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PRESURVEY REPORT ON HELICOPTER GRAVITY SURVEY NEW SOUTH WALES, VICTORIA, AND TASMANIA, 1973/74

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SUMMARY

A reconnaissance helicopter gravity survey of parts of New South Wales, Victoria, and Tasmania will be made from November 1973 to March 1974. The work will be done by the Bureau of Mineral Resources (BMR) using a contractor. It will complete the reconnaissance gravity coverage of Australia. Gravity readings will be made at stations located on an 11-km grid in NSW and Victoria and a 7-km grid in Tasmania.

Different survey operational conditions will pose particular problems as the survey progresses. The topography ranges from flat, open plains to rugged mountainous terrain; the vegetation from sparse scrub growth to dense forests; the climate from hot, arid desert-type to cold, wet alpine conditions; and the populated areas from remote pastoral districts to intensively farmed regions and large cities and towns. The taking of island readings in Bass Strait will pose further operational problems.

A number of geophysical surveys have been carried out in the area. Aeromagnetic surveys have been conducted over large parts of the Darling, Murray, Gippsland, Otway, and Sydney Basins, over the NYMAGEE, CARGELLIGO, NARROMINE, FORBES, BATHURST, BENDIGO, WANGARATTA, and TALLANGATTA 1:250 000 Sheet areas, and over Tasmania. Intensive seismic surveys have been conducted in the sedimentary basins in the search for petroleum, particularly in the offshore part of the Gippsland Basin where oil and gas fields have been discovered. Gravity surveys have been carried out in widely separated parts of the proposed survey area, mainly to locate areas of thick sedimentary section. Many minor geophysical surveys have been carried out by private companies in the vicinity of known orebodies to assist in detailed investigations of mineral reserves.

Interpretation of the proposed reconnaissance gravity data will assist in delineating the regional tectonic framework of southeastern Australia, and will aid the search for minerals, including petroleum, by indicating extensions of known mineralized belts and areas of thick sedimentary section.

INTRODUCTION

The broad objective of BMR's 1973-4 reconnaissance helicopter gravity survey of New South Wales, Victoria, and Tasmania (Plate 1) is to assist in delineating the tectonic framework of the continent as an aid to exploration for petroleum and minerals. The major geological provinces to be wholly or partly surveyed are the Great Artesian, Sydney, Darling, Murray, Otway, Gippsland, Bass, and Tasmania Basins, and the East Australian and Central Australian Orogenic Provinces (Plate 8).

Transport of the gravity meter and observer will be by helicopter. Navigation will be done using air photographs; station locations will be pin-pricked on these same photographs. Barometric levelling is to be used with a number of ties to bench-marks for elevation control. Gravity control will be maintained by ties to isogal stations within the survey area. A number of gravity surveys have already been established in and around the proposed survey area, and ties will be made to those surveys that are considered acceptable, so that the results can be incorporated in the gravity maps produced without resurvey.

Climatic conditions, vegetation, and topography vary considerably over the survey area. Operations are expected to be particularly difficult in the Australian Alps and in western Tasmania. Observing on islands in Bass Strait will also provide operational problems not encountered in previous reconnaissance helicopter gravity operations.

The main purpose of this report is to provide information that will assist the contractor in planning and controlling the survey. The geology and previous geophysical work in the survey area are discussed briefly.

OPERATIONS

Transport and Operational Planning

Flying Method. The contractor will use the cell method of traversing, using a helicopter for transport as described by Hastie & Walker (1962).

Suitability of Helicopters. Maximum overall efficiency may entail use of different types of aircraft in different parts of the survey area. Consideration must be given to the range, speed, carrying capacity, and, particularly in forested alpine regions, the vertical lift-off capability and manoeuvrability of the helicopter.

Flight Planning. The contractor will be supplied with 1:250 000 photocentre base maps on which the positions of bench-marks, isogal stations, and the permanent stations of previous gravity surveys are plotted. He is required to draw flight plans on the photocentre base maps and submit them to BMR for approval. After approval has been obtained the contractor should draw flight lines and approximate station positions on aerial photographs also provided; the aerial photographs required for the flying of a particular loop should be stored in a container (envelope or cardboard wallet) in readiness for flying.

Camp Shifts. Experience has shown that maximum efficiency of operation is obtained by shifting camp every day or two so as to be close to the loops to be flown the next day. While a day's flying is in progress members of the party can set up camp near the centre of the following day's operations. Camping equipment must therefore be readily transportable.

Acquisition and Reduction of Data

Gravity Control. This is to be maintained by the occupation of isogal stations (Barlow, 1970) established in the survey area (Plate 2). Descriptions of the precise position of these stations will be made available to the contractor. All isogal stations should be used as cell centres or tie points. Drift control must be maintained by tying into base stations every 2 to 2½ hours. All resets must be done before commencing a loop. A reset on a loop is not permitted.

Vertical Control and Elevations. A series of survey bench-marks have been established in a network of traverses (Plate 2) throughout the area. These bench-marks will be elevation control stations for the survey and the traverses will be used as segment boundaries. No loop is to cross a segment boundary. Elevations of other stations will be determined to an

acceptable tolerance using barometers. The procedure to be followed is outlined in the tender specifications. In order to minimize errors in the elevation network, loops should be confined to a single valley in mountainous areas and should not be flown during periods of sudden weather changes.

Horizontal Control. Aerial photographs will be used to provide horizontal control for the survey. Station positions must be pin-pricked accurately on the aerial photographs and transferred to the photocentre base map using the method outlined in the tender specifications for this survey. The positions of most of the bench-marks mentioned previously will have already been pin-pricked on the aerial photographs.

Vegetation. Plate 6 shows the vegetation regions in the survey area. Landing sites for the helicopter may be difficult to find in areas of dense scrub or high timber. The contractor should note that in such areas the vertical lift-off capability and manoeuvrability of the helicopter are critical factors in determining whether or not coverage can be obtained. In areas where dense vegetation prevents helicopter access, the contractor is expected to establish gravity stations along roads and tracks using a land vehicle. Again it is emphasized that every effort must be made to obtain uniform gravity coverage at the required station spacing.

Climate and Rainfall. Plate 4 shows the major climatic regions in the survey area and Plate 5 shows the average monthly rainfall of a number of places in Tasmania. Rain and cloud are expected to cause operational problems in the Australian Alps and western Tasmania; these areas should be flown in summer, preferably during January and February.

Population and Land Use. An indication of the population distribution and land use in the survey area may be gained from a study of the information in Plate 7. The contractor must give advance public notice of his flying intentions in populated or cultivated areas. This can be done by means of advice to press and radio, and by personal communication. In coverage of farming areas, the helicopter should land well clear of livestock as helicopter operations in previous surveys have been disrupted by the protests of irate farmers. In the more populous and intensely farmed areas it may be expedient to do some loops by road using a LaCoste & Romberg gravimeter.

Ties to Previous Gravity Surveys. A number of gravity surveys have already been completed within or adjacent to the survey area. The contractor is required to reoccupy a small number of permanently marked gravity stations in the surveys listed in Appendix 1. The locations of these surveys are shown in Plate 1. The BMR will supply a description of each of the stations to be reoccupied.

Reduction of Data. The reduction, adjustment and contouring of data is to be done using automatic computing techniques. The contractor may use BMR programs developed for this purpose or other programs provided they are of a standard acceptable to the BMR. Data quality control should be maintained continuously in the field by checks on loop misclosures and instrument drifts.

Particular Problems Associated with the Survey Area

In the course of the survey, the contractor will encounter particular operational problems which may necessitate some departures from normal survey practices in order to achieve adequate coverage. The main problems foreseen and their possible solutions are summarized below.

Topography. A simple division of topographic regions in the survey area appears in Plate 3. The rugged terrain which will be encountered in some parts of the survey area, particularly in the Australian Alps and western Tasmania, is expected to pose some operational problems. Landing sites for the helicopter may be difficult to find in these areas. Every effort must be made to obtain uniform coverage, and the contractor is expected to establish gravity stations along roads and tracks using a land vehicle in areas where helicopter access is restricted. The accuracy of levelling may fall in the mountainous regions because of terrain effects on pressure gradients. As stated previously loops should be confined to a single valley because pressure conditions may vary considerably from valley to valley. Where possible, gravity readings should not be taken at places where a large terrain correction would be necessary (e.g. close to edges of high cliffs).

Access. Vehicular access will be restricted in areas where roads are sparse such as in western Tasmania and mountainous parts of the mainland. It may be necessary to ferry fuel, staff, and supplies into these areas by helicopter. The contractor may obtain a quick and accurate assessment of the problem by referring to the 1:1 000 000 International Civil Aeronautical Organization (ICAO) maps of the survey area.

Remote Islands. The contractor is required to take new readings on islands in Bass Strait. Chartering of vessels may be necessary in order to dump fuel on some of the islands. Repeat readings at island stations for the purpose of gravity meter drift and barometric control will not be necessary if a LaCoste & Romberg gravimeter is used, and if heights of stations above high-water mark can be estimated. On the larger islands (e.g. Flinders), cell centres should be at high-water mark if no bench-marks are available.

GEOLOGY

The major geological provinces in the survey area are the Central Australian and East Australian Orogenic Provinces and a number of basins containing undeformed sediments, viz. the Great Artesian, Sydney, Murray, Darling, Otway, Gippsland, Bass, and Tasmania Basins (Plate 8). Subsidized boreholes in the sedimentary basins of the survey area are listed in Appendix 4 and their locations are shown in Plate 12.

Orogenic Provinces

Willyama Block and its correlates

These rocks cropping out in the Broken Hill area of New South Wales represent the easternmost extent of the Central Australian Orogenic Province. They consist of schists and gneisses of early Proterozoic age; a variety of crystalline rocks including granitic gneisses, aplites, amphibolites, and pegmatites; and late Proterozoic or early Cambrian

tillites, shales, quartzites, and limestones. The Willyama Block is the zone of metamorphic and igneous rocks around Broken Hill. The Wonaminta Block is a small inlier of metasediments and volcanics to the northeast of the Willyama Block. The two blocks are separated by the Bancannia Trough, consisting of undeformed Upper Devonian sediments. The Broken Hill lead-zinc-silver orebodies lie in the eastern part of the Willyama Block; the metamorphic rocks around the main lodes are altered arenaceous and argillaceous sediments.

Lachlan Geosyncline

The Lachlan Geosyncline is the largest part of the East Australian Orogenic Province ('Tasman Geosyncline'). It extends northward from Tasmania to Bourke (northern New South Wales) and westward from the east coast to near the Victoria/South Australia border. The folded Palaeozoic rocks of the geosyncline have been deformed by a number of tectonic events from the Cambrian to Middle Carboniferous. These have resulted in a series of elongate northerly-trending belts with the older rocks to the west and younger rocks to the east. Warren (1972) has divided the Lachlan Geosyncline into a number of units of different geological histories (Plate 9).

The Ballarat Trough is an area of Cambrian and Ordovician sediments which have been strongly folded about northerly axes. The Cambrian succession is mainly a basic volcanic sequence with interbedded chert and black shale, and the Ordovician sediments are primarily greywacke with some interbedded pyritic shale. The tight often isoclinal folding has provided suitable lower-pressure sites for mineralization at the crests of folds (e.g. Bendigo reefs).

The Melbourne Trough consists of Silurian to Middle Devonian sediments overlying a relatively undeformed Ordovician sequence. The eastern edge of the trough was subjected to volcanic activity in the Middle Devonian, and granites were emplaced both along this edge and within the trough at about this time. Much of the mineralization of this area is associated with intrusions of Devonian basic dykes.

