BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

REPORT 216

BMR MICROFORM MF104

STRATIGRAPHIC DEFINITIONS OF NAMED UNITS IN THE ARUNTA BLOCK, NORTHERN TERRITORY

by

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DEPARTMENT OF NATIONAL DEVELOPMENT

Minister: The Hon. K.F. Newman, M.P.
Secretary: A.J. Woods

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Acting Director: L.W. Williams
Assistant Director, Geological Branch: J.N. Casey

Published for the Bureau of Mineral Resources, Geology and Geophysics
by the Australian Government Publishing Service

ABSTRACT

This report presents stratigraphic definitions of named rock units in the Arunta Block, Northern Territory, mapped between 1970 and 1977. Most of the units are of crystalline rocks, but definitions of the Tertiary Hale Formation and four new members of the Upper Proterozoic Heavitree Quartzite are also included.

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INTRODUCTION

This report presents stratigraphic definitions, arranged alphabetically, of named rock units in the Arunta Block, Northern Territory. Full descriptions of the units are presented in Shaw, & others (in preparation) and Stewart & others (in preparation); brief descriptions, and definitions of rock types are presented in the Commentaries on the Strangways Range Region, Alice Springs Region, and Reynolds Range Region 1:100 000 geological maps (Shaw & Langworthy, in preparation; Offe & Shaw, in preparation; Stewart, in preparation). Map symbols referred to in this report are those used on these three special maps, and on the 1:100 000 scale Preliminary Editions.

The named units defined herein are of two types:

1. Named informal units, e.g. Mount Dunkin schist. These units have clearly defined boundaries, but relationships with other units are uncertain, and their component rock types and order of internal superposition may not be known completely. Informality is indicated by the lower case first letter of the rock name. 'Metamorphics' is used for a mixture of rock types.

2. Named formal formations, e.g. Mount Thomas Quartzite, Anmatjira Orthogneiss. These have clearly defined boundaries, distinctive compositions, known relationships to other units, and their order of internal superposition is known, or is not applicable, as in the case of (meta) igneous rocks. Formality is indicated by the upper case first letter of the rock name.

All Rb-Sr isotopic dates quoted in this report use a ^{87}Rb half-life of 1.39×10^{11} y.

STRATIGRAPHIC DEFINITIONS

Adla Granulite (New name)

Proposer:	A.P. Langworthy (in Shaw & others, in preparation)
Derivation of name:	Adla Hill, at 23°26'S, 133°32'E, in the Alice Springs 1:250 000 Sheet area.
Distribution:	The unit forms isolated hills including Adla Hill and Boen Hill, west of Cottonbush Dam in the southwest corner of the Burt 1:100 000 Sheet area. Airphoto-lineaments and several small isolated exposures indicate that the unit extends as a 10-km wide, 25-km long belt under a veneer of Cainozoic deposits between the two hills.
Type area:	A small rise at GR 5651-518078, 1.5 km east of Adla Hill.
Lithology:	Interlayered mafic granulite, and garnet-felsic granulite, both of which are partly retrogressed. The mafic granulite typically contains abundant quartz and hornblende, and small amounts of garnet. The felsic granulite contains a large proportion of coarse-grained quartz-orthoclase-plagioclase mobilisate. Some of the felsic granulite contains sillimanite.
Relationships:	The isolated exposures are completely surrounded by Cainozoic cover.
Age:	Mid-Proterozoic or older. Probably metamorphosed at 1800 m.y., the age of the main granulite metamorphism in the Strangways Metamorphic Complex, in which it is included (Black, 1975; Iyer & others, 1976).
Correlation:	Correlated with the Yambah granulite and the Ongeva granulite of Strangways Metamorphic Complex.
Synonymy:	Previously mapped as undivided Arunta Complex (Wells, 1969).

Aileron metamorphics (new name)

Proposers: A.J. Stewart, A.Y. Glikson, R.G. Warren (in Stewart & others, in preparation)

Derivation of name: Aileron (GR 5552-295943), a settlement on the Stuart Highway, 135 km north of Alice Springs, Aileron 1:100 000 Sheet area.

Distribution: Northeast part of Aileron 1:100 000 Sheet area; extends east into Alcoota 1:250 000 Sheet area.

Reference area: Prominent hill at GR 5552-255996, 6.5 km northwest of Aileron; southeastern slope of hill shows gently dipping felsic and mafic banded granulites; towards top of hill, granulites are intimately mixed with augen gneiss of Boothby Orthogneiss.

Lithology: Ten sub-units are recognised. These form enclaves up to 4 km long, composed of one subunit or several interlayered subunits, in Boothby Orthogneiss.

1. Felsic granulite, and subordinate mafic granulite, amphibolite, garnet-biotite gneiss, sillimanite gneiss, cordierite granulite and gneiss.

2. Mafic granulite, and subordinate felsic granulite.

3. Cordierite gneiss.

4. Garnet-biotite gneiss, cordierite gneiss, mafic granulite.

5. Calc-silicate rock, forsterite marble.

6. Sillimanite-garnet-biotite gneiss, amphibolite, garnet amphibolite.

7. Quartz-rich metasediment.

8. Cordierite-garnet granulite.

9. Quartzofeldspathic gneiss.

10. Amphibolite.

Relationships: Intruded by Boothby Orthogneiss, Napperby Gneiss, and unnamed granite at two localities 4 and 7 km south of Aileron, respectively.

Age: Metamorphosed in the Proterozoic. The unit is older than the Napperby Gneiss, which is dated at 1800-1500 m.y. (L.P. Black, BMR, personal communication, 1975).

Synonymy: Described as 'Granulites' by Evans & Glikson (1969), and as 'Precambrian paragneisses, basic and acid granulites' by Wells & others (Evans 1972).

Algamba Dolomite Member (new name)

Proposer:	A.J. Stewart (in Stewart & others in preparation)
Derivation of name:	Algamba Bore (GR 5453-793382), Reynolds Range 1:100 000 Sheet area.
Distribution:	In Reynolds Range, Reynolds Range 1:100 000 Sheet area.
Type section:	Section AX-3, 5.5 km southwest of Lander Bore: base of section at GR 5453-673411, top at -671407. Not measured.
Lithology:	Grey-brown laminated to thin-bedded fine-grained dolomite, and minor grev irregularly laminated fine-grained limestone.
Thickness:	425 m in type section is maximum.
Relationships:	A single lens, folded and faulted, enclosed in Pine Hill Formation.
Age:	Middle Proterozoic or older (see Pine Hill Formation).
Synonymy:	Referred to as Lander Dolomite by Australian Geophysical (1967); mapped as 'Precambrian schist metasediments, including marble' by Wells & others (Evans, 1972).

Alice Springs Granite (new name)

Proposer:	L.A. Offe (in Shaw & others, in preparation)
Derivation of name:	Alice Springs township (GR 5650-855785) in the Alice Springs 1:100 000 Sheet area.
Distribution:	North from the township for a distance of about 5 km (Alice Springs 1:100 000 Sheet area).
Type locality:	Around the Alice Springs Telegraph Station, about 3 km northeast of the Alice Springs township. Exposure here consists of orange rounded bouldery hills of muscovite-biotite granite.
Lithology:	Granite consists of microcline, albite, quartz, biotite, and muscovite. Biotite and albite are partly altered to chlorite and epidote, respectively. In places the granite contains white microcline laths up to 10 cm long. Margin of the granite is in most places gneissic.
Relationships:	No intrusive contacts apparent. Conformable with the Sadadeen Range gneiss. To the north the granite is cut the Charles River Fault. Dolerite dykes (Pds), and at the margin, pegmatite and rare aplite dykes, intrude the granite.

Age: Possibly Late Proterozoic. On the basis of mineral dates, Compston & Arriens (1968) suggest the granite was affected by an isotopic redistribution event at 1130 m.y. L.P. Black (BMR, personal communication, 1977) obtained a minimum age for the Alice Springs Granite of about 1100 m.y., from muscovite, assuming an initial $^{87}Sr/^{86}Sr$ ratio of 0.71. Thus the Alice Springs Granite may have intruded the Hayes Metamorphic Complex or at least been warmed during the Late Proterozoic Ormiston Phase of deformation and migmatisation.

Correlation: The Alice Springs Granite is correlated with medium, even-grained biotite-muscovite granitic gneiss and schistose granitic gneiss which crop out within the nose of the Blatherskite Nappe about 5 km south and southwest of Alice Springs township, in the Alice Springs 1:100 000 Sheet area. In places the gneiss contains feldspar megacrysts up to 4 cm long, and is cut by muscovite-bearing pegmatite veins and sheared porphyry. The granitic gneiss is similar in composition to both the Alice Springs Granite and the Jessie Gap gneiss. However, the thrusting associated with the nappe is thought to be essentially a north to south movement; hence the granitic gneiss is considered to be Alice Springs Granite that was foliated during thrusting.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Aloolya Gneiss</u> (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation). area.

Distribution: Two bodies 5 km apart in southeast of Anmatjira Range, Tea Tree 1:100 000 Sheet area.

Type locality: GR 5553-992353; a large clean nearly vertical rock face on northeast side of hill 3.5 km southwest of Bluebush Bore shows Aloolya Gneiss intruding Anmatjira Orthogneiss.

Lithology: Leucocratic medium-grained granitic gneiss containing prominent clots of tourmaline and garnet.

Relationships: Intrudes Tyson Creek granulite and Anmatjira Orthogneiss; thermally metamorphoses Possum Creek Charnockite. Adjoins and probably intrudes Weldon metamorphics. Intruded by dykes of aplite, pegmatite, metamorphosed basic rock, and quartz.

Age: Middle Proterozoic; slightly younger than Anmatjira Orthogneiss, which is dated at 1642 ± 100 m.y. (Rb-Sr, whole rocks; L.P. Black, BMR, personal communication 1975).

Synonymy: Mapped as 'Precambrian orthogneiss, gneissic granite' by Wells & others (Evans 1972).

Anamarra orthogneiss (new name)

Proposer: A.P. Langworthy (Shaw & others, in preparation)

Derivation of name: Anamarra Creek, 23°06'S, 134°21'E, in the Alice Springs 1:250 000 Sheet area.

Distribution: Unit forms an area of low relief covering about 14 km^2 about 5 km north of Mount Johnston.

Reference section: Along Anamarra Creek from GR 5751-347431 to 352412.

Lithology: Biotite-rich, strongly foliated orthogneiss containing megacrysts of orthoclase; small lenses of mafic granulite and amphibolite within the unit are probably xenoliths. The orthogneiss locally contains hornblende.

Relationships: Intrudes unnamed unit p€u, which consists mainly of quartzofeldspathic gneiss.

Age: Middle Proterozoic; no isotopic data available.

Synonymy: Previously mapped as undivided Arunta Complex by Wells & others (Wells, 1969).

Ankala gneiss (new name)

Proposers: R.D. Shaw, A.R. Allen (Shaw & others, in preparation).

Derivation of name: Ankala Hill (GR 5751-081276), Laughlen 1:100 000 Sheet area.

Distribution: The unit forms a fault wedge widening eastwards from its apex near Gumtree Bore (GR 5751-42264) to the Pinnacles Fault (GR 5751-195308), where it is offset to the south. The unit reappears farther southeast in the Winnecke Goldfield area, and also crops out south of a schist zone (Pzr) southeast of the reference area. It is also considered to occur in the hanging wall sequence at Rankins Copper Prospect (GR 5751-093242).

Reference area: Area surrounding Ankala Hill and between there and Gumtree Bore (i.e. between GR 5751-085284 and 5751-042264).

Lithology: Quartzofeldspathic gneiss, subordinate calcsilicate gneiss, biotite gneiss, amphibolite and rare marble, meta-ultramafic rock, and quartz-hematite rock, and extremely rare anthophyllite-rich rock.

Relationships: The unit is faulted against Erontonga metamorphics, Utnalanama granulite, and Harry Anorthositic Gabbro, and also against Sliding Rock metamorphics, except at Rankins Prospect (5751-093343), where the two units appear to be conformable.

Remarks: The Ankala gneiss is distinguished from the Utnalanama granulite by its more biotite-rich and calcareous rocks, its lower metamorphic grade and the more acid composition and layered nature of its felsic rocks. The Ankala gneiss lacks the hornblende and garnet-bearing gneisses typical of the Sliding Rock metamorphics.

Age: Middle Proterozoic or older. The first of several metamorphisms recognised in this unit is correlated with the earliest event identified in the Harry Creek area, which is dated at 1800 m.y., using ^{40}Ar-^{39}Ar incremental heating methods (Allen & Stubbs, in press).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Anmatjira Orthogneiss (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Anmatjira Range (GR 5453-780480), northern part of Reynolds Range 1:100 000 Sheet area.

Distribution: Large batholith exposed along northeastern flanks of Anmatjira Range and Yundurbulu Range (GR 5454-520700, Mount Peake 1:100 000 Sheet area).

Type locality: Ingallan Spring (GR 5453-793499), northeastern side of Anmatjira Range, where unit is well exposed as rock bars in bed of creek.

Lithology: Granitic augen gneiss, comprising ovoids of microcline up to 10 cm across and smaller subhedral rapakivi feldspars (microcline mantled by plagioclase) in coarse-grained granitic groundmass.

Relationships: Intrudes Tyson Creek granulite, Weldon metamorphics, Lander Rock beds, Mount Stafford beds, and probably the Possum Creek Charnockite. Intruded by dykes of aplite, pegmatite, microgranite, metamorphosed dolerite, and vein quartz.

Age: Middle Proterozoic; preliminary Rb-Sr whole rock isochron gives 1642 $\pm$ 100 m.y. (L.P. Black, BMR, personal communication, 1975).

Synonymy: Referred to as Napperby Granite by Australian Geophysical (1967). Described by Evans & Glikson (1969) as granitic gneiss (orthogneiss) of the Precambrian basement to the Ngalia Basin. Mapped as 'Precambrian orthogneiss, gneissic granite' by Wells & others (Evans, 1972).

Anuma schist (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation).

Derivation of name: Anuma Creek (GR 5751-370220), Laughlen 1:100 000 Sheet area.

Distribution: From Marbles Bore (GR 5751-264267) eastward to Anuma Creek, Laughlen 1:100 000 Sheet area.

Reference section: Low, well exposed north-dipping ridges extending from GR 5751-271254 for 600 m north to GR 5751-271260, Laughlen 1:100 000 Sheet area.

Lithology: Reference section begins in south with kyanite-muscovite schist containing segregations of coarse kyanite and biotite. Overlain successively to north by staurolite-muscovite schist, muscovite-biotite-quartz-feldspar gneiss, staurolite-biotite-muscovite schist, epidote-microcline rock, hematite-garnet quartzite, muscovite-biotite-quartz-feldspar gneiss, mica schist containing masses of pegmatite up to 7 m across, staurolite-biotite-muscovite schist, and interbedded marble and garnet-hematite quartzite; top is truncated by a fault.

Relationships: Concordantly overlies Erontonga metamorphics to south, and may be conformable on them; faulted against Cadney metamorphics.

Remarks: Distinguished by abundance of kyanite and staurolite, which are absent in adjacent units.

Age: Deposition of parent sediments probably Early Proterozoic. Regional metamorphism possibly about 1700 m.y. on evidence from surrounding areas. K-Ar dates of 993, 673, 371, and 336 m.y. (Webb & Lowder, 1972) result from partial argon loss during Devonian to Carboniferous Alice Springs Orogeny.

Synonymy: Mapped as part of the Arunta Complex by Wells & others (Wells, 1969).

Atnarpa Igneous Complex (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation,).

Derivation of name: Atnarpa homestead (GR 5850-783983); Fergusson Range 1:100 000 Sheet area.

Distribution: Northern part of Fergusson Range 1:100 000 Sheet area, and southern part of Riddoch 1:100 000 Sheet area.

Type areas:

1. From GR 5850-775915 for 3 km eastward to GR 5850-805915 in Fergusson Range 1:100 000 Sheet area; well exposed hilly terrain of diorite containing rafts of ortho-amphibolite of Tommys Gap metamorphics. Western end shows numerous aplite dykes (forming separate aplogranite map-unit of Complex).

2. At GR 5850-680923, Fergusson Range 1:100 000 Sheet area; tors of fresh tonalite with numerous dark xenoliths.

3. At GR 5850-695930, Fergusson Range 1:100 000 Sheet area; granite is well exposed on south bank of unnamed creek.

4. At GR 5850-970007, Fergusson Range 1:100 000 Sheet area; prominent hills of granodiorite on east bank of Hale River.

Lithology: Consanguineous igneous complex of diorite-tonalite-granodiorite-granite-aplite-hydrothermal veins. Diorite forms four bodies separated by regions of Tommys Gap metamorphics in Giles Creek Synform; is heterogeneous in mineralogical composition, giving rise to small amounts of such variants as gabbro, tonalite, adamellite, and granite. Tonalite occupies large areas in central part of White Range Nappe and western part of Giles Creek Synform; is also mineralogically heterogeneous, forming small amounts of diorite, trondhjemite, granodiorite, and adamellite; is retrogressively metamorphosed to mylonitic metatonalite gneiss in root zone of White Range Nappe. Granodiorite map-unit occurs only in Ruby Gap Nappe, east of White Range Nappe. Granite forms extensive irregular regions inside tonalite unit, is coarse-grained and contains roughly equal amounts of albite and microcline. Aplite is abundant as dykes and sheets, and sufficiently abundant in two areas of the diorite unit to be mapped as separate areas of aplogranite. Hydrothermal veins mostly intrude the diorite, and include quartz-calcite, quartz-calcite-hematite, and calcite-epidote rocks.

