast-trending zone crossing the Sheet area. This zone appears to be one of several such northeast-trending zones crossing the whole of the Pilbara (Daniels, 1967, 1968). It is therefore thought more likely that the stratigraphic complexities of the Wyloo anticline region are only local features.

Folding of the Mount Minnie Group presumably took place towards the close of the Lower Proterozoic. It is probably younger than the Ophthalmian folding but no details are known.

The Bangemall Group in the west and southwest of the Sheet area has been tightly folded into a series of north-northwest-trending anticlines and synclines by the Edmundian Fold Period. Some overfolding is present immediately southeast of Mount Florry.

One of the effects of the Edmundian folding was the production of large areas of breccia frequently in the axial zone of anticlines. Approximately one mile northwest of Mount Florry a small diapiric breccia, composed of fragments of sandstone, cuts dolomite. The diapiric structure is attributed to the effect of the Edmundian folding.

FAULTING

Abundant northwest-trending faults occur in a wide zone between Red Hill and the southeast corner of the Sheet area. They are probably related to the Ophthalmian Fold Period. The remainder of the Sheet area contains relatively few faults.

The northern boundary of the Bangemall Group in the Mount Florry region is marked by a large northwest-trending fault with a large downthrow to the southwest. It is apparently part of a more extensive fault zone extending through the Parry Range to the north.

GEOLOGICAL HISTORY

Very little is known about the Archaean history of the Wyloo Sheet area except that the Warrawoona Series was intruded by granitic material.

The Proterozoic began with a poor development of thin conglomerates. These were followed by a volcanic episode during which a thick sequence of basic volcanic rocks and pyroclastics was deposited.

This dominantly volcanic episode was followed by deposition of the Hamersley Group, a thick sequence of chemical deposits with some shale and acid volcanic material. The iron formations of this group have great lateral continuity and suggest that this period was one of great stability.

The Wyloo Group which followed the Hamersley Group is predominantly clastic, but contains an important algal dolomite horizon and minor volcanics. The early sediments were dirty, shallow water deposits with associated local accumulations of volcanic rocks. Most of the subsequent sediments were shales and greywackes probably deposited in a geosynclinal environment, the early development of which is marked by local accumulations of volcanic rocks. The source of the sediments is, in part at least, the Hamersley Group suggesting that during deposition of the Wyloo Group, uplift took place to the north or northeast and the main axis of the basin of deposition moved to the south and southwest. It is possible that the early clastic sediments of the Wyloo Group, the Turee Creek and Mount McGrath Formations, accumulated in a small local basin, perhaps representing an intermediate stage in the major shift of the axis of the basin of deposition.

Sedimentation in the Wyloo basin was terminated towards the close of the Lower Proterozoic, by strong folding during the Ophthalmian Fold Period. This was accompanied in the western part of the Sheet area by regional metamorphism and the emplacement of granitic masses.

The Mount Minnie Group, a dominantly clastic sequence, is probably older than at least one of the granites, but younger than the regional metamorphism. It is itself folded and transgresses much of the Wyloo Group. Possibly the group accumulated after uplift and erosion in small isolated basins during the instability at the close of the Lower Proterozoic.

Subsequently the area was uplifted and subjected to a lengthy period of erosion before deposition of the Bangemall Group.

At the beginning of Bangemall Group times, subsidence took place in the southwest of the Sheet area probably in the form of a long narrow trough. Deposits include dolomite, sandstone and shale. Also the presence in the sequence of abundant sedimentary breccias suggests local contemporaneous erosion caused by instability of the basin. Sedimentation was followed by strong folding during the Edmundian Fold Period. This folding was not accompanied by a regional metamorphism.

At an unknown time after the Edmundian folding the whole area was cut by numerous dolerite dykes.

The earliest recorded events in the Phanerozoic are the deposition of the Nanutarra Sandstone and Yarraloola Conglomerate when the area was partly submerged during Lower Cretaceous times. At about this time the main Pilbara area was a landmass. Between that period and the present day the whole region was subjected to several rises and falls of sea level with the resultant production of the various Cainozoic deposits.

