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LEXICON OF ANTARCTIC STRATIGRAPHIC NAMES INTRODUCED BY MEMBERS OF AUSTRALIAN EXPENDITIONS

compiled by

I.R. McLeod

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INTRODUCTION

At its meeting in Tokyo in 1968, the Working Group on Geology of the Scientific Committee on Antarctic Research (SCAR) recommended that each member nation of SCAR compile a list of all the stratigraphic names introduced by members of its expeditions. This recommendation resulted from the earlier acceptance by the International Union of Geological Sciences Sub-Commission on the Stratigraphic Lexicon of the proposal that the Working Group on Geology prepare the Antarctic section of the International Stratigraphic Lexicon.

This, the Australian contribution to the Stratigraphic Lexicon of Antarctica, follows the same general format for the account of each stratigraphic unit as the contributions of other countries which have already been issued*. Where an author has formally defined and described a new stratigraphic unit in accordance with the Australian Code of Stratigraphic Nomenclature, the name of the unit is shown here in upper case letters. Earlier authors, while using stratigraphic names in a formal way, did not formally describe them, so that preparation of the definitions and descriptions in the present accounts required some interpretation by the compiler. Such interpretation has been kept to the minimum necessary, and the temptation to draw inferences from the original author's paper - or from other sources - has, hopefully, been avoided.

This work is not intended as a critical appraisal of the geological validity of stratigraphic terms, but merely as a compilation of names that have been introduced. The entries follow the original usage of the terms, without regard to current rules and conventions for stratigraphic nomenclature.

*Grikurov, G. Kamenev, E., & Lopatin, B., 1974 - Lexicon of Antarctic stratigraphic names introduced by members of Soviet expeditions. Leningrad, Research Institute for the Geology of the Arctic (unpubl.).

Hjelle, A., 1973 - Lexicon of Antarctic stratigraphic names introduced by members of Norwegian-British-Swedish Expedition 1949-52 and later Norwegian expeditions. Oslo, Norsk Polarinstitutt (unpubl.).

Wegner, W., & Craddock, C., 1972 - Lexicon of Antarctic stratigraphic names introduced by members of United States expeditions. Washington, National Academy of Sciences.

Wolmarans, L.G., 1974 - Lexicon of Antarctic stratigraphic names introduced by members of South African expeditions. Pretoria, Geological Survey of South Africa (unpubl.).

Amery Formation

1. First published use
   Crohn (1959).

2. Definition
   Flat-lying sediments on the western and southern sides of Beaver Lake, Prince Charles Mountains.

3. Thickness
   Possibly about 300 metres (1000 feet).

4. Lithology
   Arkosic sandstone and grit with pebbly horizons, and narrow seams of coal and carbonaceous shale.

5. Age
   Tentatively Late Permian, on palynological evidence.

6. Correlatives
   "The general assemblage is strongly reminescent of the Beacon Sandstone as described from other parts of the continent."

7. Remarks
   The name was used informally by Crohn. The unit has been raised to the status of a group, the Amery Group, by Mond (1972).

AMERY GROUP

1. First published use
   Mond (1972).

2. Definition
   'The Amery Group...is defined as consisting of Radok Conglomerate, Bainmedart Coal Measures, and Flagstone Bench Formation.'

3. Remarks
   See descriptions of component formations.

BAINMEDART COAL MEASURES

1. First published use
   Mond (1972).

2. Definition
   'The name Bainmedart Coal Measures has been given to an interbedded sequence of arkose, feldspathic sandstone, siltstone, shale and coal' which includes 'most of the sedimentary rocks of the Beaver Lake area.'

3. Type locality
   "The type section is from the south side of Radok Lake along Bainmedart Cove down to the east mouth of Pagodroma Gorge."

4. Thickness
   Estimated thickness is about 1800 metres.

5. Lithology
   About half of the sequence consists of light-coloured feldspathic sandstone, commonly cross-bedded. Siltstone and shale represent about 40 percent; many beds are carbonaceous and grade into coal.