Relationships: Intrudes Tommys Gap metamorphics, Cavenagh metamorphics, and Hillsoak Bore metamorphics. Adjoins and probably intrudes unnamed unit pЄx. Intruded by plugs of ultramafic rock, amphibolite dykes, and by dolerite dykes correlated with Stuart Dyke Swarm. Unconformably overlain by Heavitree Quartzite.

Age: Middle Proterozoic; four out of five whole-rock samples lie on Rb-Sr isochron giving 1710 ± 50 m.y. (Shaw & others, in preparation). Two whole-rock samples lie on Rb-Sr isochron (with samples from Cavenagh metamorphics, Cadney metamorphics, and Jennings Granitic Gneiss) giving 1719 ± 24 m.y. (Armstrong & Stewart, 1975).

Synonymy: Mapped as part of Arunta Complex by Wells & others (Wells, 1969).

Bond Springs gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Bond Springs homestead (GR 5650-897960) Alice Springs 1:100 000 Sheet area.

Distribution: Arc of low hills near the Bond Springs homestead, in the northeast of the Alice Springs 1:100 000 Sheet area.

Reference area: North of Bond Springs homestead along tributary of the Todd River (GR 5650-897964 to 897973); abundance of leucocratic gneiss.

Lithology: Leucocratic quartzofeldspathic gneiss, garnet-muscovite gneiss, and a lesser amount of banded biotite gneiss, amphibolite, and muscovite schist. Biotite and magnetite are common accessory minerals in the leucocratic gneiss. Some southern exposures are partly migmatitic.

Relationships: Structurally underlain to the east and overlain to the west by darker rocks mapped as unassigned gneiss (pЄ); contacts are conformable with the foliation.

Remarks: The unnamed unit pЄj in the Colyer Creek area, which crops out west of the Bond Springs gneiss, also contains a high proportion of leucocratic gneiss; however the stratigraphic relationship between the two units is not known. A Palaeozoic fault (reactivated from the earlier Redbank Deformed Zone) separates the Bond Springs gneiss from an unnamed unit, pЄd, of leucocratic garnet gneiss and amphibolite to the north. Displacement along this fault is believed to be substantial, and therefore the nature of the relationship between the two leucocratic units is not known.

Age: Middle Proterozoic or older. Gneissic fabric is related to the regional Middle Proterozoic Chewings Phase of deformation and accompanying metamorphism. This fabric is overprinted in a few places by migmatite formed during the regional Late Proterozoic Ormiston Phase of deformation.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Bonya metamorphic complex (variation of published name)

Proposer: R.G. Warren (in Warren, in preparation).

Derivation of name: Bonya Creek (22°53'S, 136°24'E), Huckitta 1:250 000 Sheet area.

Distribution: In the hills drained by Bonya Creek, and surrounding the Jervois Mining District; probably extends south and east as far as the Tarlton Fault, and westwards north of the Delny - Mount Sainthill Fault as far as Dneiper homestead.

Reference area: From Charlotte Bore (22°45'S, 136°03'E) to Bonya Bore (22°47'S, 136°09'E) west of Bonya Creek.

Lithology: Well-layered sequence of felsic gneiss, amphibolite, two-mica schist, calc-silicate rock, marble, and rare magnetite quartzite.

Relationships: Intruded by Jinka Granite and Jervois Granite (Smith, 1963), and by pegmatite.

Age: Older than 1803 m.y. Jinka Granite (recalculated from Wilson & others (1960).

Correlation: May be lateral equivalent of Delny Gneiss and Delmore Metamorphics (Shaw & Warren 1975).

Synonymy: Replaces Bonya sequence (Warren, 1978). Previously mapped as undivided Arunta Complex (Smith, 1963b).

<u>Boothby Orthogneiss</u> (new name)

Proposers: A.J. Stewart, A.Y. Glikson, R.G. Warren (in Stewart & others, in preparation).

Derivation of name: Mount Boothby (GR 5552-248019), northern part of Aileron 1:100 000 Sheet area.

Distribution: Mainly in northern part of Aileron 1:100 000 Sheet area; extends north into southern edge of Tea Tree 1:100 000 Sheet area, and east into western edge of Alcoota 1:250 000 Sheet area.

Reference area: At GR 5552-270054, 1 km west of Prowse Gap, northern part of Aileron 1:100 000 Sheet area; ridge of well-exposed augen gneiss with intrusive contact against Aileron metamorphics to north. Reference locality for porphyritic granite variant is at GR5552-260973, 5 km northwest of Aileron; hill shows clear exposures of flow-textured bands of granite alternating with bands of layered granulite of Aileron metamorphics.

Lithology: Coarse granitic augen gneiss; small amount of porphyritic granite with euhedral phenocrysts. Augen and phenocrysts composed of microcline. Some small rapakivi feldspars also present. Normal biotite granite mineral assemblage; some samples also contain sillimanite and garnet, and some contain andalusite also.

Relationships: Intrudes Aileron metamorphics, Nolans Dam metamorphics, Weldon metamorphics, and Tyson Creek granulite. Faulted against Napperby Gneiss.

Age: Middle Proterozoic; no isotopic data available.

Synonymy: Described as 'Granitic gneiss (orthogneiss)' by Evans & Glikson (1969), mapped as 'Precambrian orthogneiss, gneissic granite' by Wells & others (Evans, 1972).

Bungitina metamorphics (variation of published name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Bungitina Well (abd) (GR 5851-900374) on the upper reaches of Maude Creek, 9 km south of Mount Brassey, in the northeastern part of the Riddoch 1:100 000 Sheet area.

Distribution: The principal outcrop area is a rugged belt of hills and ridges, some 3 km wide, which strike south-southwest from Mount Brassey in the Alice Springs 1:250 000 Sheet area. The unit also crops out near the confluence of Florence and Maude Creeks, and between Muller Flat Dam and the junction of Florence Creek with the Hale River, also in the Riddoch 1:100 000 Sheet area.

Reference section: Florence Creek between GR 5851-847427 and -836381.

Lithology: Mainly very fine-grained quartzofeldspathic gneiss, which is generally garnetiferous, and subordinate amphibolite. Rarer rock types include clinopyroxene or hornblende-bearing plagioclase rock, garnet quartzite, biotite schist, calc-silicate rock, and megacrystic feldspar gneiss. Lenses of unusual Mg-rich rock, noted for their base-metal content, are present at the Oonagalabi Prospect. The Mg-rich lenses include anthophyllite-rock and gedrite rock.

Informal subdivision of unit: The unit is informally subdivided into presumed lower ($p\epsilon sb_2$) and upper ($p\epsilon sb_1$) subunits. The lower subunit is more extensive, has a higher proportion of quartzofeldspathic gneiss, and contains amphibolite bodies that are commonly discordant and lensoid. These amphibolite bodies are equivalent to minor mafic granulite elsewhere in the unit. The upper subunit contains a more diverse group of rock types, including those of the Mg-rich lenses, the megacrystic feldspar gneiss, and a schistose garnetiferous biotite gneiss.

Rock types common to both informal units include the distinctive quartzofeldspathic gneiss, amphibolite, hornblende- or clinopyroxene-plagioclase rock, and calc-silicate rock.

Relationships: The metamorphics are assigned to the Strangways Metamorphic Complex. They are thought to be conformably

overlain by unnamed unit p€sl, a facies equivalent of the Cadney metamorphics, although the contact is complicated by strike faulting. The Bungitina metamorphics are thought to be unconformably overlain by the Irindina Gneiss (Joklik, 1955) of the Harts Range Group. The contact with Naringa calcareous member of the Irindina Gneiss is obscured by a zone of tectonic disturbance, which develops into a major tectonic slide. Porphyroblastic potassium feldspar gneiss assigned to the Entia Gneiss, also belonging to the Harts Range Group, locally overlies the Bungitina metamorphics along Florence Creek upstream of its junction with Maude Creek. At the southwestern extremity of the principal outcrop area, highly deformed Bungintina metamorphics pass progressively into the retrogressive Gough Dam Schist Zone, characterised by muscovite-bearing schists.

Age: Middle Proterozoic or older. The unit is presumed to have been regionally metamorphosed at 1800 m.y. like other units of the Strangways Metamorphic Complex. It may have undergone a later second metamorphism, to account for the extremely fine recrystallised texture.

Synonymy: The unit includes a group of lensic bodies of quartzofeldspathic gneiss, referred to by Joklik (1955, p. 43) as the Bungitina Granodiorite (R4787, R4588) and als all the quartzofeldspathic gneisses and subordinate mafic rocks mapped by Joklik as granitised Irindina Gneiss.

Burt Bluff Gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Burt Bluff (GR 5650-674714) in the Alice Springs 1:100 000 Sheet area.

Distribution: Extends westwards from Burt Bluff in the Alice Springs 1:100 000 Sheet area into the eastern edge of the MacDonnell Ranges 1:100 000 Sheet area, to about 5 km west of the Iwupataka Native Settlement.

Type locality: Along Jay Creek north of the Native Settlement, in the Alice Springs 1:100 000 Sheet area, where augen gneiss crops out (GR 5650-480690 to -506752).

Lithology: Schistose augen gneiss and subordinate laminated even-grained granitic gneiss. Pink and white feldspar augen, up to 3 cm long, are enclosed in a fine to medium-grained biotite-quartz-feldspar matrix. Some feldspar grains are partly altered to epidote and sericite.

Relationships: Interfingers with the Rungutjirba Gneiss; contact is considered more likely to be a metamorphosed intrusive contact than a tight macroscopically folded concordant contact. The Burt Bluff Gneiss contains rare xenoliths (for example at GR 5650-565776) possibly derived from the Simpsons Gap Metasediments, and is intruded by dolerite dykes (Ꝑds) and porphyritic and rare mafic plugs. To the south the Gneiss is unconformably overlain by the Heavitree Quartzite (Ꝑuh).

Age: Probably Middle Proterozoic or older. May be younger than the Rungutjirba Gneiss and the Simpsons Gap Metasediments, but pre-dates the pegmatite and Late Proterozoic dolerite dykes (Ꝑds) which intrude it, and the Late Proterozoic Heavitree Quartzite which overlies it. The gneissosity was probably caused in the Middle Proterozoic during the Chewings Phase of deformation.

Correlation: The Burt Bluff Gneiss may be genetically related to a large feldspar-bearing orthogneiss (Ꝑab?) cropping out north of the Chewings Range in the Alice Springs 1:100 000 Sheet area and extending to the west of the Sheet area. Xenoliths are common in the orthogneiss. It is fault-bounded to the south, north and northeast, and intruded by pegmatite, granite, and dolerite (Ꝑds).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Cadney metamorphics</u> (variation of published name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Cadney Creek, at 23°14'S, 134°44'E, Alice Springs 1:250 000 Sheet area.

Distribution: The Cadney metamorphics crop out extensively in the Riddoch and Laughlen 1:100 000 Sheet areas, principally in the headwaters of the Tug, Cadney, and Mueller Creeks in the Riddoch 1:100 000 Sheet area and as a sinuous belt extending across the central and southern Strangways Range in Laughlen 1:100 000 sheet area.

Reference area: The reference section is in the central part of the Riddoch 1:100 000 Sheet area and extends along the north of the main branch of Tug Creek from Eritjapunta Pass to the junction of Tug and Cadney Creeks and then from Mueller Bore (to the south) northeastwards to the track between Bungitina Well and Muller Flat Dam. The additional reference section in Laughlen 1:100 000 Sheet area extends from GR 5751-113321 to -151361 then GR 5751-06325 to -074445.

Lithology: Mainly calc-silicate rock, biotite gneiss, and sillimanite gneiss. The lower part of the unit also contains thick layers of quartzofeldspathic gneiss and felsic granulite. The unit also contains small amounts of marble, quartzite, and mafic granulite.

Relationships: The Cadney metamorphics consistently overlie (structurally) a number of units of mafic and felsic rocks assigned to the lower part of the Strangways Metamorphic Complex, and are thought to be younger than these felsic and mafic rocks, because it is extremely unlikely that overturning has occurred on a regional scale. These underlying units are the Yambah granulite, unnamed unit p€sp, the Ongeva granulite, and unnamed units p€u and p€x. The Cadney metamorphics have a sharp contact with these units, and their lithological differences suggest a regional discordance.

The Erontonga metamorphics, which also underlie the Cadney metamorphics, differ from the other underlying units in consisting largely of metasediments and in having a transitional contact with the Cadney metamorphics. In the White Range Nappe the Cadney metamorphics interfinger with the Hillsoak Bore metamorphics. Unit p€sl (in northern Riddoch 1:100 000 Sheet area) is considered to be a facies equivalent of the Cadney metamorphics (p€sl consists mainly of schistose biotite gneiss and layered amphibolite as well as small amounts of calc-silicate rock, marble and sillimanite gneiss identical to that in the Cadney metamorphics). Unit p€sl is overlain by the Irindina Gneiss of the Harts Range Group. The boundary between p€sl and the Harts Range Group is sharp and discordant; where a major angular break is evident between p€sl and the Harts Range Group there is evidence of a zone of structural disturbance.

The Cadney metamorphics are distinguished from neighbouring units by their content of calc-silicate rock and sillimanite-bearing gneiss.

Age: Middle Proterozoic or older. The unit is the uppermost member of the Strangways Metamorphic Complex, which underwent regional metamorphism at about 1800 m.y. (Black 1975; Iyer, Woodford, & Wilson, 1976).

Synonymy: Joklik (1955) named the unit Cadney Gneiss after Cadney Creek, but did not nominate a reference section. His type specimen, described as a meta-tuff, is part of the Cavenagh metamorphics and differs from any rock type present in the Cadney Creek area. Cadney Creek is unsuitable as a type area because it runs parallel to strike and only a part of the unit is present in this area. Although the unit is characterised by calc-silicate rock and marble it includes large amounts of pelitic gneisses and some quartzofeldspathic gneisses, so the term metamorphics is preferred to Gneiss. The stratigraphic name is regarded as informal because the unit may subsequently be amenable to formal subdivision.

Cavenagh metamorphics (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation).

Derivation of name: Cavenagh Range (GR 5851-630070) Riddoch 1:100 000 Sheet area.

Distribution: Southwestern part of Riddoch and northwestern edge of Fergusson Range 1:100 000 Sheet areas.

Reference areas: 1. Western sub-unit: 3 km section from GR 5851-654015 to -680032; moderately well-exposed terrain through sequence (from west to east) of quartzofeldspathic gneiss, para-amphibolite, chlorite schist, andalusite schist, quartzite, biotite gneiss.

2. Eastern sub-unit: 1.3 km section from GR 5851-703058 to -695066, then 1.8 km to -705081; well-exposed hilly area through sequence (from south to north) of mica-quartz gneiss and marble, feldspathic schist, quartzite, granitic gneiss, amphibolite, quartz-rich metasediment.

Lithology: see reference areas.

Relationships: Margins of unit almost wholly concealed by younger unconformably overlying Heavitree Quartzite and superficial Quaternary sediments. Parallel metamorphic foliations in Cavenagh metamorphics and Hillsoak Bore metamorphics to west suggest conformable relationship; Atnarpa Igneous Complex to north contains rafts of, and hence intrudes Cavenagh metamorphics.

Age: Time of metamorphism given by one sample of amphibolite which lies on isochron of 1719 ± 24 m.y., together with other samples from Cadney metamorphics and Atnarpa Igneous Complex.

Synonymy: Mapped as part of Arunta Complex by Wells & others (Wells, 1969), except quartz-rich metasediment at northern end or reference section through eastern sub-unit mapped as Heavitree Quartzite.

Cement Dam gneiss (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Cement Dam, at 23°24'S, 134°11'E in the Alice Springs 1:250 000 Sheet area.

Distribution: Over a strike length of 7 km in a valley 1.5 km south of Cement Dam.

Reference area: The type section is between GR 5751-183107 and 5751-175116 along the track between Randall's Peak and Porter's Well.

Lithology: Schistose biotite gneiss containing conspicuous megacrysts of potassium feldspar. More details on lithology are given in Shaw & others (in preparation).

Relationships: The southern boundary is faulted against the Randall Peak metamorphics. The northeastern boundary is a fault-branch of the same fault zone. The northern and southwestern boundaries appear to be conformable with a unit of unassigned amphibolite and subordinate biotite gneiss (p€).