ECONOMIC GEOLOGY

Apart from some amethyst production there is no mining at present in the Wyloo Sheet area. In the past, small mining concerns have extracted some gold, lead and copper. Recently several companies have investigated the base metal, iron and crocidolite potential of the area.

IRON

Both hematite ores and limonite ores are known in the Wyloo Sheet area and are largely confined to the region occupied by the Hamersley Group.

Several hematite bodies are known, especially on the northern and eastern sides of the Wyloo anticline. They are of moderate to large areal extent, and the ore grade (approximately 58% to 62% Fe) is similar to that of the hematite bodies further east in the Brockman syncline (MacLeod, 1966).

Hematite assaying over 68% Fe was reported by Maitland (1909) from Mount Edith. The ore occurs in Brockman Iron Formation, but is of small extent.

Approximately 11 miles north-northeast of Mount de Courcey is an unusual occurrence of hematite in the Mount McGrath Formation. Of this occurrence MacLeod (1966) states, "The deposit represents a replacement of a conglomerate by hematite along a zone about 8,000 feet long and over widths of up to 20 feet. In places the hematite is separated into two thin beds by a parting of shale. The mineralisation is irregular and gradational". Assays of better than 65% Fe have been obtained from the deposit.

Limonite deposits are preserved in many of the river valleys of the northern and eastern part of the Sheet area. The total tonnage is large and has been estimated by MacLeod (1966) at over 1,000 million tons. However, the grade and thickness are lower than for the limonite deposits in the Robe River to the north.

CROCIDOLITE

There is no production of crocidolite fibre from the Wyloo Sheet area.

An occurrence in the upper part of the Marra Mamba Iron Formation in Kungarra Gorge consists of several seams of fibre over 32 feet of section. One part, where best developed, the cumulative length of fibre over 32 feet measured $12\frac{1}{2}$ inches. Within this section the thickest single seam measured 4.6 inches over a strike length of $4\frac{1}{2}$ feet (Trendall and Blockley, in prep.).

This occurrence is regarded by Trendall and Blockley as one of the best fibre prospects in the western part of the Hamersley Range. It has been examined by various companies, but probably because of its poor access it has not been developed.

Two other fibre localities are known; one about 8 miles northeast of Duck Creek homestead and another in Serpentine Creek, 10 miles north of Duck Creek homestead. Both are in Marra Mamba Iron Formation. In the latter locality the fibre occurs in a thin seam approximately one inch thick developed near the base of the Marra Mamba Iron Formation.

In contrast to the fibre at Wittenoom the crocidolite in the Wyloo Sheet area is confined to the Marra Mamba Iron Formation and is not known to occur in the Brockman Iron Formation.

CHRYSOTILE

Approximately 5 miles southeast of Meilga Station, Bangemall Group dolomites are cut by dolerite dykes. In the contact zone adjacent to one of these dykes, white asbestos is developed in seams up to 6 inches wide. The fibre is of high quality, fibre lengths range from $\frac{1}{2}$ inch to 4 inches, but total reserves are small. The deposit was mined in the 1930s.

Numerous dolerite dykes cut Bangemall Group dolomites in the southwest corner of the Sheet area. It is possible that the contact zones in this region may yield further deposits similar to that near Meilga.

AMETHYST

Approximately 5 miles southeast of Mount de Courcey is a small deposit of poor quality amethyst. It occurs in a quartz vein cutting Duck Creek Dolomite. The material is at present being worked and sold for use in cheap jewellery. A small amount of gem quality material is known to exist in the deposit.

COPPER AND LEAD

Several small shows of copper and lead minerals are known in the Sheet area, but none has proved to be of much economic value.

The more important copper deposits in the Red Hill region, in the north central part of the Sheet area, have been described by Low (1963). There the copper minerals, mainly copper pyrites and malachite, occur in quartz veins cutting Ashburton Formation rocks.

Two small abandoned lead mines, the Silent Sisters and the Ariel are located on the southern side of the Wyloo anticline. The lead occurs mainly as galena in cross fractures cutting Duck Creek Dolomite (Ellis, 1951). The Silent Sisters is the larger and may warrant further investigation.