6. Relation to other units
   Middle formation of Amery Group. Transitional into underlying Radok Conglomerate. Possibly faulted against younger? Flagstone Bench Formation.

7. Age
   Palynological evidence suggests a Late Permian age (Balme & Playford, 1967; Kemp, 1973); plant fossils are of Permian age (White, 1973).

8. Correlatives
   Possible correlatives are Mount Glossopteris Formation, Mount Bastion Formation, Glossopteris Sandstone, and Buckley Coal Measures of Transantarctic Mountains.

9. Remarks
   The unit has been intruded by fine-grained basic or intermediate dykes. The coal is in the high-volatile bituminous category (Bennett & Taylor, 1972).

Coast Lavas

1. First published use
   Lambeth (1953).

2. Definition
   Parasitic cones adjacent to sea level on Heard Island.

3. Lithology
   Trachytic and basaltic lavas, scoria, and ejecta.

4. Relation to other units
   Stephenson (1964) considered these to be the youngest volcanic rocks on Heard Island.

5. Age
   Probably most of the rocks were extruded after the onset of glaciation. Stephenson (1964) considered that activity continued to recent times.

COLBECK GNEISS

1. First published use
   Trail (1970).

2. Definition
   'The Colbeck Gneiss is here defined as the gneiss which forms the coast of Mac.Robertson Land between the Colbeck Archipelago (lat. 67°25'S., long. 61°01'E) and Campbell Head (lat. 67°25'S., long. 60°39'E). It also forms a few bodies, up to 100 metres thick, within the Mawson Charnockite in the Stanton Group (of islands), and the isolated islets of Low Tongue and Tongue Rock.'

3. Type locality
   The exposures on the east and on the west sides of Taylor Glacier (about lat. 67°26'S., long. 60°50'E).

4. Thickness
   Unknown.

5. Lithology
   Garnet-biotite-quartz-feldspar gneiss, containing bodies of red granite up to 100 metres long. The unit was metamorphosed to the hornblende-granulite subfacies of the granulite facies, or to the sillimanite-almandine subfacies of the amphibolite facies.

6. Relation to other units
   Interbanded with or intruded by the Mawson Charnockite, and probably has a gradational contact with the Stillwell Gneiss.

7. Correlatives
   Doubtfully correlated with the Painted Gneiss.

Drygalski Agglomerates

1. First published use
   Lambeth (1953).

2. Definition
   A threefold sequence of agglomerates and lavas on Heard Island occurring over most of Laurens Peninsula and the east and south coasts of the island.

3. Type locality
   Mount Drygalski and the southern and northeastern parts of Laurens Peninsula

4. Thickness
   Maximum thickness on Laurens Peninsula is 340 to 370 metres (1100 to 1200 feet).

5. Lithology
   Lambeth divided the unit into three. The lower division of the unit is largely agglomerates, mostly waterlaid, with local tuffaceous shales near the top, and is intruded by gabbro stocks and bosses, trachyte necks, and basalt dykes. The middle division is disconformable on the lower; it is discontinuous, consisting of thin basalt flows. The upper division is agglomerate with tuffaceous shales and grits and breccia plugs. (See Remarks.)

6. Relation to other units
   The unit unconformably overlies the Laurens Peninsula Limestone, and is disconformably overlain by the Mt Olsen Lavas, Coast Lavas, and High Lavas. Stephenson (1964) considered the upper surface to be unconformable in some places and disconformable in others.

7. Age
   Fleming (1957) tentatively assigned a Pliocene age to a specimen of Chlamys thought to have come from the unit.

8. Remarks
   Stephenson (1964) reinterpreted these rocks as being largely glacial sediments with associated lavas, and the agglomerates and lavas of Mount Drygalski as being considerably younger than the rocks on Laurens Peninsula.