The unit is distinguished by its schistose nature and the conspicuous potassium feldspar megacrysts, which are absent from neighbouring units.

Age: Middle Proterozoic or older. No isotopic dates available.

Synonomy: Previously mapped as undivided Arunta Complex by Wells & others (Wells, 1969).

<u>Charles River gneiss</u> (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Charles River, which crosses the unit about 6 km north-northwest of the Alice Springs township in the Alice Springs 1:100 000 Sheet area.

Distribution: Crops out about 9 km north of the Alice Springs township in the Alice Springs 1:100 000 Sheet area over an area of about 30 km east-west by 4 km north-south.

Reference area: About 10 km north of the Alice Springs township on the west side of the Stuart Highway (GR 5650-846882) where it consists of banded garnet-biotite gneiss, quartzofeldspathic gneiss and amphibolite.

Lithology: Garnet-biotite gneiss, biotite gneiss, amphibolite, migmatite, and a small amount of quartzofeldspathic gneiss.

Relationships: Bounded to the north, east, and south by faults. In the west the unit is interlayered with the Old Hamilton Downs Gneiss, and conformably in contact with unassigned gneiss (p€) and migmatised gneiss of the unnamed unit Ꝑx. Partly metamorphosed norite (Ꝑgb), dykes and plugs of dolerite (Ꝑds), and pegmatite plugs intrude the unit.

Remarks: Outcrop areas that contain extensive mobilised fractions are regarded as part of the unnamed migmatite unit, Ꝑx.

Age: Probably Middle Proterozoic or older. The regional Middle Proterozoic Chewings Phase of deformation and metamorphism is thought to have produced the lithologic layering and amphibolite facies assemblages; migmatisation was coeval with the later Ormiston Phase of deformation. Late Proterozoic dolerite dykes (Ꝑds) intrude the gneiss.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Chewings Range Quartzite (variation of published name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Chewings Range; series of west-trending rugged hills and ridges extending from about Mount Lloyd in the Alice Springs 1:100 000 Sheet area to Mount Giles in the Hermannsburg 1:100 000 Sheet area.

Distribution: Chewings Range.

Type locality: Along Jay Creek in the Alice Springs 1:100 000 Sheet area from GR 5650-512808 to 508819 where massive metaquartzite, tightly cleaved micaceous metaquartzite, and schist crop out.

Lithology: Interlayered metaquartzite, highly cleaved micaceous metaquartzite, muscovite-quartz schist, and a small amount of staurolite-garnet-mica schist layers and lenses.

Thickness: Multiple folding of the unit precludes any estimate of true thickness; apparent thickness is up to 5 km.

Relationships: Partly faulted to the north against orthogneiss, and may be conformably underlain to the south by the Simpsons Gap Metasediments. Because of the complex and tight nature of the early folding in the Chewings Range, it is possible that some schist horizons in the Chewings Range Quartzite may be infolded Simpsons Gap Metasediments. However, until the structure of the range is fully understood, all schist horizons in the range are mapped as part of the Chewings Range Quartzite. The Quartzite is terminated to the east against the Charles River Fault and unconformably overlain to the west by the Heavitree Quartzite (Ꝑuh).

Age: Middle Proterozoic or older. Older than the Late Proterozoic Heavitree Quartzite which unconformably overlies it, and the dolerite dykes (Ꝑds) which intrude it. Marjoribanks (1975) suggests the Chewings Range Quartzite and surrounding rocks were recrystallised under almandine-amphibolite facies metamorphic conditions during the Middle Proterozoic, at least partly coeval with the Chewings Phase of deformation.

Correlation: Outliers of the Chewings Range Quartzite may be the isolated metaquartzite hills which protrude through alluvium, 5 km south of Simpsons Gap in the Alice Springs 1:100 000 Sheet area. Here the metaquartzite is overlain by the Rungutjirba Gneiss.

Another possible exposure of Chewings Range Quartzite crops out in the nose of the Blatherskite Nappe, 10 km south of Simpsons Gap in the Alice Springs 1:100 000 Sheet area. The outcrop is unconformably overlain by the Heavitree Quartzite and consists of glassy coarse-grained metaquartzite.

Synonymy: This the Chewings Range Quartzite of Prichard & Quinlan (1962). They considered the unit to be Heavitree Quartzite, but Condon (personal communication in Prichard & Quinlan, 1962) noted a strong structural discordance between the quartzites on air photographs. Later mapping by BMR recognised the Chewings Range quartzite as a basement unit (Forman & others, 1967) unconformably below the Heavitree Quartzite.

Coniston Schist (new name)

Proposer:	A.J. Stewart (in Stewart & others, in preparation).
Derivation of name:	Coniston homestead (GR 5453-448492), northwestern part of Reynolds Range 1:100 000 Sheet area.
Distribution:	From Mount Thomas to northwestern end of Reynolds Range; small outcrops in Giles Range.
Type locality:	GR 5453-652400, clear exposures in creek bed, 7 km southwest of Lander Bore.
Lithology:	Small augen of quartz (with magmatic resorption embayments) and rare feldspar in fine-grained schistose matrix of muscovite and quartz.
Relationships:	Lies between basal conglomerate and overlying main quartzite of Mount Thomas Quartzite; in places contains lenticular fragments up to 20 cm long of quartzite and sandstone.
Age:	Middle Proterozoic or older; younger than depositional age of Mount Thomas Quartzite, but older than age (1800-1500 m.y.) of Napperby Gneiss, which intrudes Mount Thomas Quartzite.
Synonymy:	Referred to as Pine Hill Conglomerate by Australian Geophysical (1967); mapped as 'Precambrian schist, metasediments, including marble' by Wells & others (Evans, 1972).

Emily Gap schist (new name)

Proposer:	L.A. Offe (in Shaw & others, in preparation).
Derivation of name:	Emily Gap (GR 5650-930742), Alice Springs 1:100 000 Sheet area.
Distribution:	Two areas about 6 km east and 5 km southeast of the Alice Springs township in the Alice Springs 1:100 000 Sheet area.
Reference area:	A ridge of biotite schist at GR 5650-905800, 5 km east of the Alice Springs township.
Lithology:	Northernmost outcrop consists of biotite schist, medium-grained recrystallised micaceous-quartz sandstone, and rare amphibolite. Locally the schist contains muscovite, opaque grains, and feldspar augen. Southernmost outcrop consists of two-mica schist, biotite schist, quartzose sericite schist, medium-grained, recrystallised, sericitic-quartz sandstone, and rare amphibolite. Some hematite-bearing layers.

Relationships: The adjacent Sadadeen Range gneiss contains layers and lenses of metasediment which may be derived from the Emily Gap schist; both schist outcrops are probably intruded by the Sadadeen Range gneiss. Dolerite (Ꝑds) and pegmatite dykes cut the unit. The Heavitree Quartzite unconformably overlies the southernmost exposure of the unit.

Age: Probably Middle Proterozoic or older. Late Proterozoic dolerite dykes (Ꝑds) intrude, and Heavitree Quartzite overlies the unit. Metamorphic recrystallisation may have accompanied the regional Chewings Phase of deformation.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Enbra Granulite (new name)

Proposer: A.P. Langworthy (in Shaw & others, in preparation).

Derivation of name: Enbra Hills, centred on 23°12'S, 133°48'E in the Alice Springs 1:250 000 Sheet area.

Distribution: The unit is well exposed in an area of low hills immediately south of Snake Well in Burt 1:100 000 Sheet area.

Type area: From Snake Well (GR 5651-856356) to a prominent hill 3 km to the south.

Lithology: Dominantly mafic granulite, but includes a small amount of felsic granulite. The mafic granulite is very homogeneous and consists of hypersthene, plagioclase, and hornblende.

Relationships: Separated from the Erontonga metamorphics and the Sliding Rock metamorphics by Cainozoic cover sediments. However, magnetic data indicate that the unit is faulted against both of these bounding formations.

Age: Middle Proterozoic or older. The unit is considered to be a basal member of the Strangways Metamorphic Complex, and as such was probably metamorphosed at 1800 m.y. (Black, 1975).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Erontonga metamorphics (new name)

Proposers: R.D. Shaw, A.R. Allen (in Shaw & others, in preparation).

Derivation of name: Erontonga Waterholes at GR 5751-322242, Laughlen 1:100 000 Sheet area.

Distribution: The unit crops out in three regions:

1. The main outcrop area surrounds Johannsen's Phlogopite Mine and extends eastwards from here to Pinnacles Bore in the Laughlen 1:100 000 Sheet area.

2. In an arcuate belt in the central-northern part of Burt 1:100 000 Sheet area.

3. In the Winnecke Depot Creek region in the centre of Laughlen 1:100 000 Sheet area.

Type area: From GR 5751-072304 west of Johannsens Phlogopite Mine to GR 5751-089329 on the boundary with the adjoining Cadney metamorphics. The section is folded, but the amount of folding is uncertain.

Lithology: Mainly quartzofeldspathic and cordierite-bearing pelitic rocks (containing quartz + cordierite ± orthopyroxene ± garnet ± plagioclase ± sillimanite) and small amounts of calc-silicate, magnesian, and manganiferous rocks (together ~ 5%).

Relationships: The unit overlies the Utnalanama granulite and the Harry Anorthositic Gabbro, which it appears to truncate possibly because this lower boundary is an unconformity. The unit is conformably overlain by the Cadney metamorphics. The unit was intruded by the Johannsens Metagabbro, before the regional metamorphism, and was subsequently intruded by the Gumtree Granite.

Remarks: The unit differs from the adjoining units in containing abundant cordierite-bearing gneiss.

Age: Middle Proterozoic or older ^{40}Ar-^{39}Ar apparent age spectra of a hornblende from the mafic gneisses, and of a magnesian pargasite from a magnesian rock in the Erontonga metamorphics have been interpreted to indicate two metamorphic events at 1800 m.y. and 1700 m.y. (Allen & Stubbs, in press). The unit is at least 1800 m.y. old.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Flint Spring gneiss</u> (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Flint Spring (GR 5650-783902) on Colyer Creek in the Alice Springs 1:100 000 Sheet area.

Distribution: North-northwest of the Alice Springs township in the Alice Springs 1:100 000 Sheet area over an area of about 7 km by 1 km.

Reference area: Along a tributary of Colyer Creek from GR 5650-833913 to 820915; abundance of porphyroblastic and augen gneiss.

Lithology: Consists largely of porphyroblastic and augen gneiss. Subordinate quartzofeldspathic gneiss, banded biotite gneiss, and a small number of amphibolite layers and lenses.

Relationships: Eastern contact with unassigned gneiss (p€) and western contact with the unnamed unit (p€p) are both gradational and conformable with the foliation. The Flint Spring gneiss is bounded to the north and south by faults. Slightly metamorphosed norite (Pgb) forms a small rubb outcrop within the unit and an aplite dyke, 50 cm wide intrudes the unit (GR 5650-809913), and is itself crosscut by the country rock foliation.

Age: May be Middle Proterozoic or older. Probably metamorphosed during the regional Middle Proterozoic Chewings Phase of deformation. Recrystallisation associated with the Late Proterozoic Ormiston Phase of deformation is not apparent.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Georgina Gap granitic gneiss</u> (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Georgina Gap, GR 5751-410160, Laughlen 1:100 000 Sheet area.

Distribution: The unit crops out over an area of about 10 km^2 along and east of the track to Whistleduck Bore, immediately south of Georgina Gap. An apophysis of the body is photointerpreted to extend for 6 km westwards from the southern tip of the main body along the edge of the Wigley Block.

Reference area: Markedly dissected region immediately south of Georgina Gap at GR 5751-408155 in the Laughlen 1:100 000 Sheet area.

Lithology: The granitic gneiss has a biotite content of up to 20 percent and is coarse-grained for the most part. It contains conspicuous megacrysts of K-feldspar. The gneissic layering is not markedly developed.

Relationships: The granitic gneiss appears to intrude the Mulga Creek granitic gneiss, unassigned gneiss and amphibolite (pC), and the Laughlen metamorphics. It appears to be localised at the northeastern extension of the Redbank Deformed Zone (Marjoribanks & Black, 1974).

Age: Middle Proterozoic or older. Its megacrystic nature and weak gneissic fabric suggest a lithological correlation with the Gum Tree Granite, which is dated at about 1000 m.y (Allen & Black, in preparation).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Hale Formation (new name)

Proposers: R.D. Shaw, B.R. Senior (in Shaw & others, in preparation).

Derivation of name: Hale Plain, which extends east-west between The Garden and Claraville homesteads, Alice Springs 1:250 000 Sheet area.

Distribution: The unit crops out sporadically across the Hale Plain, but is better known in subcrop from extensive drilling information (Clarke, in preparation).

Type section: Diamond Drillhole BMR 2 at GR 240088 Alice Springs 1:250 000 Sheet area.

Lithology: Kaolinitic quartzose sandstone, siltstone, and mudstone grading locally at the margins of the basin into coarse-grained, poorly sorted boulder conglomerate. A thin horizon of lignite in subcrop is named the Ulgnamba Lignite Member.

Thickness: 10 - 75 m (approximate).

Relationships: The formation is underlain in places by a laterite profile with well-developed ferruginous mottled and leached zones. It is overlain at one locality northwest of Claraville homestead by a unit of greenish-grey siltstone and chalcedonic limestone (informal unit Tw). Elsewhere, the formation is overlain by unconsolidated Cainozoic deposits - mainly alluvium.

Age: The lignite member is possibly Eocene. The underlying weathering profile is possibly Maastrichtian to Early Eocene (Idnurm & Senior, 1978). Younger intercalated silcrete is possibly Late Oligocene to Miocene.

Synonymy: The sediments of the Hale Plain have been referred to as Arltungan Series by Madigan (1932), Arltungan Formation by Madigan (1936), Arltunga Series by Hossfeld (1954), and Arltungan Beds by Joklik (1955). (The Arltunga Quartzite of Chewings (1928) is now mapped as part of the Heavitree Quartzite). Smith (1963b) revised the name to Arltunga Beds. The type locality of the Beds is in a separate basin from the Hale Formation, and is located at the western end Of Paddys Plain, where they comprise arenaceous limestone, silicified limestone, and pebbly sandstone. Hence the Arltunga Beds differ lithologically, and were deposited in a separate place from the Hale Formation, and the name Arltunga Beds is restricted to the sediments in Paddys Plain.

Harry Anorthositic Gabbro (new name)

Proposers: R.D. Shaw, A.R. Allen (in Shaw & others, in preparation).

Derivation of name: Harry Bore (GR 5651-958295), in 1:100 000 Sheet area (also synonymous with Harry Creek 23°16'S, 133°50'E Alice Springs 1:250 000 Sheet area).

Note on rock type name: The adoption of igneous, rather than metamorphic, terminology follows international usage (e.g. in Greenland) for similar rocks.

Distribution: The unit crops out in an east-west belt, and forms an area of subdued relief in the foothills of the Utnalanama Range southwest of Johannsen's Phlogopite Mine (GR 5751-079306), Laughlen 1:100 000 Sheet area.

Type area: 3 km west-southwest of Johannsen's Phlogopite Mine at GR 5751-055292.

Lithology: The most common rock type of the unit is anorthositic gabbro in the classification of Buddington (1939 p. 19), although rock types range from pyroxenitic to anorthositic end members. Ultramafic and mafic end members are less common than anorthositic rocks. The rock has been regionally metamorphosed, and only a few relict igneous patches survive.

Relationships: The gabbro appears to be a single body which intrudes, and is thought to be highly interfolded with, the Utnalanama granulite. The gabbro is truncated in the northeast by an interpreted unconformity separating it from the overlying Erontonga metamorphics. It is also truncated in the southwest by the Gumtree Granite, and in the south by the Harry Creek Deformed Zone.

Remarks: A.R. Allen considers that because the gabbro unconformably underlies the Erontonga metamorphics, it should not be included in the Strangways Metamorphic Complex.

Age: Mid-Proterozoic or older. The granulite facies metamorphism which affects the unit has been dated at 1800 m.y. using ^{40}Ar-^{39}Ar methods (Allen & Stubbs, in press).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Harverson Granite (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of Name: Harverson Pass (GR 5453-765289), lowest point in Reynolds Range, 2.5 km east of Harverson Granite, Reynolds Range 1:100 000 Sheet area.

Distribution: Equant body about 8 km across between Lander Rock (5453-825374) and Harverson Pass.

Type locality: Group of large granite tors at GR 5453-806328, 4.5 km south-southwest of Lander Rock.

Lithology: Porphyritic leucocratic grey granite, massive, comprising stubby phenocrysts of microcline up to 7 cm lone in coarse-grained granitic groundmass.

Relationships: Intrudes and metamorphoses Lander Rock beds, intruded by dykes of aplite and quartzite (numerous), but not intruded by basic dykes, which, however, do intrude adjoining Mount Airy Orthogneiss. Hence, Harverson Granite probably intrudes Mount Airy Orthogneiss.

