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PROGRAMME

and

ABSTRACTS

for the

EIGHTH SYMPOSIUM

on

"ADVANCES IN THE STUDY OF THE SYDNEY BASIN"

DEPARTMENT OF GEOLOGY
THE UNIVERSITY OF NEWCASTLE
N.S.W., 2308

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"ADVANCES IN THE STUDY OF THE SYDNEY BASIN"

27th April to the 29th April, 1973

Convenor:
ASSOC. PROF. C. F. K. DIESSEL
Department of Geology,
The University of Newcastle

559.4405

Advances in the study of the Sydney Basin; abstracts of the symposia: (annual) 1st symposium 1966 to 4th symposium 1969. Newcastle, University of Newcastle, Department of Geology. Published as one volume with individual title pages. From 5th symposium 1970 title changed to Advances in the study of the Sydney Basin; programme and abstracts, which see also.

Geology — N.S.W. — Congresses
University of Newcastle — Department of Geology
Symposium on Advances in the study of the Sydney Basin, **University of Newcastle** (s)

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Advances in the study of the Sydney Basin; programme and abstracts of the symposia: (annual) 5th symposium 1970 **to date.** Newcastle, University of Newcastle, Department of Geology. Previously known as Advances in the study of the Sydney Basin; abstracts of the symposia, which see also.

Geology — N.S.W. — Congresses
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FORWARD

Welcome to the Eighth Newcastle Symposium. This year the format of the Symposium has been changed to allow greater participation on the part of all registrants. Papers will be delivered at both sessions on Saturday but on Sunday there will be several seminars in which all present are asked to participate. The topics for discussion at the seminars cover a range of interests and cater for both the academic and practising geologist. These will provide an excellent opportunity for the sharing of ideas on a less formal basis than during the Saturday sessions.

I hope you will find this Eighth Newcastle Symposium both enjoyable and stimulating and will return for future Symposia.

B. NASHAR
Professor of Geology
Head of Department

PREFACE

The abstracts of papers presented to the first four Symposia on "Advances in the Study of the Sydney Basin," held annually from 1966 to 1969, were published together in one booklet in 1969. The abstracts for the 1970, 1971 and 1972 Symposia on the same theme were published separately in the following three years, whilst the present booklet contains the abstracts for this year's Eighth Newcastle Symposium together with the themes of the Sunday seminars.

Eight papers will be presented this year and in view of the limited number, the editors have not included an index or a table of contents. However, a cumulative index and table of contents will be published at five-yearly intervals from 1970.

The authors alone are responsible for the scientific content of their contributions.

S. ST.J. WARNE

PROGRAMME

FRIDAY, 27th APRIL, 1973

9.00 a.m. - 5.00 p.m. — REGISTRATION in Foyer of the Geology Building
The University of Newcastle.

1.30 p.m. - 5.00 p.m. — EXCURSION at CATHERINE HILL BAY
Co-ordinator: Assoc. Prof. C. F. K. Diessel
Participants meet at the car park near the beach.

after 8.00 p.m. — Informal gathering in the Upstairs Lounge of the Great Northern Hotel.

SATURDAY, 28th APRIL, 1973

8.30 a.m. - 9.00 a.m. — REGISTRATION in Foyer of the Geology Building
The University of Newcastle.

Morning Technical Session:

Science Lecture Theatre HO1
(at the rear of the Chemistry Building)
The University of Newcastle
Chairman: Professor B. Nashar
The University of Newcastle.

9.00 a.m. - 9.05 a.m. — Opening of the Eighth Newcastle Symposium.

9.05 a.m. - 9.50 a.m. — LOW GRADE METAMORPHISM IN CARBONIFEROUS ROCKS NORTH OF NEWCASTLE
R. Offler
The University of Newcastle.

9.50 a.m. - 10.35 a.m. — PHYTOCLAST REFLECTANCE IN LOW GRADE METAMORPHIC ROCKS OF THE CARBONIFEROUS NORTH OF NEWCASTLE
C. F. K. Diessel
The University of Newcastle.