The remaining mainland units of the Lachlan Belt (Warren, op. cit.) are considered to have sufficiently similar histories to describe them together (Plate 9).

The rocks are Ordovician sequences of quartzose greywacke, acid to andesitic volcanics, black shale, and carbonate rocks. They were folded during the late Ordovician to Silurian Benambran Orogeny. Metamorphism occurred in a large belt, the Wagga Metamorphic Belt, extending from near Bairnsdale in Victoria to Cobar in New South Wales. Sedimentation continued through the Silurian, and widespread acid volcanics were deposited towards the end of this period. The Silurian rocks are typified by dacitic to rhyolitic volcanics, and limestone; other common rock types are slate, greywacke, and sandstone. Large granite and granodiorite masses were emplaced during the late Silurian to early Devonian Bowning Orogeny, and they were followed by acid to intermediate lavas. Quartz sandstones, shales, and conglomerates were deposited in the Upper Devonian and folded during the Middle Carboniferous Kanimblan Orogeny.

The Hill End Trough consists of a basal Ordovician sequence of andesitic volcanics, with greywacke and some limestone, overlain by thick sequences of Silurian to Middle Devonian acid and andesitic volcanics. The trough was unaffected by the Bowning Orogeny and sedimentation was terminated by Tabberabberan Orogeny.

The Tasmanian rocks involved in major tectonic activity during the Palaeozoic form part of the Lachlan Belt. Cambrian sediments were laid down on a late Proterozoic basement along the western edge of Tasmania. To the east there was considerable volcanic activity resulting in deposition of keratophyres, quartz porphyry, and quartz-feldspar porphyry with interbedded pyroclasts. Granite and ultrabasic intrusions were emplaced in the late Cambrian and early Ordovician. The Middle Devonian Tabberabberan Orogeny impressed widespread folding and faulting on Tasmanian rocks, and was followed by a period of granitic intrusions until the early Carboniferous.

Platform Covers

The Great Artesian Basin, made up largely of Jurassic and Cretaceous sediments is the largest sedimentary basin in Australia. It has three major subdivisions, the Carpentaria, Eromanga, and Surat Basins; only the southern parts of the latter two basins lie in the survey area.

Eromanga Basin sedimentation began early in the Jurassic and continued into early Cretaceous; up to 600 m of sandstone and mudstone were deposited. A major marine transgression in the early Cretaceous was followed by deposition of between 300 and 600 m of argillaceous sediments. Volcanic detritus was deposited late in the early Cretaceous and was followed by deposition of up to 1500 m of sandstone and mudstone. The Lake Frome and Bulloo Embayments are southern lobes of the Eromanga Basin lying within the survey area.

The Sydney Basin is a half-graben with the thickest section near the fault zone on the northeastern flank. The sediments include 1200 m of mainly non-marine Triassic clastics, and a total thickness of 4900 m of Permian marine and continental sediments. The continental sequence contains extensive coal measures. Extensive volcanic deposits occur in the lower part of the Permian succession in the southern part of the basin.

The Murray Basin is a large, roughly circular artesian basin covering parts of southeastern South Australia, southwestern New South Wales and northwestern Victoria. Permian and Cretaceous sedimentary sequences are overlain by about 300 m of Cainozoic sediments. A borehole near Jerilderie penetrated 1100 m of Permian coal measures and marine siltstones, and bottomed in Ordovician phyllite. The Cretaceous sequence comprises sandstone and shale.

The Darling Basin is an easterly orientated belt of Devonian to Lower Carboniferous sediments between the Great Artesian and Murray Basins. The sequences are predominantly continental, and are thickest in faulted downwarps.

The Otway Basin contains Mesozoic and Tertiary sediments in onshore and offshore western Victoria and southeastern South Australia. Tertiary, Upper Cretaceous, and Lower Cretaceous to Jurassic sequences are separated by regional erosional unconformities. A large part of the basin

has been covered by Tertiary basalts. The Tertiary sediments consist of limestone, marl, quartz sandstones with coal lenses, and conglomerates. The irregular distribution of Upper Cretaceous sediments suggest that block-faulting forming horsts and grabens took place during deposition of the sediments. The Lower Cretaceous to Jurassic sequence consists of subgreywacke, siltstone, mudstone, coal beds and lenses, and orthoquartzite.

The Bass Basin contains nearly 2000 m of marine Tertiary sediments made up of limestones, calcareous mudstones and shales, and minor sandstones. These are underlain by 800 m of Tertiary deltaic sediments comprising interbedded shales and siltstones. The basin is possibly a southerly extension of the Otway Basin.

The Gippsland Basin covers the south coastal region of eastern Victoria and the adjoining offshore area. The deepest and most prospective part of the basin is located in Bass Strait. The section is made up of Tertiary, Upper and Lower Cretaceous, and Palaeozoic sediments. The basin is wedged-shaped in plan and broadens eastwards from an apex near Yallourn. The granitic Bassian Rise and a series of down-to-the-north fault systems form the southern boundary of the basin. Commercial quantities of hydrocarbons have been obtained from the basal Tertiary and Mesozoic sediments since 1965.

The Tasmania Basin contains marine and continental sediments of Permian and Triassic age. Dolerite was extruded in the Middle Jurassic to form an extensive sheet cover over Permian and Triassic sediments.

Economic Geology

The survey area covers regions of great mineral wealth ranging from the oil and natural-gas fields of the Gippsland Basin, to the many mineralized areas including the silver-lead-zinc-producing area of Broken Hill (New South Wales) the former gold-producing areas of Ballarat and Bendigo (Victoria) and the copper-producing areas of Mount Lyell (Tasmania) and Cobar (New South Wales). The reconnaissance gravity data may assist in delineating extensions of known mineralized belts, which may lead to the discovery of new orebodies, and may locate areas of thick sedimentary section where detailed exploration for petroleum is warranted.

PREVIOUS GEOPHYSICAL RESULTS

A great deal of geophysical activity has taken place in both the sedimentary basins and the metalliferous regions of the survey area. Geophysical exploration for hydrocarbons has been most intense in the Gippsland, Otway, and Sydney Basins, while exploration for minerals has largely been concentrated around the main mining centres such as Broken Hill, Bendigo, and Mount Lyell. The results of regional surveys for which information is readily available are discussed briefly. A detailed appraisal of the results of these surveys will be made when the results of the helicopter gravity survey are reported.

Gravity Surveys (Plate 1, Appendix 1)

As the proposed reconnaissance helicopter gravity survey will complete the reconnaissance coverage of Australia, the boundaries of the survey area are also the boundaries of earlier reconnaissance work. About 20 subsidized surveys, a number of BMR surveys, and some unsubsidized surveys have been done in the survey area. Plate 1 shows the coverage of the major gravity surveys carried out in the area.

Most of the gravity surveys have been carried out to locate sedimentary troughs and to define local structures within these troughs. The surveys have generally been successful in these purposes and at the same time have revealed the main structural trends of each region. Gravity lows in areas of shallow basement have mostly been attributed to granitic bodies of low density. This interpretation has been vindicated in some cases by drilling evidence.

Aeromagnetic Surveys (Plate 11, Appendix 2)

Subsidized and BMR aeromagnetic surveys have been carried out to provide basic data for more detailed exploration, and to assist in regional geological interpretation generally. The subsidized surveys were aimed at locating areas of thick sedimentary section as a guide to petroleum exploration. The Darnick Range survey (North Australian Petroleum, 1963), for instance, outlined a northeast-striking sedimentary trough 2000 to 3000 m deep in the Darling Basin. A masking horizon at shallower depth was attributed to a sequence of rocks containing magnetic material; it puts the interpretation in some doubt. The Murray Basin survey (Planet Exploration, 1962) covered a large part of the Murray Basin. The results suggest that the basin is an areally extensive but shallow depression. A number of troughs with about 1600 m of sediment were indicated. In the Darling Basin, the Darling Area survey (Planet Exploration, 1963) delineated a number of subsidiary troughs, each containing about 2000 m of sediment. The Mootwingee-Bancannia survey (Geosurveys, 1964) outlined horst and graben-type structures with up to 4000 m of sediment in a north-northwest-trending trough between the Darling Basin and Bulloo Embayment. A thickness of sediment reaching 6000 m was indicated by the Echuca survey (Seismic Analysis, 1962) in the southeast corner of the Murray Basin. Petroleum prospects appear to be low in the east of the survey area where numerous granitic intrusions were revealed.

Aeromagnetic surveys have been carried out by BMR at the request of the Mines Departments of New South Wales and Victoria. Their purpose was to provide information to assist in the interpretation of regional geological structure and to provide basic data for detailed metalliferous prospecting.

Seismic Surveys (Plate 10, Appendix 3)

A large number of subsidized seismic surveys, both onshore and offshore, have been carried out in the survey area. Many were reconnaissance surveys in search of or to verify substantial thicknesses of prospective sediments. The more detailed surveys were carried out to locate suitable drilling sites for stratigraphic test wells.

BMR carried out deep crustal reflection seismic surveys near Mildura (Victoria) and Broken Hill (New South Wales) in 1968, and near Tidbinbilla (Australian Capital Territory) and Braidwood (New South Wales) in 1969.

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APPENDIX 1 - GRAVITY SURVEYS

Subsidized Surveys

Name	Basin	Company	BMR Subsidy No.
Urisino-Tongo (3)*	Great Artesian	L.H. Smart	62/1920
White Cliffs (7)	Great Artesian	Mid Eastern Oil	63/1905
Tibooburra-Louth (2)	Great Artesian	American Overseas	65/4818
Nucha (5)	Great Artesian	Planet Exploration	65/4818
Packsaddle (6)	Great Artesian	Planet Exploration	67/4185
Clarence-Winathee (4)	Great Artesian	Clarence River Basin Oil	68/3041
Dandaloo	Great Artesian	A.J. Wood	64/4803
East Darling (8)	Murray Darling	Planet Exploration	64/4801
Ivanhoe (11)	Murray Darling	Texam	64/4809
Scopes (10)	Murray Darling	Alliance Oil	66/4826
Four Corners (10)	Murray Darling	Alliance Oil	68/3005
Murrumbidgee (12)	Murray Darling	Planet Exploration	68/3032
Blantyre Basin (9)	Murray Darling	NSW Oil and Gas	69/3029
Jerilderie (16)	Murray Darling	Alliance Oil	69/3079
Coleraine (20)	Otway	Alliance Oil	66/4821
Hawkesdale (21)	Otway	Shell Development	68/3035
Terang-Portland (22)	Otway	Shell Development	69/3054
Casterton (19)	Otway	Planet Exploration	70/86
Colac-Geelong (23)	Otway	Shell Development	71/560
Stockyard Hill (27)	Gippsland	Woodside (Lakes Entrance) Oil	66/4823

BMR Surveys

Title	Author	Record No.
Gravity surveys of Port Phillip Bay and adjacent areas, Victoria, 1957-58 (24)	S. Gunson & L.W. Williams	1965/64
Regional gravity traverses, southeastern NSW 1966	J.R.H. Van Son	1966/184
Regional gravity surveys, eastern Victoria 1961 and 1964	J.R.H. Van Son & W.J. Langron	1967/11
Helicopter gravity training survey, A.C.T. and southern NSW 1966 (15)	G.D. Lodwick & A.J. Flavelle	1968/85
Reconnaissance helicopter gravity surveys, northern NSW and southern Qld 1968 (1)	F. Darby	1969/109
Interpretation of a positive Bouguer Anomaly feature near Cootamundra, NSW (14)	M.D. Watts	1971/34
Gravity survey of the valleys of the Goulbourn and Ovens Rivers, Victoria 1972 (18)	G.R. Pettifer	1973/41