Age: Probably Middle Proterozoic; no isotopic date available.

Synonymy: Included in Napperby Granite by Australian Geophysical (1967), included in 'Granites and altered granites' division of Evans & Glikson (1969), mapped as 'Precambrian granite' by Wells & others (Evans, 1972).

Hayes Metamorphic Complex (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: John Hayes Rockhole (GR 5750-331978) in the northeast of Undoolya 1:100 000 Sheet area.

Distribution: Near Alice Springs township over an area of about 35 km east-west by 10 km north-south in the Alice Springs 1:100 000 Sheet area.

Components: Emily Gap schist, Teppa Hill metamorphics, Sadadeen Range gneiss, unnamed units p€pb and p€pp; all part of the granitic basement containing metasediments and amphibolite which is overlain by the Iwupataka Metamorphic Complex.

Lithology: Metasediments, amphibolite, and orthogneiss.

Relationships: The Charles River Fault is the northern boundary of the Hayes Metamorphic Complex, and the unconformably overlying Heavitree Quartzite is the southern boundary. To the east the Complex is in contact with the Jessie Gap gneiss, and to the west it is apparently overlain non-conformably by the Iwupataka Metamorphic Complex. It is intruded by the Alice Springs Granite, pegmatite, and dolerite (Pds).

Age: Probably Middle Proterozoic or older. Earliest recognised fabric and mineral assemblage are associated with the regional Middle Proterozoic Chewings Phase of deformation and metamorphism.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Heavitree Quartzite

Four new members are recognised in the type-section of the Heavitree Quartzite at Heavitree Gap. (GR 3840 3754). Three of these members can be recognised along the entire northern margin of the Amadeus Basin.

Undoolya Siltstone Member

Proposers: D.B. Clarke, R.D. Shaw (in Shaw & others, in preparation; and Clarke, in Wells, 1976 p. 26).

Derivation of name: Undoolya Gap (GR 4100 3745) in the Alice Springs 1:250 000 Sheet area.

Distribution: From Undoolya Gap (above) west to Jay Creek and then discontinuously as far west as Ormiston Gorge in the Hermannsburg 1:250 000 Sheet area.

Type area: Heavitree Gap, as for Heavitree Quartzite.

Lithology: Purple and green interlaminated siltstone and shale and rare edgewise conglomerate. Several beds of fine-grained silty sandstone in the upper part.

Thickness: 16 m.

Relationships: Unconformably overlies crystalline rocks of the Sadadeen Range gneiss; an augen gneiss in the Hayes Metamorphic Complex. The Member is conformably overlain by the Temple Bar Sandstone Member of the Heavitree Quartzite.

Age: Late Proterozoic. Younger than Stuart Dyke Swarm dated at 897 ± 9 m.y. (Black, BMR, personal communication), and older than 700-800 m.y. old glacial units.

Synonymy: The Heavitree Quartzite has been previously undivided (Wells, 1969) except informally in the Arltunga Nappe Complex (Shaw & others, 1971).

Temple Bar Sandstone Member

Proposers: D.B. Clarke, R.D. Shaw (in Shaw & others, in preparation; and Clarke, in Wells, 1976 p. 26).

Derivation of name: Temple Bar Gap (GR 3720 3736) in the Alice Springs 1:250 000 Sheet area.

Distribution: From Arltunga in eastern-central Alice Springs 1:250 000 Sheet area to Mangeraka Gorge, 43 km west-southwest of Heast Bluff in Mount Liebig 1:250 000 Sheet area.

Type area: Heavitree Gap, as for Heavitree Quartzite.

Lithology: Very fine to fine-grained quartz sandstone, characteristically containing a trace of weathered feldspar. The lower beds are generally medium to thick bedded and the upper beds are thin to medium bedded.

Thickness: 112 m.

Relationships: Conformably overlies the Undoolya Siltstone Member. The Fenn Gap Conglomerate Member overlies the Member with a local disconformity.

Age: Late Proterozoic (see Undoolya Siltstone Member).

Synonymy: The Heavitree Quartzite has been previously undivided (Wells , 1969) except informally in the Arltunga Nappe Complex (Shaw & others, 1971).

Fenn Gap Conglomerate Member

Proposers: D.B. Clarke, R.D. Shaw (in Shaw & others, in preparation; and Clarke, in Wells, 1976, p. 26).

Derivation of name: Fenn Gap (GR. 3602 3679) in the Alice Springs 1:250 000 Sheet area.

Distribution: From Arltunga in central-eastern Alice Springs 1:250 000 Sheet area to Mongeraka Gorge, 43 km west-southwest of Haast Bluff in Mount Liebig 1:250 000 Sheet area.

Type area: Heavitree Gap, as for Heavitree Quartzite.

Lithology: Medium to thick-bedded, poorly sorted, argillaceous granule conglomerate and conglomeratic sandstone, which are commonly iron stained brown, pink and purple, particularly near the base.

Thickness: 34 m.

Relationships: The member overlies the Temple Bar Sandstone with a local disconformity. On a regional scale this contact appears to be conformable. The Member is conformably overlain by the Blatherskite Sandstone Member.

Age: Late Proterozoic (see Undoolya Siltstone Member).

Synonymy: The Heavitree Quartzite has been previously undivided (Wells, 1969), except informally in the Arltunga Nappe Complex (Shaw & others, 1971).

Blatherskite Quartzite Member

Proposer: D.B. Clarke, R.D. Shaw (in Shaw & others, in preparation; and Clarke, in Wells, 1976 p. 26).

Derivation of name: Mount Blatherskite (G.R. 3839 3726) in the Alice Springs 1:250 000 sheet area.

Type area: Heavitree Gap, as for Heavitree Quartzite.

Lithology: Well-sorted, very fine to medium-grained quartz sandstone with rare silty interbeds. A 28-m thick, poorly-sorted unit of sandstone occurs in the upper part. The unit is mainly medium to thick-bedded, but includes some thin beds in the lowermost and uppermost parts.

Relationships: The unit conformably overlies the Fenn Gap Conglomerate Member and is conformably overlain by the Bitter Springs Formation.

Remarks: The boundary with the overlying Bitter Springs Formation is not exposed at Heavitree Gap, but elsewhere the base of the Bitters Springs Formation is taken to be the first appearance of a significant thickness (greater than 1 m) of siltstone.

Age: Late Proterozoic (see Undoolya Siltstone Member).

Synonymy: The Heavitree Quartzite has been previously undivided (Wells, 1969) except informally in the Arltunga Nappe Complex (Shaw & others, 1971).

Hillsoak Bore metamorphics (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation).

Derivation of name: Hillsoak Bore (GR 5850-518004) Fergusson Range 1:100 000 Sheet area.

Distribution: Northwestern part of Fergusson Range 1:100 000 Sheet area, southwestern part of Riddoch 1:100 000 Sheet area, southeastern part of Laughlen 1:100 000 Sheet area.

Reference area: 6 km section from GR 5850-515967 to GR 5850-565994 across well exposed ridges, from west to east, of marble, followed by calc-silicate rock, andalusite schist, interbedded amphibolite schist and quartzite, granitic gneiss interfingering to south with biotite-muscovite schist, overlain by biotite gneiss containing amphibolite bodies; biotite gneiss grades eastward into sillimanite gneiss.

Lithology: See reference area.

Relationships: Older rocks not known; interfingers with metatonalite of Atnarpa Igneous Complex, consistent with 'lit-par-lit' intrusion; interfingers conformably with Cadney metamorphics; unconformably overlain by Heavitree Quartzite.

Age: Parent sediments probably late Early Proterozoic. Time of metamorphism presumed to be same as that of adjoining Cadney metamorphics, Cavenagh metamorphics, and Atnarpa Igneous Complex, i.e. 1719 ± 24 m.y. (Armstrong & Stewart, 1975).

Synonymy: Mapped as part of Arunta Complex by Wells & others (Wells, 1969).

Ingula migmatite suite (new name)

Proposer: A.P. Langworthy (in Shaw & others, in preparation).

Derivation of name: Ingula Hills, GR 5651-865406 Burt 1:100 000 Sheet area.

Distribution: Highly faulted region in the central northeastern corner of Burt 1:100 000 Sheet area, 7 km north-northeast of Snake Well.

Reference area: From Saltbush Bore (GR 5651-930399) northwest along creek to GR 5651-905436.

Lithology: The suite is a complex unit consisting mainly of migmatite, granitic gneiss and quartzofeldspathic gneiss, with small amounts of cordierite gneiss, amphibolite, mafic granulite, and sillimanite gneiss.

Relationships: The suite has a gradational contact with the Erontonga metamorphics as migmatistion decreases, and with the Wuluma granitoid as migmatite passes into granitoid. The suite is faulted against the Enbra Granulite.

Age: Middle Proterozoic or older. The unit is gradational with the Wuluma granitoid which has a preliminary Rb-Sr total rock date of 1800 m.y. (L.P. Black, BMR, personal communication, 1978). The suite has been placed in the Strangways Metamorphic Complex.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Iwupataka Metamorphic Complex (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Iwupataka Native Settlement (GR 5650-477683) west-southwest of the Alice Springs township in the Alice Springs 1:100 000 Sheet area.

Distribution: Extends over about 100 km in the southern Arunta Block from near Simpsons Gap in the Alice Springs 1:100 000 Sheet area westwards to Ormiston Gorge in the Hermannsburg 1:100 000 Sheet area.

Components: Named components of the Complex are the Simpsons Gap Metasediments, Chewings Range Quartzite, Rungutjirba Gneiss, and the Burt Bluff Gneiss.

Lithology: Mainly metasedimentary and metamorphosed acid igneous rocks. Small amount of amphibolite and calc-silicate rock.

Relationships: The Complex is fault-bounded to the north, unconformably overlain by the Heavitree Quartzite to the south, possibly unconformably overlies orthogneiss of the Hayes Metamorphic Complex to the east, and grades into basement migmatite and granite to the west. Dolerite (Ꝑds) and pegmatite dykes and in places granite, porphyry, and rare basic plugs intrude the Complex.

Age: Probably Middle Proterozoic or older. Older than the Late Proterozoic Heavitree Quartzite which overlies the Complex, and the dolerite dykes (Ꝑds) which intrude the Complex. The Complex was probably metamorphosed during the regional Middle Proterozoic Chewings Phase of deformation.

Synonymy: Previously mapped by Wells & others (1968) as undivided Arunta Complex (Wells, 1969).

Jennings Granitic Gneiss (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation).

Derivation of name: Jennings Gorges (northern one at GR 5851-500064, southern one at GR 5851-504055), Riddoch 1:100 000 Sheet area.

Distribution: Two separate bodies, one in southeast corner of Laughlen, the other in the northeast corner of Undoolya 1:100 000 Sheet areas.

Type locality: Along unnamed creek from GR 5750-394006 in Undoolya 1:100 000 Sheet area for 0.9 km northeastwards to GR 5751-400012 in Laughlen 1:100 000 Sheet area; western end shows migmatitic layered coarse granitic gneiss, grading eastward to agmatitic augen gneiss and then to porphyroblastic orthogneiss (gneissic granite) containing enclaves of amphibolite at eastern end.

Lithology: Heterogeneous coarse-grained granitic gneiss grading to agmatitic augen gneiss and porphyroblastic orthogneiss. Centre of body in Laughlen 1:100 000 Sheet area occupied by finer-grained granitic gneiss map-unit; this body also includes several elongate masses of quartzofeldspathic gneiss. Both bodies contain rafts of amphibolite.

Relationships: Margin of unit discordant to foliation trend in Randall Peak metamorphics in one area, concordant in another. Concordantly surrounds large lens of unnamed hornblende gneiss unit p€v. Intrudes biotite gneiss of unnamed unit p€. Intruded by Mordor Igneous Complex. Unconformably overlain by Heavitree Quartzite.

Age: Early Middle Proterozoic; Rb-Sr whole-rock isochron on three samples gives 1719 ± 24 m.y. (Armstrong & Stewart, 1975) with low initial ratio, indicating this was time of crystallisation of granitic magma (Shaw & ohers, in preparation). Imposition of gneissic fabric was probably contemporaneous with intrusion. Biotite concentrates give: Rb-Sr date of 1121 m.y. (Armstrong & Stewart, 1975), and K-Ar dates of 1097 and 997 m.y. (Stewart, 1971), indicating isotopic disturbance during Ormiston event (1076 ± 50 m.y.; Marjoribanks & Black, 1974) or Alice Springs Orogeny (Devonian-Carboniferous).

Synonymy: Mapped as part of Arunta Complex by Wells & others (Wells, 1969).

Jessie Gap gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Jessie Gap (GR 5750-995733) about 6 km south of Undoolya homestead, Undoolya 1:100 000 Sheet area.

Distribution. Eastern part of the Alice Springs 1:100 000 Sheet area, and western part of the Undoolya 1:100 000 Sheet area.

Reference area: Alice Springs 1:100 000 Sheet area at GR 5650-968788 where granitic gneiss is weakly layered and migmatitic.

Lithology: Even-medium-grained poorly foliated gneiss of granitic composition. Some areas contain potash feldspar porphyroblasts up to 2 cm in length; sillimanite is an uncommon accessory mineral. Northeastern margin consists of granitic gneiss, amphibolite, hornblende gneiss, and augen gneiss. Rare outcrops of metamorphosed biotite granite and feldspar porphyry have been included in the unit.

Relationships: The northern part of the Jessie Gap gneiss abuts the Charles River Fault, and to the south it is unconformably overlain by the Heavitree Quartzite. The western margin of the unit is apparently concordant with metasediments (pЄpb) and consists of granite and pegmatite veining the metasediments and granitic gneiss. In the northeast, it contains a greater amount of amphibolite, and grades into unassigned interlayered gneisses and migmatite (pЄ). Dolerite (Ꝑds) and pegmatite dykes intrude the unit, and veins of pegmatite, granite and aplite both parallel and cut across the foliation.

Age: Late Proterozoic or older. Considered to have been granitised during the Late Proterozoic Ormiston Phase of deformation. Late Proterozoic dolerite dykes (Ꝑds) intrude the gneiss.

Synonymy: Previously mapped by Wells & others (1968) as undivided Arunta Complex (Wells, 1969).

Johannsen Metagabbro (new name)

Proposers: R.D. Shaw, A.R. Allen (in Shaw & others, in preparation).

Derivation of name: Johannsen's Phlogopite Mine - a well known locality in the area from which phlogopite was mined during World War II (GR 5751-079306). On the 1st Edition 1:100 000 map (Geology of the Strangways Range Region), the form term 'Dyke Swarm' is added for clarification.

Distribution: The dykes radiate outwards as a series of prominent ridges from a large mass 2 km southwest of Johannsen's Phlogopite Mine.

Type area: The large mass of metagabbro 2 km southwest of Johannsen's Phlogopite Mine is the type area.

Lithology: The metagabbro is compositionally homogeneous and total rock analyses plot in the tholeiitic field of Irvine & Barager (1971), but it is olivine normative (Allen, 1976). The primary metamorphic assemblage is plagioclase-orthopyroxene-clinopyroxene-brown green hornblende-ilmenite; although hornblende or ilmenite may be absent. Retrograde metamorphism results in green hornblende, cummingtonite, blue-green hornblende, epidote and sphene. The primary rock type is coarse-grained.

Thickness: Individual dykes are up to 100 m thick.

Relationships: The metagabbro dykes of the unit cut the Harry Anorthositic Gabbro and the Erontonga metamorphics, and are themselves cut by the Gumtree Granite, pyroxene dolerite dykes (finer-grained) and coarse-feldspar pegmatite dykes.

Remarks: The gabbro is coarser-grained than the mafic gneisses in the Erontonga metamorphics, weathers spheroidally and is much more uniform in composition.

Age: Middle Proterozoic or older. The dykes are intruded parallel to F_1 axial-plane fold traces which are thought to have formed during the main regional metamorphism of the Harry Anorthositic Gabbro. The metamorphism is dated at 1800 m.y. by the incremental ^{40}Ar-^{39}Ar method (Allen & Stubbs, in preparation), and the intrusive age of the Johannsen Metagabbro is postulated to be the same.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Lander Rock beds (variation of published name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Lander Rock (GR 5453-825374), a prominent hill between Reynolds and Anmatjira Ranges, Reynolds Range 1:100 000 Sheet area.

Distribution: Mainly along northern flanks of Reynolds and Giles Ranges; northwest part of Aileron 1:100 000 Sheet; scattered exposures in northern part of Tea Tree and various parts of Denison 1:100 000 Sheet areas and in Mount Peake, Mount Theo, Mount Solitaire and Lander River 1:250 000 Sheet areas. Also recognised, but not yet mapped in northern part of Mount Doreen 1:250 000 Sheet area.

Reference area: Lander Rock itself provides good exposure of the beds.

Lithology: Grey to brown thin to medium-bedded, weakly metamorphosed micaceous sandstone, siltstone, shale, slate; small amounts of phyllite, quartzite, chert, and amphibolite and their higher-grade metamorphic equivalents (pelitic schist, gneiss, and granofels) to the southeast.