10.35 a.m. - 11.05 a.m. — Morning Tea in Foyer of the Geology Building.

11.05 a.m. - 11.50 a.m. — STRUCTURE - THICKNESS RELATIONSHIP IN THE MOON ISLAND BEACH SUB-GROUP, NEWCASTLE COAL MEASURES, N.S.W.
K. R. Johnson
The University of New South Wales.

11.50 a.m. - 12.35 p.m. — A SEDIMENTOLOGICAL APPRAISAL OF THE WIANAMATTA GROUP
C. Herbert
Geological Survey of New South Wales.

12.35 p.m. - 12.40 p.m. — Summary and vote of thanks by chairman.

12.40 p.m. - 2.00 p.m. — Lunch at the University Union (due east of the Science Lecture Theatre).

Afternoon Technical Session:

Science Lecture Theatre HO1
(at the rear of the Chemistry Building)
The University of Newcastle
Chairman: Mr. G. T. Harman
Superintending Coal Geologist
Broken Hill Proprietary Co. Ltd.
Newcastle.

2.00 p.m. - 2.45 p.m. — THE APPROACHING GEOLOGICAL RESOURCES CRISIS IN THE SYDNEY BASIN
C. L. Adamson
Prospecting Services Pty. Ltd.

2.45 p.m. - 3.30 p.m. — THE PERMIAN-MESOZOIC SUCCESSION OF THE MERRYGOEN- NIELREX -DIGILAH AREA, NORTH-WEST SYDNEY BASIN
F. C. Loughnan, M. L. Higgins and P. Arditto.
The University of New South Wales.

3.30 p.m. - 4.00 p.m. — Afternoon Tea in Foyer of the Geology Building.

4.00 p.m. - 4.40 p.m. — ORIGIN OF PUMICE ALONG THE SYDNEY COASTLINE
G. S. Gibbons and J. L. Gordon
N.S.W. Institute of Technology.

4.40 p.m. - 5.20 p.m. — A SKIN PROBLEM ON COLD SHOULDERS?
D. F. Branagan
The University of Sydney.

5.20 p.m. - 5.25 p.m. — Summary and vote of thanks by the Chairman.

7.00 p.m. for 7.30 p.m. — Sherry followed by Symposium Dinner in the University Union (Location: 230 m N47°E of Geology Building).

SUNDAY, 29th APRIL, 1973

The technical sessions will take the form of seminars on some of the topics mentioned in a previous circular. All seminars will be held in the Geology Building.

9.30 a.m. - 10.40 a.m. — ASPECTS OF CARBONIFEROUS AND PERMIAN BIOSTRATIGRAPHY IN THE SYDNEY BASIN AND ITS NORTHERN MARGIN

Chairman: Mr. B. A. Engel
The University of Newcastle
Room 111, Geology III Laboratory.

9.30 a.m. - 10.40 a.m. — IGNEOUS ROCKS WITHIN AND AROUND THE SYDNEY BASIN

Chairman: Professor B. Nashar
The University of Newcastle
Room 109, Geology II Laboratory.

9.30 a.m. - 10.40 a.m. — RELATIONSHIPS BETWEEN COAL RANK AND OIL OCCURRENCES, AND THEIR APPLICATION TO THE SYDNEY BASIN

Chairman: Associate Professor C. F. K. Diessel

The University of Newcastle
Room 101, Geology I Laboratory.

10.40 a.m. - 11.00 a.m. — Morning Tea in Foyer of the Geology Building.

11.00 a.m. - 12.45 p.m. — ASPECTS OF CARBONIFEROUS AND PERMIAN BIOSTRATIGRAPHY IN THE SYDNEY BASIN AND ITS NORTHERN MARGIN

(Continued in Room 111, Geology III Laboratory).

11.00 a.m. - 12.45 p.m. — SYDNEY BASIN PALAEOENVIRONMENTS INCLUDING GEOLOGICAL SETTING OF COALFIELDS

Chairman: Associate Professor F. C. Loughnan
The University of New South Wales.