* Numbers refer to survey numbers in legend of Plate 1

APPENDIX 2 - AEROMAGNETIC SURVEYS

Subsidized Surveys

Name	Basin	Company	BMR Subsidy No.
Darling Area (2)*	Great Artesian	Planet Exploration	62/1731
Mootwingee-Bancannia (3)	Great Artesian	Geosurveys	64/4605
Ivanhoe (5)	Murray Darling	Exploration Drilling	62/1717
Echuca (7)	Murray Darling	Seismic Analysis	62/1723
Menindee (4)	Murray Darling	North Australian Petroleum	62/1729
Murray Basin (6)	Murray Darling	Planet Exploration	62/1732
Darnick Range (4)	Murray Darling	North Australian Petroleum	62/1768
Bass Strait -Encounter Bay (12)	Otway, Bass, Gippsland	Hematite Petroleum	62/1707 62/1711
Andersons Inlet (13)	Gippsland	Oil Development	62/1713
Sydney-Nowra (8)	Sydney	L.H. Smart	62/1726
Terrigal (9)	Sydney	Central Coast Oil	64/4600
Sydney-Newcastle Offshore (10)	Sydney	Shell Development	66/4622
Portland-Geelong (11)	Otway	Shell Development	70/373
Offshore Tasmania (14)	Tasmania	Esso Exploration	66/4626
Offshore SE Tasmania (15)	Tasmania	Esso Exploration	66/4627

BMR Surveys

Title	Author	Record No.
Forbes, West Wyalong, and Bourke Areas, airborne magnetic and radiometric survey, NSW 1960	R.M. Carter	1960/105
Cobar, Nymagee, and Cargelligo airborne magnetic and radiometric surveys	A.G. Spence	1961/51
Broken Hill airborne magnetic and radiometric surveys, NSW 1957-59	A.G. Spence	1963/24
Narromine and Bathurst airborne magnetic and radiometric surveys, NSW 1961	G.A. Young	1963/114
Tasmania aeromagnetic survey	W.A. Finney & E.P. Shelley	1967/19
Western Victoria detailed aeromagnetic survey, 1966	R. Gerdes	1967/44
Airborne magnetic and radiometric survey of the western part of the Sydney 1:250 000 map area, NSW 1966	R. Gerdes	1967/52
Western Victoria detailed aeromagnetic survey, 1967	R.A. Gerdes	1968/146
Western Victoria detailed aeromagnetic survey, 1968	R.A. Gerdes	1968/147
Bass Strait and Encounter Bay aeromagnetic survey, 1960-1961	Haematite Explorations Pty Ltd	PSSA No. 61

* Number refers to survey number in legend of Plate 11

APPENDIX 3 - SEISMIC SURVEYS

Subsidized Surveys

Name	Basin	Company	BMR Subsidy No.
Fort Grey-Yandama (15)*	Great Artesian	BOC of Australia	62/1649
Mount Jack (22)	Great Artesian	Woodside (Lakes Entrance) Oil	62/1625
Lake Paramaroo (42)	Great Artesian	Alliance Oil Development	63/1537
Tibooburra (18)	Great Artesian	Alliance Oil Development	63/1525
Lake Stewart (15)	Great Artesian	Clarence River Basin Oil	64/4531
White Cliffs (28)	Great Artesian	Mid Eastern Oil	65/11028
Mootwingee (27)	Great Artesian	Geosurveys	65/4589
Olive Downs (14)	Great Artesian	Clarence River Basin Oil	64/4574
Bancannia (17)	Great Artesian	Planet Exploration	66/11094
Tandou (44)	Great Artesian	North Australian Petroleum	66/11063
Paroo-Tibooburra (12)	Great Artesian	American Overseas	67/11155
Packsaddle (20)	Great Artesian	Planet Exploration	67/11185
Nucha (26)	Great Artesian	Planet Exploration	68/3021
Pincally (19)	Great Artesian	NSW Oil and Gas	67/3034
Hamilton Gate (13)	Great Artesian	Continental Oil	69/3085
Winnathee (16)	Great Artesian	North West Oil and Minerals	69/3082
Bundulla (37)	Great Artesian	Alliance Petroleum	70/493
Oaklands Basin (72)	Murray Darling	Australian Oil and Gas	62/1571
Mildura (75)	Murray Darling	Planet Exploration	62/1607
Bundy-Lake Boga (81)	Murray Darling	Woodside (Lakes Entrance) Oil	62/1614
Magenta (74)	Murray Darling	Planet Exploration	62/1623
Wentworth (76)	Murray Darling	Australian Oil and Gas	62/1641
Stephens Creek (42)	Murray Darling	Oil Development	62/1652
Griffith (70)	Murray Darling	Australian Petroleum	62/1653
Lake Victoria (77)	Murray Darling	Australian Oil and Gas	63/1518
Murrayville-Casterton (80)	Murray Darling	Planet Exploration	63/1529
Willcannia (29)	Murray Darling	Tasman Oil	65/11025
Pooncarrie (48)	Murray Darling	Australian Oil and Gas	65/11053
Tarrara (46)	Murray Darling	Australian Oil and Gas	65/11059
Deniliquin (73)	Murray Darling	Australian Oil and Gas	66/11078
Ivanhoe (24)	Murray Darling	Exploration Drilling	66/11076
Lake Poopelloe (30)	Murray Darling	Canadian Superior	66/11109
South Tarrara (47)	Murray Darling	Australian Oil and Gas	60/11122
Lake Poopelloe R2 (30)	Murray Darling	Planet Exploration	68/3037
Lake Wintlow (41)	Murray Darling	Alliance Oil Development	68/3031
Lake Poopelloe R3 (25)	Murray Darling	Planet Exploration	69/3309
Sunset (79)	Murray Darling	Associated Australian Oilfields	69/3018
Mount Emu (40)	Murray Darling	NSW Oil and Gas	70/197
Jerilderie North (69)	Murray Darling	NSW Oil and Gas	70/220
Narweena (78)	Murray Darling	Pexa Oil	70/221
Redbank (45)	Murray Darling	North Australian Petroleum	69/3039
Mossgiel (49)	Murray Darling	NSW Oil and Gas	69/3055
Nambuccurra (48)	Murray Darling	NSW Oil and Gas	69/3046
Hay (71)	Murray Darling	NSW Oil and Gas	69/3064
Port Campbell (102)	Otway	Frome-Broken Hill	62/1523
Warrnambool (96)	Otway	Frome-Broken Hill	62/1540
Dartmoor-Nelson (86)	Otway	Frome-Broken Hill	62/1567
Casterton (82)	Otway	Planet Exploration	62/1597

* number refers to survey number in legend of Plate 10

Name	Basin	Company	BMR Subsidy No.
Cooriemungle (101)	Otway	Frome-Broken Hill	63/1550
Branxholme-Koroit (92)	Otway	Frome-Broken Hill	63/1535
SW Victoria (87)	Otway	Frome-Broken Hill	63/1511
Princetown (104)	Otway	Frome-Broken Hill	63/1505
Curdie Vale (103)	Otway	Frome-Broken Hill	64/4504
Timboon (100)	Otway	Frome-Broken Hill	64/4500
Merino (84)	Otway	Alliance Oil Development	64/4535
Koroit (97)	Otway	Frome-Broken Hill	64/4552
Offshore Otway Basin (94)	Otway	Shell Development	65/1652
Port Fairy-Nelson (91)	Otway	Shell Development	66/11062
PEP 22-DI (88)	Otway	Shell Development	66/11124
Otway Marine (105)	Otway	Shell Development	66/11121
Cape Bridgewater (89)	Otway	Shell Development	67/11175
Otway EP67 (107)	Otway	Esso Exploration	67/11188
Hawkesdale (98)	Otway	Shell Development	68/3053
Otway ER-68 (95)	Otway	Esso Exploration	68/3036
Macarthur-Portland (90)	Otway	Shell Development	69/3080
Wannon (83)	Otway	Alliance Oil Development	70/425
Nelson-Koroit (93)	Otway	Shell Development	70/963
East Gippsland (124)	Gippsland	Woodside (Lakes Entrance) Oil	62/1507
Lake Wellington (122)	Gippsland	Woodside (Lakes Entrance) Oil	62/1552
Lakes Entrance-Woodside (123)	Gippsland	Arco	62/1591
Ninety-Mile Beach (130)	Gippsland	Arco	62/1640
Gormandale (120)	Gippsland	APM Development	63/1547
Seaspray (123)	Gippsland	Arco	64/4521
Gippsland Shelf (129)	Gippsland	Esso Exploration	64/4550
Woodside-Paynesville (119)	Gippsland	Woodside (Lakes Entrance) Oil	64/4573
Offshore Gippsland Basin (126)	Gippsland	Shell Development	65/11045
Gippsland EC-67 (132)	Gippsland	Esso Exploration	67/11184
Venus Bay (112)	Gippsland	Alliance Oil Development	67/11193
Sole (127)	Gippsland	Shell Development	67/11187
Gippsland EH68 (131)	Gippsland	Esso Exploration	68/3015
Toongabbie (121)	Gippsland	APM Development	68/3022
East Gippsland Basin (133)	Gippsland	Magellan Petroleum	68/3049
Gippsland G69A (141)	Gippsland	Esso Exploration	68/3098
Cape Patterson (113)	Gippsland	Mid Eastern Oil Co. N.L.	69/3068
Tarwin (118)	Gippsland	APM Development	70/122
Bemm River (125)	Gippsland	WYP Development	70/768
Sydney Basin (66)	Sydney	Australian Oil and Gas	62/1546
Newcastle-Maitland (56)	Sydney	Planet Exploration	62/1596
Singleton-Camden (60)	Sydney	Australian Oil and Gas	62/1605
Nowra-Coolah (39)	Sydney	L.H. Smart	62/1613
Woronora-Dural (61)	Sydney	American Overseas	62/1642
Offshore Sydney Basin (54)	Sydney	Shell Development	64/4565
Richmond-Cessnock (59)	Sydney	Shell Development	65/4577
Putty-Oakdale (58)	Sydney	Australian Oil and Gas	65/11018
Denman (51)	Sydney	Australian Oil and Gas	65/11061
Girvan (52)	Sydney	Australian Oil and Gas	65/11058
Offshore Sydney (62)	Sydney	Shell Development	67/11170
Currambene (67)	Sydney	Genoa Oil	69/3016
Broken Bay (63)	Sydney	Longreach Oil	69/3070
Parkes (50)	Sydney	NSW Oil and Gas	70/361

Name	Basin	Company	BMR Subsidy No.
Stockton (55)	Sydney	NSW Oil and Gas	70/482
South Sydney Basin (68)	Sydney	Magellan Petroleum	70/486
South Broken Bay (65)	Sydney	Longreach Oil	70/803
Charlotte Head (53)	Sydney	NSW Oil and Gas	70/828
Eastern Bass Strait (128)	Bass	Esso Exploration	66/11070
Bass ED67 (114)	Bass	Esso Exploration	67/11176
Tasman-Bass Strait (135)	Tasmania, Sydney, Gippsland	Magellan Petroleum	69/2023
Sailfish (134)	Tasmania	NSW Oil and Gas	70/884