Relationships: No underlying unit known; faulted against Weldon metamorphics and Tyson Creek granulite to northeast: unconformably overlain by Mount Thomas Quartzite of Reynolds Range Group to southwest; intruded by Anmatjira, Mount Airy, and Yaningidjara Orthogneisses, by Harverson Granite, by small bodies of unnamed granite, and by Warimbi Schist; adjoin and probably pass laterally into Mount Stafford beds.

Age: Middle Proterozoic or older; older than 1642 ± 100 m.y. Anmatjira Orthogneiss.

Synonymy: Called by Australian Geophysical (1967) 'Elgamba Quartzite' in Reynolds Range, and 'Interbedded micaceous schists and schistose quartzite' at Lander Rock. Included in 'Metasediments and metamorphics of uncertain origin' of Evans & Glikson (1969). Mapped as 'Precambrian schist, metasediments, including marble, by Wells & others (Evans, 1972). Published as Lander Rock Beds by Shaw & Stewart (1975).

<u>Laughlen metamorphics</u> (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Mount Laughlen (GR 5751-367152), Laughlen 1:100 000 Sheet area.

Distribution: The unit extends from directly south of Mount Laughlen westwards to directly south of Cement Dam (i.e. to GR 5751-183121).

Reference area: From 2.2 km southwest of Mount Laughlen (GR 5751-366120) to 7 km south of Mount Laughlen (GR 5751-359143).

Lithology: Muscovite-biotite schist, thin beds of quartzite, and very rare amphibolite. Additional information on lithology is given in Shaw & others (in preparation).

Relationships: The unit overlies unassigned biotite gneiss (p€) of the southern Ankala Block, and is in faulted contact with the rocks of the Wigley Block.

Remarks: In addition to the presence of quartzite, the unit is distinguished by the general absence of amphibolite.

Age: Middle Proterozoic or older. Lithologically correlated with the Chewings Range Quartzite, and both units are assigned to Division 3 of the Arunta Block. The Laughlen metamorphics are therefore inferred to be older than 1700 m.y., and may be older than 1800 m.y.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Mordor Igneous Complex (variation of published name)

Proposer: A.P. Langworthy (in Shaw & others, in preparation).

Derivation of name: Mordor Pound (GR 5751-440090) in which the Complex crops out, Laughlen 1:100 000 Sheet area.

Distribution: The Complex crops out over 36 km^2 inside Mordor Pound, a region of low relief surrounded by sheer cliffs of Heavitree Quartzite.

Reference area: The most unusual rock type in the complex is a phlogopite-rich peridotite and this is well exposed at a conical hill at GR 456069 in the Laughlen 1:100 000 Sheet area. The best exposures of the various rock types may be observed near the north/south traverse base line graded by CRA from GR 472052 to 476091.

Lithology: The Complex consists of ultrabasic to intermediate igneous rocks unusually enriched in large ion lithophile elements such as Ba, Rb, Sr, and K. These were unusually abundant in the primary magma, and led to derivatives enriched in phlogopite, hyalophane, and Ba orthoclase, such as phlogopite-peridotite, pyroxenite, shonkinite, melamonzonite, monzonite, syenite, and pegmatite. Carbonate veins associated with the Complex appear to be of secondary origin, by leaching & precipitation from groundwater, not of carbonatite origin. Further details are given by Langworthy & Black (1978).

Relationships: Intrudes the Jennings Granitic Gneiss.

Age: Late Proterozoic. 1210 ± 90 m.y. by Rb-Sr dating on whole-rocks and minerals (Langworthy & Black, 1978).

Synonymy: The name Mordor Complex has been used by Langworthy & Black (1978), but Mordor Igneous Complex is preferred because it has been used previously by Stewart & Warren (1977) and Warren (1978). The title 'Igneous Complex' also helps to differentiate it from various metamorphic complexes in the same area.

Mount Airy Orthogneiss (new name)

Proposer:	A.J. Stewart (in Stewart & others, in preparation).
Derivation of name:	Mount Airy (GR 5553-018122), southwest part of Tea Tree 1:100 000 Sheet area.
Distribution:	Warimbi Hills, between Reynolds and Anmatjira Ranges in southeast of Reynolds Range and southwest of Tea Tree 1:100 000 Sheet areas.
Type Locality:	GR 5453-920210, 7.5 km southwest of Pine Hill homestead, southeast part of Reynolds Range 1:100 000 Sheet area; hilly terrain showing orthogneiss cut by later strain-slip foliation and intruded by microgranite dykes.
Lithology:	Coarse granitic augen gneiss, grading to massive porphyritic granite in places; some tourmaline clots. An elongate body of porphyritic microgranite along southwest margin is labelled Pgr_1 - unnamed member of Mount Airy Orthogneiss.
Relationships:	Intrudes Lander Rock beds; adjoins and folds Mount Thomas Quartzite; faulted against Yaningidjara Orthogneiss and Weldon metamorphics; intruded by dykes of microgranite, aplite, metabasic rock, and quartz; probably intruded by Harverson Granite.
Age:	Probably Middle Proterozoic; no isotopic date.
Synonymy:	Included with Napperby Granite by Australian Geophysical (1967); included in 'granitic gneiss (orthogneiss)' division of Evans & Glikson (1969); mapped as 'Precambrian orthogneiss, granitic gneiss' and 'Precambrian granite' by Wells & others (Evans, 1972).

Mount Dobbie Granite (new name)

Proposer:	R.G. Warren (Warren, in preparation).
Derivation of name:	Mount Dobbie (23°12'S, 137°32'E), Hay River 1:250 000 Sheet area.
Distribution:	Scattered outcrops over 150 sq km surrounding Mount Dobbie.
Type locality:	At GR 6451-82334, Adam 1:100 000 Sheet area; low outcrops and creek bed exposures 1 km northwest of Mount Dobbie.
Lithology:	Muscovite-rich, biotite, two-feldspar, medium to coarse-grained leucogranite.
Relationships:	Intrudes Mount Smith metamorphics, unconformably overlain by Late Proterozoic Yackah Beds (Walter, in press).
Age:	Middle Proterozoic or older. K-Ar date on muscovite 1662 ± 25 m.y. (Amdel, 1978). True age probably close to 1800 m.y.
Synonymy:	Previously mapped as undivided granite (Smith, 1963a).

Mount Dunkin schist (new name)

Proposers:	A.J. Stewart, A.Y. Glikson (in Stewart & others, in preparation).
Derivation of name:	Mount Dunkin (GR 5552-011069), in northwest part of Aileron 1:100 000 Sheet area.
Distribution:	Immediately south of Woodforde River, northwest of Aileron 1:100 000 Sheet area.
Reference area:	Mount Dunkin itself shows excellent exposures of sillimanite schist; copper minerals also present.
Lithology:	Mostly sillimanite schist and gneiss, plus smaller amounts of biotite schist, quartzite, and calc-silicate rock.
Relationships:	Conformable above Wickstead Creek beds; faulted against Lander Rock beds and Woodforde River beds. Adjoins & probably intruded by two unnamed granites; presumed lateral equivalent to Mount Freeling schist, but separated from it by Wickstead Creek beds.
Age:	Early Middle Proterozoic; same general age as Wickstead Creek beds.
Synonymy:	Mapped as 'Precambrian schist, quartzite, dolomite and marble' by Wells & others (Evans, 1972).

Mount Freeling schist (new name)

Proposers:	A.J. Stewart, A.Y. Glikson, R.G. Warren (in Stewart & others, in preparation).
Derivation of name:	Mount Freeling (GR 5552-047020), highest peak in Aileron 1:100 000 Sheet area.
Distribution:	Extends east and west of Anna Reservoir for total of 20 km; also small outcrops immediately south of Bluebush Swamp, and 10 km southeast of Aileron.
Reference area:	At GR 5552-086020, 1 km north of Anna Reservoir, Aileron 1:100 000 Sheet area, where interbedded schist, quartz-rich metasediment, sillimanite schist and gneiss, and quartzite are well exposed on sides of gully cut by stream flowing south into reservoir.
Lithology:	Mainly muscovite-biotite schist, with smaller amounts of quartzite (distinguished on map as separate sub-unit), quartzofeldspathic schist, cordierite granulite and gneiss, quartz-rich metasediment, and sillimanite schist.
Relationships:	Lies above Wickstead Creek beds with apparent conformity; lies below Lander Rock beds with transitional contact; intruded by small unnamed granites and by Napperby Gneiss; presumed lateral equivalent of Mount Dunkin schist, but separated from it by Wickstead Creek beds.
Age:	Probably early Middle Proterozoic, same as Lander Rock beds; no isotopic dates. Older than 1800-1500 m.y. Napperby Gneiss (L.P. Black, BMR, personal communication, 1975).
Synonymy:	Mapped as 'Precambrian schist, quartzite, dolomite, and marble' by Wells & others and Evans (1972).

Mount Smith metamorphics (new name)

Proposer:	R.G. Warren (in Warren, in prep.).
Derivation of name:	Mount Smith (23°06'S, 136°59'E) Hay River 1:250 000 Sheet area.
Distribution:	Scattered outcrops at Mount Smith, and extending east for about 10 km. Also 8 km southwest of Mount Dobbie.
Reference area:	In low hills at latitude 23°06'S, longitude 137°01'E, 4 km east of Mount Smith.
Lithology:	Layered, fine-grained, biotite-feldspar-quartz granofels, medium-grained two-mica schistose gneiss, minor sillimanite-bearing gneiss.
Relationships:	Intruded by granites, and by Mount Tietkens Granite Complex. Unconformably overlain by Cambrian Marqua Beds (Smith, 1972), and Jurassic to Cretaceous Hooray Sandstone (Senior & others, 1978).
Age:	Middle Proterozoic or older, probably in excess of 1800 m.y.
Correlation:	Equated with Division 2 of the Arunta Block.
Synonymy:	Previously mapped as undivided Arunta Complex (Smith, 1963a).

Mount Stafford beds (variation of published name)

Proposer:	A.J. Stewart (in Stewart & others, in preparation).
Derivation of name:	Mount Stafford (GR 5453-578634), northwest part of Reynolds Range 1:100 000 Sheet area.
Distribution:	Yundurbulu Range in northwest corner of Reynolds Range 1:100 000 Sheet area and southwest corner of Mount Peake 1:100 000 Sheet area; also in northwest part of Denison 1:100 000 Sheet area.
Reference area:	Well-exposed strike ridges at GR 5453-510622, 1.2 km east of Tin Bore, northwest part of Reynolds Range 1:100 000 Sheet area.
Lithology:	Thin to thick-bedded grey or black layered or spotted hornfelses, typically composed of cordierite, biotite, andalusite, microcline, plagioclase, and quartz. To the northeast, approaching the Anmatjira Orthogneiss, hypersthene, garnet, and sillimanite are also present.
Relationships:	No underlying or overlying units known; passes laterally into Lander Rock beds in Denison 1:100 000 Sheet area. Intruded by Anmatjira orthogneiss, by small bodies of unnamed granite, and by metadolerite dykes and sills.

Age: Middle Proterozoic or older; older than 1642 ± 100 m.y. Anmatjira Orthogneiss.

Synonymy: Called 'Archaean interbedded micaceous schist and schistose quartzite' by Australian Geophysical (1967); mapped as 'Precambrian schist, quartzite, dolomite, and marble' by Wells & others (Evans, 1972). Published as Mount Stafford Beds by Shaw & Stewart (1975).

Mount Thomas Quartzite (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Mount Thomas (GR 5453-734536) the highest point in the Reynolds Range.

Distribution: Reynolds Range, in Aileron, Tea Tree, and Reynolds Range 1:100 000 Sheet areas: Giles Range, in the Reynolds Range and Denison 1:100 000 Sheet areas; Wabudali Range, Mount Theo 1:250 000 Sheet area.

Type section: Section AX-1, 3 km east of Mount Thomas; base at GR 5453-775315, top at -763313 not measured.

Lithology: At the type section, mostly pinkish-brown thin-bedded silicified sandstone, weakly schistose, cross laminated, and containing a small amount of detrital muscovite. Two sills of retrogressively metamorphosed microgranite of the Warimbi Schist intrude the lower part of the type section, and a third sill overlies the top of the section. Two interbeds of greenish-grey, weakly cleaved siltstone with andalusite porphyroblasts are present, one immediately above the lower sills of microgranite, the other near the top of the section. In the southeast of the Reynolds Range, the sequence is generally similar, but the proportion of siltstone and shale is greater. In the northwest of the Range, the unit begins with a few metres of basal conglomerate or pebbly arkose, overlain by white to pink orthoquartzite (about 100 m), and then by blue hematite quartzite (about 125 m); shale is absent. The basal conglomerate is separated from the quartzite by the retrogressively metamorphosed microgranite sill of the Coniston Schist.

Thickness: 850 m in type section (excluding microgranite sills); 235 m in northwest part of Reynolds Range; about 550 m in southeast part of Range.

Relationships: Overlies Lander Rock beds with an angular unconformity; conformably overlain by and interfingers with Pine Hill Formation. Intruded by orthoschist sills of Coniston and Warimbi Schists; adjoins and probably intruded by Yakalibadgi Microgranite and Mount Airy Orthogneiss; intruded by Napperby Gneiss.

Age: Middle Proterozoic or older; older than Napperby Gneiss (1800-1500 m.y., L.P. Black, BMR, personal communication, 1974).

Synonymy: Mapped as 'quartzite possibly of Upper Proterozoic age' by Quinlan (1962); mapped and referred to as Giles Quartzite and Ironbark Silts by Australian Geophysical (1967); included in 'Metasediments and metamorphics of uncertain origin' by Evans & Glikson (1969); mapped as 'Precambrian quartzite' by Wells & others (Evans, 1972).

Mount Tietkens Granite Complex (new name)

Proposer: R.G. Warren (in Warren, in preparation).

Derivation of name: Mount Tietkens (23°04'S, 136°59'E), Hay River 1:250 000 Sheet area.

Distribution: Scattered outcrops, extending over 200 km^2 south and east of Mount Tietkens.

Reference area: In low mesas at latitude 23°06'S, longitude 137°02'E approximately 7.5 km east northeast of Mount Smith.

Lithology: Older phase - medium even-grained muscovite-biotite leucocratic granite. Younger phase - porphyritic leucocratic granite with subhedral laths of microcline. Minor tourmaline leucogranite, numerous late pegmatites.

Relationships: Intrudes Mount Smith metamorphics, older granites. Unconformably overlain by Cambrian Marqua Beds (Smith, 1972), Jurassic to Cretaceous Hooray Sandstone (Senior & others, 1978).

Age: Middle Proterozoic or older. K-Ar date on muscovite from pegmatite, 1726 m.y. (Amdel, 1978). True age may be close to 1800 m.y.

Synonymy: Previously mapped as undivided granite (Smith, 1963a).

Mud Tank Carbonatite (Stewart & Warren, 1977)

Proposers: A.P. Langworthy and R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Mud Tank, a water bore adjacent to the carbonatite, at GR 430460 in the Alcoota 1:250 000 Sheet area.

Distribution: Exposed as three rounded knolls approximately 2 km^2 in area, 3 km northeast of Woolanga Bore, Laughlen 1:100 000 Sheet area.

Type area: Large rounded knoll at GR 5751-545259, Laughlen 1:100 000 Sheet area.

Lithology: Carbonatite with apatite, zircon, ilmenite-magnetite and unusual amounts of trace elements, including rare earths.

Relationships: There are no exposed contacts with adjacent basement schist and gneiss; outcrop areas of carbonatite are surrounded and isolated by Quaternary alluvium. The unit is distinguished by its unusual lithology. It is presumed to intrude unnamed basement metamorphics, p€sf.

Age: Late Proterozoic. Dates of 732 ± 5 m.y. (U-Pb on zircon) and 735 ± 75 m.y. (Rb-Sr whole-rock) have been determined by Black & Gulson (1978).

Synonymy: The unit has been referred to in an informal publication as the Strangways Range Carbonatite by Gellatly (1972). It has been referred to as the carbonatites of the Strangways Range by Crohn & Gellatly (1969) and Moore & Gray (1973). The name Mud Tank Carbonatite has been used by Stewart & Warren (1977), Warren (1978), Black & Gulson (1978), and Langworthy & Black (1978).

Mulga Creek granitic gneiss (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Mulga Creek, a tributary of the Hale River, which flows through Georgina Gap at 23°19'S, 134°28'E in centre of Alice Springs 1:250 000 Sheet area.

Distribution: The unit forms a small low plateau between the main quartzite range of Mount Laughlen and Mulga Creek.

Reference area: At GR 5751-406149, just west of its boundary with the Georgina Gap granitic gneiss.

Lithology: A chemically analysed granitic gneiss containing biotite and muscovite has the composition of a granite (specimen 5081). The unit includes the enclosed amphibolite. More details on lithology are given in Shaw & others (in preparation).