Galena occurs as thin veins in a quartz reef at the contact of granite and metamorphosed Ashburton Formation near Mount Alexander. The deposit was worked some years ago, but abandoned on account of the prevailing lead price.

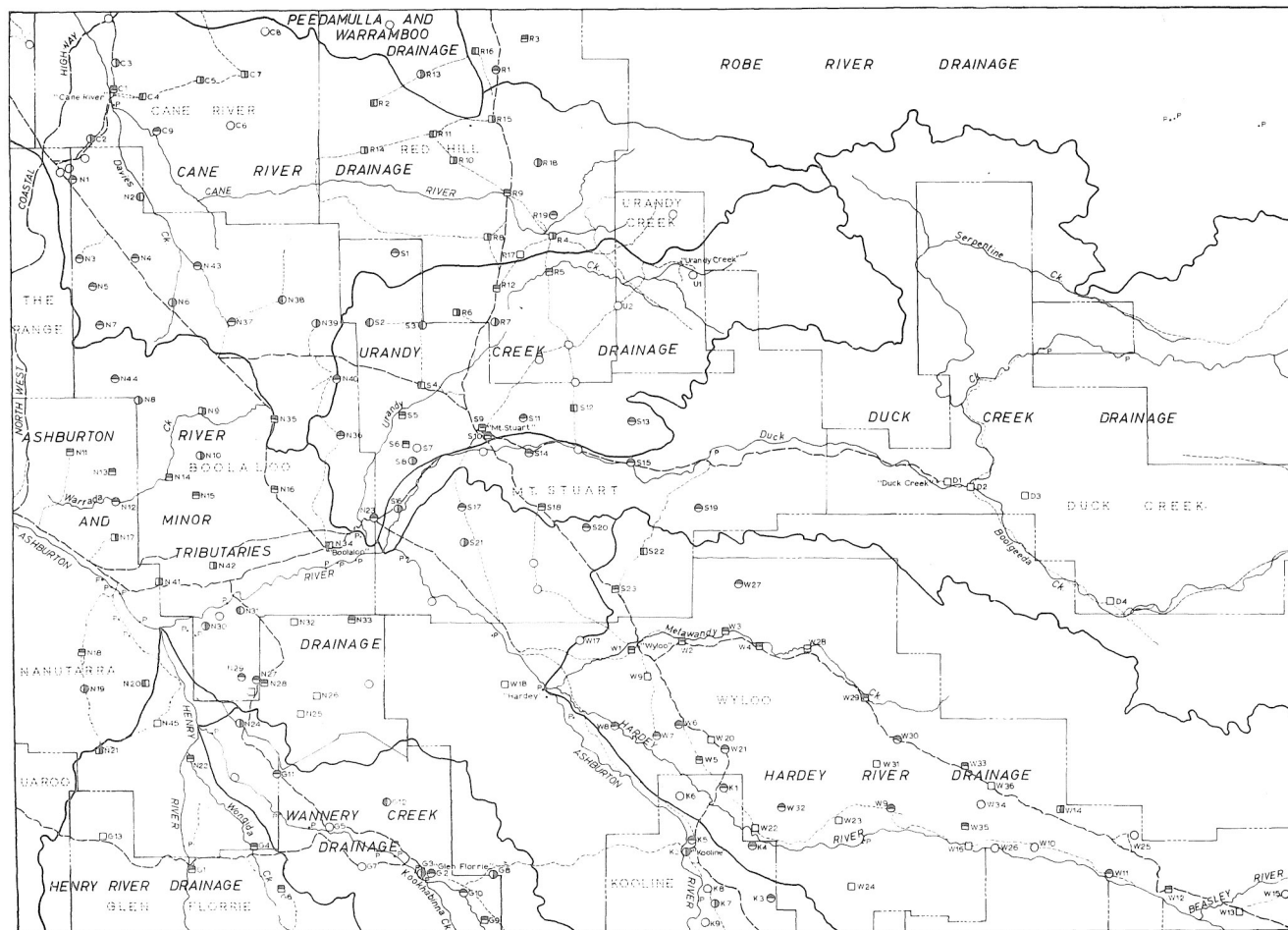
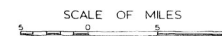