BMR Surveys

Title	Author	BMR Record No.
Rosedale seismic survey, Victoria 1961	K.F. Fowler	1961/165
Murray Basin seismic survey 1960	S.J. Watson	1962/164
Otway and Sydney Basins experimental 'vibroseis' survey, 1964	Seismograph Services Limited	1965/198
Otway Basin experimental seismic survey for comparison with the 'vibroseis' survey, Victoria, 1965-volcanics project	J.S. Raitt	1966/25
Sydney Basin experimental survey for a comparison with a 'vibroseis' survey, New South Wales, 1965	E. Schwing (I.F.P.)	1966/115
Deep crustal reflection seismic test survey, Tidbinbilla, A.C.T. and Braidwood, N.S.W., 1969	F.J. Taylor, F.J. Moss & J.C. Branson	1972/126
Deep crustal reflection seismic test survey, Mildura, Victoria and Broken Hill, N.S.W. 1968	J.C. Branson F.J. Moss & F.J. Taylor	1972/127

APPENDIX 4 - SUBSIDIZED BOREHOLES

Name	Basin	Company	BMR Subsidy No.
Binerah Downs (13)*	Great Artesian	Clarence Oil	66/4206
Bancannia South (15)	Great Artesian	Planet Exploration	67/4268
Bancannia North (14)	Great Artesian	Planet Exploration	67/4277
Jupiter (16)	Great Artesian	Planet Management and Research	69/2005
Wentworth (45)	Murray-Darling	Australian Oil and Gas	62/1212
Bundy (47)	Murray-Darling	Woodside (Lakes Entrance) Oil	62/1218
Jerilderie (49)	Murray-Darling	Australian Oil and Gas	62/1216
Balranald (46)	Murray-Darling	Woodside (Lakes Entrance) Oil	62/1106
Ivanhoe (103)	Murray-Darling	North Shore Oil Corp.	63/1028
Killendoo (48)	Murray-Darling	Amalgamated Petroleum Exploration	60/4001
Lake Victoria (44)	Murray-Darling	Australian Oil and Gas	64/4049
Blantyre (41)	Murray-Darling	Mid Eastern Oil	64/4131
Pondie Range (17)	Murray-Darling	Mid Eastern Oil	66/4226
Tararra (43)	Murray-Darling	Australian Oil and Gas	66/4238
Poopelloe Lake (18)	Murray-Darling	NSW Oil and Gas	69/2014
Mount Emu (42)	Murray-Darling	NSW Oil and Gas	69/2038
Morkalla (51)	Murray-Darling	Associated Aust. Oilfields	70/233
Sunset (50)	Murray-Darling	Associated Aust. Oilfields	70/234
Port Campbell No.1 (69)	Otway	Frome-Broken Hill	62/1020
Port Campbell No.2 (68)	Otway	Frome-Broken Hill	62/1004
Flaxman's (65)	Otway	Frome-Broken Hill	62/1074
Anglesea (72)	Otway	Oil Development	62/1217
Pretty Hill (61)	Otway	Frome-Broken Hill	62/1115
Sherbrook (67)	Otway	Frome-Broken Hill	62/1045
Eumeralla (57)	Otway	Frome-Broken Hill	62/1308
Fergusons Hill (67)	Otway	Frome-Broken Hill	63/1061
Heathfield (53)	Otway	Planet Exploration	64/4019
Port Campbell No.4 (66)	Otway	Frome-Broken Hill	64/4063
Tullich (52)	Otway	Planet Exploration	64/4088
Pecten (70)	Otway	Shell Development	67/4239
Mussel (101)	Otway	Esso Exploration	69/2021
Hindhaugh Creek (71)	Otway	Pursuit Oil	69/2026
Hawkesdale (60)	Otway	Shell Development	69/2032
Moyne Falls (58)	Otway	Shell Development	69/2032
Nerita (73)	Otway	Shell Development	67/4258
Voluta (56)	Otway	Shell Development	67/4263
Casterton No. 1 (54)	Otway	Planet Exploration	65/4135
Casterton No. 2 (55)	Otway	Planet Exploration	67/4270
Prawn (100)	Otway	Esso Exploration	67/4273
Nautilus (102)	Otway	Esso Exploration	68/2008
Garvoc (63)	Otway	Interstate Oil	68/2020
Woolsthorpe (59)	Otway	Interstate Oil	68/2019
Purrumbete (64)	Otway	Interstate Oil	68/2021
Rowans (62)	Otway	Shell Development	72/896
Snail (74)	Otway	Haematite Petroleum	72/3159
Rosedale (75)	Gippsland	APM Development	62/1035
Wellington Park (79)	Gippsland	Arco Ltd	62/1077

* Number refers to borehole number on Plate 12 legend

Name	Basin	Company	BMR Subsidy No.
North Seaspray (80)	Gippsland	Arco Ltd/Woodside (Lakes Entrance)	62/1305
SW Bairnsdale (76)	Gippsland	Arco Ltd/Woodside (Lakes Entrance)	62/1224
Merriman (83)	Gippsland	Arco Ltd/Woodside (Lakes Entrance)	63/1301
Carr's Creek (82)	Gippsland	Arco Ltd/Woodside (Lakes Entrance)	63/1306
Seaspray (81)	Gippsland	Arco Ltd	64/4002
Duck Bay (78)	Gippsland	Arco Ltd/Woodside	64/4014
Gippsland Shelf (88)	Gippsland	Esso Exploration	64/4124
Woodside South (84)	Gippsland	Woodside (Lakes Entrance) Oil	65/4159
Gippsland Shelf No. 4 (90)	Gippsland	Esso Exploration	65/4183
Sunday Island (86)	Gippsland	Woodside (Lakes Entrance) Oil	65/4180
St Margaret I. (85)	Gippsland	Woodside (Lakes Entrance) Oil	65/4185
Groper No. 2 (87)	Gippsland	Esso Exploration	69/2028
Milton (77)	Gippsland	Ashburton Oil	69/2033
Sailfish (94)	Gippsland	NSW Oil and Gas	71/472
Cobia (92)	Gippsland	Esso Exploration	72/2703
Morwong (89)	Gippsland	Esso Exploration	72/3235
Mulgoa No. 2 (36)	Sydney	Australian Oil and Gas	62/1024
Mt Hunter (37)	Sydney	Australian Oil and Gas	62/1083
Kurrajong Hts (34)	Sydney	Australian Oil and Gas	62/1109
East Maitland (29)	Sydney	Planet Exploration	62/1116
Stockyard Mt (39)	Sydney	Fairmont Drillers	62/1114
Mt Murwin (31)	Sydney	Australian Oil and Gas	63/1000
Loder (27)	Sydney	Australian Oil and Gas	62/1135
Woronora (38)	Sydney	Australian Oil and Gas	63/1022
Belford (28)	Sydney	Australian Oil and Gas	64/4109
Camberwell (26)	Sydney	Australian Oil and Gas	65/4179
Dural South (35)	Sydney	Shell Development	66/4209
Martindale (25)	Sydney	Australian Oil and Gas	67/4243
Coonemia (40)	Sydney	Geonoa Oil	69/2010
Howes Swamp (32)	Sydney	Esso Exploration	70/139
Higher Macdonald (33)	Sydney	Australian Oil and Gas	68/2037
Jerry Plains (30)	Sydney	Esso Exploration	69/2004
Clam (99)	Tasmania	Esso Exploration	69/2016
Bluebone (95)	Tasmania	Esso Exploration	69/2029
Bass 1 (97)	Bass	Esso Exploration	65/4167
Bass 2 (96)	Bass	Esso Exploration	66/4817
Bass 3 (98)	Bass	Esso Exploration	67/4241

PLATE 1

STRZELECKI | TICKALARA | BULLOO | EULO | CUNNAMULLA | DIRRANBANDI | SAINT GEORGE | GOONDIWINDI | WARWICK | TWEED HEADS

CALLABONNA | MILPARINKA | URISINO | YANTABULLA | ENNGONIA | ANGLEDOOL | MOREE | INVERELL | GRAFTON | MACLEAN

FROME | COBHAM LAKE | WHITE CLIFFS | LOUTH | BOURKE | WALGETT | NARRABRI | MANILLA | DORRIGO | COFFS HARBOUR

CURNAMONA | BROKEN HILL | WILCANNIA | BARNATO | COBAR | NYNGAN | GILGANDRA | TAMWORTH | HASTINGS

OLARY | MENINDEE | MANARA | IVANHOE | NYMAGEE | NARROMINE | DUBBO | SINGLETON | NEWCASTLE

CHOWILLA | ANA BRANCH | POONCARIE | BOOLIGAL | CARGELLIGO | FORBES | BATHURST | SYDNEY

RENMARK | MILDURA | BALRANALD | HAY | NARRANDERA | COOTAMUNDRA | GOULBURN | WOLLONGONG

PINNAROO | OUYEN | SWAN HILL | DENILIQUIN | JERILDERIE | WAGGA WAGGA | CANBERRA | ULLADULLA

NARACOORTE | HORSHAM | SAINT ARNAUD | BENDIGO | WANGARATTA | TALLANGATTA | BEGA

PENOLA | HAMILTON | BALLARAT | MELBOURNE | WARBURTON | BAIRNSDALE | MALLACOOTA

PORTLAND | COLAC | QUEENSCLIFF | WARRAGUL | SALE

SJ54-16 | SJ55-13 | SJ55-14 | SJ55-15

SK54-4 | SK55-1 | SK55-2 | SK55-3 | SK55-4

SK55-5 | SK55-6 | SK55-7 | SK55-8

SK55-9 | SK55-10 | SK55-11 | SK55-12

SK55-13 | SK55-14 | SK55-15 | SK55-16

NEW SOUTH WALES

VICTORIA

TASMANIA

A.C.T.

Tamworth | Grafton | Albury | Mildura | Nowra | NEWCASTLE | SYDNEY | HOBART | King I | Furneaux Group | Commonwealth Territory of Jervis Bay

28° | 32° | 36° | 40° | 44°

139°30' | 144° | 150° | 156°

LEGEND

Survey area

PREVIOUS GRAVITY SURVEYS

1. Reconnaissance helicopter – BMR – 1968
2. 'Tibooburra – Louth' – American Overseas – 1965-66
3. 'Urisino – Tongo' – L H Smart – 1961, 1963
4. 'Clarence – Winnathee' – Clarence River Basin Oil – 1968
5. 'Nucha' – Planet Exploration – 1965
6. 'Packsaddle' – Planet Exploration – 1967
7. 'White Cliffs' – Mid Eastern Oil – 1964
8. 'East Darling' – Planet Exploration – 1963
9. 'Blantyre Basin' – NSW Oil and Gas – 1969
10. 'Scopes and Four Corners' – Alliance Oil – 1967-68
11. 'Ivanhoe' – Texam – 1965
12. 'Murrumbidgee' – Planet Exploration – 1968
13. 'Yithan' – BMR – 1959
14. 'Cootamundra' – BMR – 1967
15. Reconnaissance helicopter – BMR – 1966
16. 'Jerilderie' – NSW 08&9 – 1969
17. 'Mildura' – Frome-BHP – 1957
18. 'Wangaratta' – BMR – 1972
19. 'Casterton' – Planet Exploration – 1970
20. 'Coleraine' – Alliance Oil – 1966
21. 'Hawkesdale' – Shell Development (Australia) – 1968
22. 'Terang – Portland' – Shell Development (Australia) – 1969
23. 'Colac – Geelong – Shell Development (Australia) – 1971
24. 'Port Phillip Bay' – BMR – 1957-58
25. 'Baragwanath Anticline – BMR – 1958, 1960
26. 'East Gippsland' – BMR – 1953
27. 'Stockyard Hill' – Woodside (Lakes Entrance) Oil – 1966
28. University of Tasmania and Tasmanian Mines Dept.