Relationships: Has a discordant, possibly intrusive, contact with unassigned gneiss and amphibolite (p€). It is intruded by the Georgina Gap granitic gneiss, and is unconformably overlain by the Heavitree Quartzite.

Remarks: The foliation in the gneiss is thought to post-date the time of inferred intrusion of the Mulga Creek body. The unit is distinguished from the Georgina Gap granitic gneiss by its fine grainsize and lack of potassium feldspar megacrysts.

Age: Middle Proterozoic or older. No isotopic dates.

Synonymy: Previously mapped by Wells & others (1968) as undivided Arunta Complex.

Napperby Gneiss (variation of published name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

The Napperby Granite of Cook & Scott (1967) and Australian Geophysical (1967) is changed to Napperby Gneiss because of the markedly layered structure of the rock.

A full stratigraphic definition of the unit has not hitherto been published.

Derivation of name: Napperby homestead (268509), near centre of Napperby 1:250 000 Sheet area.

Distribution: Yalyirimbi Range in southern part of Reynolds Range and northern part of Napperby 1:100 000 Sheet areas; also in northwestern part of Aileron 1:100 000 Sheet area.

Type locality: South 20 Mile Waterhole (283507), on Day Creek 15 km east of Napperby homestead on southern side of Yalyirimbi Range: creek bed provides excellent clean rock surfaces of layered and kinked gneiss cut by mylonitic zones.

Lithology: Medium to coarse-grained equigranular thinly layered granitic gneiss, comprising dark layers rich in biotite and light layers rich in quartz, microcline perthite, and sodic plagioclase. Layering is re-oriented along kink bands (some in conjuguate sets), strain-slip cleavage zones, and cut by sharply bounded zones up to 1 m wide of black mylonite.

Relationships: Intrudes Wickstead Creek beds, Mount Freeling schist, Mount Dunkin schist, Nolans Dam metamorphics, Aileron metamorphics, and Lander Rock beds in northwestern part of Aileron 1:100 000 Sheet area; intrudes Mount Thomas Quartzite and Pine Hill Formation in southeastern part of Reynolds Range 1:100 000 Sheet area.

Age: Middle Proterozoic; preliminary Rb-Sr isotopic dates on whole rocks and muscovite are in range 1800 to 1500 m.y. (L.P. Black, BMR, personal communication, 1975).

Synonymy: Originally called Napperby Granite by Cook & Scott (1967); Napperby Granite of Australian Geophysical (1967) included granitic rocks in Reynolds and Anmatjira Ranges as well as in Yalyirimbi Range; included in 'Granitic gneiss (orthogneiss)' of Evans & Glikson (1969); mapped as 'Precambrian orthogneiss, granitic gneiss' by Wells & others (Evans 1972).

Ngalurbindi Orthogneiss (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Ngalurbindi Hills (GR 5353 - 200300) in southern part of Denison 1:100 000 Sheet area.

Distribution: Ngalurbindi Hills.

Type locality: GR 5353-067307, 7 km southwest of Mount Allan homestead, southwest part of Denison 1:100 000 Sheet area. Clean exposure on north side of hill, showing coarse augen gneiss containing large xenoliths of biotite gneiss.

Lithology: Mainly coarse porphyritic granitic augen gneiss, grading eastward to medium-grained granitic gneiss similar to Napperby Gneiss farther east in Yalyirimbi Range.

Relationships: Intrudes unnamed slate and schist in Rocco Bore area; intruded by Wangala Granite and probably by Uldirra Porphyry.

Age: Probably Middle Proterozoic; no isotopic date.

Synonymy: Included in 'Granitic gneiss (orthogneiss)' of Evans & Glikson (1969); mapped as 'Precambrian orthogneiss, gneissic granite' by Wells & others (Evans, 1972).

Nolans Dam metamorphics (new name)

Proposers: A.J. Stewart, A.Y. Glikson, R.G. Warren (in Stewart & others, in preparation).

Derivation of name: Nolans Dam (GR 5552-218991), north-central part of Aileron 1:100 000 Sheet area.

Distribution: Between Nolans Dam and Bluebush Swamp, in northern part of Aileron 1:100 000 Sheet area.

Reference area: Area of hills and gullies at GR 5552-248955, 5 km west of Aileron; here, cordierite gneiss contains garnet, and is layered.

Lithology: Largely cordierite gneiss (cordierite, andalusite, garnet, biotite, plagioclase, orthoclase, quartz), with lens of quartzofeldspathic gneiss 400 m x 5 km as separate mapped subunit; small amounts of garnet-biotite gneiss, muscovite schist, quartzite, and retrogressively metamorphosed rock accompany the cordierite gneiss.

Relationships: Passes laterally into schist of Lander Rock beds; intruded by Napperby Gneiss.

Age: Probably early Middle Proterozoic or older, same as Lander Rock beds; older than 1800-1500 m.y. Napperby Gneiss (L.P. Black, BMR, personal communication, 1975).

Synonymy: Described as 'Garnet- and andalusite-bearing schists' by Evans & Glikson (1969), mapped as 'Precambrian schist, metasediments, including marble' by Wells & others (Evans, 1972).

Old Hamilton Downs Gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Old Hamilton Downs homestead near the headwaters of Jay Creek in the MacDonnell Ranges 1:100 000 Sheet area.

Distribution: From north of Simpsons Gap in the Alice Springs 1:100 000 Sheet area westwards into the MacDonnell Ranges 1:100 000 Sheet area.

Type locality: Muscovite-bearing granitic gneiss at GR 5650-486858 in the Alice Springs 1:100 000 Sheet area.

Lithology: Homogeneous, medium-grained granitic gneiss in Alice Springs 1:100 000 Sheet area grading to muscovite gneiss in the MacDonnell Ranges 1:100 000 Sheet area.

Relationships: Cut to the northwest and south by Palaeozoic faults, interfingers with and possibly intrudes the Charles River gneiss to the east, and grades rapidly through a migmatitic zone into interlayered gneiss and amphibolite (p€) to the northeast. Dolerite dykes (Ꝑds) and rare pegmatite veins intrude the unit. Considered to be an anatectic granite.

Age: Late Proterozoic. Anatexis and migmatisation may be comparable in age with the regional migmatite event which affects the southwestern part of the Arunta Block and has been dated at about 1080 m.y. (Marjoribanks & Black, 1974).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Ongeva granulite (new name)

Proposers: R.D. Shaw and R.G. Warren. Mapped by A.P. Langworthy and R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Ongeva Creek, tributary of the Waite River, 23°07'S, 134°35'E in the Alice Springs 1:250 000 Sheet area.

Distribution: Central eastern margin of Laughlen 1:100 000 Sheet area, and central western margin of Riddoch 1:100 000 Sheet area.

Reference area: An area of several square kilometres centred on GR 460330.

Lithology: Interlayered mafic granulite, felsic granulite, and migmatite with small amounts of cordierite gneiss, garnet gneiss, mafic calc-silicate, and biotite gneiss.

Relationships: The unit is overlain by Cadney metamorphics and has a complex boundary with unnamed unit p€u. This later boundary is thought to be largely a metamorphosed intrusive contact, much of p€u being considered to be a metamorphosed granite complex. The boundary is further complicated by retrograde metamorphism to the amphibolite facies near and north of the boundary. Relics of original unretrogressed country rock in p€u resemble the Ongeva granulite.

Age: Metamorphosed at 1800 m.y. (Black, 1975), and cut by retrograde zones, e.g. Gough Dam Schist Zone, at several times subsequent to that.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Oolbra orthogneiss (new name)

Proposer: A.P. Langworthy (in Shaw & others, in preparation).

Derivation of name: Oolbra Dam, 23°20'S 133°52'E, Alice Springs 1:250 000 Sheet.

Distribution: South of vehicle track between Oolbra Dam and Scrub Hill, in central Burt 1:100 000 Preliminary Sheet area.

Reference area: The type area is a 1 km^2 region centred on GR 5651-885229, Burt 1:100 000 Sheet area.

Lithology: Macroscopically homogeneous granitic gneiss containing conspicuous porphyroblasts of orthoclase (up to 75 mm across) in a matrix of quartz biotite, plagioclase, garnet, orthoclase, hornblende and opaque minerals. The orthogneiss is markedly schistose.

Relationships: Intrudes Sliding Rock metamorphics and Narbib granulite, and is cut by Narbib Deformed Zone.

Age: Middle-Proterozoic or older; possibly same as Anamarra orthogneiss, based on their similarity in degree of deformation and metamorphism.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Pine Hill Formation (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Pine Hill homestead (GR 5553-996231), in southwest of Tea Tree 1:100 000 Sheet area.

Distribution: Reynolds Range, in Reynolds Range, Tea Tree, and Aileron 1:100 000 Sheet areas; Giles Range, in Reynolds Range and Denison 1:100 000 Sheet areas; Wabudali Range, in Mount Theo 1:250 000 Sheet area.

Type Section: Section AX-2, 3 km east of Mount Thomas, immediately above type section of Mount Thomas Quartzite, in Reynolds Range. Base at GR 5453-761313, top at -756311. Not measured.

Lithology: In type section, weakly cleaved red-brown to grey-green shale, siltstone, and fine-grained silty sandstone, grading to slate, with porphyroblasts of andalusite. A distinctive pair of marker beds occurs near the middle of the section, comprising a white orthoquartzite below, and blue hematite quartzite above, the two separated by a few metres of shale. Two thin sills of microgranite retrogressively metamorphosed to orthoschist of Warimbi Schist are present in lower part of section. To the southeast, unit is regionally metamorphosed to mica schist and metapelitic granofels.

Thickness: 570 m in type section; apparently fairly constant along entire Reynolds Range.

Relationships: Conformably overlies and interfingers with Mount Thomas Quartzite; no overlying unit known. Includes conformable Algamba Dolomite Member and Woodforde River beds. Intruded by retrogressively metamorphosed microgranite sills of Warimbi Schist, and by Napperby Gneiss.

Age: Middle Proterozoic or older; older than 1800 to 1500 m.y. Napperby Gneiss.

Synonymy: Called Ironbark Silts by Australian Geophysical (1967); included in 'Meta-sediments and acid metamorphics of uncertain origin' of Evans & Glikson (1969); mapped as 'Precambrian schist metasediments, including marble' by Wells & others (Evans, 1972).

Possum Creek Charnockite (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Possum Creek (GR 5553-960410), western part of Tea Tree 1:100 000 Sheet area.

Distribution: Six separate and discrete masses up to 2 km long in southeast part of Anmatjira Range, Tea Tree 1:100 000 Sheet area.

Type locality: Hill (GR 5553-950390) about 400 m across on southeast bank of Possum Creek is composed of charnockite with foliation dipping about 50 degrees southeast.

Lithology: Brown medium-grained felsic granulite composed of sanidine, andesine, quartz, hypersthene, and brown hornblende; contains rapakivi feldspar augen spaced about 20 cm apart; strong foliation; contains dark elongate xenoliths.

Relationships: Intrudes Tyson Creek granulite, adjoins and possibly intruded by Aloolya Gneiss.

Age: Late Early Proterozoic; preliminary Rb-Sr whole rock isotopic date 1814 ± 75 m.y. (L.P. Black, BMR, personal communication, 1975).

Synonymy: Included in 'Granulites' of Evans & Glikson (1969), and in 'Precambrian orthogneiss' and 'Precambrian paragneiss, basic and acid granulites' of Wells & others (Evans, 1972).

Randall Peak metamorphics (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Randall Peak Bore 23°23'S, 134°11'E, Alice Springs 1:250 000 Sheet area. Also after Randall's Peak GR 5751-142097.

Distribution: Complex arcuate pattern of ridges in the southern part of Laughlen and northern part of Undoolya 1:100 000 Sheet areas.

Reference area: From Porters Well (GR 5751-221093) for about 4 km farther to the southeast.

Lithology: Quartzofeldspathic gneiss, amphibolite, biotite gneiss, and subordinate muscovite-biotite gneiss. Other minor rock types include hornblende gneiss, sillimanite gneiss, and megacrystic feldspar gneiss. More details on lithology are given in Shaw & others (in preparation).

Relationships: The surrounding rocks are dominantly biotite gneisses (C.I. >12), which lack the quartzofeldspathic gneiss layers (C.I. < 12) which characterise the Randall Peak metamorphics. The unit is surrounded, for the most part, by unassigned biotite gneisses (p€). Based on meagre foliation-dip information, the metamorphics consistently dip underneath the unit p€ and may be older. The Trephina granitic gneiss has discordant contacts against the Randall Peak metamorphics and encloses a raft of the metamorphics. The Jennings Granitic Gneiss has some conformable contacts and some discordant contacts with the metamorphics. The metamorphics are intruded by a number of small gabbroic plugs, and unconformably overlain by the Heavitree Quartzite.

Age: Middle Proterozoic or older. No isotopic dates.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Reynolds Range Group (Shaw & Stewart, 1975)

Proposers: A.T. Wells, A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Reynolds Range (GR 5453-750320), in centre of Reynolds Range 1:100 000 Sheet area.

The metasedimentary rocks forming the Reynolds Range are a conformable sequence which comprises, in ascending order, the Mount Thomas Quartzite, Pine Hill Formation, the Algamba Dolomite Member of the Pine Hill Formation, and the Woodforde River beds, which are laterally equivalent to the Algamba Dolomite Member. The sequence is interpreted as a lithogenetic group that formed during a marine transgression.

Rungutjirba Gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Rungutjirba Ridge, a conspicuous west-trending ridge passing through Simpsons Gap in the Alice Springs 1:100 000 Sheet area.

Distribution: South of Simpsons Gap where it bifurcates westwards towards the headwaters of Laura Creek in the Alice Springs 1:100 000 Sheet area.

Type locality: 5 km west-northwest of Temple Bar Gap along a tributary of Roe Creek (GR 5650-670758) in the Alice Springs 1:100 000 Sheet area, where it consists of fine-grained quartzofeldspathic gneiss.

Lithology: Laminated fine-grained pink or cream-coloured quartzofeldspathic gneiss, typically consisting of quartz and plagioclase augen, commonly less than 2 mm long, in an aphanitic muscovite-quartz-feldspar matrix. Biotite and euhedral magnetite are present locally.

Relationships: Although no crosscutting relationships are seen, the unit appears to intrude the Simpsons Gap Metasediments and the Chewings Range Quartzite on its eastern margin. It intrudes the Simpsons Gap Metasediments on its northern margin. Interfingering of the unit with the Burt Bluff Gneiss is interpreted as an intrusive contact.

The Rungutjirba Gneiss is intruded by dolerite (Ꝑds) and unconformably overlain by the Heavitree Quartzite (Ꝑuh).

Age: Probably Middle Proterozoic or older. Older than the Late Proterozoic dolerite dykes and Heavitree Quartzite. Assumed to be of similar metamorphic age as other members of the Iwupataka Metamorphic Complex i.e. Middle Proterozoic.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Sadadeen Range gneiss (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Sadadeen Range (GR 5650-865775) in the Alice Springs 1:100 000 Sheet area.

Distribution: Low rounded hills east and west of the Alice Springs township in the Alice Springs 1:100 000 Sheet area.

Reference area: GR 5650-865775 where the unit consists of porphyroblastic gneiss.

Lithology: Characterised by lenticular, blocky, or ovoid porphyroblasts of perthitic microcline up to 8 cm in length in a schistose matrix of biotite, quartz, and feldspar. Some parts of unit are highly schistose and porphyroblasts are lacking. In places contains small amounts of muscovite, garnet, and epidote.

Relationships: Has concordant contacts with the neighbouring unnamed metasediments (p€pb), unnamed calc-silicate rock (p€pp), Emily Gap schist, and Alice Springs Granite. Is interlayered with the Teppa Hill metamorphics, and near the Emily Gap schist commonly contains schist and quartzose metasediment layers. Xenoliths are rare, consist of fine to medium-grained biotite gneiss, biotite and biotite-muscovite schist, and metamorphosed magnetite-biotite and muscovite-chlorite-bearing feldspathic quartz sandstone, and probably originate from the Teppa Hill metamorphics or the Emily Gap schist. To the west the Sadadeen Range gneiss appears to be nonconformably overlain by the basal conglomerate of the Simpsons Gap Metasediments; in places the foliation is at a high angle to the conglomerate bed. The Charles River Fault forms the northern boundary of the unit, and west of the Alice Springs township the gneiss is cut by west trending faults showing horizontal displacements of about 1 km. Dolerite (Ꞓds) and pegmatite dykes cut the Sadadeen Range gneiss and all are unconformably overlain to the south by Heavitree Quartzite.

Age: Probably Middle Proterozoic or older. Older than the Late Proterozoic Heavitree Quartzite, which unconformably overlies it, and the dolerite and pegmatite dykes which intrude it. The gneiss was probably metamorphosed during the regional Middle Proterozoic Chewings Phase of deformation.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Simpsons Gap Metasediments</u> (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Simpsons Gap (GR 5650-692810) 17 km west of the Alice Springs township in the Alice Springs 1:100 000 Sheet area.