Finch Creek Beds

1. First published use
   Mawson (1943).

2. Definition
   Fluvio-glacial deposits in the valley of Finch Creek, Macquarie Island.

3. Type locality
   Finch Creek.

4. Thickness
   About 4.6 metres (15 feet)

5. Lithology
   Sand, gravel, and peaty mud, including a conglomerate with limonitic cement containing bird bones.

6. Relation to other units
   Younger than volcanic units on island.

7. Age
   '...late glacial or early post-glacial'. (See Remarks.)

8. Correlatives
   Other unnamed fluvio-glacial deposits on Macquarie Island probably have a similar age.

9. Remarks
   McEvey & Vestjens (1974) briefly described extensions of the beds and quoted a C^{14} age measurement of 6100 $\pm$ 120 y.B.P. for a sample of the bones.

FLAGSTONE BENCH FORMATION

1. First published use
   Mond (1972).

2. Definition
   'The name Flagstone Bench Formation is proposed for the light-coloured feldspathic sandstone with iron concretions cropping out south of Beaver Lake and in the southern part of Jetty Peninsula.'

3. Type locality
   The northeast part of Flagstone Bench.

4. Thickness
   About 400 to 600 metres.

5. Lithology
   Current-bedded light-coloured very coarse-grained angular to subangular fairly well sorted feldspathic sandstone with iron oxide concretions, and interbedded reddish brown to brown feldspathic sandstone and grit grading into sandy siltstone.

6. Relation to other units
   Possibly downfaulted against Bainmedart Coal Measures. Youngest? formation in Amery Group.

7. Age
   Probably Late Permian

8. Remarks
   The formation is unfossiliferous, and its stratigraphic relation to other formations in the Amery Group is uncertain.

Gabbroid Group

1. First published use.
   Mawson (1943).

2. Definition
   'The Older Basic Group is invaded by a series of intrusives in the form of dykes, sills, and bosses which, taken together, are referred to as the Gabbroid Group." They occur in the northern third of Macquarie Island.

3. Lithology
   A variety of gabbros and ultramafites with associated pegmatites and lamprophyres. Serpentization and prehnitization are common.

4. Relation to other units
   Intrusive into the Older Basic Group and unconformably overlain by the Younger Basic Group. (See Remarks.)

5. Age
   Tentatively assigned to the Early Tertiary by analogy with occurrences of similar rocks in New Zealand.

6. Remarks
   Varne et al. (1969) interpreted the rocks of this group as intruding the rocks which Mawson referred to as Younger Basic Group and being intruded in turn by

Mawson's Older Basic Group, and ascribe a Pliocene age to the sequence. Varne & Rubenach (1972) consider that the intrusions have been metamorphosed to greenschist or amphibolite facies grade.

High Lavas

1. First published use
   Lambeth (1953)

2. Definition
   'The High Lavas appear to extend upwards from the top of the Drygalski Agglomerate to the culminating peak Mt Mawson.'

3. Thickness
   About 2400 metres (8000 feet)

4. Lithology
   Predominantly limburgites, olivine-augite basalts, and trachybasalts, with subordinate plagioclase basalts and trachytes, and local dykes. Stephenson (1964) recognized a basal sequence of reddish flows of uniform thickness, and noted pillow structures in this sequence and also higher in the volcanic pile.

5. Relation to other units
   Disconformable on the Drygalski Agglomerate.

6. Age
   'Most of the volcanism appears to have finished before the Pleistocene glaciation'; Stephenson (1964) considered that formation of the volcanic pile continued probably during the Pleistocene.

7. Correlatives
   The Mt Olsen lavas on Heard Island are in a similar stratigraphic situation to the High Lavas, although they may not be contemporaneous.

Laurens Peninsula Limestones

1. First published use
   Lambeth (1953)

2. Definition
   The lowest formation on Heard Island, cropping out on the south and northeast coasts of Laurens Peninsula in latitude 53°01'S, longitude 73°20'E.

3. Thickness
   At least 74 metres (250 feet).

4. Lithology
   Thin-bedded pelagic limestone intercalated with thin soft tuffaceous shales, with numerous chert lenticles.