FIGURE 2

DRAINAGE PROVINCES
AND
WATER SUPPLIES

WYLOO SHEET SF 50-10



REFERENCE

- Highway _____
Main road _____
Roads and tracks _____
Station boundary _____
Homestead _____
Drainage province boundary *o* "Wylloo"
Stream (non-perennial) _____
Pool _____
Well: quality not specified
quality potable (<2500ppm) _____
quality stock (2500ppm-10000ppm) _____
quality saline (>10000ppm) _____
Bore: quality not specified
quality potable (<2500ppm) _____
quality stock (2500ppm-10000ppm) _____
quality saline (>10000ppm) _____

Note Details of wells and bores shown on this sheet are available at the Geological Survey of Western Australia

GOLD

Some gold production is known from the Paulsen mine, 8 miles north of Wyloo homestead. The gold originated from a quartz reef cutting Fortescue Group basaltic rocks.

To the southeast of Paulsen in the Metawandi Creek region small gold nuggets are rumoured to have been found.

There is a possibility that alluvial gold may exist in the Ashburton Valley near Kooline homestead. The area is close to known alluvial gold a few miles south in the Mount Dawson region in the Edmund Sheet area.

WATER

Permanent pools exist on some of the larger rivers and creeks in the Wyloo Sheet area and these are used for stock watering especially along the Ashburton River. However, most of the water for domestic and stock purposes is obtained from shallow bores and wells generally in alluvium, colluvium, and calcrete. The majority of these bores and wells are located in the lower lying country in the western part of the Sheet area.

Several of the Cane River Station bores are in Ashburton Formation. The water is very saline because of the soluble salt content of the shales and schists in this region.

Deep water possibilities exist in several of the synclines in the Hamersley Group in the east and in the sandstone basin immediately west of Red Hill.

A selection of typical bores and wells from the Wyloo Sheet area is given in Table 2.

TABLE 2. TYPICAL UNDERGROUND WATER SUPPLIES WYLOO

Map No*	Name	Total Depth (ft)	Depth to water (ft)	Quality ppm	Yield gph
Cane River Station					
C2	Wabco B	—	—	5,900	poor
C3	Old Gate B	—	18	9,700	—
C5	Brodagee W	—	47	8,750	—
Glen Florrie Station					
G3	Homestead No. 2 B	44	15	stock	good
G9	6 Mile W	—	20	1,400	good
G11	Boundary B	173	105	1,020	fair
Nanutarra Station					
N4	Davis Hills B	125	—	1,500	good
N29	Morton B	40	—	good	good
N39	Cement Tank B	110	—	fair	good
Red Hill Station					
R6	Boogaree W	43	—	fair	good
R10	Scotty W	30	—	fair	good
R19	Bloodwood B	36	20	good	good
Kooline Station					
K3	Gum Corner B	100	—	good	fair
K4	20 Mile B	45	—	good	good
K5	No. 2 House B	45	—	1,580	700 +
Mount Stuart Station					
S5	No. 42 W	30	—	good	good
S11	House Creek B	45	—	good	good
S16	Middle B	60	—	fair	good
Wyloo Station					
W4	Big Metawandi W	40	6	good	good
W7	Beedie B	50	10	good	good
W9	Wooly B	48	15	good	good

* Refers to the number of well or bore as used in Figure 2.