Distribution: Confined to the area south of Simpsons Gap and between the Chewings Range and the Heavitree Quartzite ridge. May extend as far west as the Hermannsburg 1:100 000 Sheet area.

Type locality: Along Jay Creek in the Alice Springs 1:100 000 Sheet area between GR 5650-506767 and 513779 where the unit consists of recrystallised epidote-alkali feldspar-muscovite-quartz-sandstore. The basal conglomerate does not crop out at the type locality, but a good exposure can be seen at GR 5650-765782.

Lithology: Thin cobble conglomerate at base, overlain by recrystallised micaceous and feldspathic quartz sandstone with interlayered staurolite-garnet-two-mica schist and a small amount of amphibolite.

Relationships: East of Simpsonn Gap the metasediments overlie the Sadadeen Range gneiss; to the south they are unconformably overlain by the Heavitree Quartzite, but to the north they appear to be concordantly overlain by the Chewings Range Quartzite. The metasediments are intruded by the Burt Bluff Gneiss and the Rungutjirba Gneiss as seen at GR 5650-564775, where the Burt Bluff Gneiss and the Rungutjirba Gneiss interfinger with the unit and the Burt Bluff Gneiss contains a 2.5 m long sliver of recrystallised sericitic sandstone. Pegmatite, undivided granite (Pg) and dolerite dykes (Pds) also intrude the unit.

Age: Middle Proterozoic or older. Folded and metamorphosed to upper greenschist or low amphibolite facies assemblages in the Middle Proterozoic during the Chewings Phase of deformation

Correlation: The Simpsons Gap Metasediments are similar in composition, metamorphic grade and style of deformation to pelitic and semi-pelitic schists cropping out south of the Chewings Range in the Hermannsburg 1:100 000 Sheet area (Marjoribanks, 1975). Preliminary mapping of the basement rocks south of the Chewings Range in the MacDonnell Ranges 1:100 000 Sheet area indicates that the Simpsons Gap Metasediments may extend from the Alice Springs 1:100 000 Sheet area through the MacDonnell Ranges 1:100 000 Sheet area as far west as the Hermannsburg 1:100 000 Sheet area.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Sliding Rock metamorphics</u> (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Sliding Rock Well at 23°19'S, 134°13'E in the Alice Springs 1:250 000 Sheet area.

Distribution: A series of broad east-striking ridges which parallel Harry Creek to the north and extend from the headwaters at White Tree Creek in the Burt 1:100 000 Sheet area to Turner's Prospect in the Laughlen 1:100 000 Sheet area.

Reference area: On the eastern side of the track from Sliding Rock Well to Randall Peak Bore, i.e. between GR 5751-193207 and 5751-178185, Laughlen 1:100 000 Sheet area.

Lithology: A sequence of hornblende-biotite gneiss, garnet-biotite gneiss, biotite gneiss, quartzofeldspathic gneiss, and amphibolite. Granitic gneiss and rare kyanite gneiss are confined to the western end of the outcrop. Sillimanite gneiss is confined to the southern margin of the unit and to the inferred contact with the Ankala gneiss in the northeast of the unit at Rankin's Prospect. More details on lithology are given in Shaw & others (in preparation).

Relationships: The southern boundary of the unit is conformable against unassigned rocks (p€) and is marked by the outgoing of garnetiferous biotite gneiss and an increase in the biotite content of the gneiss giving rise to rocks that have a relatively high colour index (CI > 20). At the northeastern end of the unit the southern margin is intruded by the Oolbra Orthogneiss. The northern margin is faulted against the Ankala gneiss for most of its length. At Rankin's Prospect the metamorphics are conformably overlain by a thin unit of schist, marble, calc-silicate rock, and magnetite quartzite followed by a unit of mainly quartzofeldspathic gneiss; both units are tentatively assigned to the Ankala gneiss. The common occurrence of either garnet or hornblende in the gneisses of the Sliding Rock metamorphics makes the unit distinctive.

Age: Middle Proterozoic or older. No isotopic dates.

Synonymy: Previously mapped as undivided Arunta Complex by Wells & others (Wells, 1969).

<u>Strangways Metamorphic Complex</u> (variation of published name)

Proposers: R.D. Shaw, R.G. Warren.

Derivation of name: The Complex is named after Strangways Range, which spans central and northwestern Alice Springs 1:250 000 Sheet area. (This is an extended usage approved by the N.T. Lands Branch and National Mapping and shown on latest 1:250 000 topographic map).

Distribution: Northwestern and northern central Alice Springs 1:250 000 Sheet area, and southern central and central-eastern Alcoota 1:250 000 Sheet area.

Type area: Strangways Range is the type area. A reference section between GR 5751-042263 and Southern Cross Bore (GR 5751-191395) is representative of the lower part of the complex. A reference section between the White Lady Mica Mine and White Hill Dam in northeastern Alice Springs 1:250 000 Sheet area is a representative section of the upper part of the complex because its boundary with the overlying Harts Range Group is clearly displayed.

Lithology: Mainly mafic and felsic granulites and lesser amounts of cordierite and sillimanite-bearing gneisses. The upper part of the Complex also contains calc-silicate rock, marble, sillimanite gneiss, schistose biotite gneiss, and layered amphibolite.

Component units: The complex includes the Utnalanama Granulite, Harry Anorthositic Gabbro, the Erontonga metamorphics, the Cadney metamorphics, the Yambah granulite, the Ongeva granulite, and the Bungitina metamorphics in the Alice Springs 1:250 000 Sheet area. The Complex also includes the Mount Bleechmore Granulite and the Kanandra Granulite in the Alcoota 1:200 000 Sheet area (Shaw & Warren, 1975). The Ingula Migmatite Suite and the Wuluma Granite are considered to have formed during the ultrametamorphism which has affected the entire complex and are also included in it.

Relationships: The unit is overlain by the Irindina Gneiss (Joklik, 1955) of the Harts Range Group between Old (Schaber) Station Well and White Hill Dam. The contact is slightly discordant in that there is a distinct change in rock type, an abrupt increase in the continuity of compositional layering, and a sharp decrease in the amount of minor folding. Farther west (north of the Oonagalabi Prospect) the contact becomes a clear angular discordance, but the presence of a deformed zone containing numerous intrafolial folds and small thrust faults makes the nature of the contact difficult to assess. The Strangways Metamorphic Complex contains much less garnet in its biotite gneiss, and includes abundant quartzofeldspathic gneiss not apparent in the Irindina Gneiss. Cross-cutting mafic granulite and amphibolite bodies (metagabbros) are common in the Strangways Metamorphic Complex, but very rare and generally absent from the Harts Range Group. Compositional units tend to be much more continuous in the Harts Range Group. The complex is thought to be an older basement (Division 1) below the other rocks (Divisions 2 and 3) in the Arunta Block.

Age: A widespread metamorphism which affects the entire complex has been dated by Black (1975) at about 1800 m.y. and at 1860 ± 70 m.y. by Iyer, & others (1976).

Synonymy: Previously published as Strangways Range Metamorphic Complex by Shaw & Warren (1975). The name is now changed to Strangways Metamorphic Complex for brevity.

<u>Teppa Hill metamorphics</u> (new name)

Proposer: L.A. Offe (in Shaw & others, in preparation).

Derivation of name: Teppa Hill (GR 5650-850795) in the Alice Springs 1:100 000 Sheet area.

Distribution: Arc of low hills extending from the Charles River Fault to the Alice Springs township in the Alice Springs 1:100 000 Sheet area.

Reference area: GR 5650-826792 to -818785, where the unit consists of quartz-rich metasediments and orthogneiss, amphibolite, and quartzite.

Lithology: Interlayered fine to coarse-grained muscovite-biotite quartzose gneiss, orthogneiss, metaquartzite, biotite and muscovite schists, amphibolite and a small amount of calc-silicate rock.

Relationships: Apparently concordant with the Sadadeen Range gneiss to the east, northeast, west, and southwest. However, the southeast boundary shows interfingering of the Teppa Hill metamorphics with the Sadadeen Range gneiss. The apparently concordant contact in detail is made up of intimately interlayered metasediment and orthogneiss; for practical purposes the Teppa Hill metamorphics include all the metasedimentary layers together with the included interlayers of orthogneiss in the transition zone. Dolerite (Ꝑds) and pegmatite dykes intrude the Teppa Hill metamorphics.

Age: Probably Middle Proterozoic or older. May have been metamorphosed during the regional Middle Proterozoic Chewings Phase of deformation. Older than the Late Proterozoic dolerite dykes which intrude the unit.

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

<u>Tommys Gap metamorphics</u> (new name)

Proposer: A.J. Stewart (in Shaw & others, in preparation).

Derivation of name: Tommys Gap (GR 5850-622855), Fergusson Range 1:100 000 Sheet area.

Distribution: Northern part of Fergusson Range 1:100 000 Sheet area; three separate areas separated by rocks of Atnarpa Igneous Complex.

Reference areas: 1. Western area: Tommys Gap and for 1.5 km northwards: low hills and gullies show good exposures of basic metavolcanics, ferruginous quartzite, calc-silicate rock, marble and chlorite schist.

2. Eastern area: at GR 5850-802930, 3.5 km east-southeast of Chabbana Waterholes, low hilly terrain shows good exposure of hornblende gneiss.

3. Central area: at GR 5850-702924, 0.5 km south-southeast of Marmalade Dam, prominent hill of well-exposed orthoamphibolite intruded by tongue of granite of Atnarpa Igneous Complex.

Lithology: 1. Western area: as for reference area, plus quartzite and amphibolite at eastern end of area.

2. Eastern area: layered hornblende gneiss composed of andesine-hornblende-quartz-accessories.

3. Central area: orthoamphibolite (labradorite-hornblende-clinopyroxene-epidote-sphene-opaques), quartz-rich metasediment (quartz-microcline-chlorite-epidote), hornblende gneiss, quartzofeldspathic gneiss, biotite gneiss.

Relationships: No older rocks known; no younger rocks in sequence with unit. Intruded by Atnarpa Igneous Complex, by dykes of ultramafic rock, by an amphibolite dyke, and by a dolerite plug correlated with Stuart Dyke Swarm. Unconformably overlain by Heavitree Quartzite.

Age: Middle Proterozoic or older. Older than the 1710 ± 50 m.y. old Atnarpa Igneous Complex (Cooper & others, 1971). Using Rb-Sr data on single sample of biotite gneiss, and initial ratio of 0.7, parent sediment can be no older than 2300 m.y.

Synonymy: Mapped as undivided Arunta Complex by Wells & others (Wells,1969); quartzite body at eastern end of western area mapped as Heavitree Quartzite by Wells & others (Wells, 1969).

<u>Tyson Creek granulite</u> (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Tyson Creek (GR 5553-060350), western part of the Tea Tree 1:100 000 Sheet area.

Distribution: Southeastern part of Anmatjira Range, Tea Tree and Reynolds Range 1:100 000 Sheet areas.

Reference area: GR 5553-030250, 4 km east-northeast of Pine Hill homestead; waterfall in creek bed has clean rockfaces showing Tyson Creek granulite intruded by Possum Creek Charnockite.

Lithology: Interlayered mafic granulite composed of labradorite or bytownite, clinopyroxene, hypersthene, and biotite, and felsic granulite composed of orthoclase, andesine, garnet, and biotite. Felsic granulite also forms masses large enough to show separately on map.

Relationships: No older rocks known; adjoins Weldon metamorphics with apparent conformity; intruded by Anmatjira Orthogneiss, Aloolya Gneiss, Possum Creek Charnockite, unnamed charnockitic granite 3 km northwest of Sandy Creek Bore, and by dolerite dyke.

Age: Early Middle Proterozoic or older; preliminary Rb-Sr whole-rock analyses give time of metamorphism at 1800 to 1700 m.y. (L.P. Black, BMR, personal communication, 1975).

Synonymy: Included in 'Basic granulites' of Evans & Glikson (1969), mapped in with 'Paragneiss, basic and acid granulites' by Wells & others (Evans, 1972).

Trephina granitic gneiss (new name)

Proposer: R.D. Shaw (in Shaw & others, in preparation).

Derivation of name: Trephina Creek, a tributary of Ross River centred on 23°29'S, 134°21'E in the Alice Springs 1:250 000 Sheet area.

Distribution: The unit occupies an extensive, flat, relatively low-lying region of about 50 km^2 in the central headwaters of Trephina Creek centred on GR 5751-270090, Laughlen 1:100 000 Sheet area.

Reference area: Typical exposures of the unit can be examined 4 to 5 km north of Whistleduck Bore.

Lithology: A biotite granitic gneiss containing sparsely disseminated potassium feldspar megacrysts. The unit includes enclosed bodies of amphibolite. Additional information on lithology is given in Shaw & others (in preparation).

Relationships: Has discordant contacts against unassigned gneisses (p€) of the northern Wigley Block; intruded by the Whistleduck Dyke Swarm.

Age: Probably Middle Proterozoic. Lithologically correlated and hence may be coeval with Jennings Granitic Gneiss, which is considered to have been intruded at about 1700 m.y. (Stewart, in Shaw & others, 1979; Armstrong & Stewart 1975).

Synonymy: Previously mapped by Wells & others as undivided Arunta Complex (Wells, 1969).

Uldirra Porphyry (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Uldirra Hill (GR 5353-180290) in southern part of Denison 1:100 000 Sheet area.

Distribution: In Ngalurbindi Hills, southern part of Denison 1:100 000 Sheet area.

Type locality: GR 5353-175257, 3 km south of Uldirra Hill; at western margin of range of hills, porphyry is well exposed and shows the following rock-types in close proximity: white leucocratic porphyritic microgranite with abundant microphenocrysts of dark yellow monazite, quartz, feldspar, and chlorite; grey porphyritic microgranite with microphenocrysts of sphene, allanite, quartz, feldspar, and chlorite; quartz-feldspar rock.

Lithology: Pale grey to white porphyritic microgranite comprising phenocrysts of quartz (rounded), microcline, plagioclase (andesine to albite), and biotite or chlorite in a recrystallised groundmass of same minerals. Other phenocrysts in some samples include monazite, muscovite, allanite, and sphene. Plagioclase sericitised and saussuritised. Rock is weakly foliated. Subordinate rock-types (not mapped) include porphyritic microgranodiorite, muscovite-quartz-feldspar rock, and quartz-feldspar rock.

Relationships: Intrusive relationships not known; adjoins and faulted against Ngalurbindi Orthogneiss; adjoins unnamed bodies of granite and granodiorite.

Age: Probably Middle Proterozoic; no isotopic date.

Synonymy: Southernmost part described by Evans & Glikson (1969), mapped as 'Precambrian quartz-feldspar porphyry' by Wells & others, (Evans, 1972).

<u>Ulgnamba Lignite Member</u> (new name)

Proposer: R.D. Shaw, B.R. Senior (in Shaw & others, in preparation).

Derivation of name: Ulgnamba Bore, GR 461419, in the Alice Springs 1:250 000 Sheet area.

Distribution: As lenses identified in subcrop in several drillholes into the Hale Basin under the Hale Plain.

Type section: Near base of section just above basement in Diamond Drill Hole BMR 2 at GR 240088 Alice Springs 1:250 000 Sheet.

Lithology: Lignite, carbonaceous shale.

Thickness: 4 m.

Relationships: The unit occurs near the base of the Hale Formation in BMR DDH 2, near but not directly on basement. Elsewhere the member occurs as lenses in the Hale Formation, but always at the same stratigraphic level.

Age: Tertiary, possibly Eocene, but no studies of spores have been published.

Synonymy: Previously mapped as undivided Tertiary sediments by Wells & others (Wells, 1969) (See also definition of Hale Formation).

Utnalanama granulite (new name)

Proposers: R.D. Shaw, A.R. Allen (in Shaw & others, in preparation).

Derivation of name: Utnalanama Range, 23°14'S, 134°07'E, in the Alice Springs 1:250 000 Sheet area.

Distribution: Southern foothills of Utnalanama Range.

Reference area: GR 5751-0503001, 2 km west-southwest of Johannsen's Phlogopite Mine.

Lithology: Coarse-grained pale to dark grey tonalitic to dioritic granulite with a granular texture (i.e. a granofels). The tonalite phase consists principally of quartz and antiperthitic plagioclase (An_{40}), together with orthopyroxene (10%) and ilmenite (1%). The dioritic to leucogabbroic phase is composed of quartz (10%) antiperthitic plagioclase (An_{40}), orthopyroxene, clinopyroxene, and ilmenite (1%). The unit has undergone extensive retrograde metamorphism.

Relationships: Intruded by the Harry Anorthositic Gabbro; both units overlain by the Erontonga metamorphics which differ from the Utnalanama granulite in consisting of an interlayered sequence of quartzofeldspathic, cordierite and garnet-bearing gneisses. The unit is also intruded by the Johannsen Metagabbro Dyke Swarm, and by numerous intrusive bodies including the Gumtree Granite.