RECONNAISSANCE HELICOPTER GRAVITY SURVEY

EASTERN AUSTRALIA 1973/74

LOCALITY MAP

100 0 100 200 300 400 KILOMETRES

To accompany Record No 1973/177

A/B2-86

PLATE 2

LEGEND

- Elevation control traverse
- Cambridge pendulum station
- Isogal station (primary)
- Isogal station (secondary)
- Photo centres accurate
- Photo centres approximate (plotting by detail)

ELEVATION CONTROL TRAVERSES AND PHOTOGRAPHIC COVERAGE

100 0 100 200 300 400 KILOMETRES

A/B2-87

To accompany Record No 1973/177

PLATE 3

QUEENSLAND

NEW SOUTH WALES

VICTORIA

SOUTH AUSTRALIA

TASMANIA

A.C.T.

Mt Bajimbo 1524

Round Mtn 1584

Black Sugarloaf Mt 1494

1585

Barrington Tops

Mt Coricudgy 1255

SYDNEY

Mt Oxley 307

Mt Booroondarra 448

Wambelong Mtn 1205

Mt Nurri 419

Mt Robe 474

BROKEN HILL

Darling River

Lachlan River

Murray River

MILDURA

Murrumbidgee River

CANBERRA

1914

Bimberi Pk

Mt Kosciusko 2228

Mt Moliagul 527

Mt Buangor 990

Mt Buller 1807

MELBOURNE

LAUNCESTON

Ben Lomond 1573

Mt Ossa 1617

HOBART

Mt Picton 1323

28°

32°

36°

40°

44°

139°30'

144°

150°

156°

LEGEND

River or stream

527 Elevation (metres)

>1210m

610 — 1210m

152 — 610m

<152m

(Based on A/B0-60)

TOPOGRAPHY

100 0 100 200 300 400 KILOMETRES

To accompany Record No 1973/177

A/B2-88

PLATE 4

QUEENSLAND

NEW SOUTH WALES

VICTORIA

SOUTH AUSTRALIA

A.C.T.

BROKEN HILL

MILDURA

Nhill

Hay

Dubbo

Wagga Wagga

CANBERRA

SYDNEY

Hotel Kosciusko

MELBOURNE

LAUNCESTON

HOBART

TASMANIA

RAINFALL (INCHES)

J F M A M J J A S O N D

28°

32°

36°

40°

139°30'

144°

150°

156°

44°

LEGEND

1 Subtropical East Coast
2 Subtropical Highlands
3 Subtropical Inland
4 Subtropical Interior
5 Dry Continental Interior
6 Temperate Interior
7 Temperate Inland
8 Temperate Highlands
9 Temperate Coastal
10 Alpine Mountain Type
11 Temperate Coastal Mountains

(Based on A/B0-60)