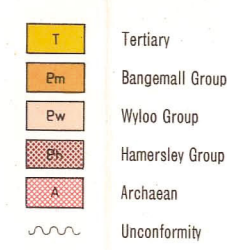
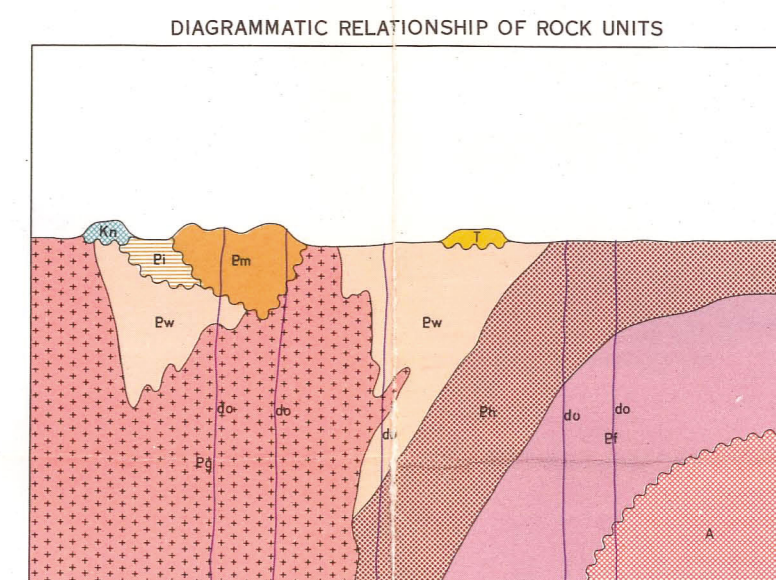
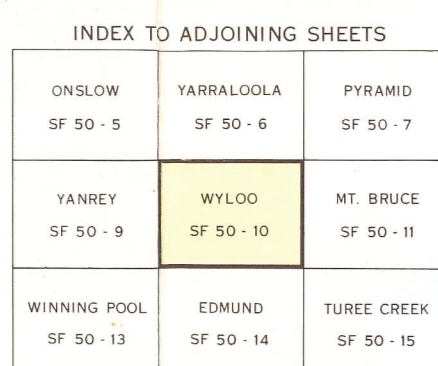
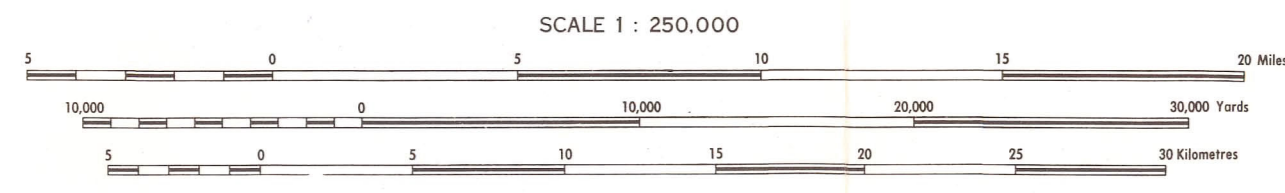
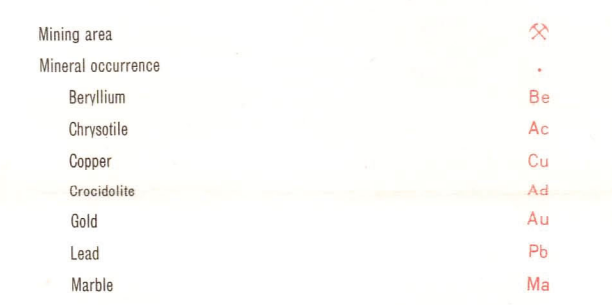
TABLE 1. WYLOO 1 : 250,000 GEOLOGICAL SERIES STRATIGRAPHIC COLUMN