Age: Middle Proterozoic or older. The first granulite facies metamorphism, which brought about partial melting of the unit, has been dated as 1800 m.y. using ^{40}Ar-^{39}Ar methods (Allen & Stubbs, in preparation).

Comment on lithological name: A.R. Allen prefers to use the name 'Utralanama granofels' because of the extent of retrogression and the granofelsic texture typical of the rest of the unit. However Utnalanama granulite is preferred to allow consistency with similar units in the region.

Synonymy: Previously mapped as undivided Arunta Complex by Wells & others (Wells, 1969).

Wangala Granite (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Wangala Hills (GR 5353-000430), western part of Denison 1:100 000 Sheet area.

Distribution: Mainly Wangala Hills; small outcrops in western part of Reynolds Range 1:100 000 Sheet area to east.

Type locality: GR 5353-018448, 5 km south-southeast of Mount Denison homestead in western part of Denison 1:100 000 Sheet area. On north side of range of hills, rock face has been dynamited for isotopic dating, shows coarse porphyritic granite with aligned tabular phenocrysts of microcline intruded by medium-grained porphyritic granite. Another reference locality is at GR 5353-941377, 13 km south-southwest of Mount Denison homestead, in western part of Denison 1:100 000 Sheet area. Prominent ridge at margin of Wangala Hills shows good exposure of rapakivi granite intruded by medium-grained porphyritic granite; the rapakivi granite forms at least one large xenolith in the porphyritic granite, and there is a chilled porphyritic granite shell around the xenolith. There is a large zoned dyke of pegmatite with an aplite core along the contact of the two granites; the aplite contains microcline phenocrysts up to 28 cm across.

Lithology: Mostly medium-grained massive to foliated even-grained granite in east, and coarse porphyritic granite with aligned euhedral tabular phenocrysts of microcline (flattened parallel to side or b-pinacoid), and some coarse rapakivi granite, in west. These earlier granites are intruded by smaller bodies of medium-grained porphyritic granite, and by microgranite.

Relationships: Intrudes Wickstead Creek beds at Mount Allan Tin Mine, intrudes Ngalurbindi Orthogneiss, intrudes unnamed quartzofeldspathic gneiss unit 5 km south of Mount Denison Homestead, and intrudes unnamed quartzofeldspathic schist unit 10 km south of Mount Denison homestead. Intruded by amphibolite, pegmatite, porphyry, and quartz dykes.

Age: Probably Middle Proterozoic; no isotopic dates.

Synonymy: Included in Napperby Granite by Australian Geophysical (1967); included in 'Granites and altered granites' of Evans & Glikson (1969); mapped as 'Precambrian granite' by Wells & others (Evans, 1972).

<u>Warimbi Schist</u> (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Warimbi Hills (GR 5453-880240), southeastern part of Reynolds Range 1:100 000 Sheet area.

Distribution: Central part of Reynolds Range, from neighbourhood of Mount Thomas to 16 km southeast of Mount Thomas.

Type locality: GR 5453-772315, 3 km east of Mount Thomas, interpolated in type section of Mount Thomas Quartzite.

Lithology: A sill (lopolith) of medium to fine-grained orthoschist comprising broken porphyroclasts of quartz with deep magmatic resorption embayments, and elongate aggregates of biotite flakes, in schistose fine groundmass of recrystallised quartz and oriented muscovite and biotite.

Thickness: 350 m at type locality; three smaller sills injected at successively higher stratigraphic levels in Reynolds Range Group are 6m, 6m, and 50m thick, respectively.

Relationships: Intrudes Mount Thomas Quartzite and Pine Hill Formation; contains numerous xenoliths and rafts of Mount Thomas Quartzite.

Age: Middle Proterozoic or older; muscovite has given single K-Ar date of 1370 m.y. (Lowder & Webb, 1972), but probably partly reset by Alice Springs Orogeny. Younger than Mount Thomas Quartzite and Pine Hill Formation, but older than Napperby Gneiss (1800-1500 m.y.) which intrudes them.

Synonymy: Mapped as 'Granodiorite' by Australian Geophysical (1967), described as 'porphyry' by Evans & Glikson (1969), mapped as 'Precambrian quartz-feldspar porphyry' and 'Precambrian igneous and metamorphic rocks' by Wells & others (Evans, 1972).

<u>Weldon metamorphics</u> (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Mount Weldon (GR 5553-943342), western edge of Tea Tree 1:100 000 Sheet area.

Distribution: Southeastern half of Anmatjira Range, Tea Tree and Reynolds Range 1:100 000 Sheet areas; also one outcrop 5 km southeast of Mount Stafford, in north of Reynolds Range 1:100 000 Sheet area.

Reference area: In Reynolds Range 1:100 000 Sheet area at GR 5453-935383, 4 km north of Mount Weldon; bed of Possum Creek shows excellent exposure of layered metapelitic gneiss and amphibolite, intruded by Anmatjira Orthogneiss.

Lithology: Five lithological sub-units recognised and mapped:

1. Most extensive sub-unit (as seen at reference area) is a layered metapelitic gneiss composed of quartz, cordierite, orthoclase, biotite, garnet, oligoclase, and sillimanite.

2. Massive unit of metapelitic granulite composed of cordierite, biotite, garnet, and sillimanite.

3. Medium to coarse-grained sub-unit composed of cordierite, biotite, and sillimanite, ± orthoclase, ± quartz, ± spinel.

4. Psammitic granulite composed of quartz, cordierite, orthoclase, biotite, sillimanite, plagioclase, garnet.

5. Lenses of amphibolite, composed of brown hornblende, labradorite, ± clinopyroxene, ± hypersthene.

Relationships: Underlying rocks not known. Adjoins Tyson Creek granulite with apparent conformity. Intruded by Anmatjira Orthogneiss, probably by Aloolya Gneiss, and by dolerite dykes. Faulted against Lander Rock beds.

Age: Parent sediments probably late Early Proterozoic or older. No isotopic dates on unit itself. Older than 1642 ± 100 m.y. Anmatjira Orthogneiss. Metamorphosed at same time as 1800-1700 m.y. Tyson Creek granulite.

Synonymy: Shown as 'Napperby Granite' by Australian Geophysical (1967); called 'Granulites' by Evans & Glikson (1969), mapped in with 'Precambrian paragneiss, basic and acid granulites' by Wells & others (Evans, 1972).

Wickstead Creek beds (new name)

Proposers: A.J. Stewart, A.Y. Glikson (in Stewart & others, in preparation).

Derivation of name: Wickstead Creek (GR 5552-100950), northern part of Aileron 1:100 000 Sheet area.

Distribution: Southeast part of Reynolds Range, in Aileron, Tea Tree, Reynolds Range, and Napperby 1:100 000 Sheet areas; smaller outcrops in centre of Reynolds Range, and centre and north of Denison 1:100 000 Sheet areas.

Reference area: GR 5452-937056, east edge of Napperby 1:100 000 Sheet area; bed of Wallaby Creek shows calc-silicate rock engulfed by Napperby Gneiss.

Lithology: Interbedded calc-silicate rocks (epidote-quartz, garnet-zoisite-diopside-quartz, epidote-garnet-calcite), diopside marble, biotite, schist, and metapelitic granofels. Two sub-units of (1) quartzite, sillimanite schist, and quartzo-feldspathic gneiss; (2) quartz-rich metasediment.

Thickness: Unknown because of complex folding; no more than 1000 m (width of total outcrop).

Relationships: Unit underlies Lander Rock beds with apparent conformity in central part of Reynolds Range; forms conformable lenses in Lander Rock beds 5 km northeast of Anna Reservoir. Apparently conformable with and grades into Mount Freeling and Mount Dunkin schists, but stratigraphic order unknown because of lack of facings. Adjoins Mount Thomas Quartzite presumably unconformably (contact concealed). Interpreted as calcareous facies of Lander Rock beds and Mount Freeling schist. Underlies unnamed unit of quartzfeldspathic gneiss in northern part of Denison 1:100 000 Sheet area with

apparent conformity. Intruded by Napperby Gneiss; forms rafts in Ngalurbindi Orthogneiss and Wangala Granite.

Age: Middle Proterozoic or older; same as Lander Rock beds.

Synonymy: Mapped as 'Precambrian schist, quartzite, dolomite, and marble' and 'Precambrian quartzite' by Wells & others (Evans, 1972).

Woodforde River beds (new name)

Proposers: A.J. Stewart, A.Y. Glikson (in Stewart & others, in preparation).

Derivation of name: Woodforde River (GR 5552-054066), in northwest of Aileron 1:100 000 Sheet area.

Distribution: Upper reaches of Woodforde River, in northwest of Aileron and southwest of Tea Tree 1:100 000 Sheet areas. Quartzite part of unit extends west into southeast part of Reynolds Range 1:100 000 Sheet area.

Reference area: Bed of Woodforde River at GR 5552-018087, 2.2 km north of Mount Dunkin; clean exposure of marble and calc-silicate rocks, folded and disrupted; also on northeast bank of river about another 100 m northwest (upstream).

Lithology: Diopside marble, forsterite marble, tremolite marble, garnet-epidote-diopside-plagioclase-microcline rock, biotite-muscovite-epidote-plagioclase-microcline-quartz rock, magnetite-hornblende-cummingtonite-oligoclase rock, para-amphibolite, chlorite schist, phlogopite marble. Thin interbeds of quartzite and sillimanite schist in western part of outcrop.

Thickness: Unknown: no more than about 1000 m (width of total outcrop).

Relationships: Conformably overlies Pine Hill Formation: top of beds not preserved because they occupy core of synform; intruded by unnamed granite.

Age: Middle Proterozoic or older.

Correlation: Correlated with Algamba Dolomite Member of Pine Hill Formation on similarity of stratigraphic position.

Synonymy: Mapped as Lander Dolomite by Australian Geophysical (1967); mapped as 'Precambrian schist quartzite, dolomite, and marble' by Wells & others (Evans, 1972).

Wuluma granitoid (new name)

Proposer:	A.P. Langworthy (in Shaw & others, in preparation).
Derivation of name:	Wuluma Hills, GR 5651-940372 in the Alice Springs 1:250 000 Sheet area. The Hills are shown in the Burt 1:100 000 preliminary geological map.
Distribution:	Rounded hills over 16 km^2 immediately southeast of Salt Bush Bore.
Reference area:	1 km^2 area centred on GR 930372, each side of the vehicle track.
Lithology:	The unit consists of a granitoid; that is, coarse-grained granitic rock gradational with the mobilisate of the adjacent migmatitic rocks of the Ingula migmatite suite. Small amounts of mafic granulite and sillimanite gneiss occur as xenoliths.
Relationships:	Gradational with the migmatite of the Ingula migmatite suite, and intrudes the Erontonga metamorphics. It is part of the Ingoola migmatite suite.
Age:	Middle Proterozoic or older. A preliminary Rb-Sr total rock date of about 1800 m.y. has been obtained for the granitoid (L.P. Black, BMR, personal communication, 1978).
Synonymy:	Previously mapped as undivided Arunta Complex by Wells & others (Wells, 1969).

Yakalibadgi Microgranite (new name)

Proposer:	A.J. Stewart (in Stewart & others, in preparation).
Derivation of name:	Yakalibadgi Hill (GR 5453-517540), northeast part of Reynolds Range 1:100 000 Sheet area.
Distribution:	Southwestern flank of northwestern part of Reynolds Range, Reynolds Range 1:100 000 Sheet area.
Type locality:	GR 5453-662368, 8 km northwest of Mount Thomas, Reynolds Range 1:100 000 Sheet area; good exposure of foliated dark grey microgranodiorite with small biotite-rich xenoliths.
Lithology:	Porphyritic microgranite, retrogressively metamorphosed, consisting of sericitised feldspar, quartz, biotite, muscovite, zircon, tourmaline, apatite, and opaque grains. Phenocrysts are quartz and sericitised plagioclase. Microcline only in groundmass. Grades southeastwards into medium-grained granite at southeast end of body, and northwestward to biotite orthoschist and biotite-muscovite orthoschist, as retrogression and deformation obliterate igneous texture; original phenocrysts survive as quartz and plagioclase augen.

Relationships: Intrudes Lander Rock beds. Adjoins base of basal conglomerate of Mount Thomas Quartzite, but could have intruded along unconformity, as Mount Thomas Quartzite acted as a barrier to granitic intrusions elsewhere in Reynolds Range. No clasts of microgranite known in basal conglomerate of Mount Thomas Quartzite.

Age: Middle Proterozoic or older; younger than Lander Rock beds, probably younger than Mount Thomas Quartzite, probably older than 1800-1500 m.y. Napperby Gneiss. Single K-Ar date of 920 m.y. on biotite from southeast of unit probably reset by Alice Springs Orogeny (Lowder & Webb, 1972).

Synonymy: Mapped as Napperby Granite by Australian Geophysical (1967); included in 'Acid schists' by Evans & Glikson (1969); mapped partly as 'Precambrian granite', partly as 'Precambrian schist, metasediments, including marble' by Wells & others (Evans, 1972).

Yambah granulite (variation of published name)

Proposers: R.D. Shaw and R.G. Warren; mapped by A.P. Langworthy (in Shaw & others, in preparation).

Derivation of name: Yambah homestead at 23°08'S, 133°50'E, in the Alice Springs 1:250 000 Sheet area.

Distribution: Extensive area north and northeast of Yambah homestead.

Reference area: The southern slopes of Mount Strangways centred on GR 820504.

Lithology: Interlayered mafic granulite, felsic granulite, garnet-cordierite-hypersthene granulite, and cordierite gneiss/quartzite. It also contains small amounts of calc-silicate, sapphirine-spinel rock, anthophyllite rock, quartzofeldspathic gneiss, and migmatite.

Relationships: Faulted against the Erontonga metamorphics and the unnamed unit pCsp. It appears to be conformably overlain by Cadney metamorphics at one locality (GR 5651-960470), but is faulted elsewhere. It belongs to the middle or lower part of the Strangways Metamorphic Complex.

Age: Middle Proterozoic or older. The main granulite metamorphism is M_1 and has been dated at 1800 m.y. (Black 1975; Iyer & others, 1976) but several retrograde younger schist zones cut the unit. The original sediments may be Early Proterozoic, but there is no direct evidence of this.

Correlation: Correlates with the pCsp and Ongeva granulite. Lower Strangways Complex.

Synonymy: The unit has been mapped in the Alcoota 1:250 000 Sheet area as the Yambah Granulite (Shaw & Warren, 1975). However, the unit originally mapped in the Alcoota Sheet area is now subdivided in the Alice Springs 1:250 000 Sheet area into two informal units: Yambah granulite, and the unnamed unit pCsp which appears to lack cordierite granulite. R.D. Shaw considers that the Yambah granulite as mapped in the Burt 1:100 000 Sheet will be further subdivided in the future and prefers to revert to an informal name.

Yaningidjara Orthogneiss (new name)

Proposer: A.J. Stewart (in Stewart & others, in preparation).

Derivation of name: Yaningidjara Hills (GR 5553-090160) in southwestern part of Tea Tree 1:100 000 Sheet area.

Distribution: Southern part of Tea Tree 1:100 000 Sheet area.

Type Locality: At GR 5553-065154, a remarkable hill of bare rock - an inselberg - at southwestern side of Yaningidjara Hills; shows clear exposures of augen gneiss with garnet, cut by foliated microgranite dykes about 1 m wide.

Lithology: Coarse porphyritic granitic augen gneiss with rapakivi feldspars and clots of red-brown garnet; sillimanite visible in thin section. Some microgranite dykes.

Relationships: Intrudes Lander Rock beds; faulted against Mount Airy Orthogneiss.

Age: Probably Middle Proterozoic, by analogy with other orthogneisses in the area; no isotopic date.

Synonymy: Described as 'Granitic gneiss (orthogneiss)' by Evans & Glikson (1969), mapped as 'Precambrian orthogneiss, gneissic granite' by Wells & others (Evans, 1972).

Your Dam metamorphics (new name)

Proposer: R.G. Warren (in Warren, in preparation).

Derivation of name: Your Dam (lat. 22°53'S, long. 137°16'E) approximately 9 km south-southwest of Marqua homestead (new location), Tobermory 1:250 000 Sheet area.

Distribution: Scattered outcrops in a broad zone from 11 km east of Your Dam to 5 km northwest of Your Dam.

Reference area: At latitude 22°53'S, longitude 137°16', approximately 0.5 km north of Your Dam in creek bed adjacent to road.

Lithology:	Muscovite-feldspar-quartz granofels, schistose gneiss, and schist.
Relationships:	Unconformably overlain by Late Proterozoic Yackah Beds (Walter, in press) and by Jurassic to Cretaceous Hooray Sandstone (Senior & others, 1978).
Age:	Early or early Middle Proterozoic; probably in excess of 1800 m.y.; correlated with Utopia Quartzite and Ledan Schist of Shaw & Warren (1975), and Hatches Creek Group of Smith (1972).
Synonymy:	Not previously recognised.

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