For Tasmanian rainfall, see Plate5

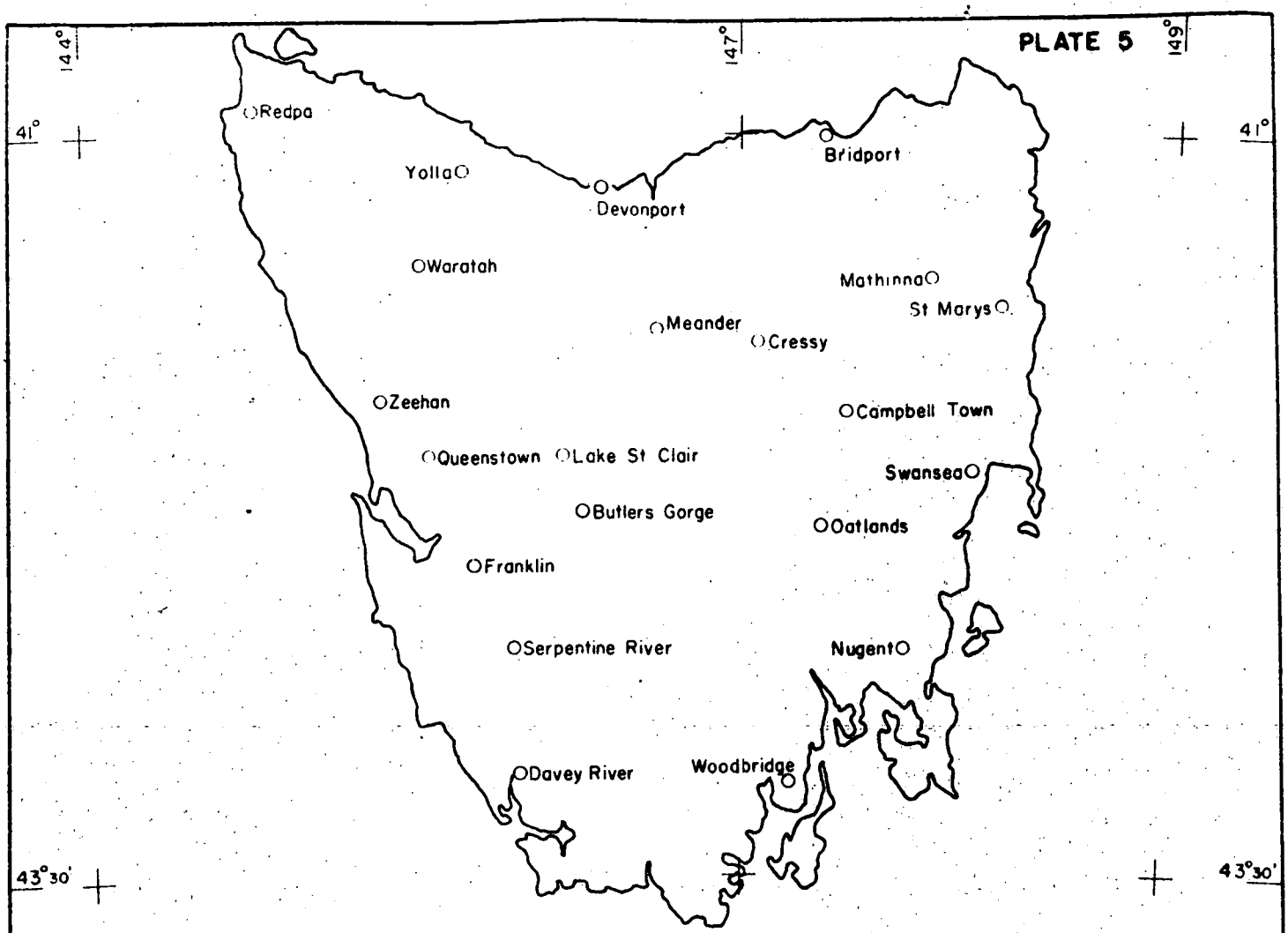
CLIMATIC REGIONS

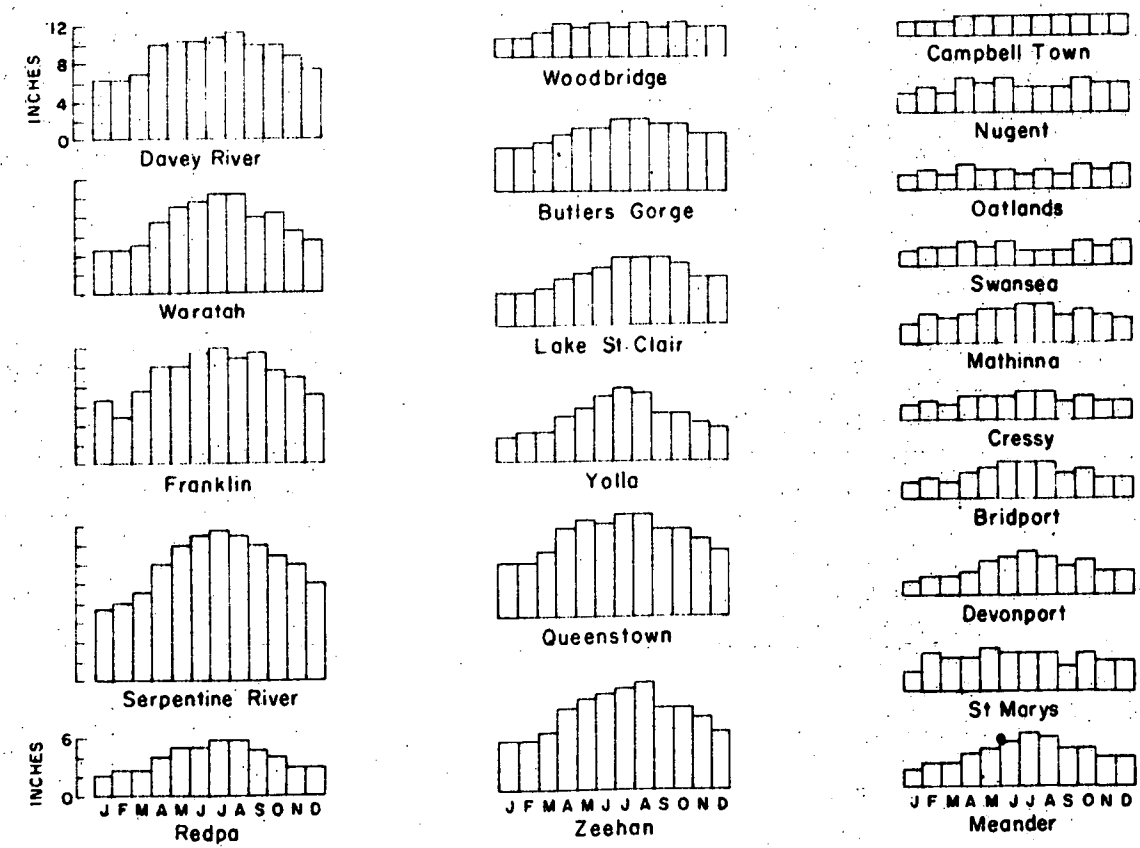
100 0 100 200 300 400 KILOMETRES

To accompany Record No 1973/177

A/B2-89

PLATE 5



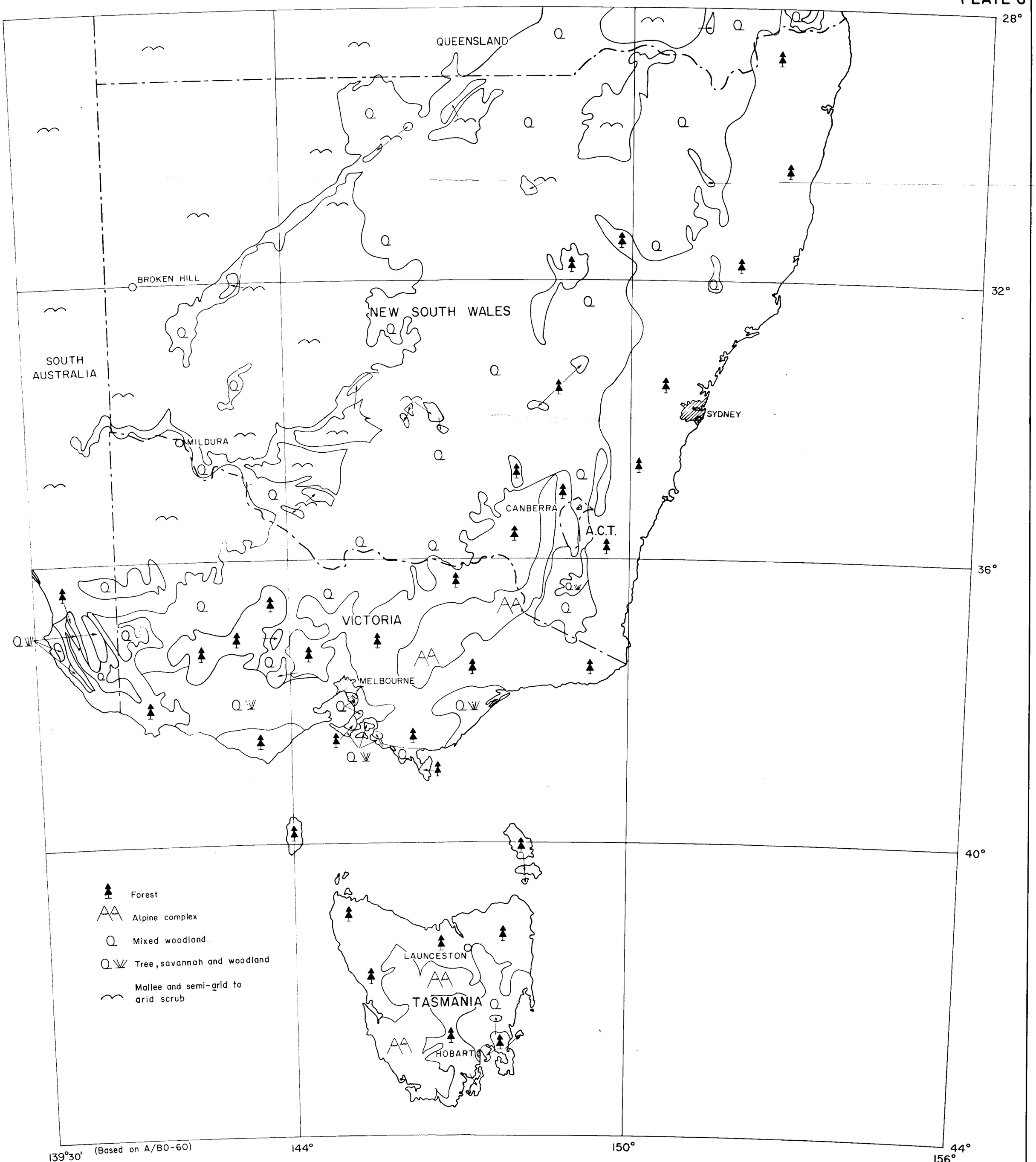


MEAN MONTHLY RAINFALL FOR TASMANIA, 1931-1960

To accompany Record No 1973/177

K55/B2-33A

PLATE 6



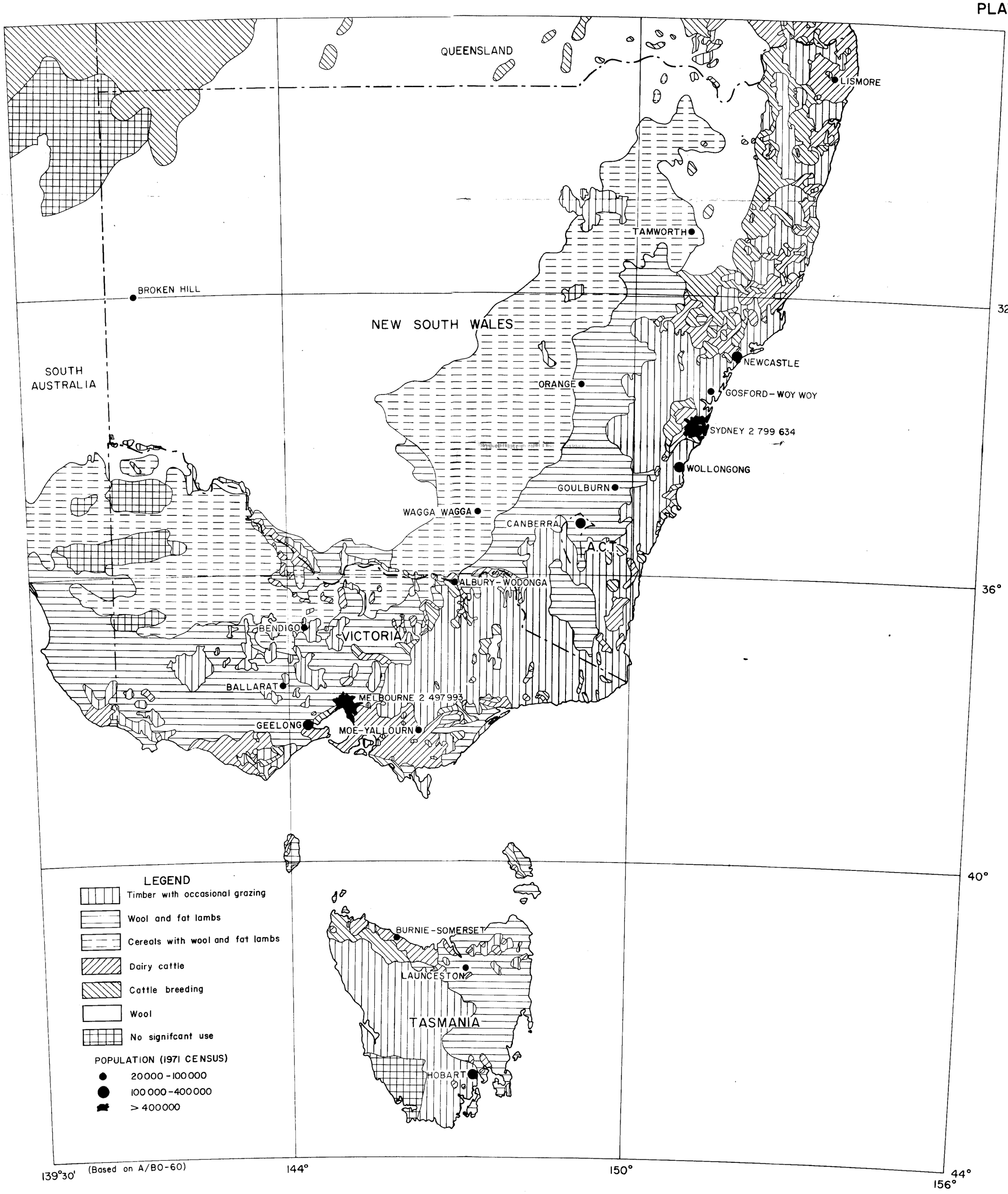
VEGETATION REGIONS

100 0 100 200 300 400 KILOMETRES

To accompany Record No 1973/177

A/B2-90

PLATE 7



DOMINANT LAND USE AND MAIN POPULATION CENTRES

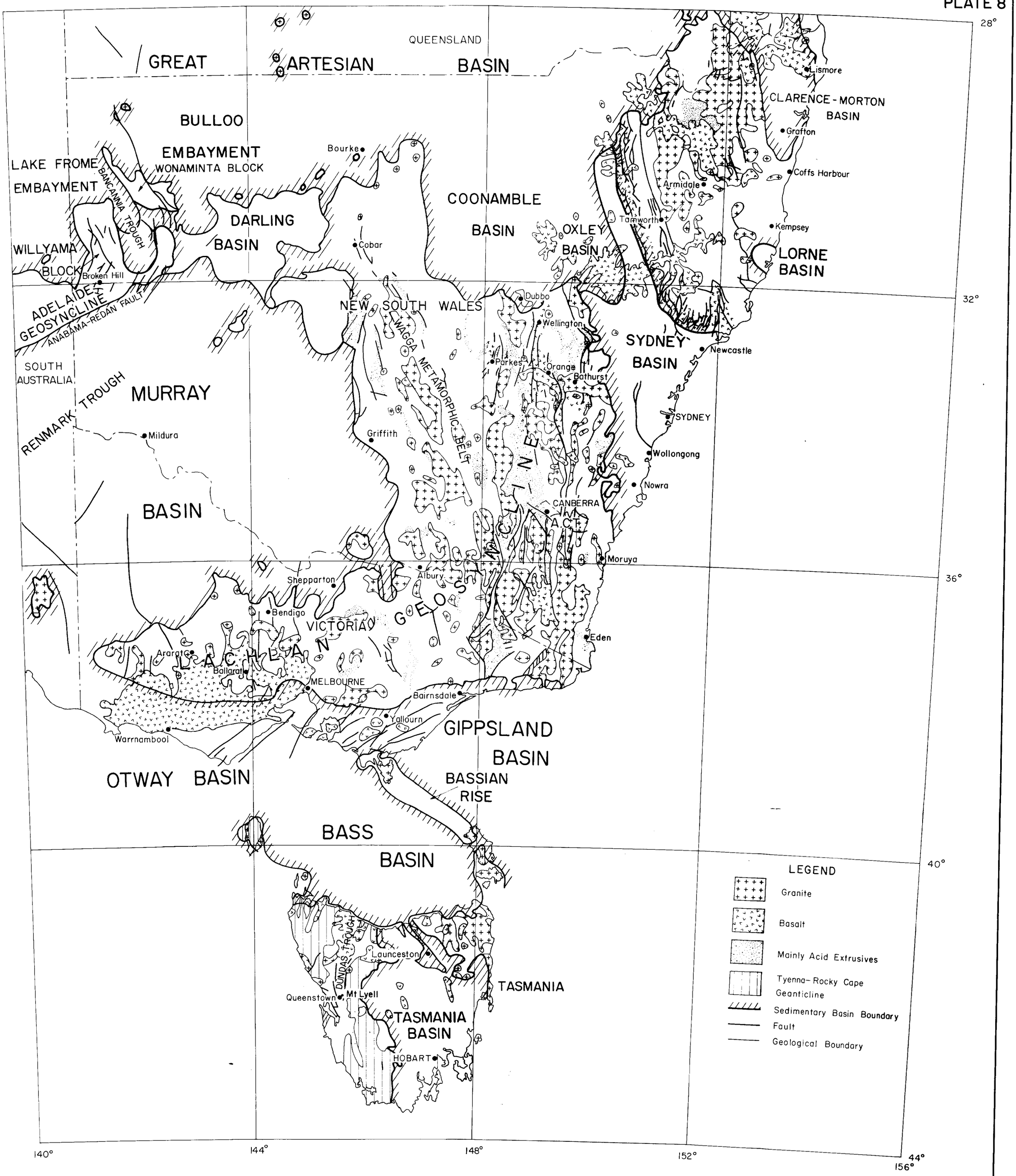
To accompany Record No 1973/177

100 0 100 200 300 400 KILOMETRES

A/B2-91

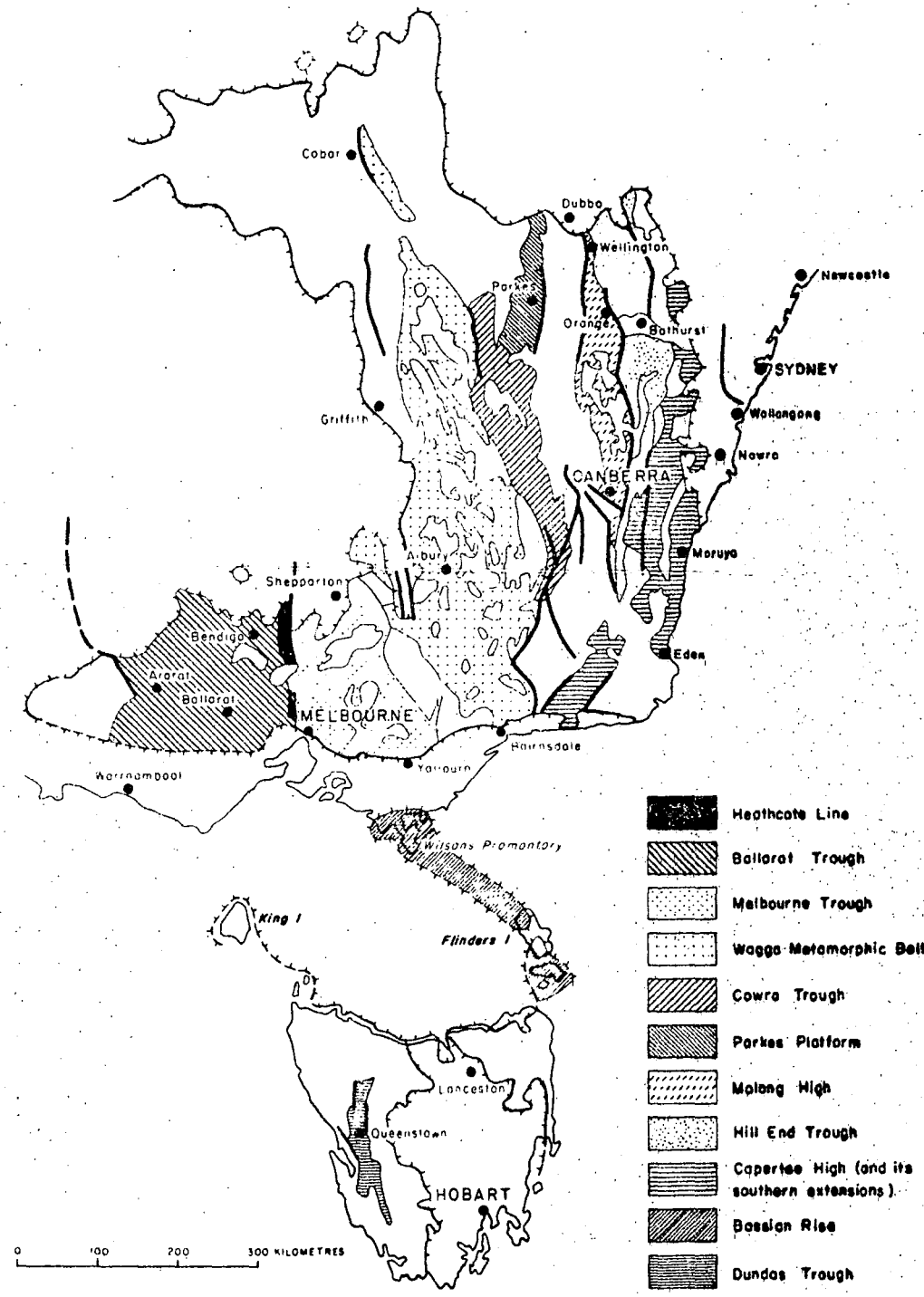
PLATE 8

GEOLOGY



To accompany Record No 1973/177

A/B2-92



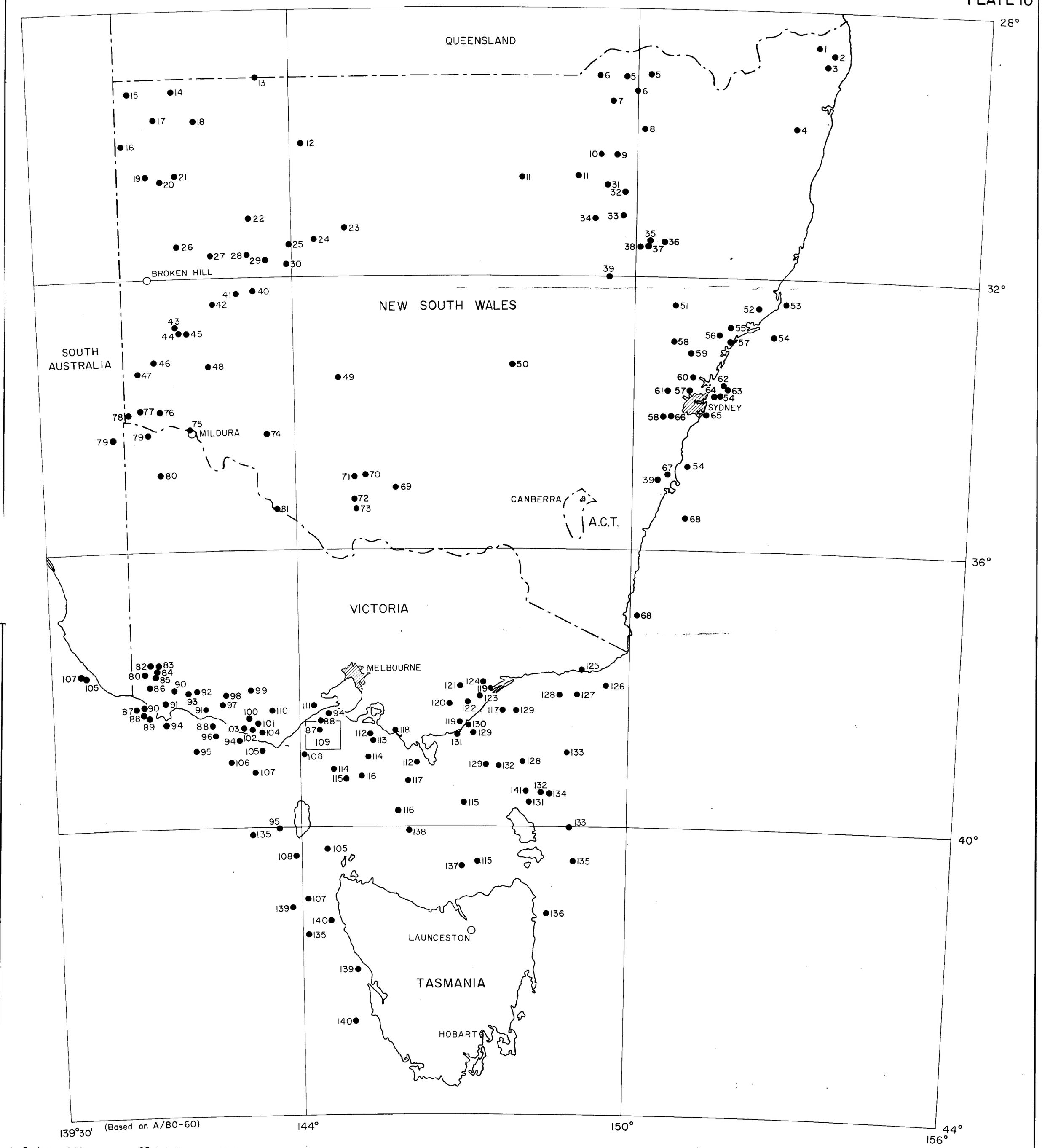
ELEMENTS OF THE LACHLAN BELT

(R.G.Warren, Bulletin 145)

To accompany Record No 1973/177

A/B2-93A

PLATE 10



1 Casino – 1962
2 Nimbin – 1966
3 Blue Knob – 1963
4 P E L 66 – 1968
5 Boolooroo – 1967
6 Moree – 1964
7 Garah – 1965
8 Pallamallawa – 1965
9 Yetman – Wee Waa – 1962
10 Edgeroi – 1963
11 Pilliga – Merri Merri – 1965
12 Paroo – Tibooburra – 1967
13 Hamilton Gate – 1970
14 Olive Downs – 1965
15 Fort Grey – Yandama – 1962
Lake Stewart – 1964
16 Winnathee – 1969
17 Bancannia – 1966
18 Tibooburra – 1963
19 Pincally – 1969
20 Packsaddle – 1967
21 Lake Windaunka – 1967
22 Mount Jack – 1962
23 Helyambo – 1969
24 Ivanhoe – 1966
25 Lake Poopelloe R3 – 1969
26 Nucha – 1968
27 Mootwingee – 1965
28 White Cliffs – 1965
29 Wilcannia – 1965
30 Lake Poopelloe – 1966
Lake Poopelloe R2 – 1968
31 Bohena – 1964
32 Keepit Dam – 1964
33 Walgett – Gunnedah – 1962
34 Narrabri – Coonamble – 1962
35 Breeza – 1968
Blackville – 1969
36 New Windy – 1965
37 Bundulla – 1970
38 Caroona – 1963
39 Nowra – Coolah – 1962
40 Mount Emu – 1970
41 Lake Wintlow – 1968
42 Stephen's Creek – 1962
Lake Pamamaroo – 1963
43 Tandou – Coombah – 1968
44 Tandou – 1966
45 Redbank – 1969
46 Tararra – 1966
47 South Tararra – 1966
48 Pooncarie – 1966
Nambuccurra – 1969
49 Mossgiel – 1969
50 Parkes – 1970
51 Denman – 1966
52 Girvan – 1966
53 Charlotte Head – 1970
54 Offshore Sydney Basin – 1964