Age		Group	Map Symbol	Formation or Member	Lithology	Thickness (feet)	Remarks	
CAINOZOIC	QUATER- NARY		Qra		Alluvium.		Good aquifer.	
			Qrg		Colluvium, unconsolidated sand and gravel.			
			Qra		Wind-blown sand.			
	TERTIARY		Tc		Colluvium, partly consolidated valley fill deposits.			
			To		Calcrete-limestone and calcareous gravels with opaline silica.			
			Tp	Robe Pisolite.	Pisolitic limonite deposits with fossil wood fragments.	90	Occurs along old river channels. Contains iron ore.	
			Th		Hematite deposits. Mostly residual on Brockman Iron Formation.			
	UNCONFORMITY							
MESO- ZOIC	CRET- ACEOUS		Kn	Yarraloola Conglomerate and Nanutarra Formation.	Conglomerate, sandstone, siltstone, and some shale.			
UNCONFORMITY								
PROTEROZOIC	MIDDLE PROTEROZOIC	Bangemall Group	Pmk	Kiangi Creek Formation.	Sandstone and quartzite.	800+		
			Pma	Revels Corner Sandstone Member.	Thin-bedded sandstone, some quartzite.	1,100+		
			Pmil	Warrada Dolomite Member.	Dolomite. Some sandy dolomite and calcarenite.	2,100		
			Pmiu	Wannery Member.	Shale and mudstone.	1,100		
			Pmie	Yeelingee Member.	Shale and mudstone with some sandstone and thin dolomite.	approx. 700	} Probable lateral equivalents of Wannery Member.	
			Pmio	Weewoddie Dolomite Member.	Dolomite and some shale.	approx. 500		
			Pmih	Chubilyer Member.	Shale and mudstone with thin sandstone and rare dolomite.	600		
			Pmid	Gooragoora Sandstone Member.	Sandstone and quartzite. Thin-bedded, cross-bedded, and locally pyritic.	1,100		
			Pmi	Wongida Dolomite Member.	Dolomite. Some sandy dolomite, dolomitic sandstone and chert.	2,100	Carries abundant algal fossils.	
			Pmis	Yilgatherra Member.	Sandstone, quartzite, and quartz-pebble conglomerate.	0-1,000		
	UNCONFORMITY							
	LOWER PROTEROZOIC	Mount Minnie Group	Pi	Undifferentiated Mount Minnie Group.	Sandstone, quartzite, shale, and rare jaspilite.			
			Pia	Warramboos Sandstone.	Thin-bedded sandstone and quartzite with some shale.			
			Piw	Wabco Shale.	Brown shale with thin interbedded sandstone.	1,700		
			Pib	Brodagee Sandstone.	Sandstone, quartzite, and conglomerate.	2,500		
	UNCONFORMITY							
	LOWER PROTEROZOIC	MOUNT BRUCE SUPERGROUP	Wylloo Group	Pwa	Ashburton Formation.	Shale, greywacke, banded iron formation, and dolomite.		Metamorphosed in west of Sheet area.
				Pws	Mudong Member of Ashburton Formation.	Quartzite with some marble, amphibolite, and quartz-magnetite rock.		Metamorphosed in west of Sheet area.
				Pwam		Cordierite and andalusite-rich rocks.		Contact metamorphosed Ashburton Formation.
				Pwx		Acid and basic volcanics, agglomerate and tuff.		Local development at base of Pwa.
				Pwd	Duck Creek Dolomite.	Dolomite with some chert and shale.	3,300+	Contains abundant algal fossils.
				Pwm	Mount McGrath Formation.	Shale, sandstone, greywacke, conglomerate, dolomite, quartzite, and thin basalt.		
				Pwb	Cheela Springs Basalt Member.	Saussuritized, amygdaloidal quartz-basalt.	5,000	Member of Pwm.
				Pwq	Beasley River Quartzite.	Quartzite with pebble beds and conglomerate.		
			Pwt	Turee Creek Formation.	Thin-bedded silty shale, sandstone, greywacke, conglomerate, and some dolomite.	1,000		
			Hamersley Group	Pho	Boolgeeda Iron Formation.	Purplish ferruginous flaggy siltstone, banded iron formation, and shale.	700	
				Phw	Woongarra Volcanics.	Rhyolite and dacitic flows, often porphyritic. Some tuff.	1,800	
				Phj	Weeli Wolli Formation.	Banded iron formation and some shale.	1,600	Intruded by dolerite sills.
				Phb	Brockman Iron Formation.	Banded iron formation, chert, and shale with some conglomerate.	2,200	Contains iron ore.
				Phs	Mount McRae Shale.	Shale, siltstone, dolomitic shale with banded iron formation and chert.	300	
					Mount Sylvia Formation.	Shale with three prominent thin banded iron formation bands.	100	
				Phd	Wittenoom Dolomite.	Grey dolomite with some chert and shale.	500	
				Phm	Marra Mamba Iron Formation.	Chert and banded iron formation with some shale.	750	Contains crocidolite.
			Fortescue Group	Pfj	Jeerinah Formation.	Shale, chert, banded iron formation, mudstone, quartzite and dolomite.		} Together form Mount Jope Volcanics.
				Pfbu	Bunjinah Pillow Lava Member.	Basalt, some well developed pillows.		
				Pfbp	Pyradie Pyroclastic Member.	Agglomerate and ash.		
				Pfbo	Boongal Pillow Lava Member.	Basalt with some pillow development.		
				Pf	Undifferentiated Fortescue Group.	Basalt, greywacke, shale, conglomerate, and chlorite schist.		
UNCONFORMITY								
ARCH- AEAN			Aw	Warrawoona Series.	Basic lava, agglomerate, chlorite schist, banded iron formation.		Intruded by dolerite.	