12.45 p.m. - 2.00 p.m. — Farewell Luncheon in the University Union.

LOW GRADE METAMORPHISM IN CARBONIFEROUS ROCKS NORTH OF NEWCASTLE

R. OFFLER
The University of Newcastle

Preliminary microscopic and X-ray studies of the Carboniferous sediments, lavas, tuffs and plutonic rocks, north of Newcastle, indicate that these rocks have undergone extensive metamorphic alteration.

The minerals formed during this alteration appear in fractures, as cements and as replacement products of the original detrital and primary igneous minerals.

Certain of these minerals have been used to delineate four successive zones of alteration. In order of increasing grade they are the heulandite — clinoptilolite zone; laumontite zone; prehnite-pumpellyite zone and actinolite zone. These zones trend in a north-north-westerly direction and cross stratigraphic boundaries. Their formation is thought to be due to heat from a deep seated magmatic source.

The metamorphism appears to post date the intrusion of the Barrington Granodiorite (270 x 10^6 years) since metamorphic alteration products have been observed in specimens from this body.

PHYTOCLAST REFLECTANCE IN LOW GRADE METAMORPHIC ROCKS OF THE CARBONIFEROUS NORTH OF NEWCASTLE

C. F. K. DIESSEL
The University of Newcastle

Microscopic studies of dispersed organic matter in sediments (phytoclasts) have gained an increasing importance for the solution of a number of geological problems, both of an academic and applied nature. In most such studies the scope of the investigations has been restricted to diagenetically immature rocks in which the rank of the associated organic matter rarely exceeds the bituminous coal stage.

In this address preliminary results of reflectance measurements are presented that have been obtained from phytoclasts contained in the low grade metamorphic rocks discussed by the previous speaker; (see abstract by R. Offler: Low Grade Metamorphism in Carboniferous Rocks north of Newcastle.) The majority of the meta-sediments studied were of marine origin, supplemented by some of the thin, paralic coal seams that occur sporadically in Middle and Upper Carboniferous rocks. Apart from the coal, high concentrations of organic matter, together with large quantities of framboidal pyrite are commonly found in the mudstones of the Burindi Facies.

Because of the small size of the phytoclasts high microscope magnifications are necessary. In the present study the reflectance measurements were carried out with a Carl Zeiss MPM — Photometer mounted on a Zeiss Photomicroscope. Commonly a magnification of 800 x has been used, the area actually measured being 2.5 microns in diameter. The measurements have been carried out in monochromatic, plane-polarised light of 546 nm wave length. For calibration purposes several glass standards plus a clean cleavage block of silicon carbide have been used. The samples came from recently made cuttings and other outcrops, and per sample about 30 readings of minimum and maximum reflectance values were taken.

The results are displayed in diagrams and maps. Mean maximum reflectances (per sample, in oil) range from 0.48% to 6.14%, the high values being concentrated in a NW-striking belt between Monkerai and Gloucester Tops. There is good agreement between phytoclast reflectance and the metamorphic zones determined by R. Offler.

STRUCTURE-THICKNESS RELATIONSHIPS IN THE MOON ISLAND BEACH SUB-GROUP, NEWCASTLE COAL MEASURES, NEW SOUTH WALES

K. R. JOHNSON
The University of New South Wales

In the Macquarie Syncline and a number of other areas of the Sydney Basin there is an apparent relationship between the thickness of some formations and the present-day structure of the Basin. Trend-surface analysis of borehole information has been used to quantitatively analyse both the structure and thickness data into regional and local components.

The structure of the Macquarie Syncline may be resolved into two simple regional components: one, a planar homoclinal component dipping to the southeast, and the other a synclinal component striking northnortheast. Local structural components isolated as residuals from the structure trend-surfaces correspond with prominent ridges and depressions along, and adjacent to, the Macquarie Syncline.