5. Relation to other units
   Base of unit below sea level. Overlain by Drygalski Agglomerates and intruded by micromonzonite and thin sills of trachybasalt.

6. Age
   Abundant Globigerina sp. and Gumbelina sp. indicate an Early Tertiary age.

7. Remarks
   Stephenson (1964) equated a small lithologically similar outcrop east of Baudissin Glacier to this unit, and noted erratics of limestone at several places on the northeast coast of the island.

MAWSON CHARNOCKITE

1. First published use
   Trail (1970).

2. Definition
   'The Mawson Charnockite is here defined as the charnockite which crops out along the coast of Mac.Robertson Land between Austskjera (lat. 67°30'S., long. 64°00'E) and Byrd Head (lat. 67°21'S., long. 61°00'E), and extends seawards to Nelson Rock (lat. 67°25'S., long. 62°45'E) and inland to the southern limit of the Framnes Mountains and to Mill Peak (lat. 67°59'S., long. 61°10'E).'

3. Type locality
   The outcrop on which the ANARE station, Mawson, is built.

4. Lithology
   'Dark brown medium-grained to coarse-grained hypersthene-quartz-feldspar rock with a foliation produced by the parallel alignment of stringers and small lenses of light or dark minerals, and alignment of porphyroblasts where present. It has been metamorphosed under the conditions of the hornblende-granulite subfacies of the granulite facies of metamorphism.'

5. Relation to other units
   Interbanded with or intrusive into the Colbeck Gneiss.

6. Age
   Potassium-argon total-rock ages range from 490 to 655 m.y. (Ravich & Krylov, 1964).

Mawson Granite

1. First published use
   Crohn (1959).

2. Definition
   The country rock of the Mawson area.

3. Type locality
   Mawson.

4. Lithology
   Porphyritic gneissic charnockitic granite with a slight to moderate foliation and numerous xenoliths.

5. Relation to other units
   'Wherever its contacts are exposed, it is unmistakably intrusive into all other rocks with which it comes into contact.'

6. Remarks
   Name used informally by Crohn. Subsequently formally defined as Mawson Charnockite by Trail (1970).

Mt Olsen Lavas

1. First published use
   Lambeth (1953).

2. Definition
   Lavas on the heights of Laurens Peninsula about Mt Olsen and Mt Anzac, Heard Island.

3. Thickness
   Up to 430 metres (1400 feet).

4. Lithology
   Trachyandesites overlain by trachyte.

5. Relation to other units
   Disconformable on the Drygalski Agglomerate.

6. Age
   Probably largely earlier than the Pleistocene glaciation.

7. Correlatives
   The unit occupies a similar stratigraphic position to the High Lavas, although they may not be contemporaneous.

Older Basic Group

1. First published use
   Mawson (1943).

2. Definition
   A sequence of basic lavas and pyroclasts occurring mainly in the northern part of Macquarie Island.

3. Thickness
   At least 200 metres (650 feet).

4. Lithology
   Thin flows of dolerite and basalt with some pyroclastic and possibly tuffaceous submarine deposits.

5. Relation to other units
   Intruded by dykes, sills and bosses of Gabbroid Group, and unconformably overlain by Younger Basic Group. (See Remarks.)

6. Age
   Tentatively assigned to the Cretaceous by analogy with similar rocks in Australia, New Zealand, and Antarctica. (See Remarks.)

7. Synonyms
   Mawson also used the term Older Basic Series for this unit.

8. Remarks
   Varne et al. (1969) reinterpreted these rocks as being the youngest igneous rocks on the island; they regarded them as dyke swarms which are commonly dense enough to exclude the country rock (Mawson's Younger Basic Group and Gabbroid Group), and no older than Pliocene in age. Varne & Rubenach (1972) consider that the rocks have been metamorphosed to the amphibolite facies grade.