55 Stockton – 1970
56 Newcastle – Maitland – 1962
57 Sydney – Newcastle – 1965
58 Putty – Oakdale – 1965
59 Richmond – Cessnock – 1965
60 Singleton – Camden – 1962
61 Woronora – Dural – 1962
62 Offshore Sydney – 1967
63 Broken Bay – 1970
64 Sealion – 1971
65 South Broken Bay – 1970
66 Sydney Basin – 1961
67 Currambene – 1969
68 South Sydney Basin – 1970
69 Jerilderie North – 1970
70 Griffith – 1963
71 Hay – 1969
72 Oaklands Basin – 1961
73 Deniliquin – 1966
74 Magenta – 1962
75 Mildura – 1962
76 Wentworth – 1962
77 Lake Victoria – 1963
78 Narweena – 1970
79 Sunset – 1969
80 Murrayville – Casterton – 1963
81 Bundy – Lake Boga – 1962
82 Casterton – 1962
83 Wannon – 1970
84 Merino – 1964
85 Bahgallah – 1967
86 Dartmoor – Nelson – 1961
87 SW Victoria – 1963
88 P E P 22/D1 – 1966
89 Cape Bridgewater – 1967
90 Macarthur – Portland – 1970
91 Port Fairy – Nelson – 1966
92 Branxholme – Koroit – 1963
93 Nelson – Koroit – 1970
94 Offshore Otway Basin – 1966
95 Otway E R 68 – 1968
96 Warrnambool – 1961
97 Koroit – 1964
98 Hawkesdale – 1969
99 Warrnambool – Pomborneit – 1970
100 Timboon – 1964
101 Cooriemungle – 1963
102 Port Campbell – 1960
103 Curdie Vale – 1964
104 Princetown – 1963
105 Otway Marine – 1966
106 Portland – King Island – 1972
107 Otway E P 67 – 1967
108 Cape Grim – Cape Jaffa – 1964
109 Torquay Embayment – 1972
110 Colac – Geelong – 1972
111 Paraparap – 1972
112 Venus Bay – 1967
113 Cape Patterson – 1970
114 Bass ED 67 – 1967
115 Bass EF 68 – 1968
116 Bass Area – 1965
117 Flinders Island – Kingston – 1962
118 Tarwin – 1970
119 Woodside – Paynesville – 1965
120 Gormandale – 1963
121 Toongabbie – 1968
122 Lake Wellington – 1961
123 Lakes Entrance – Woodside – 1962
Seaspray – 1964
124 East Gippsland – 1960
125 Bemm River – 1970
126 Offshore Gippsland Basin – 1965
127 Sole – 1967
128 Eastern Bass Strait – 1966
129 Gippsland Shelf – 1964
130 Nintey Mile Beach – 1962
131 Gippsland EH68 – 1968
132 Gippsland EC67 – 1967
133 East Gippsland Basin – 1968
134 Sailfish – 1970
135 Tasman – Bass Strait – 1969
136 East Tasmania T69B – 1969
137 Bass B69A – 1969
138 King Island East – 1965
139 West Tasmania T69A – 1969
140 Tasmania EE68 – 1968
141 Gippsland G69A – 1969