The thickness data for fourteen consecutive units in the Moon Island Beach Sub-group when analysed into their regional and local components yield results which may be grouped according to the lithology and geographic extent of each formation. The widespread coals reveal a planar increase in thickness to the northeast with superimposed antiform thickness trends with axes striking northnortheast and coinciding with the synclinal component of the Macquarie Syncline. Similar results are obtained for the fine clastic horizons. Linear correlation between the structure residuals and the thickness residuals also shows a statistically significant inverse correlation at a local scale. The conglomerate and sandstone formations do not always show consistent regional or local patterns of thickness variation.

These results indicate that the present structure, apart from the homoclinal dip, is a simple intensification of a persistent basement subsidence pattern which prevailed during the late Permian. The degree to which the thickness variations reflect the tectonic subsidence is governed by the rate of accumulation of particular lithologies. Slowly accumulating coal seams best reflect the tectonic subsidence geometry, while conglomerates were only slightly influenced by tectonic subsidence. Compactional subsidence of the substrata was probably more important in determining the geometry of the coarse clastic formatons.

A SEDIMENTOLOGICAL APPRAISAL OF THE WIANAMATTA GROUP*

C. HERBERT
Geological Survey of New South Wales

The Middle Triassic Wianamatta Group comprises over 300 m of interbedded shale and minor sandstone and is the highest stratigraphic unit preserved in the Sydney Basin.

Nomenclature

As outlined in Herbert (1970), there were difficulties in reconsiling new stratigraphic information with the formal nomenclature as erected by Lovering (1954). These difficulties have been confirmed during a recent diamond drilling programme by the N.S.W. Department of Mines involving ten fully cored holes. Virtually the only unit which can be retained in its originally intended form is the basal Ashfield Shale. The overlying Minchinbury Sandstone has some problems in definition but is recognizable as a very persistent unit. Other sandstone units such as Potts Hill Sandstone and the Razorback Sandstone are not traceable beyond their immediate type areas and can therefore not be used as reliable boundary formations for divisions between other units such as the Camden and Liverpool Sub-groups. As a consequence all strata above the Minchinbury Sandstone will be regarded as the Bringelly Shale with prominent sandstone units as members.

Stratigraphy

The generalized stratigraphy as accepted herein is outlined below:—

Wianamatta Group

Bringelly Shale 260 m — Interbedded carbonaceous and non-carbonceous shale, laminites and channel sandstones with sporadic minor coal developed towards the the base.

Minchinbury Sandstone — 0-6m — Fine to medium grained lithic sandstone.

Ashfield Shale 45-60 m — Black siltstone grading upwards to a fine sandstone-siltstone laminite.

Hawkesbury Sandstone

Palaeoenvironment

No significant sedimentary breaks are present throughout the sequence, therefore, it is assumed that the Wianamatta Group was deposited essentially by a single progression of sedimentary environments over the area. Basically the Wianamatta Group represents a progression of marine to terrestrial environments from the base towards the top, becoming generally more sandy upwards.

The Ashfield Shale is a shallow marine, black siltstone which grades upwards into laminated fine sandstone with invertebrate burrows and ripple marks. The overlying Minchinbury Sandstone with low angle crossbedding represents a beach and barrier bar complex protecting an intertidal lagoon consisting of a laminite sequence over 6 m thick with invertebrate burrows, desiccation cracks and ripples. This lagoonal laminite sequence is represented by the basal part of the Bringelly Shale which then grades upwards into closely interbedded intertidal lagoon laminites and marsh carbonaceous claystones with abundant fossil roots and sporadic coaly development.

Higher in the Bringelly Shale, interbedded carbonaceous and "leached" light grey claystone with ubiquitous fossil roots become more common. This alteration between light and dark coloured claystone is possibly a form of incipient soil development in a swampy environment. Laminites, now less significant volumetrically, lack signs of burrowing and instead have thick carbonaceous root stringers and disturbed bedding. These laminites are generally interpreted to be stream and tidal creek levees. Common crossbedded sandstone channels up to 20 m thick, have erosive contacts with the surrounding sediments and are interpreted as fluvial and estuarine channels.