PAINTED GNEISS

1. First published use
   Trail (1970).

2. Definition
   'The Painted Gneiss is here defined as the gneiss which forms several bodies, up to several hundred metres thick, within the Mawson Charnockite of the Framnes Mountains, in Mac.Robertson Land.'

3. Type locality
   Painted Peak (lat. 67o45'S., long. 62o50'E) in the Framnes Mountains.

4. Thickness
   Up to several hundred metres.

5. Lithology
   A heterogeneous unit; predominantly garnet-quartz-feldspar gneiss with minor calcareous and doleritic rocks, metamorphosed to the hornblende-granulite subfacies of the granulite facies.

6. Relation to other units
   Entirely enclosed by the Mawson Charnockite.

7. Age
   'At least as old as the Mawson Charnockite.'

RADOK CONGLOMERATE

1. First published use
   Mond (1972).

2. Definition
   'The name Radok Conglomerate is proposed for the basal conglomerate and associated sandstone and siltstone of the Amery Group in the Beaver Lake area.'

3. Type locality
   'The type section is along the south side of Radok Lake.'

4. Thickness
   150 to 220 metres.

5. Lithology
   Greenish grey and reddish brown or purple poorly sorted conglomerate with clasts of basement rocks, interbedded with yellowish brown sandstone and dark grey carbonaceous siltstone and shale.

6. Relation to other units
   Lowest formation in Amery Group. Unconformable on high-grade metamorphic rocks; transitional into overlying Bainmedart Coal Measures.

7. Age
   Palynological work suggests a Late Permian age (Kemp, 1973).

8. Remarks
   The unit is intruded by lamprophyre sills.

STILLWELL GNEISS

1. First published use
   Trail (1970).

2. Definition
   'The Stillwell Gneiss is here defined as the gneiss which forms the coast of Kemp Land from the Tilley Nunatak (lat. 67°24'S., long. 62°02'E) to the head of Edward VIII Gulf and to the Jagar Islands (lat. 66°33'S., long. 57°15'E) north of the Gulf.'

3. Type locality
   The Stillwell Hills (about lat. 67°25'S., long. 59°28'E.

4. Thickness
   Probably greater than 10 000 metres.

5. Lithology
   Alternating layers, from a few centimentres to a few hundred metres thick, of quartz-feldspar gneiss and massive hornblende-pyroxene-plagioclase rock; metamorphosed to the hornblende-granulite subfacies of the granulite facies.

6. Relation to other units
   Probably gradational with the Colbeck Gneiss.

7. Age
   Potassium-argon total-rock ages range from 535 m.y. to 620 m.y. (Ravich & Krylov, 1964).

8. Remarks
   The Stillwell Gneiss probably has a gradational boundary with an unnamed sequence of gneisses to the west.

Younger Basic Group

1. First published use.
   Mawson (1943).

2. Definition
   'The rocks included in this group consist of a series of interbedded basaltic and andesitic agglomerates, breccias, tuffs, and lava'. They occupy the southernmost two-thirds of Macquarie Island.

3. Thickness
   At least 430 metres (1400 feet)

4. Lithology
   Basaltic pyroclasts and lavas; pillow lavas with associated Globigerina ooze are common. Dykes of basalt and dolerite intrude rocks of the series.

5. Relation to other units.
   Unconformable on the Older Basic Group and Gabbroid Group. (See Remarks.)

6. Age
   Miocene, by analogy with similar rocks in New Zealand.

7. Correlatives and synonyms
   Mawson used the terms Younger Basic Series, Younger Volcanic Series, Younger Series and Newer Volcanic Series synonomously with this.

8. Remarks
   Varne et al. (1969) interpreted these rocks as being the oldest (Pliocene) in the northern part of Macquarie Island, and considered that the Gabbroid Group and dyke swarms (Mawson's Younger Basic Group) were intruded into them. Varne & Rubenach (1972) record beds of mudstone, greywacke, grit, and conglomerate interbedded with the lavas and breccias, and quote a probable middle or early Miocene age for interstitial ooze in the pillow lavas.

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