INTRUSIVES
Proterozoic: Dolerite dykes (d), granite and granodiorite (Pg). Archaean: Granite rocks (Ag).

REFERENCES

- Daniels, J. L., 1965, Breccias associated with the Proterozoic Bangemall Group: West Australia Geol. Survey Ann. Rept. 1964, p. 34-36.
- 1966, Revised stratigraphy, palaeocurrent system and palaeogeography of the Proterozoic Bangemall Group: West. Australia Geol. Survey Ann. Rept. 1965, p. 48-56.
- 1967, Explanatory notes on the Turee Creek 1 : 250,000 geological sheet, Western Australia: West. Australia Geol. Survey Rec. 1967/7 (unpublished).
- 1968, Explanatory notes on the Edmund geological series sheet SF/50-14, Western Australia: West. Australia Geol. Survey Rec. 1968/3 (unpublished).
- de la Hunty, L. E., 1965, Mount Bruce, Western Australia: West. Australia Geol. Survey 1 : 250,000 Geol. Series Explan. Notes.
- Ellis, H. A., 1951, Report on a reconnaissance examination of the Kooline Lead Field: West. Australia Geol. Survey Ann. Rept. 1949, p. 9-13.
- Halligan, R., and Daniels, J. L., 1964, Precambrian geology of the Ashburton Valley region, North-West Division: West. Australia Geol. Survey Ann. Rept. 1963, p. 38-46.
- Low, G. H., 1963, Copper deposits of Western Australia: West. Australia Geol. Survey Mineral Resources Bull. 8.
- MacLeod, W. N., 1966, The geology and iron deposits of the Hamersley Range area, Western Australia: West Australia Geol. Survey Bull. 117.
- MacLeod, W. N., de la Hunty, L. E., Jones, W. R., and Halligan, R., 1963, A preliminary report on the Hamersley Iron Province, North-West Division: West Australia Geol. Survey Ann. Rept. 1962, p. 44-54.
- Maitland, A. G., 1909, Geological investigations in the country lying between 21° 30' and 25° 30' S Latitude and 113° 30' and 118° 30' E Longitude, embracing parts of the Gascoyne, Ashburton and West Pilbara Goldfields: West. Australia Geol. Survey Bull. 33.
- McWhae, J. R. H., Playford, P. E., Lindner, A. W., Glenister, B. F., and Balme, B. E., 1958, The stratigraphy of Western Australia: Geol. Soc. Australia Jour. v. 4.
- Ryan, G. R., and Blockley, J. G., 1965, Progress report on the Hamersley Range blue asbestos survey: West. Australia Geol. Survey Rec. 1965/32 (unpublished).
- Talbot, H. W. B., 1926, A geological reconnaissance of part of the Ashburton drainage basin, with notes on the country southwards to Meekatharra: West Australia Geol. Survey Bull. 85.
- Trendall, A. F., and Blockley, J. G. (in prep.), Iron formations of the Precambrian Hamersley Group, Western Australia, with special reference to the associated crocidolite: West. Australia Geol. Survey Bull. 119.
- Williams, I. R., 1966, Explanatory notes on the Yarraloola 1 : 250,000 geological sheet area, Western Australia: West. Australia Geol. Survey Rec. 1965/29 (unpublished).



WYLOO
SHEET SF 50 - 10
FIRST EDITION 1969