An overall picture of a regressive, linear clastic shoreline becomes apparent by a detailed comparison with known modern sedimentary environments. The Wianamatta Group, therefore, from the base up shows a gradation between four main environments: offshore marine shelf; beach and barrier island; lagoonal and tidal flat complex; fluviatile coastal plain.

References

HERBERT, C., 1970: The sedimentology and palaeoenvironment of the Triassic Wianamatta Group sandstones, Sydney Basin. Rec. geol. Surv. N.S.W. 12 (1), 29-44.

LOVERING, J. F., 1954: The stratigraphy of the Wianamatta Group, Triassic System, Sydney Basin. Rec. Aust. Mus. 23 (4), 169-210.

* Published with the permission of the Under Secretary, Department of Mines, New South Wales.

THE APPROACHING GEOLOGICAL RESOURCES CRISIS IN THE SYDNEY BASIN

C. L. ADAMSON
Prospecting Services Pty. Ltd.

The Sydney Basin is a unique region in many ways. The basis of this uniqueness is the geology.

Geology is the basis of the interesting physiography and scenery. Geology is the basis of much of the heavy industry, which helps support the largest concentration of population in Australia. As a result of the large population and the geological conditions the Sydney Basin is the most important geological resources producing province, both in value and tonnage, of its size in Australia. The region contains one of the most concentrated facilities for outdoor recreation in Australia. More present and proposed National Parks and reserves of various types exist within the Basin than in any comparable area in Australia. More domestic and industrial water supplies, both surface and subsurface, are stored here than anywhere else.

Expanding population generates increasing demands for land for a great variety of uses. Expanding population creates great demands for geological resources.

Conflicts between mineral exploitation and other demands already exist and these conflicts will intensify.

Major fields of conflict in the future will exist in two main sections of the geological resources industry. These are coal and construction materials. Lesser conflicts will develop in other spheres.

Vast reserves of coal exist in the deeper parts of the Sydney Basin in areas committed to population growth, National Parks, and other reserves.

The central parts of the Basin will have its accessible resources of hard rock and sand exhausted in the relatively near future. Ceramic products will become more important and although vast reserves of shale exist, determined efforts must be made to assure these for future use.

Sandstone will become a more important material in its own right and as a source of sand. Reserves are very large, but accessible reserves must be established.

Research is needed in utilisation of the abundant materials close to markets, otherwise problems and cost of transporting large volume low cost materials will become a burden on the community.

Research is also required into use of the waste materials of the mining industry. The ideal mining operation of the future should produce no waste, if the location is adjacent to a large population.

Some very unpalatable policy decisions regarding zoning and planning need to be made in the present, if confusion and waste of resources is to be avoided in the future.

THE PERMIAN-MESOZOIC SUCCESSION OF THE MERRYGOEN-NIELREX-DIGILAH AREA, NORTH WEST SYDNEY BASIN

F. C. LOUGHNAN, M. L. HIGGINS and P. ARDITTO
The University of New South Wales

The Merrygoen-Nielrex-Digilah area is located on a structural high that separates the Sydney Basin from the Great Artesian Basin and in consequence, the stratigraphic succession is relatively thin. The sedimentation, which is essentially fluvial, prevailed from Upper Permian through to Middle Jurassic times but, whereas the Permian and Triassic units thicken to the east and southeast, those of the Jurassic show a reverse trend, increasing in development to the west and northwest.

The Permian Dunedoo Formation, which is virtually restricted in outcrop to the precincts of the various basement inliers, ranges up to 50 feet in thickness and consists of conglomerates, porcellanites, sandstones and sandy shales with thin lenticular beds of flint clay, carbonaceous shale and impure coal. It is succeeded by the Boulderwood Conglomerate, which is one of the key horizons and apparently represents the westerly extension of the basal conglomerates of the Narrabeen Wollar Sandstone. The Wallingarah Creek Formation, overlying the Boulderwood, has a thickness in excess of 100 feet and consists of a variable sequence of ferruginous shales, sandstones and conglomerates with numerous lenticular beds of clay-ironstone. Thin beds of dense and pelletal flint clay, the latter frequently coloured green due to the presence of chromium in the lattice of the kaolinite, occur in places. The presence of **Dichroidium** in some of the dense flint clays confirms the age as Triassic.