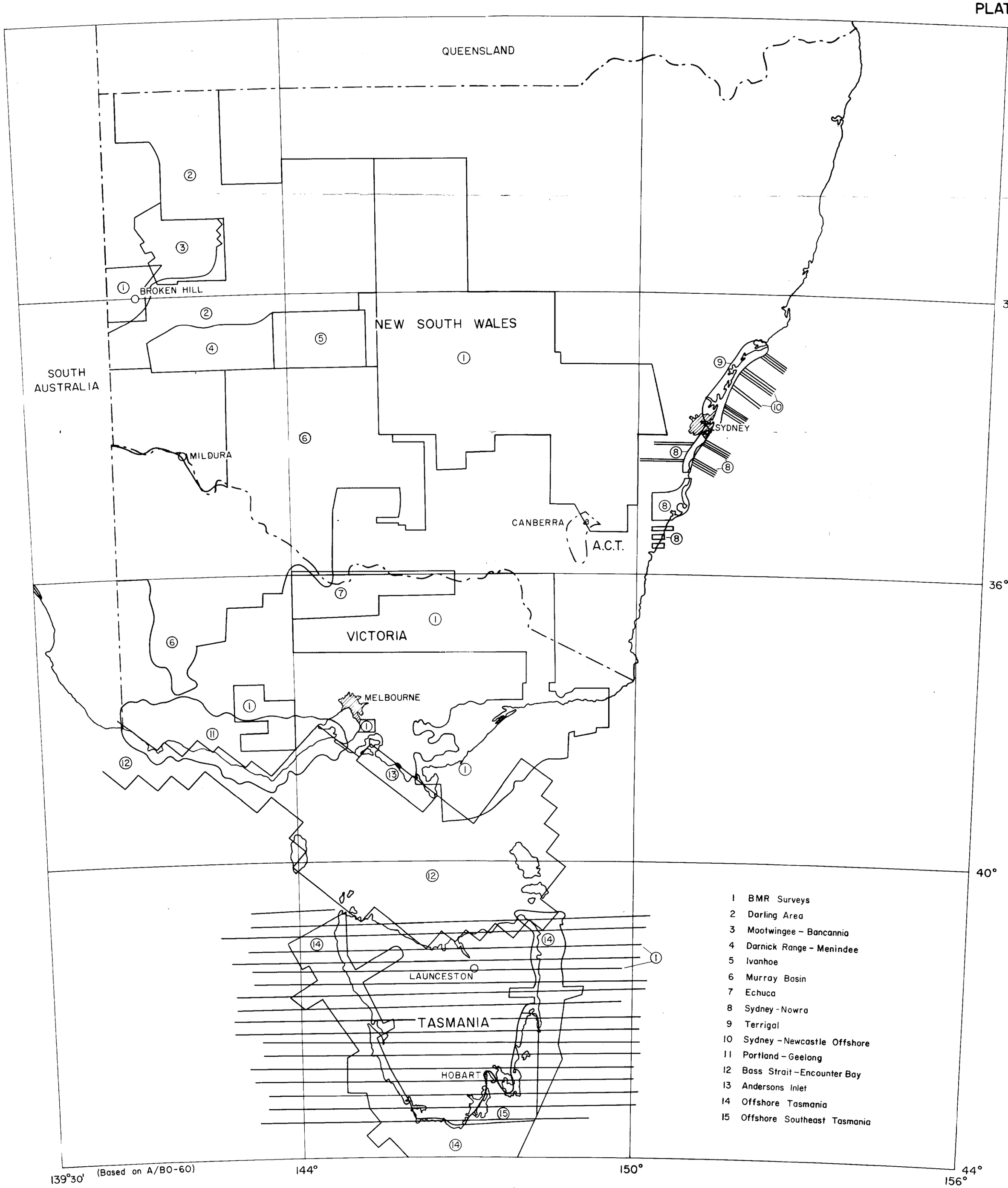
SUBSIDIZED SEISMIC SURVEYS

100 0 100 200km

To accompany Record No 1973/177

A/E3 – 9

PLATE II



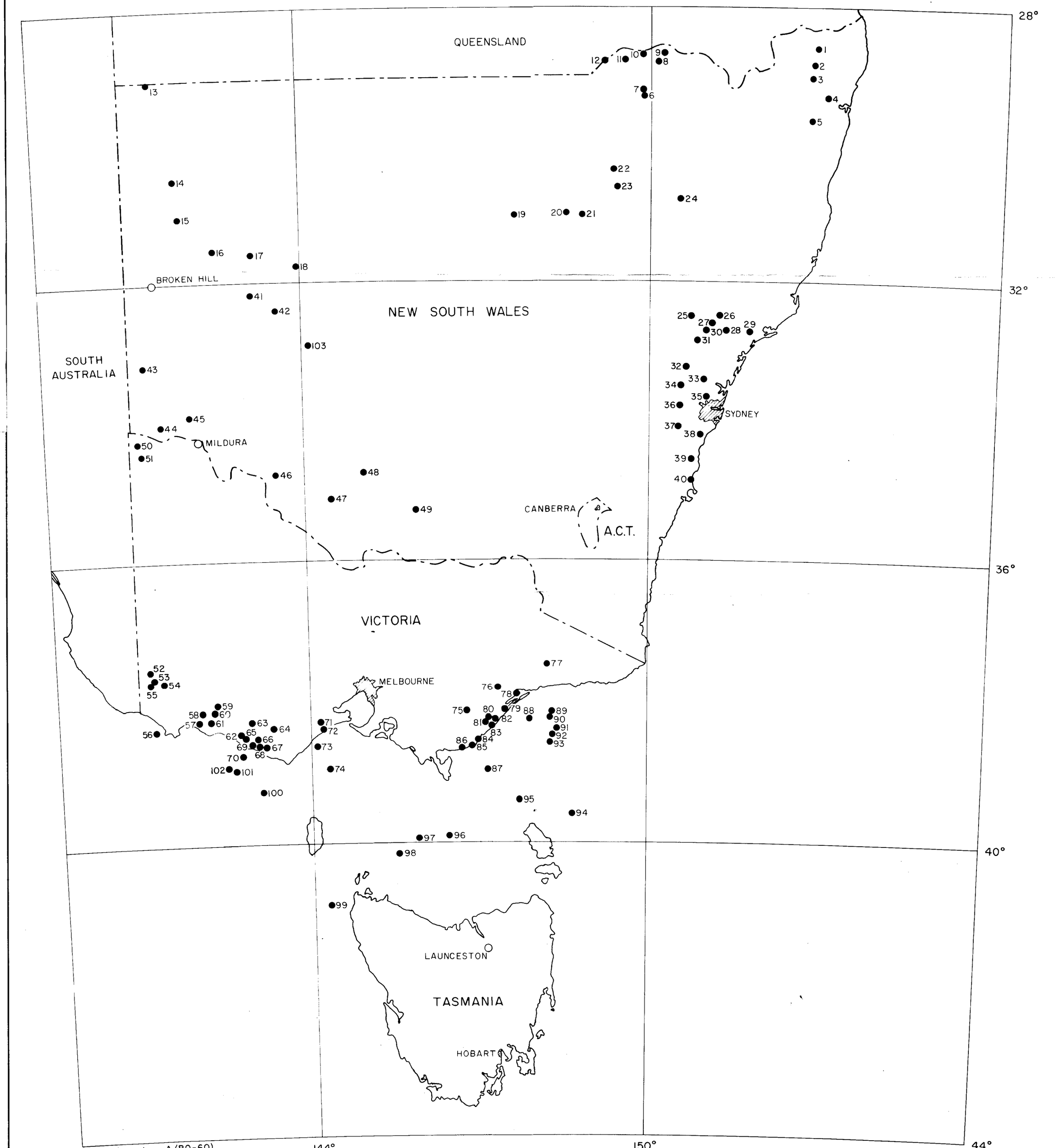
AEROMAGNETIC SURVEYS

100 0 100 200 300 400 KILOMETRES

To accompany Record No 1973/177

A/BI – 11

PLATE 12



(Based on A/B0-60)

BOREHOLES

1 Kyogle – 1963
2 Sextonville – 1963
3 Hogarth – 1968
4 Tullymorgan – 1965
5 Clifden 3 – 1963
6 Moree – 1973
7 Gil Gil – 1965
8 Limebon – 1967
9 Goondiwindi – 1964
10 MacIntyre – 1964
11 Boomi – 1963
12 Werrina 1&2 – 1969
13 Binerah Downs – 1966
14 Bancannia North – 1968
15 Bancannia South – 1967
16 Jupiter – 1969
17 Pondie Range – 1966
18 Poopelloe Lake – 1969
19 Sandy Camp – 1963
20 Baradine West 2 – 1963
21 Baradine West – 1963
22 Wee Waa – 1963
23 Bohena – 1963
24 Kelvin – 1965
25 Martindale – 1967
26 Camberwell – 1965
27 Loder – 1963
28 Belford – 1964
29 East Maitland – 1962
30 Jerry Plains – 1969
31 Mt Murwin – 1963
32 Howes Swamp – 1970
33 Higher Macdonald – 1968
34 Kurrajong Heights – 1962
35 Dural South – 1966
36 Mulgoa 2 – 1958
37 Mt Hunter – 1961
38 Woronora – 1963
39 Stockyard Mtn – 1962
40 Coonemia – 1969
41 Blantyre – 1965
42 Mount Emu – 1969
43 Tararra – 1966
44 Lake Victoria – 1964
45 Wentworth – 1961
46 Balranald – 1962
47 Bundy – 1962
48 Killendoo – 1964
49 Jerilderie – 1962
50 Sunset – 1970
51 Morkalla – 1970
52 Tullich – 1964
53 Heathfield – 1964
54 Casterton – 1965
55 Casterton 2 – 1967
56 Voluta – 1967
57 Eumeralla – 1963
58 Moyne Falls – 1969
59 Wollsthorpe – 1968
60 Hawkesdale – 1969
61 Pretty Hill – 1962
62 Rowans – 1972
63 Garvoc – 1968
64 Purrumbete – 1968
65 Flaxman's – 1961
66 P Campbell 4 – 1964
67 Sherbrook – 1963
Fergusons Hill – 1964
68 P Campbell 2 – 1960
69 P Campbell 1 – 1959
70 Pecten – 1967
71 Hindhaugh Cr – 1969
72 Anglesea – 1962
73 Nerita – 1967
74 Snail – 1972
75 Rosedale – 1960
76 S W Bairnsdale – 1963
77 Milton – 1969
78 Duck Bay – 1964
79 Wellington Park – 1961
80 North Seaspray – 1962
81 Seaspray – 1964
82 Carr's Creek – 1963
83 Merriman – 1963
84 Woodside South – 1965
85 St Margaret 1 – 1966
86 Sunday Island – 1966
87 Groper 2 – 1969
88 Gippsland Shelf – 1965 (Barracouta)
89 Morwong – 1973
90 Gippsland Shelf 4 – 1965 (Marlin)
91 Halibut – 1965
92 Cobia – 1972
93 Kingfish – 1965
94 Sailfish – 1971
95 Bluebone – 1969
96 Bass 2 – 1966
97 Bass 1 – 1965
98 Bass 3 – 1967
99 Clam – 1969
100 Prawn – 1968
101 Mussel – 1969
102 Nautilus – 1968
103 Ivanhoe – 1963

a) Unless otherwise stated well name refers to No.1 well
b) Proclaimed Discovery Well underlined

SUBSIDIZED BOREHOLES

100 0 100 200 km

To accompany Record No 1973/177

A/B2-94