The Ukebung Creek Claystone, the lower most unit of the Jurassic, conformably overlies the Wallingarah Creek Formation. It varies in thickness up to 35 feet and consists of a succession of fine to coarse-grained, pelletal flint clays with minor amounts of kaolinitic sandstone and shale, clay-ironstone and infrequent thin beds of impure coal. In places the flint clays contain abundant, disseminated hematite and have the composition and appearance of the "chocolate shales" of the Bald Hill Claystone. The Doona Sandstone Member located at the top of the formation, is light-coloured, medium-grained and composed of angular quartz grains and rounded pellets of flint clay set in a matrix of well-ordered kaolinite. It is characterised by ripple marks, worm trails, plant stems and rootlet remains and because of the tendency to form prominent ledges, it has proven very useful as a marker horizon.

The Doona Sandstone Member is succeeded by the Digilah Formation which has a thickness of approximately 50 feet and consists of blue-grey, kaolinite shales and lenticular clay-ironstones near the base but these pass upwards into micaceous shales and siltstones and fine-grained quartzose sandstones. Thin tonstein-like bands composed essentially of kaolinite with gorceixite-goyazite and minor amounts of quartz occur within the blue-grey shales near the base of the formation. **Thinnfeldia Talbragarensis** is present in some of the ferruginous shales indicating a lower Jurassic age for the sediments.

The tree-studded Pilliga Sandstone is the youngest formation of the Mesozoic in the area. It is composed of cross-bedded, quartzose sandstones and conglomerates with minor amounts of siltstone and shale and, because of its greater resistance to erosion, tends to form low plateaux.

The Boulderwood conglomerate and Wallingarah Creek Formation are equivalent to the "Lower Merrygoen Beds" of Kenny and the Ukebung Creek Claystones and Digilah Formation to the "Upper Merrygoen Beds."

"ORIGIN OF PUMICE ALONG SYDNEY COASTLINE."

G. S. GIBBONS and J. L. GORDON
The N.S.W. Institute of Technology

On the beaches of the Sydney coastline are many deposits of pumice. Some deposits are scattered, some are bedded in the dunes and some follow old strand lines parallel with the beach.

It is "conventional wisdom" that this pumice originated from the New Zealand volcanic centres and drifted across the Tasman Sea to its present location.

Examination of the local material was followed by comparison of its chemical and physical properties with New Zealand material. The conditions under which drifting might have occurred has been investigated by examining weather patterns on the west coast of New Zealand and the east coast of N.S.W., and the current-drift pattern in the Tasman Sea.

An important conclusion is that the rate of drift and amount of material deposited was probably controlled to a substantial degree by its permeability as well as its porosity.

A SKIN PROBLEM ON COLD SHOULDERS?

D. F. BRANAGAN
The University of Sydney

A widespread phenomenon developed on the plateau surfaces of the Sydney Basin, (and also elsewhere in the state) is a series of apparently isolated 'patches' of patterned ground varying in size from a few square metres to perhaps two hectares. A brief outline of known occurrences was given at the November 1970 meeting of the Specialist Group in Sedimentology (G.S.A. Inc.) Since then many more occurrences have been located and several studied in some detail.

The patterning consists essentially of polygonal cracks in sandstone extending perhaps 20 cms. into the rock surface, and there is clearly a relationship between rock grainsize and size of polygons — finer sandstones being marked by smaller and usually more regular patterns.

The phenomenon has been recognised on the Blue Mountains, Woronora and Hornsby plateaux and is developed on both Triassic and Permian sandstones in these areas. A similar phenomenon is reported from the Sassafras plateau west of Milton, and I have recently noted it in the Manilla area of New England where it is developed (though rather poorly) in coarse Devonian greywackes. It also occurs in Tasmania and has been reported from several overseas locations.

The areas of patterning in the Sydney region seem to be within undulations or on the shoulders of broad valleys close to the general plateau level. Occasionally, as at Northbridge and Clifton Gardens, the patterning is observed only on the curved sides of relatively steep valleys. In general the boundaries of the patterned ground areas are gradational — the cracking dying out laterally (on the nearly horizontal surfaces) and vertically (on the sloping sides) so that a 'normal' sandstone surface appearance with occasional deeply penetrating joints is presented. The pattern is, I believe a shrinkage phenomenon.

The mode of formation tentatively presented for the pattern described at one locality in Ku-rin-gai [Branagan (1969)] that of igneous intrusion and consequent contact effects must be rejected.

The widespread character of the patterning and its regional relation to the present landscape suggests a genetic relationship. The tendency for the patterning to occur within the broad 'valleys' below the general plateau levels makes it tempting to link the polygon formation with the formation of valleys prior to uplift (? in Pliocene) of the Plateaux.

However I believe it likely that the patterning is a more recent phenomenon. In terms of climate the glacial intervals within the Pleistocene could have supplied ideal conditions for freeze/thaw alternation and the relatively sheltered hollows and shoulders on the plateaux perhaps proved the most suitable places for such patterns to develop.

Slides, maps and cross-sections will be used to describe this interesting phenomenon and possibly explain it.

Reference: Branagan, D. F. (1969) A tesselated sandstone platform, Ku-rin-gai Chase, N.S.W. J. Proc. Roy. Soc., N.S.W. Vol. 101 1968 Pts. 3 and 4.

ANNOTATIONS ON SUNDAY SEMINARS

9.30 a.m. - 10.40 a.m. — ASPECTS OF CARBONIFEROUS AND PERMIAN BIOSTRATIGRAPHY IN THE SYDNEY BASIN AND ITS NORTHERN MARGIN.
Chairman: Mr. B. A. Engel, The University of Newcastle, Room 111, Geology III Laboratory.

Current field work in previously unmapped portions of the Carboniferous of the Hunter Valley and north of Newcastle have extended our knowledge of the distribution of late Palaeozoic fossil assemblages in the area. It is the intention of the seminar to define the picture that has emerged and discuss its palaeo-geographic and stratigraphic implications.

9.30 a.m. - 10.40 a.m. — IGNEOUS ROCKS WITHIN AND AROUND THE SYDNEY BASIN.
Chairman: Professor B. Nashar, The University of Newcastle, Room 109, Geology II Laboratory.

The Sydney Basin contains a large variety of igneous rocks ranging in age from Carbinferous to Tertiary. They occur in the form of extrusions, stocks, dykes, sills and batholiths. These rocks are of both scientific and economic interest the latter being demonstrated by the numerous quarries that provide the communities in the Sydney Basin with road metal, aggregate, railway ballast and industrial stones. The seminar is intended to bring together people with a common interest in igneous rocks.

9.30 a.m. - 10.40 a.m. — RELATIONSHIPS BETWEEN COAL RANK AND OIL OCCURRENCES, AND THEIR APPLICATION TO THE SYDNEY BASIN.
Chairman: Associate Professor C. F. K. Diessel, The University of Newcastle, Room 101, Geology I Laboratory.

Ever since D. White's Carbon Ratio Theory was published oil exploration has gained a great deal from coalification studies, particularly, in defining the "hydrocarbon deadline" below which oil is unlikely to occur. The development of accurate photometric methods has given a great boost to the application of coal petrography to oil exploration. Current trend results and their implications, concerning the prospects for finding oil in the Sydney Basin are to be discussed.

11.00 a.m. - 12.45 p.m. — SYDNEY BASIN PALAEOENVIRONMENTS INCLUDING GEOLOGICAL SETTING OF COALFIELDS.
Chairman: Associate Professor F. C. Loughnan, The University of New South Wales.

The filling of the Sydney Basin with the various and occasionally quite contrasting sediments is the result of a delicate interplay of many environmental factors, such as basin configuration, climate topographic relief differences between hinterland and depositional sites, dispersal patterns, delta locations etc. These features are topics to be discussed.